SECTION 18 FIMBRIATAE

The 5 species of this section are characterized by cordate or ovate leaves, calyx much inflated, ovate-campanulate, greenish, 10-20-nerved, and petals laciniately multipartite. The 5 species fall in two groups - (1) S.multifida, S.schizopetala, S.physalodes and S.lacera; (2) S.campanulata. The species of the first group occur in Turkey, Syria, Iran and Southern Russia, and are characterized by cordate leaves, flowers many, usually in a dichasial cyme. S.campanulata comes from America, and has ovate or ovate-lanceolate leaves, flowers solitary or few, and subnodding.

Key to the Oriental species.

Calyx 20-nerved; capsule 3 times as long as anthophore
.....57. S.multifida

Calyx 10-nerved; capsule as long as anthophore or subsessile:
Calyx teeth obtuse; capsule ovate, as long as anthophore
.....58. S.physalodes

Calyx teeth acute; capsule ovate-globose, subsessile
.....59. S.schizopetala

57. S.multifida (Adams)Rohrb., Monogr.Sil., 88 (1868); Boiss., Fl.Or., i, 629 (1867)[S.fimbriata]- Bot.Mag., xxiii, t.908(1806); Loudon, Lad.Fl.Gard.Ornam., i, t.25.fig.8 (1843).

Syn. Lychnis Behen Buxb., Pl.Cent., iii, 31 (1735)
Cucubalus fimbriatus Gueldenst., Reise, ii, 24 (1791) nomen nud.

EX BIBL UNIV EDINBURGEN

Cucubalus multifidus Adams in Weber et Mohr,Beitr.,i, 57 (1805)

Cucubalus fimbriatus Bieb.,Fl.Taur-Cauc.,i,333(1808)

Viscago fimbriata Hornem.,Hort.Hafn.,i,409(1813)

Tall perennial from a deep-seated tap root.Stem erect or ascending-erect,90.0-150.0 cm. tall,leafy,striate,fistulose, usually simple below,becoming branched in the region of inflorescence, sparingly or densely puberulent throughout,sometimes more or less hirsute,usually becoming glandular above.Lower leaves petiolate, broadly ovate with cordate base,more or less attenuated into petiole;middle ones 5.2-14.0 cm.long,2.5-8.8 cm.wide,ovate with somewhat cordate base,sessile or subsessile;upper ones ovate-lanceolate;all leaves 3-5-nerved,acute to acuminate,margin more or less pilose,dorsal surface conspicuously hirsute,ventral one puberulent,seldom more or less hispidulous.Inflorescence a compound dichasial cyme,lax.Bracts and bracteoles unequal,like the cauline leaves,with the pedicel glandular-puberulent and more or less hirsute.Pedicels 5.0-20.0 cm.long,erect or ascending. Flowers hermaphrodite,erect.Calyx 1.7-2.2 cm.long,7.0-8.5 mm. diam.,ovate-campanulate,inflated,greenish,membraneous,with 15-20 nerves,nerves reticulately anastomosed,hirsute and glandular-puberulent,base umbilicate;teeth 3.0-5.0 X 3.5-5.0 mm., broadly triangular,acute,with hyaline margin,apex ciliate.Petal white, 1.7-2.5 cm.long;claw 9.5-14.0 mm.long,exserted,smooth,expanded above,exauriculate or erose-denticulate;limb 7.5-11.0 X 5.0 -7.0 mm.,obovate-cuneate,multipartite,lobes linear,simple or branched; ligules two,minute,sometimes absent.Filaments exserted,smooth. Styles 3 (4-5),exserted,more or less thickened,hairy.Anthophore

3.0-4.0 mm.long,stout,smooth.Capsule 8.0-10.0 X 4.5-5.0 mm., ovoid,3 times as long as anthophore,included. Seed brown, 2.0-2.3 mm.long,with flat face and convex back,granulate.Ch.

Type - In Iberia [Caucasia]

TURKEY- Armenia (Pontus),Aigan dag above Hamskoei,20-7-1889, Sint.1347 ; between Bayburt & Trabzon,June 1834,Montb..Prov. Rize:Cimil,2000m.,Aug.1866,Bal.1421 .Lazistan,sine loco.Aucher493; Haldizan,2280m.,23-8-1933,Balls 586. Prov.Giresun:below Tamdere, 1600m.,9-8-1952,Davis 20633.Prov. Rize:dt.Hemsin,Ortakoy-Cat, 1700m.,2-9-1952,Davis 21304 .Prov.Hakkari:Cilo dag in Diz deresi, 1740m.,10-8-1954,Davis 24286;ibid. below Cilo yayla,2700m., 7-8-1954,Davis 23972.Prov.Van:dt.Satak,Kavussahap dag,1950m., 22-8-1954,Davis 23007.

Geogr. North East Turkey & Southern Caucasus

Habitat-Montains among stones;alt.-1600-2700m..Fl.-June-Sept.

A robust perennial plant without any significant variant.S.multifida differs from the other two Oriental species by its tall stature,calyx 15-20-nerved,petal usually exauriculate, multipartite,the ligules absent or minute,and capsule 3 times as long as anthophore

58. S.physalodes Boiss.,Diagn.Pl.Nov.Or.,Ser.1.viii,83 (1849); Boiss.,Fl.Or.,i,630 (1867);Rohrb.,Monogr.Sil., 88 (1868);Post,Fl.Syr.Pal.& Sinai,ed.2.i,184(1932).

Perennial. Stem erect,fistulose,terete,thick,leafy,simple below,becoming branched above,tomentose & more or less hirsute with septate crisp hairs.Leaves monomorphic,1.5-3.0 cm.long, 8.0-13.0 mm.wide,ovate acuminate,5-nerved at the base, pubescent & hirsute;lower leaves cordate at the base,attenuated into petiole;upper ones with cuneate or truncate base,sessile.

Inflorescence a compound dichasial cyme.Bracts and bracteoles -lower ones ovate-lanceolate acuminate,upper ones oblong-linear. Pedicels as long as calyx,erect,becoming deflexed in fruit. Flowers hermaphrodite,erect.Calyx 1.5-1.7 cm.long,4.5-6.0 mm. diam.,broadly cylindrical with umbilicate base,in fruit inflated & campanulate,membraneous,greenish,glandular-puberulent,with 10 reticulately anastomosed nerves;teeth subequal,4.5-6.0 X 4.0-5.5 mm.,broadly triangular,obtuse or nearly so,with hyaline margin, sparingly ciliate at the apex.Petal white,1.15-1.3 cm.long; claw 6.5-7.0 mm.long,smooth,expanded above;auricles acute,erose-denticulate or obscure,sometimes absent;limb 5.0-6.0 X 2.3-3.0 mm.,oblong,more or less cuneate towards the base,fringed into 4-6 linear,simple or branched lobes,often with two lateral outgrowths at the sides;ligules two,1.3-2.0 mm.long,oblong,fimbriate, Filaments exserted,smooth.Styles 3, exserted,hairy above. Anthophore smooth.Capsule ovoid as long as anthophore,included. Seed dark brown,2.8-3.5 mm.long,with flat face & covex back, granulate.Ch.

Type- In dumosis Palaestinae borealis circa Banias [holo.G.;iso.K'.]

Geogr. Endemic to N.Palestine and Antilebanon
Habitat- Thickets. Fl.- June

59. S.schizopetala Bornm. in Bull.Herb.Boiss.,vii,114 (1899); in Beih.Bot.Centrabl.,xxvii,114 (1911)

Perennial,sometimes behaves as biennial,30.0-45.0 cm. tall.Root slender,tapering,expanded into a short more or less thick caudex.Caudex 3.0-5.5 mm.long,3.0-4.0 mm.wide,erect,with

marcescent shreds of old petioles,usually simple.Stem erect, often arcuate at the base,terete,often striate,greenish,usually simple below,becoming branched in the region of inflorescence, hairy with somewhat deflexed hairs,becoming more or less glandular and conspicuously hirsute above;middle internodes 3.5-5.4 cm. long.Caudical and lower cauline leaves rosulate,petiolate, 15.0-20.5 cm.long,3.0-4.5 cm.wide,ovate acuminate;middle cauline leaves 10.5-15.0 cm.long,2.5-3.7 cm.wide,ovate,subsessile;upper ones ovate-lanceolate,acuminate;all leaves 3-5-nerved,thin,ventral surface glabrous or sparingly puberulent,dorsal surface puberulent & more or less hirsute,margin pilose.Inflorescence a compound dichasial cyme,lax.Bracts equal,ovate acuminate.Pedicels 6.0-25.0 mm.long,erect or ascending,in fruit more or less nodding. Flowers hermaphrodite,erect.Calyx 1.5-1.9 cm.long,6.0-7.5 mm. diam.,ovate-campanulate,greenish,membraneous,glandular-puberulent & more or less hirsute,with 10 reticulately anastomosed nerves, in fruit much inflated with more or less contracted orific;teeth 4.0-5.3 X 2.5- 3.7 mm.,triangular,acute,with hyaline margin, ciliate at the apex.Petal white,2.0-2.3 cm.long;claw 1.3-1.5 cm.long,exserted,smooth,expanded above,acutely auriculate;limb 7.0-8.0 X 3.0-4.3 mm.,obovate-cuneate,multipartite,lobes linear simple or cleft;ligules two,2.0-3.3 mm.long,obling,fimbriate. Filaments exserted,smooth.Styles 3,more or less exserted,hairy. Anthophore 1.5-2.0 mm.long,stout,smooth.Capsule 7.0-9.5 X 8.0-9.0 mm.,ovoid-globose,subsessile,included.Seed brown,2.3-2.5 mm.long, with flat face & grooved back,tuberculate.Ch.

Type- Assyria Orientalis (Kurdistania):Erbil,Dschebel-Sefin,in faucibus sub-alpinis supra pagum Schaklava;1600m.s.m.

Bornm.951 [holo.B.]

IRAQ- Bakirma,1200m.,9-5-1947,Rawi 8575

Geogr. Endemic to Iraq.

Habitat- Subalpine ;alt.-1200-1600m..Fl.- May

S.schizopetala is closely related to S.physalodes Boiss. in the general appearance of the plant,including leaf shape, structure & shape of the calyx,and the deflexed fruiting pedicel. But it differs from the latter by the indumentum,calyx teeth, and petal with the acutely auriculate claw, and lamina multipartite. It differs from S.multifida (Adams)Rohrb. by the habit,leaf shape,number of calyx nerves,narrow and acutely auriculate claw, oblong laciniate ligules,and the relative length of the capsule and anthophore.

SECTION 19 INFLATAE

The species of this section are provided with a slender, woody,naked caudex bearing several stems.The plants are perennial,of medium size and glabrous.The stem is leafy and branched above.Caudical leaves are usually small and middle and upper cauline ones large and conspicuous.The flowers are large,erect or subnodding with inflated calyces.

The species fall into 2 subsections on the basis,primarily, of shape of calyx and petal and,secondarily,of habit of plant and indumentum.

Subsection Latifoliae contains 11 species from the Mediterranean region,mainly from the eastern countries,and are characterized by the tall habit and large,conspicuous cauline leaves.

Subsection Procumbentes contains only one species from the Caucasus and Siberia,and has a prostrate habit,linear-lanceolate leaves and emarginate petal;moreover the plant is puberulent & more or less hirsute.

Key to the subsections and Oriental species.

1a. Petal deeply bipartite,usually ligulate;plants erect or ascending,glabrous and glaucescent;calyx always glabrous 19A.Subsection.Latifolia

2a. Calyx 15-20-nerved;leaves ovate,ovate-lanceolate or elliptical-lanceolate,with rounded or cordate base:

3a. Calyx ovate-campanulate,umbilicate,much inflated, with orific wide open;capsule ovoid-globose, 3-4 times as long as anthophore;calyx teeth

ovate-triangular acute

.....60.S.Cucubalus

3b. Calyx ovate-oblong,truncate,semi-inflated with more or less contracted orific;capsule ovoid, 5-7 times as long as anthophore;calyx teeth triangular ,obtuse.....61.S.Czerei

2b. Calyx 10-nerved;leaves obovate or elliptical-lanceolate,more or less fleshy.Calyx campanulate, truncate,with lanceolate acute teeth

..... 62.S.Fabaria

1a. Petal emarginate,eligulate;plant procumbent,puberulent; calyx more or less hirsute

.....19B.Subsection.Procumbentes

SUBSECTION 19A LATIFOLIAE

60. S.Cucubalus Wibel,Prim.Fl.Werth.,241.(1799);Boiss.,Fl.Or.,i,628 (1867);Rohrb.,Monogr.Sil.,84(1868)-Reichb.,Ic.Fl.Germ. Helv.,vi,t.299.fig.5120(1844);Moss,Cambr.Brit.Fl., t.79(1920);Hegi,Ill.Fl.Mittel-Eur.,iii,t.99.Fig.2(1910

Syn.

Cucubalus Behen Linn.,Sp.Pl.,1.414(1753),non Silene Behen Linn.,Sp.Pl.,1.418(1753)

Cucubalus latifolius Mill.,Gard.Dict.,8.No.2(1768);non Poir. (1789)

Cucubalus angustifolius Mill.,Gard.Dict.,8.No.3(1768);non Poir. (1789)

Cucubalus Behen Mill.,Gard.Dict.,8.No.4(1768);nonS.Behen

Lychnis Behen Scop.,Fl.Carn.,2.i,305(1772)

Cucubalus venosus Gilib.,Fl.Lithuan.,ii,165(1781)-nom. illigit.

Behen vulgaris Moench,Metod.,709(1794)-nom.illigit.

Cucubalus inflatus Salisb.,Prodr.,302(1796)-nom.illigit.

Silene Cucubalus Wibel,Prim.Fl.Werth.,241(1799)

Silene inflata (Salisb.)Sm.,Fl.Brit.,467(1800)-nom.illigit.

Viscago Behen Hornem.,Hort.Hafn.,409(1813)

Silene vesicaria Schrad.ex Reichb.,Fl.Germ.Exc.,823(1832)

S.Behen Wirzen,Enum.Pl.Offic.Fenn.,36(1837);non Linn.(1753)

S.crispata Stev. in Bull.Soc.Nat.Mosc.,xxix.i,315(1856)

S.Wallichiana Klotzsch,Bot.Ergebn.Waldem.Riese,139(1862)

S.venosa (Gilib.)Auchers.,Fl.Prov.Brandenb.11.Fl.Berlin, 23 (1859);i,86 (1864).

Oncerum glabrum Dulac,Fl.Haut.Pyr.,258 (1867)

Behen vesicarius (Schrad.)Fourr.in Ann.Soc.Linn.Lyon N.S., xvi,343 (1868).

Silene vulgaris (Moench) Garcke,Fl.Deutschl.,9.64 (1869)-nom.illigit.

Behenantha inflata Schur in Verh.N.V.Bruun,xv.2,131(1877)

Silene Pseudo-Behen Schur ex Nym.,Consp.,88(1878);non

S.capsiriensis Jeanbernat & Timb-Lagr.in Trav.Soc.Phys. Nat.Toulouse,vii. (1886)?

S.latifolia (Mill.)Rendle & Britten,List Brit.Seed-pl., 5 (1907-;non Poir.(1789)

S.angustifolia Briquet,Prodr.Fl.Corse.,i,543 (1910);non Poir.(1789);non M.B.(1808)

Perennial,18.0-80.0 cm.tall,from a deep-seated woody tap-root. Root stout,sometimes fusiform,with a multicipital crown.Caudex 3.0-15.7 cm.long,2.0-7.5 mm.wide,slender,usually ascending,or

more or less prostrate,rarely stout & erect,usually branched, with marcescent shreds of old petioles.Stem erect,arcuately erect, sometimes ascending,usually simple below,becoming branched above, sometimes branched throughout,leafy,terete,glabrous and glaucescent;middle internodes 1.3-6.5 cm.long.Caudical & lower cauline leaves more or less crowded,petiolate,3.0-11.0 cm. long,5.0-40.0mm.wide,obovate,broadly oblanceolate or elliptical-lanceolate,sometimes narrowly lanceolate or oblanceolate,more or less attenuated into petiole,base with hyaline margin,apex obtuse, sometimes mucronate,margin cartiligenous,often serrate-ciliate or denticulate-ciliate;other cauline leaves sessile,4.0-9.5 cm.long, 5.0-35.0 mm.wide,lanceolate,elliptical-lanceolate or ovate-lanceolate,with round or cordate base,rarely base cuneate,acute to acuminate,margin cartiligenous,smooth;all leaves glabrous,often glaucous,1-nerved.Inflorescence a compound dichasial cyme,open & loose,rarely branches unequal then flowers are in subcorymbose cyme.Bracts equal,lanceolate or linear-lanceolate,acuminate; bracteoles scarious.Pedicels 4.0-37.0 mm.long,slender.Flowers dioecious- or monoecious-polygamous,more or less nodding at anthesis.Calyx 1.3-2.1 cm.long,7.0-10.0 mm.diam.,ovate-campanulate, membraneous,inflated,pale green to purplish or white,with 15-20 reticulately anastomosed greenish or pinkish nerves,umbilicate, teeth 2.2-3.5 X 2.0-5.0 mm., broadly triangular or ovate-triangular, acute,with hyaline smooth or finely ciliate margin.Petal 1.25-1.85 cm.long,white or livid;claw 1.0-1.35 cm.long,equaling calyx tube, smooth,expanded above;auricles various-acute,obtuse,round or erose-denticulate,sometimes true auricles lacking;limb 3.0-6.0 X 2.0-4.0 mm.,oblong-obovate ,deeply bipartite into oblong-cuneate

lobes,lobes essentially entire with round apex,rarely emarginate; ligules usually more than thickened outgrowths or lacking,rarely more or less conspicuous.Filaments usually exserted,smooth, sometimes with the styles purplish.Styles 3 (3-5),exserted, smooth.Anthophore 2.0-3.5 (4.0) mm.long,smooth,stout.Capsule 6.0-13.0 X 5.0-7.5 mm.,ovoid-globose,3-4 times as long as anthophore,included.Seed brownish,1.0-1.5 mm.long, with flat or more or less concave face & flat or convex back.Hp.or Ch.

This polymorphic species is variable in such characters as size & sometimes habit of the plant,size & shape of the leaves,number of flowers in the inflorescence,and size and colour of the calyx.Two well marked varieties can be distinguished from the typical form in the Oriental material, primarily on the basis of the petal colour and on the character of the leaf base.

Key to the varieties.

Cauline leaves linear-lanceolate,oblanceolate or ovate-lanceolate, with round or cuneate base;calyx globose at the base;seed warty papillose;plants of medium size:

Petal white ..... a. var. Cucubalus

Petal red or pinkish ..... b. var. rubra

Cauline leaves ovate-lanceolate,with cordate or subcordate base; calyx less globose at the base;seed with pointed papillae; plants robust ..... c.var.commutata

a. var. Cucubalus .

Syn. Silene inflata var.vulgaris Gaudin,Fl.Helv.,iii,162

(1828);Otth in DC.,Prodr.,i,368(1824).

S.Cucubalus var.typica Beck,Fl.Nieder-Oesterr.,38(1890)

S.venosa var.typica Halacsy,Consp.Fl.Gr.,i,160(1901)

S.inflata var.typica Rohlena in Silzb.Bohm.Ges.Wiss.,xvii,19 (1903)

S.vulgaris var.vulgaris Briq.,Prodr.Fl.Corse,i,545(1910); Hayek,Prodr.Fl.pen.Balc.,i,257(1927)

S.venosa var.vulgaris Graebn.& Sscherson,Syn.Mittel-Eur.Fl., v,2.66 (1929).

Stem erect or ascending at the base.Leaves 5.0-20.0 mm.wide,lanceolate to ovate-lanceolate.Calyx greenish or white with greenish or pinkish nerves.Petal white or livid.

Type- In Europae septentrionalioris pratis siccis.

TURKEY- Prov.Rize: dt.Ikizdere,Vercinin Tepe,3000m.,29-8-1952, Davis 21132 .Prov.Giresun:Balaban daglari,above Tamdere,2700m., 7-8-1952,Davis20571.Prov.Erzurum:Erzurum,Zohrab 149.Kurdistan, sine loco,a1840,Strang..Prov.Amasya:Amasya,Manissad.870.Prov. Ankara:Kecioran,20-5-1945,Kasap.;Ankara,20-5-1932,Kotte;ibid, Kecioren,20-5-1946 Kasap..Asia Minor,Payas,15-51933,Tufnell 24. Prov.Nigde:in Ortakoyarardi valley,1200m.,19-6-1952,Davis 19057. Prov.Maras:Mt.Bimgoell,at Gumgum,2940m.,23-8-1895,Ky.393;sine loco. Aucher 492.Mt.Taurus (Cilicia),a1838,Ky.69.Prov.Hatay: Nur daglari (Mt.Amanus) Kusliji dag,15-1950m.,Aug.1908,Harad.2524; Nur daglari,in vall. 600m.,July 1906,Harad.236;Nur daglari, 7-1200m.,July1911,Harad.3639.Prov.Bursa:Ulu dag,30-7-1945, Kasap..Kelkit,Koseyolu,23-6-1950,Atilla .

SYRIA- Homs,600m.,May 1910,Harad.3241;Mt.Nusairy Bahamra,15 miles E. of Ladikei,300m.,April 1909,Harad. 2881;Magdula,yr.1863-4, Lowne ;Damascus,Gaill.1615;ibid. Gaill.880.

LEBANON- Saida,1853,Bl.61; Beirut,Post .

PALESTINE- Sarona,1-20 m.,29-7-1910,AC.6106 ;Nablus,600m.,26-3-1911, AC.2106;Gaza,1883,Hart ;Rusayfah,Wadibed,700m.,17-4-1936,AC.12106 ; Bank of Jabbok river,500m.,2-5-1911,AC.G106; Ain Hesban,660m., 27-4-1911,AC.m106; Ul-Kajs,1350m.,9-5-1935,AC. 10106.

CYPRUS-Mt.Troodos,1650m.,6-5-1947,Mavrom.;Larnaca,25-4-1862, Ky.288; nr. Kyshraca,May 1880,Sint.& Rigo 997;Ayios Demetrianos Kythrea,180m.,6-4-1950,Chapm.172 ;Lisso,600m.,10-6-1913,Harad.835; between Apostolas Andreas & Chelones,30m.,21-2-1941,Davis 2290; Syrianolori,30-3-1935,Syngr.640; Mt. Troodos,between Olympus & Chinoistra,16-6-1939,Lind.;Chinoistra,1800m.,9-7-1940,Davis 1797; Limasol,April & May 1913,Harad.611;ibid. March 1901,Lascelles; Kyrenia,Tracey 11;Strouthkia,20-4-1934,Syngr.467; Chionistra, 1920m.,7-6-1937,Kennedy 352 ;Dt.Famagusta,Quratimni,60m.,15-12-1940, Davis 2054,Mt.Troodos,1500m.,10-6-1912,Harad.401

IKARIA (NIKARIA)- Hag Kyrikas,18-4-1934,Rechinger 4751

IRAN- Nr.Tehran,1500m.,May 1941,Trott.839;Mishon dag,Aug.1929, Gilliat-Smith 2606

AFGHANISTAN- Kurrum valley,Alikhel,2400-300m.,9-6-1879,Aitch.544; Khafiristhan,Griff.1652

Since the form known as var.angustifolia appears to be sporadic in the Oriental Countries,its validity as a significant variant is doubtful

b. var. rubra (Ram) Chowdhuri,comb. nov.

Syn. S.inflata var.rubra (Ram)Otth in DC.,Prodr.,i,368(1824)

S.inflata var.rubriflora Boiss.,Fl.Or.,i,629 (1867)

S.venosa var.colorata Beck in Glasnik Muz.Bosn.Hereeg., xix,16 (1907)

S.vulgaris var.rosea J.Bar in Bollet.Soc.Ticin.Sc.Nat., xi,178 (1915)

S.vulgaris var.rubriflora Schinz & Thellung in Ber.Schw. B.G.,xxiv/xxv,184 (1916)

Stem erect or ascending at the base.Leaves 3.0-15.0 mm. wide,linear-lanceolate to lanceolate.Calyx with reddish tinge. Petal pink or purplish.

Type- In Pyrenaeis et alpibus Bernensibus

PALESTINE- Jerusalem,880m.,30-4-1912,AC.106b

c. var. commutata (Guss.) Rohrb.,Monogr.Sil.,86(1868);Post,Fl.Syr. Pal. & Sinai,ed.2.i,184 (1932).

Syn. Silene Fabaria Pers.,Fl.Sic.,i,149(1826);non Sibth.& Sm. (1806);non Rohrb. (1868)

S. commutata Guss.,Fl.Sic.Prodr.,i,499(1824);non Schur(1858)

S.Fabaria Bertol.,Fl,It.,iv,627 (1839); non Sibth. + Sm. (1806).

S.inflata var.armena Koch in Linnaea,xv,712(1841)

S.inflata var.athoa Griseb.,Spic.Fl.Rum.Bith.,i,171(1843)

S.venosa var.commutata Gurke in Richter-Gurke Pl.Eur.,ii, 286 (1899)

S.angustifolia subsp.vulgaris var.commutata Briq.,Prodr.Fl. Corse,i,546(1910)

S.Cucubalus subsp. commutata(Guss.)Rechinger,Fl.Aeg., 165 (1943)

Stem tall,erect.Cauline leaves 1.8-5.4 cm.wide,broadly ovate-lanceolate,with cordate or subcordate base.Calyx greenish or white.Petal white or livid.

Type- In glareosis,et rupibus montosis;Busambra,Pizzuta,Favignana

TURKEY- Prov.Canakkale/ Balikesir:Kaz dag,nr.Kareikos,Sint.950. Prov.Kastamonu:Tosya at Kawak-cesme,21-5-1892,Sint. 3945;ibid. 17-6-1892,Sint.3945b. Prov.Amasya:Amasya,460m.,6-5-1889,Bornm.77. Prov.Gumusane: Gumusane,9-8-1889,Sint.1722.Prov.Bitlis:Tatvan Tug, 1800m.,29-6-1954,Davis 22313;Tatvan,1750m.,27-6-1954,Davis22183. Prov.Hakkari:Cilo dag,below Cilo yayla,2700m.,10-8-1954,Davis 24241.Prov.Van:dt.Satak,Kavussahap dag,2400m.,22-7-1954,Davis 23017.Prov.Ankara:Ela dag,14-7-1937,Kasap..Cilician Taurus, yr.1896,Siehe 454

PALESTINE-Petra in the Sik,17-4-1945,Davis 9313

Geogr.(of sp.) It is circumpolar in its distribution

Habitat (of sp.)- In fields,on rock ledges & in stony places; alt.-1-2700m..Fl.-March-Aug.

61. S.Czerei Baumg.,Enum.Strip.Transs.,iii,345 (1816)

Robust perennial,35.0-80.0 cm.tall.Root slender, woody,abruptly expanded into caudex. Caudex short,simple or 2-3-forked,covered with yellowish bases of old leaves,erect or arcuate.Stem erect,often arcuate at the base,usually simple below,branched from the middle above,sometimes branched throughout, leafy,terete,glabrous,greenish,often with glaucous bloom;middle internodes 4.3-6.7 cm.long. Caudical & lower cauline leaves rosulate,petiolate,5.0-10.0 cm.long,2.5-4.0 cm.wide,obovate- or ovate-spathulate,more or less attenuated into short petiole,apex obtuse or mucronate,base with hyaline serrate-ciliate margin;middle cauline leaves 3.5-10.7 cm.long,1.8-4.7 (6.0) cm.wide,ovate- or oblong-lanceolate,with cordate,sometimes ovate with round semi-amplexcule base,sessile,acute;upper ones ovate-lanceolate or lanceolate,with round base,acute;all leaves 1-nerved,glabrous,glaucescent,with cartiligenous margin. Inflorescence a compound dichasial cyme;branches of dichasium often unequal;sometimes main axis 2-3 times forkrd,with lateral branches more or less erect bearing flowers in corymbose cymes. Bracts equal,lanceolate or ovate-lanceolate,acuminate,lower ones foliaceous,upper ones scarious .Pedicels 9.0-30.0 mm.long, filiform,horizontal,spreading or more or less nodding at anthesis, becoming erect in fruit.Flowers hermaphrodite,more or less nodding.Calyx 1.1-1.3 cm.long,3.5-4.5 mm.diam.,elliptical-

or ovate-campanulate,sometimes ovate-oblong,greenish white, firm in texture,with 15-20 nerves,nerves anastomosed.base truncate, in fruit orific more or less contracted;teeth 1.5-2.3 X 1.8-2.5 mm.,widely triangular or triangular-ovate,with membraneous essentially glabrous margin,sometimes tips slightly ciliate. Petal white,1.4-1.8 cm.long;claw 9.0-1.5 mm.long,exserted,smooth; auricles obtuse or round;limb 4.0-6.5 X 1.8-2.5 mm.,oblong-obovate,bipartite almost to the base,lobes oblong-linear,more or less cuneate,entire often emarginate;ligules absent.Filaments exserted,smooth,often purplish.Styles 3, long,exserted,more or less curved and hairy at the apices.Anthophore 1.8-2.3 mm.long, smooth,thick.Capsule 9.0-12.0 X 5.4-6.5 mm.,ovoid,5-7 times as long as anthophore or subsessile,included,or slightly protruding calyx.Seed dark brown,0.6-1.5 mm.long,with sub-concave face & more or less convex back,papillose.Ch.

Key to the subspecies.

Caudical leaves obovate;cauline ones ovate or ovate-lanceolate or oblong-lanceolate;capsule 5-6 times as long as anthophore; seed 0.6-1.0 mm.long .....i.subsp.Czerei

Caudical leaves orbicular-spathulate;cauline ones ovate or ovate-oblong;capsule subsessile;seed 1.0-1.5 mm.long. .....ii.subsp.aeoniopsis

i. subsp. Czerei . Boiss.,Fl.Or.,i,629 (1867);Lindman in Act.Hort. Berg.,1.no.6.13 & 14,t.34 & 35 (1891)-Reichb., Ic.Fl.Germ.Helv.,vi,t.301.fig.5121 (1844).

Syn. Silene saponariifolia Reichb.,Fl.Germ.Exc.,824(1832); non Schott ex Rohrb. in O.B.Z., xix,71 (1869)

Cucubalus Czerei Steud.,Nomencl.,ed.2.i,451 (1840)

Silene Schottiana Schur,Enum.Pl.Transs.,103(1866)

S.Fabaria Rohrb.,Monogr.Sil.,81 (1868);non Sibth.& Sm. (1806);non Bertol (1839).

S.Fabaria var.Czerei Rohrb. in O.B.Z.,xix,268(1869).

Behenantha Czerei Schur in Verh.N.V.Bruun,xv,2(1876)

Caudical leaves 3.0-10.0 cm.long,2.5-4.0 cm.wide,ovate, ovate-lanceolate or oblong-lanceolate,base more or less narrowed,apex obtuse;cauline leaves 3.5-10.7 cm.long,1.8-4.7 cm.wide,ovate-lanceolate or oblong-lanceolate,with cordate base. Lateral cymules many-flowered corymb-like or umbellate.Calyx 1.1-1.3 cm.long;teeth ovate-triangular,apex ciliate.Lamina 4.0-6.5 X 1.8-2.5 mm.,conspicuously exserted.Capsule 5-6 times as long as anthophore.Seed 0.6-1.0 mm.long,with conspicuous papillae

Syntypes-Transylvania-in coll Albensi inferiore ibidem ad margines vinearum prope pagum Cz.Benedek primum lecta,postea autem ad vinearum sepes juxta Maros-Solymos et Ketskedaga ad coll Hunyadensem pertinentes a me observata., July-Aug.,Baumg.

TURKEY- North Antalya,sine loco.Aucher 492

ii. subsp. aeoniopsis (Bornm.) Chowdhuri,comb.et stat.nov.

Syn. S.aeoniopsis Bornm.in Fedde,Repert.Bieh.,lxxxix,112(1936)

Caudical leaves 4.9-9.0 cm.long,1.5-4.0 cm.wide,orbicular-spathulate,mucronate,base with hyaline margin,serrate-ciliate; cauline leaves 4.3-7.5 cm.long,1.7-5.0 cm.wide,ovate with cordate base,acute;upper ones lanceolate with round base.Cymules few-1-flowered,more or less remote.Calyx 1.1-1.2 cm.long;teeth ovate,obtuse,smooth.Petal more or less protruding calyx.Capsule 0.9-11.0 X 7.0-8.0 mm.,ovoid,subsessile.Seed 1.0-1.5 mm.long, with less pointed papillae

Type- Turkey-Prov.Ankara:Kalecik,in valley Keci-deresi,7-800m., 7-7-1929,Bornm.13884 [holo. B.,iso.K!,,BM!,]

Bornmuller described his S.aeoniopsis from material collected by himself from Ankara,[Bornm.13884],dated 7-7-1929 (but in literat. the year was written as 1932).Among the differential characters given are its biennial(monocarpic) habit and umbilicate calyx,but the authentic specimen shows that the calyx is truncate (especially in fruit),and has 20 reticulately anastomosed nerves.It resembles S.Czerei Baumg. in all essential characters except the leaves which are described above,and slightly smaller petals,and subsessile capsule.I have therefore treated it as a subspecies.

Geogr. Transylvania,Greece & Turkey

Habitat-(of sp.)- in valley;alt.-7-800m..Fl.-July

62. S.Fabaria (Linn.)Sibth. et.Sm.,Fl. Graecae Prodr.,i,293(1806); Boiss.,Fl.Or.,i,627 (1867);Hayek,Prodr.Fl.pen.Balc., i,256 (1927)-Sibth.& Sm.,Fl.Graecae,v,t.415(1825).

Syn. Cucubalus Fabarius Linn.,Sp.Pl.,ed.1.414(1753);non Sieb (1823);non Thore(1803)

Silene Fabaria Sibth.& Sm.,Fl.Gr,Prodr.,i,293(1806);non Persl(1826);nonBertol.(1839)

S.viscariifolia Lang et Szovits,Herb Ruth,no.84(1830); non Reichb.(1832)

S.Byzantina Castagne ex Boiss.,Fl.Or.,i,627 (1867)

Cucubalus macrophyllus Hort
Silene macrophylla Sprong.Herb.
S.fabaefolia Schott Herb
S.cephalonica Schimper et Wiest
} ex Rohrb.,Monogr.Sil., 81 (1868)

Viscago Fabaria Hornem,Hort.Hafn.,409(1813)

Silene Ionica Halacsy,Fl.Gr.,i,158 (1901)

Glabrous perennial,30.0-90.0 cm.tall,from a deep-seated woody taproot.Caudex 2.3-6.3 cm.long,3.0-4.3 mm.wide,erect or more or less curved,sparingly branched,often with marcescent shreds of old petioles.Stem erect or arcuately erect,terete, usually simple below,branched above,sometimes alternately branched from the base upwards,leafy,glaucescent;lower nodes more or less swollen;middle internodes 1.4-3.2 cm.long. Caudical and lower cauline leaves rosulate,3.0-6.5 cm.long, 0.8-2.0 cm.wide,obovate,attenuated at the base,base with hyaline margin,margin scabrous or sparingly,sometimes densely serrate-ciliate;other cauline leaves 1.6-6.0 cm.long,0.7-3.4

cm.wide,subsessile to sessile;lower ones like the caudical leaves;middle & upper leaves elliptical- or ovate-lanceolate, mucronate;all leaves more or less fleshy,1-nerved.Inflorescence a compound dichasial cyme;main axis often 1-3-korked,branches ascending bearing flowers in a corymb-like cyme.Bracts & bracteoles usually unequal,ovate to lanceolate,acuminate,with hyaline smooth or sparingly ciliate margin.Pedicels 5.0-24.0 mm.long, spreading or bent down at anthesis,becoming rigid and erect or arcuately erect in fruit. Calyx 1.15-1.3 cm.long,4.0-4.5 mm. diam., white with greenish or pinkish tinge,elliptical or ovate-campanulate,with 10 purplish anastomosed nerves,glabrous and glaucescent,in fruit ovate or oblong-ovate with constricted orific;teeth 1.5-2.0 X 1.3-1.8 mm.,broadly triangular,acute, with hyaline smooth or finely ciliate margin.Petal white or livid,1.4-1.6 cm.long;claw 9.5-10.5 mm.long,equaling calyx, smooth,expanded above;true auricles lacking or obscure;limb 4.5-5.5 X 3.5-4.0 mm.,obovate-cuneate,deeply bipartite;lobes oblong-linear,with round or emarginate apices;ligules two,0.3-0.7 mm.long,linear.Filaments exserted,smooth.Styles 3,exserted,hairy above.Anthophore 2.5-3.0 mm.long,massive,smooth.Capsule 7.0-10.0 X 4.0-8.0 mm.,ovoid or ovoid-globose,3-4 times as long as anthophore,included or slightly exserted.Seed brown,1.0-1.5 mm.long,with more or less concave face & convex back,granulate. Ch.or Hp.

Type- In Sicilia [holo.L'.]

TURKEY- Prov.Isparta:Olklatchi nr.Egirdir,1-6-1845,Heldr..Prov. Konya:Ermenek,13-6-1950,Atilla.Cilicia-Kagirak,yr.1896,Siehe187.

SAMOS IS.- Between Carlovasi & Dhrakaion,7-5-1940,Davis 1704 ; Hagios Konstantions,6-6-1934,Rechinger 3763;sine loco Forsyth 673

CYCLADES- Sudreas (nr.Keros),5-5-1934,Rechinger 5116

Geogr. Hungary,Rumania,Greece,Islands of Samos & Chios in the Turkish Archipelago & Turkey.

Habitat- In sandy & rocky places by sea side,sometimes saxatile on the limestone cliffs. Fl.- May & June

S.Fabaria is obviously most closely related to S.Czerei Baumg. with which it is often confused.Their relationship is demonstrated by the similarity of the inflorescence,and shape and size of calyx and petals.But it has some distinctive features by which it stands apart from the latter.These morphological characters are cited in a tabular comparison distinguishing S.Fabaria from S.Czerei & S.Cucubalus var.commutata (Tab. 4)

S.Fabaria is monomorphic,allowing for minor variations in size,and structure of the leaf (thick or thin),

TABLE

Synoptical comparison of the characters distinguishing S. Cucubalus, S. Fabaria & S. Czerei.

	S. Cucubalus	S. Fabaria	S. Czerei
Stem	erect, often arcuate at the base, simple below, branched above glabrous and glaucous	erect, often arcuately erect, simple below, branched above, glabrous and glaucous	erect, or arcuate at the base, simple or branched, glabrous and glaucous
Cauline-Leaves	broadly ovate, or elliptical lanceolate, base cordate, apex acute or acuminate, not conspicuously fleshy	elliptical-lanceolate, obovate-lanceolate with tapering base, obtuse or mucronate, fleshy	ovate, oblong-ovate, oblong-lanceolate or ovate-lanceolate, base usually cordate, apex acute not conspicuously fleshy
Infloresence	Usually short, open, loose corymb-like	axis usually forked, bearing cymules, cymules umbellate or corymb-like	axis usually forked bearing cymules laterally, cymules few- to 1-flowered, umbellate or corymb-like
Flower	monoecious-or dioecious-polygamous, nodding	hemaphrodite, nodding	hermaphrodite, nodding
Calyx	ovate or ovate-campanulate, inflated, umbilicate, 20-nerved, teeth ovate-triangular acute; orifice wide open	elliptical, campanulate, semi-inflated, 10-nerved, in fruit truncate & orifice ± constricted; teeth triangular or lanceolate, acute; adpressed in fruit	elliptical or campanulate, semi-inflated, 10-nerved, in fruit truncate adpressed, with constricted orifice, teeth ovate-triangular, obtuse
Petal	White, bipartite; ligules small or represented by thickening	White, bipartite, ligulate	White, bipartite, eligulate
Capsule	ovate-globose, 3-4-times as long as anthophore, included	ovate, 3-4 times as long as anthophore, slightly protruding calyx	ovate, subsessile, slightly protruding calyx
Seed	with flat or ± convex face & back, 1.0-1.5 mm. long	convex back and concave face, 1.0-1.5 mm. long	convex back and concave face, 0.6-1.5 mm. long

SECTION 20 BRACHYPODAE

The 9 species are characterized by the short stout caudex, large & conspicuous rosulate caudical leaves,rather small flowers, and oblong or ovoid-oblong capsule.This section shows some resemblance to the section Odontopetalae .The general habit, nature of caudex,shape & distribution of leaves on the stem all point to its relationship with that section.Section Brachypodae also indicates,through S monerantha Williams,some connection with section Cordifoliae ,since the leaf shape & habit of S.monerantha Williams are similar to those of S.lazica Boiss.

The species of this section fall into 2 fairly distinct subsections on the basis of pedicel length,position of the flower at or after anthesis and to some extent their geographical distributions.

Subsection Nutantes contains 4 species from Sinai,Syria, Palestine and Iraq.The only species found in the Ionian Islands is S.cephalenia Heldr..The flowers are either subsessile or shortly pedicellate,more or less congested,and erect at anthesis becoming nodding after anthesis.

Subsection Erectae comprising 5 species is from Western Turkey,Greece,Hungary and only one from Arabia.These species are characterized by long pedicel,usually 1-3 , rarely few & congested flowers that are erect at or after anthesis.

Key to the subsections and Oriental species.

Flowers with short pedicels or subsessile,nodding after anthesis.

.....20A.Subsection Nutantes

Cauline leaves ovate-cordate;limb cuneate;calyx teeth ovate,obtuse 63.S.monerantha

Cauline leaves oblong-lanceolate to linear-lanceolate;limb oblong;calyx teeth acute :

Inflorescence more or less lax;calyx oblong in fruit, teeth triangular;flowers with short pedicels;anthophore scabrous .....64. S.grisea

Inflorescence congested;calyx oblong-clavate in fruit, teeth lanceolate;flowers subsessile or sessile; anthophore smooth 65.S.oreosinaica

Flowers with long pedicels,usuallu 1-3,seldom few & more or less congested,erect at and after anthesis .....20B.Subsection Erectae

SUBSECTION 20B NUTANTES

63. S.monerantha Williams in Journ.Linn.Soc.,xxxii,103 (1896).

Syn. S.monantha Boiss. et Hausskn. in Boiss.,Fl.Or.,Suppl., 99 (1888);non Wats.(1875)

Caespitose perennial,7.0-24.0 cm.tall,with a suffruticose base.Caudex short,stout,woody,simple or 2-3-forked,erect,covered with bases of old leaves and those of branches.Stem erect or arcuately erect,leafy,terete,simple or sparingly branched in the region of inflorescence,coarsely puberulent & hirsute with spreading or curled hairs,greyish,usually viscid above;middle internodes 1.2-3.7 cm.long.Caudical leaves rosulate,2.3-3.5 cm. long, 4.0-6.5 mm.wide,oblong-spathulate or lanceolate- or oblanceolate-spathulate,attenuated into petiole,base with wide

hyaline ciliate margin,persistent,apex obtuse or nearly so; cauline leaves 1.0-2.5 cm.long,7.0-23.0 mm.wide,lower ones oblong-lanceolate or oblanceolate,tapering at the base,upper ones ovate cordate,sessile,obscurely 3-5-nerved,apex mucronate; all leaves puberulent & hirsute.Flowers solitary or 2-4 in a dichasial cyme,hermaphrodite,erect at anthesis,becoming nodding after anthesis.Bracts equal,ovate or ovate-lanceolate,obtuse. Pedicels 5.0-13.0 mm.long.Calyx 9.0-9.5 mm.long,2.3-2.5 mm. diam.,cylindrical-clavate,umbilicate,with 10 greenish anastomosed nerves,more or less hirtellous with white spreading hairs,in fruit oblong with a constriction below the capsule;teeth unequal, 1.5-2.0 X 1.5-2.3 mm.,ovate,obtuse or nearly so,with hyaline villose margin.Petal pale green,1.2-1.35 cm.long;claw 8.0-9.0 mm.long,exserted,smooth,exauriculate;limb 4.0-5.5 X 2.5-3.0 mm., cuneate,bilobed;ligules two,1.0-1.5 mm.long,truncate,denticulate. Filaments included,smooth.Styles 3,included,hairy.Anthophore 2.0-3.3 mm.long,smooth.Capsule 7.0-10.0 X 3.0-4.5 mm.,oblong, 4-5 times as long as anthophore,included.Seed 0.9-1.5 mm.long, dark brown,with concave face and slightly grooved back,granulate. Ch.

Type- In fissuris rupium montis Sinjar Mesopotamiae,Hausskn. [holo.G.]

IRAQ- Kurdistan,Dohuk Gorge,450m.,25-7-1933,Guest 3710

Geogr. Endemic to Iraq .

Habitat- Limestome cliff;alt.-450m..Fl.-June & July

S.monerantha resembles S.lazica Boiss. in habit, indumentum and leaf shape.These resemblances indicate a connection

between Brachypodae and Cordifoliae .For this close similarity between the two species Boissier placed S.monerantha in the Supplement to his Flora Orientalis,next to S.lazica. But S.monerantha differs from S.lazica by its flower and their position after anthesis,and by the size & shape of calyx and those of fruit.These characters show its distinct relationship with S.grisea,which occurs in Palestine,Syria & Lebanon.

64. S. grisea Boiss.,Diagn.Pl.Nov.Or.,Ser.1.viii,88 (1849);Boiss., Fl.Or.,i,646 (1867);Rohrb.,Monogr.Sil.,145(1868)- Bouloumoy,Fl.Lib. Syr.,t.47.fig.3&4 (1930).

Syn. S.grisea Boiss.,Diagn.Pl.Nov.Or.,Ser.1,viii,88(1849); non Boiss.in Bourg.Pl.Lyc (1842)ms.

Perennial,17.0-44.5 cm.tall,shruby at the base.Caudex simple or sparingly branched,erect,becoming woody & suffruticose, in old plant 5.0-16.0 cm.long,4.0-9.0 mm.wide,young portion covered with bases of old leaves & sometimes with bases of old stems,and old portion bears leaf scars.Stem erect,often angled below,or arcuate at the base,terete,simple,rarely sparingly branched below,usually branched in the region of inflorescence, valvety grey with more or less short,spreading tomentum,more or less viscid;middle internodes 3.0-7.5 cm.long.Caudical leaves rosulate,1.8-5.3 cm.long,3.5-9.0 mm.wide,ovate-,lanceolate-, oblanceolate- or oblong-spathulate,attenuated into petiole; lower cauline leaves 1.3-3.1 cm.long,2.5-5.0 mm.wide,oblong or lanceolate;upper cauline leaves linear-lanceolate;all leaves obtuse to acute,1-nerved,tomentulose,caudical ones often

mucronate.Inflorescence a compound dichasial cyme.Bracts & bracteoles equal,linear-lanceolate,acute,base with hyaline margin.Pedicels of terminal flowers 3.0-7.0 mm.long,and those of lateral ones 5.0-12.0 mm.long,erect or spreading.Flowers hermaphrodite,erect at anthesis,becoming nodding after anthesis. Calyx 1.05--1.25 cm.long,2.5-3.0 mm.diam.,clavate or obconical-cylindrical,with 10 greenish,more or less anastomosed nerves, puberulent and hirtellous,in fruit oblong or oblong-clavate with more or less constricted base;teeth 2.0-3.5 X 1.5-2.3 mm., triangular,acute,with ciliate margin.Petal yellowish green, 1.55-1.8 cm.long;claw 1.05-1.13 cm.long,exserted,smooth;auricles minute or lacking;limb 5.0-6.5 X 1.3- 2.0 mm.,oblong,bipartite beyond middle into linear lobes;ligules two,0.3-0.5 mm.long,obtuse. Filaments included or exserted,smooth.Styles 3,included,usually hairy.Anthophore 2.5-3.0 mm.long,scabrous,somewhat thick.Capsule 7.0-10.0 X 3.5-4.3 mm.,oblong,3-4 times as long as anthophore, somewhat exceeding calyx.Seed brownish,0.9-1.3 mm.long,with flat striate face & grooved granulate back.Chw.

Type- Ad rupes calcareas Libani supra Eden,in montosis prope Elmalu Lyciae,Pestalozza ? [holo.G.]

LEBANON- Cedretum,1350m.,30-7-1855,Ky.343;Ihdan,1500m.,30-6-1910,Bornm.11433;Bscherri to Qadisha cave,18-8-1945,Davis 10074; Qadisha gorge below Bscherri,900-1200m.,19-8-1945,Davis10128 .

PALESTINE- Ayn Farah,200-800m.,20-5-1903,Dinsm.2796;Wadi Surwenit below Michmas,26-12-1942,Davis 5037

Geogr. Endemic to the area cited above

Habitat- In vertical limestone cliffs & on open or shady rocks; alt.-200-1350m..Fl.-May- Sept.

65. S.oreosinaica Chowdhuri,sp.nov. Plate 10;fig.15.

Affinis S.griseae Boiss. sed floribus subsessilibus ad apicem ramorum et caulisim congestis,petalorum unguibus plerumque auriculatis,capsula ovoideo-oblonga anthophoro glabro suffulta, seminibus dorso convexis differt.

Herba perennis,caespitosa,20.0-35.0 cm.alta.Caudex ligneus,brevis,simplex vel ramosus,erectus vel ascendens,superne dense foliosus.Caules floriferi erecti vel e basi arcuato-erecti, teretes,inferne simplices ut folia griseo-puberuli,superne alternatim ramosi ut folia glanduloso-tementosi viscidi;internodiis mediis 4.5-5.7 cm.longis.Folia caudicalia numerosa,rosularia, petiolata,3.0-6.2 cm.longa,4.5-8.0 mm.lata,oblongo-lanceolata vel oblanceolata,in petiolum brevem attenuata,basi brevissime vaginato-connata ibique membranaceo-marginata,ciliolata,marcescentia; folia caulina sessilia,1.6-4.0 cm.longa,3.0-6.5 mm.lata,lanceolata vel lineari-lanceolata,omnia acuta,uninervia,plus minus crassa. Bracteae aequales,foliis caulinis similes,e basi anguste albo-marginatae,ciliolatae.Pedicelli 1.5-2.0 mm.longi.Flores hermaphroditi, cernui,ad apicem ramorum et caulisim congesti.Calyx 1.0-1.3 cm. longus,3.0-3.5 mm. diametro,cylindrico-obconicus,hirtello-glandulosus,viscidus,nervis 10 virescentibus et anastomosantibus, in fructu oblongo-clavatus infra capsulam leviter constrictus,basi truncatus;dentes 3.0-3.5 X 1.3-2.0 mm.,lanceolati acuti membranaceo-marginati,ciliolati.Petala 1.2-1.3 cm.longa,in sicco brunescentia;unguis 7.5-8.0 mm.longus,glaber,acutim vel obtusim auriculatus;lamina 4.5-5.0 X 1.5-2.3 mm.,oblonga,ultra medium bipartita,lobis oblongo-linearibus;ligulae binae,0.9-1.3 mm.longae,oblongae,obtusae.Filamenta exserta,glabra.Styli tres,

Plate
10

Plate 10-Silene oreosinaica Chowdhuri

Fig.15

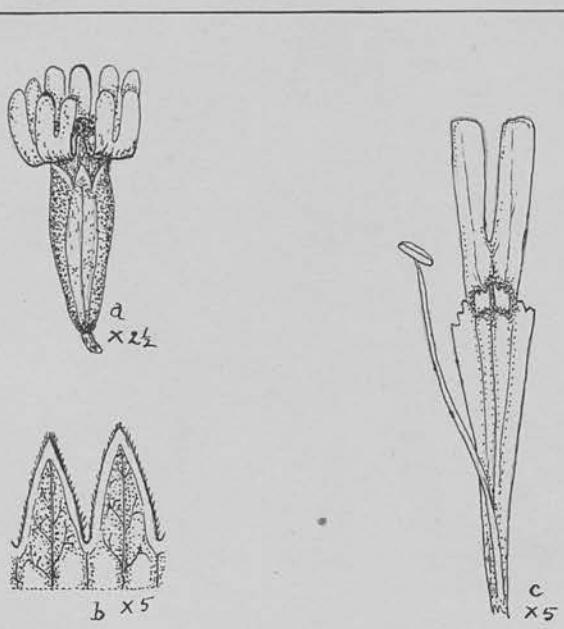


Fig.15.Silene oreosinaica:a-flower;
b-calyx teeth;c-petal.

exserti,puberuli.Anthophorus 2.5-3.0 mm.longus,glaber.Capsula 6.0-8.3 X 4.0-4.5 mm.,ovoideo-oblonga,anthophoro 2-3-plo longior, calyce inclusa.Semina 0.9-1.3 mm.longa,brunea,dorso papillosa convexa,faciebus plana

Type - Sinai-in rupium fissuris montis St.Catharinae,27 Mai et 17 Jul.1835,Schimper 296 ? et 352 [holo.K]

Geogr. Endemic.

Habitat- In rock crevices .Fl.- May.

S.sinaica was described by Boissier in his Diagn. Pl.Nov.Or., series 1,part i,25 (1842),the description being based on specimens collected by W.Schimper from Sinai [no. 296 & 352].Subsequently Boissier reduced this species to a variety of S.odontopetala Fenzl (var. congesta Boiss) in his Fl.Or.,i,626 (1867).Rohrbach accepted Boissier's varietal rank for this taxon (calling it var. sinaica (Boiss.)Rohrb.) but modified the description,stating " flores saepe cenui capitato-congesti subsessiles ".I have seen both the holotype at Geneva and the isotype at Kew.The two specimens differ markedly.The holotype of S.sinaica is dwarf,with a cluster of flowers at the apex of the simple stem,and the flowers are erect and sessile,the calyx is obconical or campanulate and conspicuously inflated.The isotype is tall and alternately branched,the stem and branches ending in clusters of flowers. The flowers are subsessile,crowded on the apex of stem & branches,subnodding or nodding at anthesis;the calyx is

cylindrical-obconical at anthesis,becoming ovoid-oblong after anthesis and not at all inflated.Moreover,the lamina is oblong bipartite into oblong-linear lobes.These characters suggest the isotype's affinity with S.grisea Boiss. and its allies, rather than to S.odontopetala Fenzl.

It is clear that these two specimens bearing the same number (296 & 352) can not belong to the same taxon. Boissier's original description fits well the specimen from Geneva,which must now be referred to as S.odontopetala var. congesta Boiss.. The specimen (at Kew) is described as a new species (S.oreosinaica Chowdhuri).Considering its close similarity to S.grisea Boiss., I have included it in the section Brachypodae .

SUBSECTION 20B ERECTAE

66. S.leptoclada Boiss.,Fl.Or.,i,647 (1867);Rohrb.,Monogr.Sil., 145 (1868).

Syn. S.grisea Boiss.in Bourg.Pl.Lyc.no.45,ms.;non Boiss., Diagn.Pl.Nov.Or.,Ser.1,viii,88 (1849)

Caespitose perennial,20.0-35.0 cm.tall.Caudex 2.0-5.7 cm.long,3.0-7.5 mm.wide,erect or arcuate,branched,woody and suffruticose,old part is covered with leaf scars & comparatively young part with bases of old leaf bases and those of old stems. Stem simple,terete,erect or geniculately-erect,valvety-grey with soft long white hairs,becoming sparingly puberulent & viscidly glandular above;middle internodes 2.9-5.2 cm.long.

Caudical leaves rosulate,2.0-4.3 cm.long,3.0-8.0 mm.wide,obovate-lanceolate- or oblanceolate-spathulate,attenuated into short petiole,base with hyaline pilose margin,apex obtuse or mucronate, sometimes acute;cauline leaves gradually reduced upwards,sessile, 1.5-3.7 cm.long,3.0-6.0 mm.wide,lanceolate- or oblanceolate-linear,acute;all leaves especially the caudical ones tomentulose, 1-nerves.Flowers solitary,terminal,hermaphrodite,erect.Bracts equal,small,ovate,acute to acuminate,with hyaline ciliate margin towards the base.Pedicels 1.5-3.4 cm.long,strict,erect.Calyx 1.3-1.5 cm.long,2.5-3.0 mm.diam.,clavate,truncate-umbilicate, puberulent,seldom sparingly glandular,with 10 greenish sparingly anastomosed nerves,in fruit oblong with a constriction below the capsule;teeth 1.5-2.5 X 1.3-2.0 mm.,ovate to lanceolate, obtuse to acute,with hyaline ciliate margin.Petal yellowish when dry,1.2-1.5 cmlong;claw 8.0-9.0 mm.long,exceeding calyx, smooth,exauriculate;limb 4.0-6.0 X 1.5-2.3 mm.,cuneate bifid to 1/3 its length into ovate obtuse lobes;ligules two,minut, ovate.Filaments exserted,smooth.Styles 3,included,hairy. Anthophore 2.5-3.5 mm.long,smooth.Capsule 8.0-9.5 X 5.0-6.5 mm.,oblong,nearly 3-4 times as long as anthophore,included. Seed brown,0.9-1.3 mm.long,with flat striate face & grooved granulate back.Chw.

Type- In Lycia (Turkey) prope Elmalu,Bourg.45[holo.G.;iso.K'.,E'.]

TURKEY- Prov.Antalya:Calbali dag at Cukur Ardic yayla,1700m., 15-7-1949,Davis18392; nr. Calbali dag,between Tepe Delen yayla & Sojut Cumasi yayla,13-7-1949,Davis 15262.

Geogr. Endemic to Lycia.

Habitat- Rocky places at the foot & sides of mountains;
alt.- 1700m.. Fl.-May-July

S.leptoclada is somewhat variable as regards the shape of leaf & calycine teeth.The calyx teeth are usually ovate obtuse,but are often lanceolate acute,sometimes obtuse & acute alternating.The lamina is cuneate & shortly bifid into ovate lobes but sometimes develops small outgrowths from its side.But these characters are not sufficiently well marked to separate the populations into subspecific categories.

S.leptoclada resembles S.flavescens W. & K in habit,leaf shape,indumentum,shape & size of flowers,shape of flowering & fruiting calyx and shape of capsule,but differs by the calyx teeth,incision of lamina,shape of petal lobes,& relative length of the capsule to that of the calyx(The ovate obtuse & lanceolate acute calyx teeth,which are supposed to be distinctive of S.leptoclada & S.flavescens , are very variable in both species.)

SECTION 21 PINIFOLIAE

The 11 species of this section are provided with woody roots,stongly suffruticose erect or ascending caudex,erect leafy or bracteate stem bearing 1 or 1-5 or 7 flowers,leaves linear-subulate,triquetrous,straight or falcate,often pointed (sometimes more or less flat).The plants are usually puberulent & glandular,very rarely glabrous.

The species of this section fall into 3 fairly distinct subsections,on the basis of caudex & stem character,shape, size & inflation of calyx,and geographical relation.

Subsect. Fruticosae contains 5 species,all of which are relatively primitive in this section.They have a woody, stout,erect caudex,stem of medium stature,branched & leafy, and bearing 2-5 or 7 flowers in a dichasial cyme;they are confined to Iran and Southern Russia.

Subsect. Masmenae contains 5 species,all from alpine & subalpine regions of Turkey.The plants have subscapiform stems with solitary flowers, and have the habit of an Acantholimon(Plumbaginaceae).The calyx is long cylindrical-clavate and not inflated at anthesis.

The 3rd subsection,Pungentes ,contains only one species which is characterized by its inflated,oblong calyx and is found in the Eastern Turkey

Key to the subsection & Oriental species.

1a. Caudex thick,erect & short,simple or forked;stem leafy, branched,of medium stature;flowers 2-7,in a dichasial

cyme;calyx more or less short,cylindrical-clavate,not inflated 21A.Subsect.Fruticosae

2a. Leaves monomorphic,linear-subulate,triquetrous, subpungent;calyx tubular,often more or less narrowed towards the base:

3a. Leaves straight;calyx 1.2-1.5 cm.long;capsule oblong;seed with concave face & flat back 69.S.tragacantha

3b. Leaves spreading,at length recurved;calyx 2.0-2.5 cm.long,teeth acute or obtuse;capsule oblong-ovoid;seed with flat face & grooved back 68.S.goniocaula

2b. Leaves often dimorphic,upper linear,obtuse or mucronate,flat or more or less plicate,lower leaves linear-subulate,triquetrous;calyx tubular-clavate. Capsule ovoid ;calyx teeth round 67.S.nodulosa

1b. Caudex slender,woody,branched,compact,ascending;stem dwarf, subscapiform,bracteate,1- or 2-3-flowered:

4a. Flowers 1-2 or 3 in a dichasial cyme;calyx 1.5-1.8 cm. long,inflated,oblong;capsule as long as anthophore 21C.Subsect.Pungentes

4b. Flowers solitary,rarely 2-3 in a dichasial cyme;calyx above 2.0 cm.in length,tubular-clavate,not inflated at anthesis;capsule shorter or longer than anthophore, rarely equal to it 21B.Subsect.Masmenae

5a. Caudical leaves strongly falcate;capsule ovoid, 2-3 times shorter than anthophore,entire

capsule exserted
.....72.S.falcata

5b. Caudical leaves straight,sometimes slightly curved; capsule oblong or oblong-ovoid,longer than or as long as anthophore,included:

6a. Capsule oblong:

7a. Petal pink;limb oblong,bipartite;capsule 1½-2 times shorter than anthophore;calyx teeth obtuse 71.S.echinus

7b. Petal white;limb obovate or obcordate,emarginate or shallowly bifid;capsule as long as anthophore; calyx teeth acute.....70.S.masmenaea

6b. Capsule ovoid-oblong:

8a. Plant canescent-pubescent,not glandular;caudical leaves linear-subulate,rigid,subfalcate,3-nerved;calyx 3.5-4.0 cm.long,in fruit slightly inflated;limb obovate,bipartite
.....73. S.Caryophylloides

8b. Plant glandular-puberulent;caudical leaves linear-subulate,slender,straight;calyx below 3.3 cm.in length;limb obcordate,bipartite; calyx not inflated in fruit.
.....74.S.subulata

SUBSECTION 21A. FRUTICOSAE

67. S.nodulosa Boiss.,Diagn.Pl.Nov.Or.,Ser.1,i,31 (1842);Boiss.,Fl.Or. i,616 (1867);Rohrb.,Monogr.Sil.,189 (1868).

Syn. S.nodulosa Boiss.,Diagn. 1.i,31 (1842);non Viv.(1824)

S .nodulosa var.Schiraziana Boiss.,Diagn.,1,viii,91(1849)
S.nodulosa var.peduncularis Fenzl in Ky.Pl.Pers. 1845.ms.

Perennial with suffruticose base,8.0-35.0 cm.tall.Caudex erect,branched,multicipital,covered with the bases of old leaves. Stem many,slender,erect,often arcuate at the base,terete,more or less leafy,alternately branched throughout,scabrous-puberulent throughout.Leaves monomorphic,linear,more or less triquetrous, often flat towards the apex,rigid,straight,apex obtuse or mucronate;caudical ones 2.5-9.0 cm.long,1.5-2.0 mm.wide,base with hyaline ciliate margin;cauline leaves 1.2-4.0 cm.long, 1.5-2.0 mm.wide,gradually reduced above. Inflorescence a dichasial cyme,few-flowered.Bracts & bracteoles equal,small, ovate-lanceolate,acute to acuminate,with hyaline ciliate margin. Pedicels of terminal flowers 2.0-5.0 mm.long,and those of lateral ones 7.0-17.0 mm.long.Flowers hermaphrodite,often pistillate with aborted stamens,erect.Calyx 2.1-2.4 cm.long, 2.8-3.0 mm.diam.,clavate-cylindrical,umbilicate,with 10 pinkish anastomosed nerves,hirtellous;teeth 1.3-1.5 X 1.0-1.3 mm., ovate,round at the apex,with wide hyaline ciliate margin.Petal 1.9-2.2 cm.long,white;claw 1.3-1.5 cm.long,exserted,smooth; auricles small,acute or obscure;limb 6.0-7.0 X 2.0-3.3 mm., cuneate,bifid into oblong lobes;ligules two,0.8-1.3 mm.long, oblong,denticulate.Filaments smooth,included.Styles 3,exserted, hairy.Anthophore 5.0-15.0 mm.long,smooth.Capsule 8.0-10.0 X 3.5-4.0 mm.,ovoid,as long as or somewhat shorter than anthophore, included.Seed 1.0-1.3 mm.long,with flat face & grooved back.Ch.

Type-In rupibus aridis Elamout Persiae,Aucher 4217[holo.G.;iso.K', BM'.]

IRAN-Prov.Fars,Kuh Daena,15-7-1842,Ky.653 ; nr.Schiraz,30-4-1842, Ky.303 ;Kuh Eschker,3000m.,July 1868,Hausskn.;Auf felsen,Nummdet Kalb,Schiraz,16-6-1885,Stapf 1931; Kuh Abbas Ali,3-9-1885,Stapf .

This species is evidently related to S.goniocaula through the variety glandulosa in habit,leaf character & calyx teeth,but differs in its clavate-cylindrical calyx,shape of the lamina,& in indumentum.The var.peduncularis Fenzl is not restricted to the province of Fars;it is sporadic and henc it has not been treated as an significant variant.

The leaves of this species & S.goniocaula are linear or linear-subulate,triquetrous.In S.goniocaula the leaves are usually subfalcate,whereas in S.nodulosa Boiss they are straight & spreading.In both species the leaves often become flat at the apex and thus lose their triquetrous form; when they are flat,their apices naturally become obtuse or mucronate.This character therefore can not be relied upon alone in the delimitation of these two related species

68.S.goniocaula Boiss.,Diagn.Pl.Nov.Or.,Ser.1.i,31 (1842).

Perennial with suffruticose base,10.0-35.0 cm.tall. Caudex 1.7-8.0 cm.long,2.5-8.0 mm.wide,erect or arcuate,branched, covered with brownish bases of old leaves.Stem slender,erect, terete,usually branched,sometimes simple,glabrous throughout, sparingly glandular-puberulent above especially in the pedicels and calyx,sometimes sparsely & retrorsely puberulent throughout; middle internodes 2.3-10.4 cm.long.Leaves monomorphic ,linear, canaliculate or triquetrous,spreading becoming curved at the apex,pointed;caudical ones rosulate,2.0-6.9 cm.long,1.5-3.0 mm.

wide,base with hyaline ciliate margin;cauline leaves remote, reduced,1.3-4.0 cm.long,1.5-2.5 mm.wide.Flowers 2-5 or 7 in a dichasial cyme,hermaphrodite,seldom pistillate due to abortion of stamens,erect.Bracts equal,ovate-acuminate,with hyaline ciliate margin.Pedicels of terminal flowers 1.5-3.0 cm.long, and those of lateral flowers 3.0-7.0 cm.long,erect or ascending. Calyx 2.1-2.4 cm.long,3.5-4.3 mm.diam.,tubular,umbilicate,white or pinkish,with 10 anastomosed nerves,sparingly glandular-puberulent in fruit clavate;teeth 2.0-3.0 X 1.5-1.8 mm.,lanceolate,acute, with hyaline ciliate margin.Petal white,2.5-2.9 cm.long;claw 1.8-2.0 cm.long,exceeding calyx,smooth;auricles obtuse,acute or round,sometimes more or less obscure;limb 7.0-10.0 X 3.3-4.0 mm.,cuneate or obcordate-cuneate,bipartite into obovate-oblong lobes;ligules two,1.0-1.3 mm.long,oblong,cleft.Filaments equaling claw,smooth.Styles 3,exserted,hairy.Anthophore 6.0-7.0 mm.long,sparsely hairy.Capsule 1.3-1.5 X 0.5-0.6 cm., oblong-ovoid,twice as long as anthophore,included.Seed dark brown, 0.8-1.3 mm.long,with flat face & grooved back,striate.Ch.

Key to the varieties.

Plants glabrous below,sparingly glandular-puberulent in the region of pedicel;calyx teeth lanceolate,acute .....a.var.goniocaula

Plants glandular-puberulent at the base,the indumentum thinning out above;calyx teeth ovate,obtuse .....b.var.glandulosa

a. var. goniocaula . Boiss.,Fl.Or.,i,619 (1867);Rohrb.,Monogr.Sil., 189 (1868)

Plants glabrous below,becoming sparingly puberulent &

glandular above,especially on the pedicels.Calyx teeth lanceolate, acute.Limb cuneate.Flowers white

Type- In Persiae monte Ellwend,Aucher 438 [holo.G.,iso.K! BM!]

IRAN- Prov. Irak-Adjemi,Mt.Elwend (middle) yr.1882,Polak

b. var. glandulosa Chowdhuri,var. nov.

Planta inferne brevissime glanduloso-puberula,superne sparsim puberula.Dentes calycis ovati obtusi.Petala rosea; lamina cuneata vel obcordato-cuneata.

Type- Iran -Schir kuh,3750m.,26-7-1932,Balls 141 [holo. E.]

Geogr. Endemic

Habitat- In rocky places & crevices of rocks;alt.-3750 m..
Fl.- July

69. S.tragacantha Fenzl in Boiss.,Fl.Or.,i,621 (1867);Rohrb.,Monogr. Sil.,125 (1868)

Caespitose perennial,10.0-25.0 cm.tall,with suffruticose base.Caudex erect or arcuate,upto 13.0 cm.in length,3.0-6.0 mm. in width,simple or more or less forked,covered with bases of old leaves.Stem simple,terete,erect or geniculately erect,sparsely puberulent below,becoming densely & retrorsely pubescent above, older part becoming obviously glabrous;nodes more or less swollen; middle internodes 1.3-2.9 cm.long.Caudical leaves rosulate, 1.7-4.6 cm.long,1.0-1.5 mm.wide,linear,triquetrous,base with

hyaline ciliate margin,apex acute or more or less pointed;cauline leaves 1.3-2.7 cm.long,1.0-1.5 mm.wide,similar to caudical leaves,only one or two upper pairs short,linear-lanceolate, 3-nerved;all leaves scabrous-puberulent.Bracts & bracteoles equal,lanceolate-linear,with narrow hyaline margin.Pedicels 2.0-3.5 mm.long,erect.Flowers hermaphrodite,solitary or 2-3 in a dichasial cyme.Calyx 1.2-1.35 cm.long,2.3-2.5 mm.diam., tubular,umbilicate,with 10 pinkish anastomosed nerves,in fruit clavate with constricted base;teeth ovate,obtuse,with hyaline finely ciliate margin.Petal white;claw equaling or slightly exceeding calyx,smooth;auricles minute,sometimes obscure;limb bipartite;ligules two,oblong,obtuse.Filaments equaling claw,smooth.Styles 3,exserted,hairy.Anthophore smooth.Capsule oblong,twice as long as anthophore.Seed brown,with more or less concave face & flat granulate back.Chw.

Type- In glareosis et rupestribus alpis Kuhdaena Persiae australis Ky.700[holo.G.,iso.K!]

Geogr. Endemic to Southern Iran.
Habitat- Gravelly & stony places. Fl.- July

SUBSECTION 21B. MASMENAE

70. S.masmenaea Boiss.,Diagn.Pl.Nov.Or.,Ser.11.v,57(1856)

Perennial,5.0-12.0cm.tall,caespitose. Root slender, woody,with a multicipital crown.Caudex 3.0-14.5 cm.long,2.5-6.0 mm.wide,slender,erect or ascenfing,sometimes more or less prostrate, branched,covered with bases of old leaves.Stem erect,terete,

scapiform,rarely leafy,greenish,sometimes pinkish from the base upwards,usually glabrescent below,becoming glandular-puberulent and more or less viscid above,rarely puberulent below,rarely puberulent and eglandular throughout;middle internodes 2.0-3.5 cm.long.Caudical leaves rosulate,linear-subulate,triquetrous, with pointed apex,spreading & subfalcate or erect, more or less clasping the stem,base with hyaline margin;cauline leaves usually in a few pairs,bract-like,1.3-2.5 cm.long,2.0-3.0 mm.wide, ovate-lanceolate,acuminate,3-nerved at the base,with hyaline margin upto certain length;all leaves usually glabrous with villose or densely ciliate margin,rarely puberulent.Flowers hermaphrodite,seldom pistillate with aborted stamens,solitary, terminal.Bracts like the cauline leaves,glandular-puberulent. Pedicels 1.8-4.3 cm.long,erect.Calyx 2.0-3.0 cm.long,3.5-5.0 mm.diam., cylindrical-clavate,greenish or yellowish,sometimes pinkish,umbilicate,with 10 pinkish anastomosed nerves,glandular-puberulent,usually more or less viscid,in fruit clavate;teeth 2.5-5.0 X 2.3-4.0 mm.,triangular,lanceolate or ovate-triangular often with constricted base,obtuse,with wide hyaline ciliate margin.Petal greenish white,1.3-1.65 cm.long;claw 9.5-11.0 mm. long,slightly exserted,expanded above,smooth,seldom ciliate; auricle obtuse;limb 3.5-5.5 X 3.5-5.0 mm.,obovate or obcordate, emarginate or ¼ bilobed,lobes oblong-obovate;ligules two,fleshy, oblong,round at the apex or eroded-denticulate.Filaments exserted, smooth,Styles 3,exserted,hairy.Anthophore 7.0-11.0 mm.long, smooth.Capsule 9.0-12.0 X 4.0-4.5 mm.,oblong,as long as anthophore, included.Seed dark brown,with flat face & grooved back.Chc.

Although considerable variation occurs in the indumentum,and viscosity of the stem and leaves,leaf shape and size,and nature of the stem,one variety can be distinctly marked out on a morphological and geographical basis.This variety (eglandulosa),which is retrorsely puberulent throughout and not viscid at all,occurs in the western part of Turkey in the province of Isparta.The other form considered as typical is found in the provinces of Maras & Seyhan.

Key to the varieties.

Plant usually glabrous below,becoming glandular & puberulent and more or less viscid above;calyx glandular-puberulent & viscid;claw slightly exserted .....a.var.masmenaea

Plant retrorsely puberulent throughout,not viscid;calyx pubescent and more or less hirtellous,not glandular and viscid;claw conspicuously exserted .....b.var.eglandulosa

a. var. masmenaea . Boiss.,Fl.Or.,i,620 (1867);Rohrb.,Monogr.Sil., 126 (1868)-Bouloumoy,Fl.Lib. Syr.,t.51.fig.4(1930)

Plants glabrous below,becoming glandular-puberulent & more or less viscid above,sometimes sparingly puberulent below. Stem usually scapiform,seldom leafy throughout.Caudical leaves straight or subfalcate;cauline leaves usually bract-like, sometimes similar to caudical ones & gradually reduced above, upper ones (1 or 2 pairs) bract-like.Calyx glandular-puberulent, more or less viscid.Claw equaling or slightly exceeding calyx.

Plants from Maras & Seyhan.

Type- Turkey- in regione alpina montis Masmeneudagh ad septentrionem Ciliciae, Balansa [holo.G.]

TURKEY- Prov. Maras: dt.Cardak,Berit dag,nr.Arpa Cucuru yayla, 2300m.,25-8-1952,Davis 20281; Berit dag,2800m.,26-8-1952, Davis 20350; dt.Goksun,on Isik dag,above Karli yayla,2700m., Davis 19988. Prov. Seyhan: dt.Saimbeyli,Bozoglan dag,above Obruk yayla,2300m.,7-7-1952,Davis 19750 .Cappadocica,Aslan dag, & Masmeneudagh,6-8-1856,Bal. .Cataonia,Beryt dagh,2700m.,Hausskn.

b. var. eglandulosa Chowdhuri,var.nov.

Planta puberula vel hirtello-puberula,haud glandulosa vel viscida.Folia caudicalia stricta,erecta,raro subfalcata; folia caulina bracteiformia.Calyx hirtello-puberulus,haud glandulosus et viscidus.Ungues petalorum exserti.

Type- Turkey- Prov.Isparta,dt.Sutculer,Dedegol dag,above the tarn Dedegol,2700m.,3-8-1949,Davis 16019 [holo.K.,E.]

TURKEY- Prov.Antalya (Lycia):Calbali dag,14-7-1949,Davis .

Geogr. Endemic to Turkey.

Habitat(of sp.) Stony places and rocky mountain sides; alt.-2300-2700m..Fl.-July & Aug.

S.masmenaea differs from S.echinus Boiss.& Heldr. by the height of the flowering shoot,size of the caudical leavees, in the indumentum,calyx teeth,shape & size of petal and lastly in the relative length of capsule & anthophore.S.masmenaea is less glandular and less viscid,stem is long and lamina obovate obcordate,emarginate or shortly bilobed,while in S.echinus the plant is densely glandular & viscid throughout,the stem

short and the lamina cuneate and deeply bipartite.

71. S.echinus Boiss. et Heldr.,Diagn.Pl.Nov.Or.,Ser.11.v,56(1856); Boiss.,Fl.Or.,i,620 (1867);Rohrb.,Monogr.Sil.,125(1868).

Syn. S.subulata Heldr.,Pl.Anat (1845); non Boiss. (1842)

Pulvinately caespitose perennial,4.0-10.0 cm.tall, 5.0-19.0 cm.across.Root woody,with a multicipital crown.Caudex 3.0-20.0 cm.long,2.5-10.0 mm.wide,prostrate or ascending,branched, covered with old leaf bases.Stem 2.0-4.3 cm.tall,erect,terete, simple,scapiform,glandular-puberulent,becoming densely glandular and viscid above;middle internodes 5.0-15.0 mm.long.Caudical leaves rosulate,11.0-28.0 mm.long,needle-shaped,triquetrous, straight,pointed,scabrous-puberulent,base with hyaline ciliate margin;cauline leaves 1 or 2 pairs,bract-like,1.1-1.5 cm.long, 1.5-2.0 mm.wide,ovate-lanceolate or lanceolate,acuminate,3-nerved, glandular-puberulent,marin membraneous & villose.Bracts equal, like the cauline leaves.Pedicels 1.4-2.5 cm.long,erect.Flowers solitary,terminal,hermaphrodite,erect.Calyx 2.7-2.9 cm.long, 4.0-5.0 mm.diam.,cylindrical-clavate,umbilicate,glandular-puberulent & viscid,with 10 pinkish anastomosed nerves;teeth 3.0-3.5 X 2.0-3.3 mm.,triangular-lanceolate or ovate-lanceolate, acute,with wide hyaline ciliate margin.Petal pink,2.0-2.3 cm. long;claw 1.3-1.45 cm.long, equaling or slightly exceeding calyx, smooth,acutely auriculate;limb 7.0-8.5 X 3.0-4.3 mm.,cuneate, bipartite into oblong-linear lobes;ligules two,0.8-1.3 mm.long, oblong,obtuse.Filaments exserted,smooth.Styles 3,exserted,hairy. Anthophore 1.3-1.9 cm.long,smooth.Capsule 9.0-11.0 X 4.5-6.0 mm.,

TABLE 5.

Synoptical comparison of the morphological characters & distribution distinguishing S.echinus & S.masmenaea

Character	S.echinus	S.masmenaea
Ht.of the stem	2.0-4.0 cm.	5.0-10.0 cm.
Indument-um	glandular-puberulent, becoming viscid above	pubescent throughout,usually eglandular.
Caudical lvs.	linear-subulate, straight,apex hard & pointed,spreading horizontally	linear-subulate,usually recurved, if straight clasping the stem, 3-nerved at the base.
Pedicels	1.4-2.5 cm.long	2.0-4.3 cm.long.
Calyx	tubular-clavate,nerves pinkish,glandular-puberulent teeth lanceolate,acute.	obconical-cylindrical,greenish yellow,sometimes pinkish, pubescent sparingly glandular; teeth ovate or lanceolate,obtuse often with constricted base.
Petal	pink;claw equaling or slightly exceeding calyx acutely auriculate;limb cuneate,bipartite;lobes linear	greenish white;claw exserted, obtusely auriculate;limb obovate or obcordate,emarginate or shortly bilobed
Anthoph-ore	1.3-1.9 cm.long	7.0-11.0 mm.long.
Capsule	9.0-11.0 mm.long,1½-2 times as long as anthophore,often slightly exserted.	9.0-12.0 mm.long,as long as anthophore,included
Distrib-ution	Mediterranean 1.	Mediterranean 1& 2.

oblong,1½-2 times as short as anthophore,included or slightly exserted.Seed dark brown,0.9-1.5 mm.long,with flat face & grooved tuberculate back. Chc.

Type- Turkey-in aridis montis Boudroum ad meridiem urbis Isbarta Pisidiae,Heldr. [holo.G.]

TURKEY- Prov. Mugla (Pisidia):Mts.Bodrum & Davros,Aug.1845, Heldr.;Mt.Davros,2100m.,Aug.1845,Heldr..Prov.Antalya:dt.Gebiz (Pisidia) Bozburun dag at Tozlu Cukur yayla,1900m.,24-7-1949, Davis 15520.Prov.Aydin:Baba dag,1950m.,19-6-1948,Davis 259. Prov. Denizil:Baba dag,19-2300m.,24-8-1950,Davis 18386 . Smyrna,Whittall 582

Geogr. Endemic to the Mediterranean part of Turkey

Habitat-Limestone scree;on conglomerate rocks,occasionally in cracks of sloping rocks;alt.-1500-2300m..Fl.-June-Aug.

S.echinus bears a strong resemblance to S.masmenaea Boiss. in habit and leaf but differs in being dwarf and densely glandular-puberulent throughout,in having the caudical leaves needle-shaped and straight,the calyx teeth acute,and petal with cuneate bifid limb.These differences have been brought out in the table [Tab. 5]

72. S.falcata Sibth. et Sm.,Prodr.Fl.Graec.,i,301 (1806);Boiss., Fl.Or.,i,620 (1867);Rohrb.,Monogr.Sil.,125 (1868)- Sibth.et Sm.,Fl.Graec.,v,t.436 (1825)

Pulvinately caespitose perennial,3.0-9.0 cm.tall and 4.0-14.0 cm.across.Root slender,woody,with a multicipital crown.Caudex 3.0-7.8 cm.long,ascending or erect,branched,covered with old leaves or with their bases.Stem few-many,scapiform, erect,terete,usually purplish from the base upwards,glandular-

puberulent;middle internodes 1.2-3.0 cm.long.Caudical leaves rosulate,7.0-25.0 mm.long,0.5-1.0 mm.wide,linear-subulate, triquetrous,strongly falcate,base with hyaline ciliate margin; cauline leaves in few pairs,bract-like,4.0-19.0 mm.long,1.3-2.0 mm.wide,linear-lanceolate or ovate-lanceolate,acuminate,3-nerved, usually falcate,with narrow hyaline margin from base upwards; all leaves glandular-puberulent,with pilose or ciliate margin. Bracts equal,ovate-lanceolate,acuminate,3-nerved,with narrow hyaline ciliate margin.Pedicels 1.3-4.0 cm.long,erect.Flowers hermaphrodite,solitary,terminal,erect.Calyx 2.3-2.5 cm.long, 3.0-4.0 mm.diam.,cylindrical-clavate,purplish,umbilicate,with 10 anastomosed nerves,glandular-puberulent;teeth 2.3-3.0 X 1.0-2.5 mm.,oblong-lanceolate or ovate with constricted base,obtuse, with wide hyaline ciliate margin.Petal greenish or cream white,often purplish on the reverse,1.2-1.5 cm.long;claw 7.0-8.5 mm.long,exserted,smooth;auricles obtuse or round; limb 5.0-6.5 X 4.0-4.5 mm.,oblong-ovate,bipartite into oblong lobes;ligules two,oblong,obtuse or denticulate.Filaments smooth, slightly exserted.Styles 3,exserted,finely hairy above.Anthophore 1.5-2.2 cm.long,smooth.Capsule 8.0-11.0 X 4.0-5.3 mm.,ovoid, dark brown,2-3 times shorter than anthophore,fully exserted. Seed dark brown,1.0-1.5 mm.long,with flat striate face & obtusely grooved granulate back.Chc.

Type- Turkey-in monte Olympo Bithyno,Sibth. [holo. Oxford;iso.K!]

TURKEY- Prov.Bursa:Ulu dag,2500m.,17-8-1932,Kotte;ibid. 1088-1850, Clement ;ibid. Aug.1842,Boiss.;ibid. Aucher 454;ibid. yr.1844, Noe ;ibid. Mill ; ibid. Sept.1873,Pichler ;ibid.2500m.,17-8-1933, Kotte ;ibid. 23-2500m.,13-9-1947,Davis 14845.Prov.Kutahya,dt. Gebiz (Phragia):Saphane dag,2000-2100m.,27-8-1950,Davis 18450

Geogr. N.W.Turkey

Habitat- Summit of mountains & in marble scree ;alt.-2000-2500m., Fl.- Aug. & Sept.

S.falcata is unique in the section in having an exserted capsule which suggests a relationship with S.Saxifraga Linn., but it differs from the latter in habit,leaf & stem characters, & in the claw being auriculate.It is closely related to S.masmenaea Boiss. & S.echinus Boiss. & Heldr. in the remarkable habitat,root stock & leaf characters,but readily distinguishable from the both by the peculiar falcate leaves & exserted capsule

73. S. caryophylloides (Poir.) Otth in DC.,Prodr.,i,369 (1824);Boiss., Fl.Or.,i,618 (1867);Rohrb.,Monogr.Sil.,127 (1868)-Russegg.,Reise Eur.As.& Afr.Atlas,iii, t.10(1843);Fenzl,Illustr.Pl.Syr.,t.11(1842).

Syn. Cucubalus caryophylloides Poir.,Encycl.,Suppl.,i,416
Silene stentoria Fenzl,Pugill Pl.Nov.Syr.,no.9 (1842)

Caespitose perennial,12.0-26.5 cm.tall.Caudex woody, branched,erect or ascending,sometimes arcuate,covered with leaf scars or bases of old leaves & bears vegetative buds.Stem erect or arcuately erect,subscapiform,terete,more or less leafy,simple,sometimes 1-2 times pedicellately branched above, valvaty with white deflexed glandless hairs,more or less viscid.Caudical leaves rosulate,0.5-4.2 cm.long,1.0-2.5 mm. wide,linear or linear-subulate,sub-triquetrous,subfalcate, attenuated into long petiole,pubescent,base with hyaline ciliate

margin;cauline leaves in 3-7 pairs,bract-like,1.1-3.5 cm.long, 2.0-3.0 mm.wide,ovate-lanceolate,straight or subfalcate,acuminate, base 3-nerved,with hyaline ciliate margin.Bracts equal,similar to cauline leaves.Pedicels 0.3-2.3 cm.long,erect.Flowers solitary,terminal,or 2-3 in a dichasial cyme,hermaphrodite,erect. Calyx 3.5-4.0 cm.long,5.0-6.5 mm.diam.,cylindrical-clavate, umbilicate,pubescent,sometimes hirtellous,with 10 purplish anastomosed nerves,in fruit slightly inflated;teeth 3.5-6.0 X 2.5-4.5 mm.,broadly ovate with constricted base,acute or nearly so, with wide hyaline ciliate margin.Petal white,2.3-3.0 cm.long;claw 1.8-2.3 cm.long,exserted,smooth,obtusely auriculate;limb 5.0-7.0 X 3.5-4.5 mm.,oblong-ovate,bipartite into oblong lobes;ligules two, 0.9-1.3 mm.long,oblong,denticulate or crenulate.Filaments exserted, smooth.Styles 3,exserted,hairy.Anthophore 1.7-2.0 cm.long,smooth. Capsule 12.0-1.7X 4.0-4.5 mm.,ovoid-oblong,as long as or somewhat shorter than anthophore,included or slightly exserted.Seed grey brown,1.5-2.0 mm.long,with flat face & grooved back,granulate. Ch. or Hs.

Type- In Oriente (Turkey)

TURKEY- Kelsen,N.W.of Eregli,July 1912,Siehe 203.Cilician Taurus, Bulghar maaden,July 1855,Bal.803 ;slope of Mt.Gisyl Deppe,2100m., 16/22-7-1853,Ky. 17,105.

Geogr. Turkey & Lebanon

Habitat- Top of mountains;alt.-2100m..Fl.- July & Aug.

74. S.subulata Boiss.,Diagn.Pl.Nov.Or.,Ser.1.i,33 (1842);Boiss.,Fl.Or. i,619 (1867);Rohrb.,Monogr.Sil.,127(1868);Williams in Journ.Linn.Soc.,xxxii,81(1896)-Bouloumoy,Fl.Lib.Syr. t.51.fig.3 (1930).

Syn. S.subulata Boiss., Diagn.,1.i,33(1842);non Heldr.(1845)
S.nardifolia Boiss.in Huet Pl.Armen.
S.caryophylloides var.nardifolia (Boiss.)Rohrb.,Monogr.Sil. 127 (1868)

Caespitose perennial,4.5-15.7 cm.tall.Caudex 3.5-26.0 cm.long, 2.0-6.0 mm.wide,slender,woody,compactly branched,with marcescent shreds of old petioles.Stem erect,sometimes arcuate at the base, terete,subscapiform,simple,usually glandular-puberulent & viscid throughout,sometimes puberulent below,becoming glandular-puberulent above;middle internodes 2.0-5.5 cm.long.Caudical leaves rosulate, 1.5-3.5 cm.long,0.5-1.0 mm.wide,linear-subulate,often needle-shaped,triquetrous,usually straight,sometimes slightly falcate, base with hyaline ciliate margin;cauline leaves in few pairs, bract-like1.5-3.5 cm.long,1.5-2.5(3.0) mm.wide,linear-lanceolate, sometimes ovate-lanceolate,acuminate,straight or subfalcate,base 3-nerved with hyaline ciliate margin;all leaves glandular-puberulent & more or less viscid.Bracts equal,like the cauline leaves.Pedicels 1.7-5.5 cm.long,erect.Flowers solitary,terminal, rarely 2-3 in a dichasial cyme,hermaphrodite,erect.Calyx 2.8-3.3 cm.long,4.0-5.5 mm.wide,cylindrical with a narrow base,umbilicate, glandular-puberulent,with 10 pinkish anastomosed nerves,in fruit clavate;teeth 2.5-3.3 X 2.0-2.5 mm.,ovate,often with constricted base,acute or nearly so,with wide hyaline ciliate margin.Petal white,2.5-3.3 cm.long;claw 1.6-2.3 cm.long,exceeding calyx,smooth, auricles acute,obtuse or round;limb 9.0-10.0 X 5.0-6.5 mm., obcordate-cuneate,bipartite into obovate lobes;ligules two,1.0-1.5 mm.long,oblong,denticulate.Filaments exserted,smooth.Styles 3, exserted,hairy.Anthophore 11.0-20.0 mm.long,smooth.Capsule

11.0-21.0 X 5.0-6.3 mm.,oblong,as long as anthophore,1/3 exceeding calyx.Seed brown,1.0-1.5 mm.long,with flat face & obtusely grooved back,granulate. Ch. or Hs.

Type- Turkey- in montibus ad Euphratem,Aucher 453 [holo.G.;iso.K! BM!]

TURKEY- Prov.Gumusane:Bayburt,May 1853,Huet; ibid. 20-6 & 9-7-1862,Bourg.42;Bayburt,Kop dag,2400m.,20-7-1934,Balls1793; Karahissartasch,10-6-1896,Sint.5721.Prov.Amasya:Ak dag,Manissad.862; ibid.10-5-1889,Bornm.153 .Sine loco.Montb.2260; sine loco.Aucher.

Geogr. Endemic to Irano-T uran. region of Turkey

Habitat- Hill top,sometimes on limestone scree;alt.-2400m..

Fl.- May-July

Although S.subulata Boiss. was sunk under S.caryophylloides (Poir.)Otth by Rohrbach,it is a distinct species with a number of diagnostics to its credit.These characters are the narrow needle-shaped caudical leaves,different indumentum,calyx tubular at anthesis,becoming clavate in fruit but not at all inflated,limb shape & smaller seed.Comparative morphology reveals its position between S.caryophylloides & S.masnemaea Boiss.

SUBSECTION 21C PUNGENTES.

75. S.pungens Boiss.,Diagn.Pl.Nov.Or.,Ser.1,i,32 (1842);Boiss.,Fl.Or., i,625 (1867);Rohrb.,Monogr.Sil.,77 (1868).

Caespitose perennial,dwarf, 10.5-23.7 cm.tall.Root slender woody,with a multicipital crown.Caudex woody,more or less stout, prostrate,branched,covered with dead leaves.Stem 7.0-12.0 cm. tall,erect or ascending,sometimes arcuate at the base,simple or

sparsely branched,terete,greyish with short retrorse hairs, becoming dense above,viscid;lower internodes short,middle ones 2.0-4.3 cm.long.Leaves mpnomorphic,1.2-2.7 cm.long,0.5-1.5 mm. wide,linear-subulate,triquetrous,pointed,rigid,straight,spreading, puberulent,usually persistent on old stem,base with wide hyaline ciliate margin.Bracts 9.0-11.0 X 1.5-2.0 mm,,ovate-lanceolate, acute or acuminate.Pedicels 3.0-4.0 mm.long,erect or ascending, puberulent & viscid,sparingly glandular .Flowers solitary, terminal,sometimes 2-3 in a dichasial cyme,hermaphrodite,erect. Calyx 1.56-1.8 cm.long,4.0-5.0 mm.diam.,oblong-cylindrical,more or less inflated,umbilicate,with 10 purplish anastomosed nerves, pubescent & viscid,sparingly glandular;teeth 2.3-2.8 X 2.0-2.5 mm.,ovate-lanceolate,obtuse or rounded,often with more or less constricted base,with wide membraneous ciliate margin.Petal white,1.4-1.6 cm.long;claw 9.0-11.0 mm.long,exceeding calyx tube, smooth;auricles usually obtuse or rounded,rarely acute;limb 4.0-4.7 X 3.0-3.5 mm.,obcordate,bilobed,lobes oblong;ligules two,0.8-1.5 mm.long,ovate,denticulate.Filaments as long as or slightly exceeding claw,smooth.Styles 3,equaling claw,smooth.Anthophore 5.0-8.5 mm.long,puberulent.Capsule 7.0-9.0 X 4.0-4.5 mm.,ovoid-oblong,as long as or slightly longer than anthophore,included. Seed dark brown,0.9-1.3 mm.long,with flat smooth face & obtusely grooved,tuberculate back.Chc.

Type-Turkey-in monte Olympo Armeniae,Aucher 450[holo.G.;iso.K!,BM!]

TURKEY- Prov. Erzerum: Erzerum,Zohrab 161;base of Mt.Tech dag above Erzerum,1800-2100m.,July 1853,Huet;Erzerum,Calv.& Zohrab 551; Kechis dag,June 1834,Montb.2412. Armenian Tourus,Erginghan, Syukor dag,Sint.1164. Prov.Van:dt.Baskale,Ispiriz dag,2600m., 31-7-1954,Davis 23627;dt.Satak,on Kavussahap dag,3100m.,23-7-1954, Davis 23135.

IRAN- Meshan dag,2200m.,20-6-1924,Grosheim & Schischkin 228; Mishon,5-8-1929,Gilliat-Smith 2590

Geogr. Endemic to the Irano-Tour. region of Turkey & N.W.Iran.

Habitat- On mountains;alt.-1800-3100m..Fl.-June -Aug.

S.pungens is closely related to the members of subsect. Masmenae in habit,leaf shape & in geographical distribution.It differs from S.masmenaea Boiss.and allied species by the oblong-cylindrical and more or less inflated calyx.Because of this slight inflation of the calyx,S.pungens was placed by Boissier under the sect.Inflatae .Rohrbach placed the species in the subgenus Behen .Due to the similarity in habit,leaf & lamina character,I have transferred the species to section Pinifoliae where it is kept in separate subsection. The species is monomorphic.

SECTION 22 AURICULATAE

The 18 species of this section are characterized by their caespitose habit,slender branched caudex,usually large & solitary flowers (seldom 1-3 flowers in a dichasial cyme),auricled claw, and ovoid or ovoid-oblong,stipitate capsule.The species are mostly confined to the Mediterranean countries.On the basis of stem character & relative size of caudical and cauline leaves,the species fall into 2 distinct subsections.

The subsect.Scapiformae,comprising 3 species,is very close to the section Pinifoliae where the stem is scapiform with much reduced,bract-like cauline leaves.The flowers are either solitary & terminal,or 2-3 in a terminal dichasial cyme.The caudical leaves are linear,linear-lanceolate,whereas the cauline ones are bract-like,ovate or ovate-lanceolate.

The second subsection,Brevicaulae,contains 15 species.These species are characterized by leafy stem,cauline leaves like the caudical ones,either gradually reduced above or sometimes the upper leaves more conspicuous.This section shows more affinity to the sections Macranthae & Suffruticosae.

Key to the subsections and the Oriental species.

leaves suddenly reduced

1a. Stem scapiform;cauline leaves bract-like 22A.Subsect.Scapiformae

2a. Flowers pink;limb obcordate;anthophore smooth;capsule ovoid plants 1.5-4.3 cm.tall 76.S.argaea

2b. Flowers white;limb obovate-cuneate or cuneate;anthophore hairy or scabrous;capsule ovoid-conical or ovoid-oblong; plants more than 5.0 cm.in height :

3a. Calyx 1.6-2.0 cm.long,tubular;teeth ovate,obtuse;limb cuneate;anthophore hairy 77.S.lucida

3b. Calyx 2.0-3.1 cm.long,tubular-clavate;teeth lanceolate, acute;limb obovate- or obcordate-cuneate;anthophore scabrous 78.S.rhynchocarpa

1b. Stem leafy;cauline leaves like the caudical ones,gradually reduced upwards,or upper ones more conspicuous 22B.Subsect.Brevicaulae

anthophore 2-4x longer than capsule

4a. Capsule subglobose,2-4 times shorter than anthophore:

5a. Calyx,in fruit,subglobose,more or less inflated with narrow elongated base;teeth broadly triangular,acute; claw auriculate 80.S.Davisii

5b. Calyx cylindrical-clavate,in fruit not at all inflated; teeth ovate,obtuse;claw exauriculate .....81.S.depressa var. Meyeri

anthophore as long as or 1½-2x longer

4b. Capsule not subglobose,as long as or 1½-2 times shorter than anthophore:

6a. Cauline leaves ovate or ovate-lanceolate:

7a. Calyx 1.5-1.65 cm.long,tubular with narrow base; limb emarginate;leaves 4.5-6.3 X 1.3-1.5 mm., ...89.S.minutifolia

7b. Calyx more than 2.0 cm.in length,cylindrical-clavate;limb deeply bipartite;leaves larger :

.....

8a. Petal auriculate,obovate-cuneate;capsule 1½-2 times shorter than anthophore .....82.S.Boryi var.tejedensis

8b. Petal exauriculate,oblong;capsule as long as anthophore 88.S.microphylla

6b. Cauline leaves lanceolate,oblanceolate,linear-oblanceolate, or linear-subulate,rarely ovate (then leaves large,3-5-nerved,with cordate base;calyx more than 3.0 cm.in length):

9a. Cauline leaves lanceolate,oblanceolate,or linear-oblanceolate rarely ovate,apex obtuse or acute,not pointed:

10a. Calyx ovate-clavate & more or less inflated with long narrow base;teeth broadly triangular,obtuse; limb obcordate 84.S.pulchella

10b. Calyx cylindrical-clavate in fruit,rarely inflated; teeth ovate or lanceolate,acute or obtuse;limb not obcordate:

11a. Petal exauriculate;calyx crisp-puberulent, eglandular;teeth ovate obtuse;capsule oblong; plant crisp-puberulent below,becoming glabrous above .....83. S.palinotricha

11b. Petal auriculate;calyx glandular-puberulent; teeth lanceolate acute;capsule ovoid-oblong; plant puberulent & glandular,often hirtellous:

12a. Plant viscid above;petal white;anthophore smooth:

13a. Calyx 3.0-3.5 cm.long,in fruit more or less inflated;limb oblong 87.S.commelinifolia

13b. Calyx below 3.0 cm.in length,in fruit not inflated;limb oblong-cuneate 85.S.brevicaulis

12b. Plant not viscid;petal pink;anthophore

hairy 86.Santitaurica

9b. Cauline leaves linear-subulate,straight or slightly curved, apex pointed & hard .....79 S.eremicana

SUBSECTION 22A. SCAPIFORMAE

76. S.argaea Fisch. et Mey.in Ann.Sc.Nat.,Ser.iv.i,36 (1854);Boiss., Fl.Or.,i,620 (1867);Rohrb.,Monogr.Sil.,126 (1868)

Tufted,dwarf perennial,1.5-4.3 cm.tall.Root woody,stout, bearing few adventitious buds,with a multicipital crown.Caudex subterranean & aerial,3.0-19.0 cm.long,2.5-8.0 mm.wide,slender, woody,branched,often compact,subterranean with scaly leaves,aerial ones covered with bases of old leaves.Stem erect,sometimes arcuately erect,more or less leafy,simple,terete,pubescent & more or less hispidulous,becoming glandular & viscid above;middle internodes 3.0-15.0 mm.long.Leaves monomorphic,linear,linear-lanceolate, seldom ovate,acuminate,3-nerved at the base,straight or slightly curved;caudical leaves rosulate,subsessile,flat or slightly plicate; cauline ones in a few pairs,sessile,flat,pubescent.Flowers solitary,terminal,hermaphrodite,erect.Bracts equal,ovate,acute to acuminate,3-nerved at the base,base with hyaline villose margin. Pedicels 3.0-10.0 mm.long,erect.Calyx 2.4-3.2 cm.long,3.0-5.0 mm.diam.,cylindrical-clavate,purplish,umbilicate,with 10 anastomosed, nerves,glandular-puberulent,viscid,infruit more or less inflated, dlightly constricted below the capsule;teeth 2.4-3.0 X 1.5-2.0 mm., oblong or ovate,obtuse,sometimes emarginate,with wide hyaline ciliate margin.Petal pink,1.3-1.5 cm.long;claw 8.0-10.0 mm.long, equaling calyx,smooth;auricles obtuse,or nearly round,seldom

obscure;limb 4.0-6.5 X 4.0-5.5 mm.,obcordate,often cuneate at the base,bipartite into 1/3-½ of its length into ovate obtuse lobes;ligules two,0.8-1.5 mm.long,oblong,obtuse or denticulate. Filaments exserted,smooth.Styles 3, exserted,hairy.Anthophore 1.0-2.7 cm.long,smooth.Capsule 5.0-10.0 X 4.5-5.0 mm.,ovoid,as long as or 1-5 times shorter than anthophore,included.Seed dark brown,0.7-1.0 mm.long,with flat or more or less concave face & obtusely grooved back,granulate.Chc.or Hs.

Key to the subspecies.

Calyx 2.4-2.6 cm,long;anthophore 1.0-1.5 cm.long;capsule 10.0-13.0 X 4.5-5.0 mm.,as long as anthophore;plants 1.5-4.3 cm.tall.
.....i.subsp. argaea

Calyx 3.0-3.2 cm.long;anthophore 2.5-2.7 cm.long;capsule 5.0-7.5 X 4.0-5.0 mm.,4-5 times shorter than anthophore;plants 1.5-2.5 cm. tall,often more or less pulvinate
.....ii.subsp.delectabiles

i. subsp. argaea .

Plant 1.5-4.3 cm.tall.Leaves 3.0-11.0 mm.long,1.0-1.5 mm.wide,linear-lanceolate,linear,flat,pubescent & sparsely glandular.Calyx 2.4-2.6 cm.long;teeth ovate,obtuse,rarely oblong,, obtuse.Anthophore 1.0-1.5 cm.long.Capsule 11.0-13.0 X 4.5-5.0 mm., ovoid-oblong,as long as anthophore.

Lectotype- in reg. alpina montis Argaei Cappadociae,3000',Bal.1042 [...c.K!]

TURKEY- Prov.Kayseri:Ercies dag (Erciyas dag),2800m.,22-7-1898, Siehe 217;ibid. 20-7-1889,Siehe 212

ii. subsp. delictabilès (Turrill)Chowdhuri,comb.et stat.nov.

Syn. S.delictabilès Turrill in Kew Bull.1929,225

Plant 1.5-2.5 cm.tall,more or less pulvinate.Leaves 5.0-13.0 mm.long,1.0-2.0 mm.wide,linear,linear-lanceolate,ventral surface more or less tomentose,dorsal surface puberulent.Calyx 3.0-3.2 cm.long;teeth oblong,emarginate or obtuse,sometimes ovate obtuse.Anthophore 2.5-2.7 cm.long.Capsule 5.0-7.5 X 4.5-5.0 mm., ovoid,4-5 times shorter than anthophore.

Type- Iran-nr. the top of Mishou dag,in cracks in the rocks, 29-7-1928,Gilliat-Smith 2359 [holo.K!]

Geogr.(of sp.) Turkey & Iran

Habitat- On mountains ;alt.-2800m..Fl.-July

I have examined at Kew specimens collected by Balansa & found that the plant is glandular-puberulent especially on the upper part,the limb obcordate & more or less cuneate at the base and that the seed has a flat or slightly concave face & obtusely grooved back.

77. S.lucida Chowdhuri,sp. nov. Plate 11. fig.16

Ab omnibus speciebus sectionis habitu valde compacto, indumento multo densiore,caulibus haud viscosis,foliis caudicalibus brevioribus sed anguste linearibus,calycibus angustioribus,pilis

eglandulosis et glandulosis intermixtis differt.

Herba perennis,pumila,dense caespitosa,5.0-15.0 cm.alta. Radix lignea,elongata,verticalis,multiceps.Caudices numerosi, tenues,lignei,ramosi,superne foliolati.Caules floriferi tenues, teretes,erecti vel ascendenti-erecti saepius basi arcuati,remote foliosi,simplices vel supra 1-2-ramosi,ut folia canescentes et subretrorsim pubescentes superne sparse glandulosi,internodiis mediis 2.0-4.3 cm.longis.Folia caudicalia conferta,0.8-2.4 cm. longa,1.5-2.3 mm.lata,lineari-spathulata in petiolum paullum attenuata,basi brevissime vaginato-connata ibique anguste membranaceo-marginata et ciliata,marcescentia;folia caulina plus minus remota,bracteiformia,6.0-10.0 mm.longa,2.0-3.0 mm. lata,ovato-lanceolata vel lineari-lanceolata,acuminata,subtus prominenter trinervia,basi anguste membranaceo-marginata et ciliata.Flores hermaphroditi,solitarii vel 2-3 irregulariter et subdichotome dispositi.Bracteae 4.5-7.0 X 2.0-3.0 mm.,foliis caulinis similes,puberulae,tota longitudine anguste albo-marginatae, ciliolatae,interdum sparse glandulosae.Pedicelli 0.6-2.5 (3.7) cm.longi,erecti vel ascendentes,glanduloso-puberuli.Calyx 1.6-2.0 cm.longus,3.5-4.3 mm. diametro,cylindricus,albo-membranaceus, nervis 10 intense purpurascentibus superne paullum anastomosantibus praeditus,glanduloso-puberulus,in fructu clavatus infra capsulam attenuatus,basi truncato-umbilicatus;dentes 1.3-2.0 X 1.5-2.0 mm., ovati,obtusi vel subemarginati,late albo-marginati,ciliolati. Petala 1.5-1.75 cm.longa,alba,in sicco purpurea;unguis 9.0-10.0 mm. longus,paulo exsertus,glaber,superne dilatatus et obtuse auriculatus;lamina 6.0-7.5 X 3.0-3.5 mm.,cuneata,bipartita,lobis

Plate

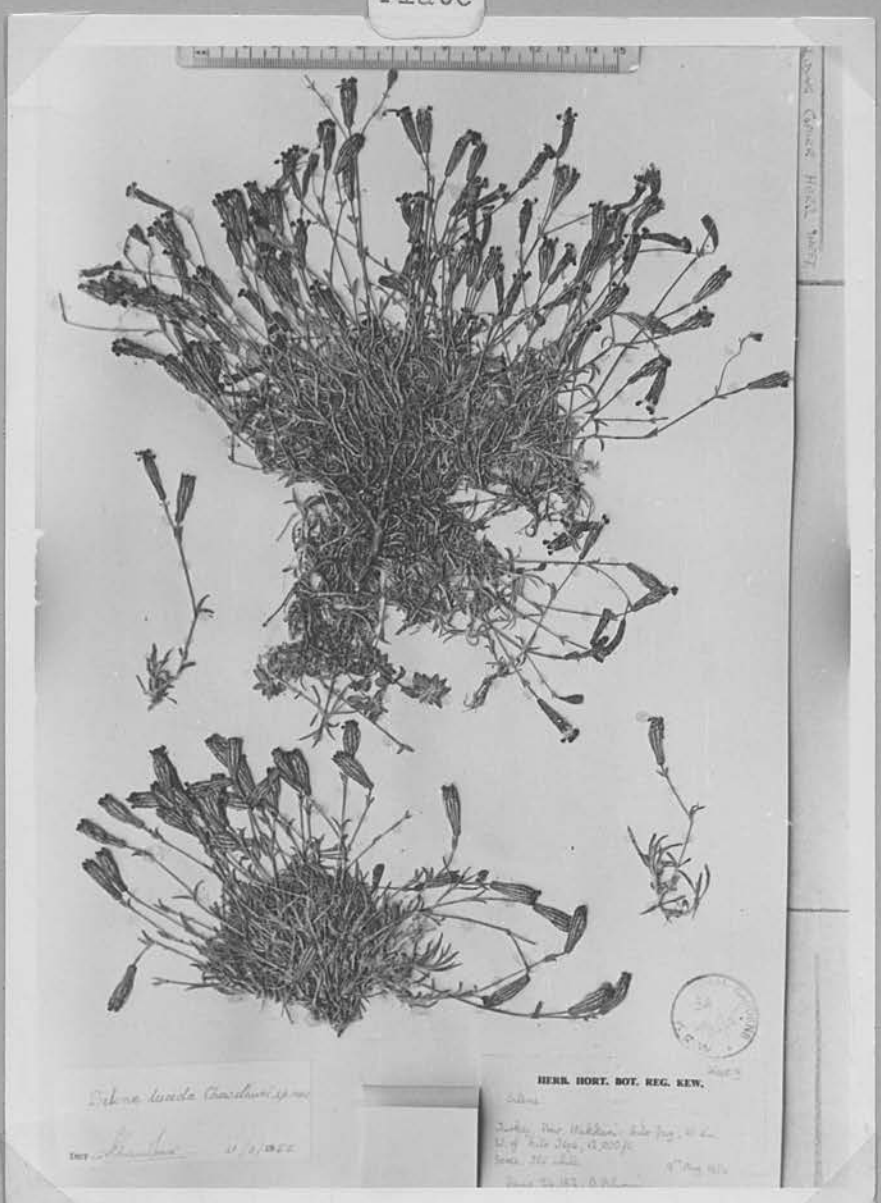


Plate 11-Silene lucida Chowdhuri

Fig.16

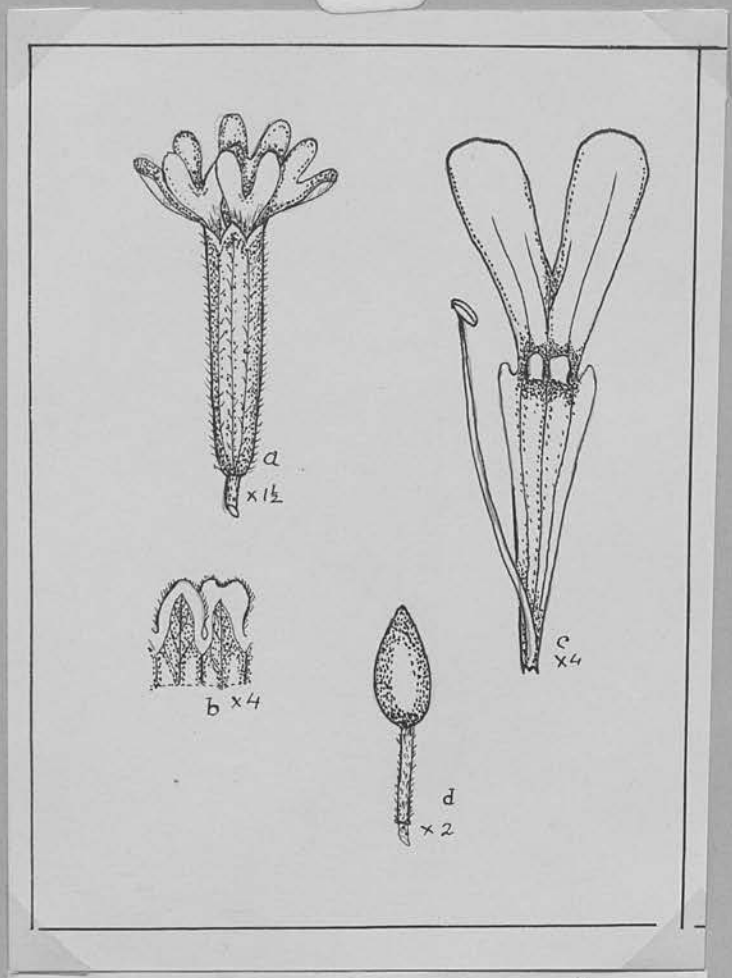


Fig.16.Silene lucida:a-flower;
b-calyx teeth;c-petal;d-capsule.

oblongis ad apicem rotundatis praedita;ligulae binae,0.7-1.0 mm. longae,oblongae,obtusae.Filamenta 11.0-13.0 mm.longa,glabra, exserta.Styli tres, 7.0-9.0 mm.longi,exserti,superne minute pubescentes.Anthophorus 7.0-9.0 mm.longus,puberulus.Capsula 7.5-9.0 X 3.5-4.0 mm.,ovoideo-oblonga,anthophorum aequans,calyce inclusa.Semina brunea,1.0-1.5 mm.longa,dorso canaliculata,faciebus plana.

TURKEY- Prov.Hakkari:Cilo dag,10km. West of Cilo Tepe,3600m., scree,9-8-1954,Davis 24182,O.Polunin.[holo.K.,iso.E.]; Prov.Van,dt.Gevas:Artos dag,3150m.,southern slope,15-7-1954, Davis 22874,O.Polunin.

78. S.rhynchocarpa Boiss.,Diagn.Pl.Nov.Or.,Ser.1.i,33 (1842);Boiss., Fl.Or.,i,618(1867);Rohrb.,Monogr.Sil.,126 (1868).

Syn. S.lycia Boiss.,Diagn.Pl.Nov.Or.,Ser.1,viii,90 (1849)
S.rhynchocarpa var.lycia Boiss.,Fl.Or.,i,618(1867)
S.oreophila Bornm.,It.Anat.,no.4179(1899)ms.;non Boiss. (1867).

Perennial,6.4-31.5 cm.tall. Caudices several from the crown, 4.0-18.0 cm.long,1.5-7.3 mm.wide,decumbent to ascending,or erect,usually branched,with marcescent shreds of old leaves & fine adventitious roots.Stem erect or ascending,often arcuate, subscapiform,terete,purplish from the base upwards,simple,tomentose or densely pubescent with crisp & more or less adpressed hairs, becoming densely glandular and viscid above;middle internodes 2.5-5.3 cm.long.Caudical leaves rosulate,petiolate,1.5-6.5 cm.long, 1.5-10.0 mm.wide,linear-lanceolate to lanceolate,attenuated

into petiole,base with hyaline ciliate margin,straight or subfalcate;cauline leaves in a few pairs,bract-like,sessile, 1.5-3.4 cm.long,2.0-7.0 mm. wide,ovate or ovate-lanceolate, sometimes lanceolate,glandular-puberulent;all leaves 3-5-nerved, acute.Flowers hermaphrodite,sometimes pistillate with aborted stamens,solitary,terminal,or 2-3 in a dichasial cyme.Bracts & bracteoles equal,like the cauline leaves.Pedicels of terminal flowers 3.0-6.5 mm.long,& those of lateral flowers 1.5-3.3 mm. long,erect.Calyx 2.0-3.1 cm.long,3.0-5.0 mm.diam.,tubular-clavate, umbilicate,with 10 purplish anastomosed nerves,glandular-puberulent, viscid,in fruit more or less constricted below the capsule;teeth 2.0-3.5 X 2.0-3.0 mm.,unequal,ovate ,obtuse,or round,lanceolate or triangular,acute,with hyaline ciliate margin,often obtuse & acute teeth occur together.Petal white,1.7-2.6 cm.long;claw 1.0-1.6 cm.long,exserted,smooth;auricles obtuse or acute,sometimes obscure; limb 7.0-10.0 X 4.0-8.0 mm.,obcordate-cuneate or obovate-cuneate, bipartite into 1/3 of its length into obovate or oblong lobes; ligules two,0.8-1.3 mm.long,oblong,obtuse or denticulate,thick. Filaments exserted,smooth.Styles 3,exserted,hairy.Anthophore 1.0-1.45 cm.long,smooth or scabrous.Capsule 1.1-1.7 X 0.5-0.75 cm.,ovoid-conical,as long as or slightly longer than anthophore, apex slightly protruding calyx.Seed brown,1.3-2.0 mm.long,with flat face & obtusely grooved back,tuberculate.Hs.

Syntype -Turkey-in Cariae et Lydiae montibus Tmolo et Cadmo,Boiss. , Jun.1842 [holo.G.];Olympo Bithyno,Aucher 444 [G.]

TURKEY- Prov.Bursa:Ulu dag,July 1873,Pichler;ibid.,10-6-1932,Kotte; ibid.,30-6-1944,Basar.;ibid.,31-7-1944,Basar..Prov.Antalya:

Elmali dag,9-6-1860,Bourg.47 .Prov.Konya/Afyon:Sultan dag,above Engeli,28-6-1890,Bornm.4174; Afyonkarahisar,Sultan dag,Bornm.. Prov.Hakkari:Kara dag,3240m.,16-8-1954,Davis24478 ;Cilo dag , 10km. W. of Cilo Tepe,3090m.,9-7-1954,Davis24136;ibid.9-8-1954, Davis 24153. Prov.Van,dt.Gevas;Artos dag,3000m.,15-7-1954,Davis 22817;dt.Satak:Kavussahap dag,3300m.,23-7-1954,Davis23210

IRAQ- Arl Gir dag,3200m.,24-8-1948,Gillett 12348 ;ibid.,2900m., 5-8-1947,Gillett 9583;ibid,3000m.,22-7-1932,Guest 2841 ;Chia-i-Mandali,2700m.,19-7-1932,Guest 2698

Geogr. Endemic to Turkey & N.Iraq.

Habitat- On mountains sides,rocky places & on metamorphic rocks; alt.-2700-3240m..Fl.-June-Aug.

S.rhynchocarpa shows most resemblance to S.caryophylloides (Poir.)Otth in its tendency to have the upper cauline leaves reduced and remote,being bract-like in appearance,& in having large flowers;but in S.rhynchocarpa the caudical & lower cauline leaves are linear-lanceolate or lanceolate.It is distinguished from S.caryophylloides (Poir.)Otth by the fruiting calyx, which is not inflated,limb which is obcordate- or obovate-cuneate, and capsule which is ovoid-conical.It also shows some similarity towards S.oreophila Boiss. in habit,inflorescence and in the size and shape of calyx,but the latter can be easily distinguished from S.rhynchocarpa by the straight,3-nerved,caudical leaves, oblong-cuneate limb of petal,and by the oblong-conical capsule.

SUBSECTION 22B. BREVICAULAE

79. S.eremicana Stapf in Denkschr.Akad.Wien,284 (1886).

Perennial,14.0-20.0 cm.tall. Caudex slender,4.0-7.5 cm.long,2.0-4.0 mm.wide,becoming branched & suffruticose,covered with bases of old leaves.Stem simple,terete,erect or arcuate,

leafy,puberulent with short adpressed hairs,glandular and viscid throughout,becoming more or less dense upwards;middle internodes 3.0-4.7 cm.long.Caudical leaves rosulate,petiolate,2.3-6.1 cm. long,2.0-2.3 mm.wide,linear or linear-subulate,attenuated into petiole,straight or slightly curved,base with hyaline ciliate margin;cauline leaves sessile,1.5-2.7 cm.long,2.0-2.3 mm.wide, linear,sometimes linear-subulate,spreading;all leaves 1-nerved, acute or pointed,glandular-puberulent.Flowers solitary,terminal, 2-3 in a dichasial cyme,hermaphrodite,sometimes pistillate with aborted stamens.Bracts & bracteoles linear-lanceolate,acuminate, with a narrow hyaline ciliate margin.Pedicels of terminal flowers 8.0-13.0 mm.long,& those of lateral flowers 15.0-18.0 mm.long. Calyx 2.5-2.65 cm.long,4.5-5.0 mm.diam.,cylindrical-clavate, truncate-umbilicate,often slightly inflated,with 10 greenish anastomosed nerves,glandular-puberulent & viscid,in fruit clavate and more or less constricted below the capsule;teeth 3.5-4.0 X 1.3-1.5 mm.,lanceolate,acute,with hyaline glandular-ciliate margin.Petal 2.0-2.2 cm.long;claw 1.5-1.6 cm.long,equaling calyx,smooth;auricles obtuse or round;limb 5.0-6.0 X 2.0-2.5 mm., cuneate,bipartite into 2/3 of its length into linear lobes;ligules two,1.0-1.7 mm.long,oblong,obtuse or denticulate.Filaments smooth. Styles 3, exserted,hairy.Anthophore 9.0-11.0 mm.long,smooth. Capsule 9.0-12.0 X 4.0-4.5 mm.,oblong,as long as anthophore, included.Seed dark brown,0.7-1.3 mm.long,with flat striate face & grooved tuberculate back.Hp.or Ch.

Type- Iran-in locis ad Mt.Elwend prope Haydere [holo.V.;iso.K!]
IRAQ-Chia-i-Mandali,2400-2700m.,20-8-1932,Guest 2792

Geogr. Iraq and Iran .
Habitat- On mountains ;alt.- 2400-2700 m. Fl.- Sept.

S.eremicana,in its nearly linear-subulate or linear leaves with pointed apices,and in its slightly inflated calyx approaches S.pungens Boiss.,but it is distinguished from it by the slightly falcate leaves,shape of the calyx,and form of petal. To some extent S.eremicana resembles S.rhynchocarpa Boiss.,but is easily differentiated by its leafy stem,cuneate limb,marrow calyx and oblong capsule

This species appears to be intermediate between the subsect. Scapiformae & the subsect.Brevicaulae .The leaf shape and facies distinctly show its ~~its~~ affinity to S.rhynchocarpa Boiss.,but the leafy stem & cauline leaves,which are conspicuous, favours its retainsion in the subsect.Brevicaulae

80. S. Davisii Chowdhuri,sp.nov. Plate 12; fig.17

Affinis S.brevicauli Boiss. sed indumento parcissimo, caulibus et calycibus haud viscosis,calyce fructifero superne subgloboso-inflato dentibus late triangularibus,capsula subglobosa anthophoro 2-3-plo breviore,seminibus majoribus recedit.

Herba perennis,humilis,saxatilis,caespitosa,basi multicipiti-suffruticosa.Caudex 3.0-15.0 cm.longus,3.0-9.5 mm. latus,ligneus,ramosus,superne dense foliatus.Caules floriferi 4.0-10.0 cm.longi,numerosi,teretes,erecti vel arcuato-erecti, simplices,foliosi,pallide virides,ut folia pilis albidis eglandulosis retrorsis sparsim pubescentes,internodis infimis abbreviatis,mediis 1.2-2.4 cm.longis.Folia caudicalia rosularia, 1.8-4.0 cm.longa,3.0-5.5 mm.lata,oblanceolata vel lineari-oblanceolata vel anguste obovata,in petiolum aequilongum sensim

attenuata,basi brevissime vaginato-connata ibique membranaceo-marginata ciliata,marcescentia;folia caulina numerosa,conspicua, oblonga vel lineari-oblanceolata,sessilia,patula,in petiolum brevem attenuata,omnia acuta,uninervia,costa mediana tenue pallescente.Flores hermaphroditi,ad apicem caulis solitarii, breviter pedicellati.Bracteae lineari-lanceolatae,acuminatae, puberulae,versus basin anguste membranaceo-marginatae,sparsim ciliolatae.Pedicelli 2.0-5.0 mm.longi,erecti.Calyx 2.6-3.0 cm. longus,6.0-7.0 mm.in diametro,tubuloso-clavatus,albido-membranaceus, nervis 10 virescentibus superne anastomosantibus praeditus,basi truncato-umbilicatus;dentes 3.5-4.3 X 3.0-4.0 mm.,late triangulares, acuti,albo-marginati,ciliolati.Petala 1.4-1.6 cm.longa,in sicco pallide brunescentia;unguis 7.5-9.5 mm.longus,glaber, superne dilatatus et obtuse auriculatus;lamina 6.5-7.5 X 4.3-5.0 mm.,obovato-cuneata,ad medium in lobos obovatos bipartita; ligulae binae,0.3-0.5 mm.longae,parvae,obtusae.Filamenta 1.1-1.3 cm.longa,exserta,glabra.Styli tres, 7.0-9.0 mm.longi, exserti,pubescentes.Anthophorus 1.8-2.4 cm.longus,glaber.Capsula 7.0-9.0 X 6.0-7.5 mm.,subglobosa 3-4-plo brevior,calyce inclusa. Semina 1.3-2.0 mm.longa,dorso canaliculata,faciebus plana.

Turkey- Prov.Hakkari: Cilo dag,between Diz deresi & Cilo yayla, 2400m.,limestone cliff of george,10-8-1954,Davis 24245,O.Polunin [holo.K.,iso.E.];Cilo dag,1620m.,crevices of conglomerate rocks, 6-81954,Davis 23918,O.Polunin.Prov.Van,dt.Baskali:Ispiriz dag, 2700m.,crevices of serpentine rocks,31-7-1954,Davis 23720

The new species,apparently endemic to eastern Turkey, is named after Dr.P.H.Davis who collected it.It is closely allied

Plate 12

Plate 12-Silene Davisii Chowdhuri

Fig.17

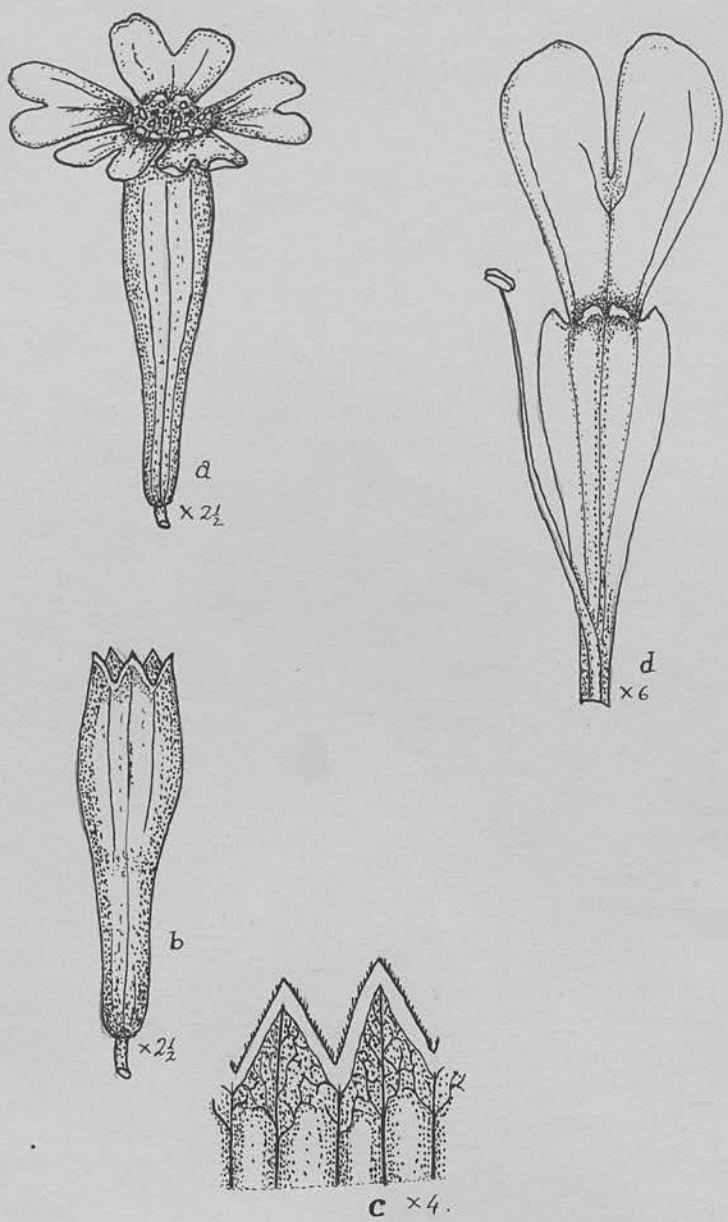


Fig.17.Silene Davisii:a-flower;b-calyx;c-calyx teeth;
d-petal; e-capsule.

to S.brevicaulis Boiss. ,but differs from it in the following diagnostics:plants sparsely puberulent,eglandular & not at all viscid,tubular-clavate & white calyx with greenish nerves which in fruit is inflated and subglobose with attenuated or narrow base,calyx teeth broad,triangular,and obcordate-cuneate limb.

81. S.depressa M.Bieb.,Fl.Taur.Cauc.,i,336(1808).

var. Meyeri (Fenzl)Rohrb.,Monogr.Sil.,133(1868);Williams in Journ.Linn.Soc.,xxxii,90(1896).

Syn. S.depressa C.A.Mey.,Ind.Pl.Cauc.,216(1831);non M.B.(1808); non Baumg.(1816);non Ledeb.(1830);non Viv.(1814)

S.depressa γ. Ledeb.,Fl.Ross.,i,321(1842).

S.Meyeri Fenzl in Ky.Pl.Pers. ap Boiss.,Fl.Or.,i,623 (1867).

S.Meyeri var.Persica Boiss.,ibid.

S.Meyeri var.hirsuta Boiss.,ibid.

Dwarf perennial,3.0-15.0 cm.tall.Caudex erect or arcuate, becoming branched & suffruticose,covered with marcescent shreds of old leaves.Stem erect,simple,terete,leafy,retrorsely pubescent throughout;middle internodes 1.0-2.5 cm.long.Leaves oblanceolate, linear-lanceolate,oblong-linear or oblog-ovate,1-nerved,pubescent or glabrous,acute or obtuse,ciliate;caudical leaves 0.7-2.5 cm.long, 1.5-3.5 mm.wide,petiolate,attenuated into petiole,base with hyaline margin;cauline leaves sessile,0.8-3.0 cm.long,1.8-4.0 mm.wide.Flowers hermaphrodite,erect,solitary,or 2-3 in acyme. Bracts equal,lanceolate,acute,with hyaline ciliate margin.Pedicels 1.5-3.0 mm.long.Calyx 2.5-3.0 cm.long,3.0-3.5 mm.diam.,tubular-clavate,truncate,with 10 pinkish anastomosed nerves,glandular-puberulent,in fruit constricted below the capsule;teeth 2.8-3.3 X

2.0-2.8 mm.,ovate,often with constricted base,obtuse,with hyaline ciliate margin.Petal white,1.6-1.8 cm.long;claw 9.0-10.0 mm. long,exserted,smooth,exauriculate;limb 7.0-8.0 X 4.3-5.0 mm., obovate-cuneate,bipartite into 1/3 of its length into oblong lobes;ligules two,1.3-1.5 mm.long,oblong,obtuse.Filaments included,smooth.Styles 3. included,hairy.Anthophore 1.0-1.2 cm. long,smooth.Capsule subglobose ?,3-4 times as short as anthophore, included.Seed not seen. Hp.

Type-in fissuris rupium ditionis Talysch,C.A.M. & Hoh.

IRAN- Schiraz,Ky.;at ruins Persepolim,21-4-1842,Ky.280 .
Geogr. Iran & Caucasus.
Habitat- crevices of rocks and in rocky places.Fl.-April-July.

82. S.Boryi Boiss. Elench.Pl.Nov.Hisp.,19 (1838).

var. tejedensis (Boiss.)Rohrb.,Monogr.Sil.,130(1868);Post,Fl. Syr.Pal.& Sinai,ed.2.i,183(1932)-Boiss.,Voy.Bo Esp.,t.25b. (1839-45).

Syn. S.tejedensis Boiss.,Elench.Pl.Nov.Hisp.,19(1838).
S.Tuba Ehrenbg.herb.

Dwarf perennial,3.5-18.0 cm.tall. Root woody,deep-seated, often bearing adventitious buds,with a multicipital crown.Caudex prostrate,ascending,slender,branched,young portion covered with marcescent shreds of old petioles.Stem slender,terete,leafy, arcuately erect,erect,or ascending,simple,usually densely & retrorsely puberulent below,becoming glandular-puberulent & viscid,often hirsute above;middle internodes 7.0-20.0 mm.long.

Caudical & lower cauline leaves rosulate,shortly petiolate, 1.3-2.4 cm.long,2.5-6.0 mm.wide,ovate- to oblong-lanceolate, more or less attenuated into petiole,base with hyaline ciliate margin;other cauline leaves conspicuous,sessile,4.0-12.0 mm. long,3.0-5.5 mm.wide,ovate or ovate-lanceolate,sometimes oblong-lanceolate;all leaves 1-nerved,obtuse,pubescent,sparsely glandular and hirtellous.Flowers hermaphrodite,erect,solitary,terminal, or in(2-3) a cyme.Bracts equal,lanceolate to ovate-lanceolate, acute or nearly so.Pedicels of terminal flowers 0.5-3.0 cm.long, and those of lateral flowers 2.0-5.0 cm.long.Calyx 2.5-2.8 cm. long,3.5-4.3 mm.diam.,tubular-clavate,truncate,with 10 pinkish anastomosed nerves,glandular-puberulent & viscid,in fruit base narrowed below the capsule;teeth 2.0-2.5 X 1.5-2.0 mm.,ovate, obtuse,with wide hyaline margin.Petal white to pink,1.6-1.9 cm. long;claw9.5-11.0 mm.long,exceeding calyx,smooth,acutely auriculate;limb 6.5-8.0 X 3.5-4.3 mm.,obovate,bipartite to the middle into oblong-obovate lobes;ligules two,0.5-1.0 mm.long, oblong,denticulate.Filaments exserted,smooth.Styles 3, exserted, hairy.Anthophore 1.4-1.85 cm.long,smooth or sparsely & minutely puberulent.Capsule 9.0-14.0 X 4.0-5.5 mm.,ovoid-oblong,1½-2 times shorter than anthophore,included.Seed brown,0.7-1.3 mm. long,with flat face & grooved back,granulate.Hs.

Type- Spain-in arenosis et inter lapides regionis alpinae, Sierra Tejeda in parte superiori,et in summis Sierra de la Nieve amic,Boiss. [G].

SYRIA- Mt.Hermone,21-2400m,,26-6-1855,Ky.208

IRAN- Mt.Zerde,Aucher 441; Kuh Daena,29-7-1842,Ky.768.

Geogr.(of var.) Spain,Algeria,Lebanon,Syria & Iran.

Habitat- On mountains;alt.-21-2400m..Fl.-July

The type var.Boryi is confined to Spain & N.W. Africa.On the other hand,the distribution of the var.tejedensis is highly disjunct,occurring in Spain& N.W.Africa in one hand ,and in Lebanon,Syria & Iran on the other.

83. S.palinotricha Fenzl,ap Boiss.,Fl.Or.,i,621 (1867);Rohrb.,Monogr. Sil.,132 (1868).

Perennial,10.0-15.0 cm.tall.Caudices several from the crown,ascending,branched,covered with the bases of old leaves. Stem ascending-erect or erect,terete,leafy,densely crisp puberulent below,becoming sparsely & minutely puberulent or more or less glabrous above.Caudical and lower cauline leaves rosulate, petiolate,3.5-7.0 cm.long,3.5-6.0 mm.wide,oblong-lanceolate to lanceolate,attenuated into petiole,base with hyaline margin; other cauline leaves subsessile or sessile,1.8-4.1 cm.long, 3.0-5.5 mm.wide,lanceolate or linear-lanceolate;all leaves 3-nerved,more or less acute,crisp-puberulent,with ciliate margin. Flowers hermaphrodite,solitary,terminal,or 2-3 in a cyme.Bracts & bracteoles subequal,linear-lanceolate,acuminate,3-nerved at the base,with hyaline villose margin.Pedicels of terminal flowers 1.5-4.5 cm.long,& those of lateral flowers 1.0-2.3 cm. long,erect.Calyx 2.4-2.7 cm.long,3.0-4.0 mm.diam.,cylindrical-clavate,truncate at the base,with 10 pinkish or purplish anastomosed nerves,densely crisp puberulent,in fruit clavate; teeth 2.0-2.5 X 1.8-2.3 mm.,ovate,obtuse or round,with hyaline

ciliate margin.Petal white,2.3-2.6 cm.long;claw 1.7-1.8 cm.long, exserted,smooth;auricles obtuse,acute or round,often obscure; limb 6.0-8.0 X 3.5-4.5 mm.,cuneate,biparite into obovate-oblong lobes;ligules two,1.0-1.5 mm.long,oblong,crenulate.Filaments exserted,smooth.Styles 3, equaling claw,smooth.Anthophore 1.1-1.4 cm.long,smooth.Capsule oblong,as long as or somewhat longer than anthophore.Seed not seen. Hs.

Type- In regione alpina Persiae borealis,mons Demavend in jugo Nasseron ,Ky.[G.,BM!] ;montes inter Asterabad et Schahrud Bunge [G.]

Geogr. Endemic to Iran

Habitat- On mountains .Fl.-June

S.palinotricha appears to be close to S.Boryi var.tejedensis (Boiss.)Rohrb. in general habit,shape of calyx & capsule,but differs from the latter by the long oblanceolate,3-nerved leaves,in the nature and density of indumentum on stem & leaves,shape of the limb,& by the relative length of capsule & anthophore.It is further distinguished by the absence of auricles from the petal claw.

84. S.pulchella Chowdhuri,sp.nov. Plate 13;fig.18.

Affinis S.depressae M.B.(praesertim var.Meyeri Fenzl) sed indumento paginae foliorum glanduloso-puberulo, calyce post anthesin superne ovato-clavato subinflato infra capsulam attenuato,dentibus calycinis late triangularibus,

laminis petalorum obcordato-bifidis recedit.

Herba perennis,pumila,4.0-9.5 cm.alta,basi multicipiti-caespitosa.Caudex 3.0-15.0 cm.longus,2.5-6.0 mm.latus,tenuis, ligneus,ramosus,ad apicem foliatus.Caules numerosi,tenues,teretes, erecti,vel basi arcuato-erecti,simplices vel saepius supra breviter 1-2-ramosi (ramulis unifloris),ut folia glanduloso-puberuli,superne dense glanduloso-pubescentes viscidi;nodis plus minus incrassati,interdoni infimi abbreviati,medii 0.8-2.1 cm. longi.Folia caudicalia rosulata,1.3-2.5 cm.longa,3.0-5.0 mm. lata,oblanceolata vel lineari-oblanceolata vel obovata,in petiolum fere aequilongum sensim attenuata,basi brevissime vaginato-connata ibique membranaceo-marginata,ciliolata,marcescentia, ad apicem obtusa vel mucronulata rarius acuta;folia caulina sessilia vel breviter petiolata,1.3-3.0 cm.longa,3.0-6.0 mm.lata, caudicalibus similia,sursum paullum increscentia,erecto-adpressa, omnia canescentia,viridia,uninervia,costa mediana subtus prominente.Flores hermaphroditi,solitarii vel 2-3 irregulariter subdichotome dispositi,breviter pedicellati.Bracteae aequales, 6.0-9.0 mm.longae,2.0-3.5 mm.latae,lanceolatae vel oblanceolatae, acutae,versus basin anguste membranaceo-marginatae ciliolatae, glanduloso-puberulae.Pedicelli 2.0-4.0 mm.longi,stricti,erecti, glanduloso-puberuli.Calyx 2.6-2.8 cm.longus,8.0-10.0 mm. diametro, elongato-clavatus,superne subinflatus,rubello- vel albido-membranaceus,nervis 10 purpurascentibus superne anastomosantibus praeditus,glanduloso-puberulus viscidus,in fructu superne ovato-clavatus subinflatus infra capsulam attenuatus,basi truncato-umbilicatus;dentes 3.5-4.3 X 4.0-5.0 mm.,late ovate-triangulares, obtusi,late hyalino-marginati ciliolati.Petala alba vel pallide

Plate 13

Davis 23,775, O.Polunin
Silene

Turkey. Prov. Van dist.Baskale:
Ispiris Dag, 3200 m. Among lime-
stone rocks. Fls white, fading to

Plate 13-Silene pulchella Chowdhuri

Fig.18

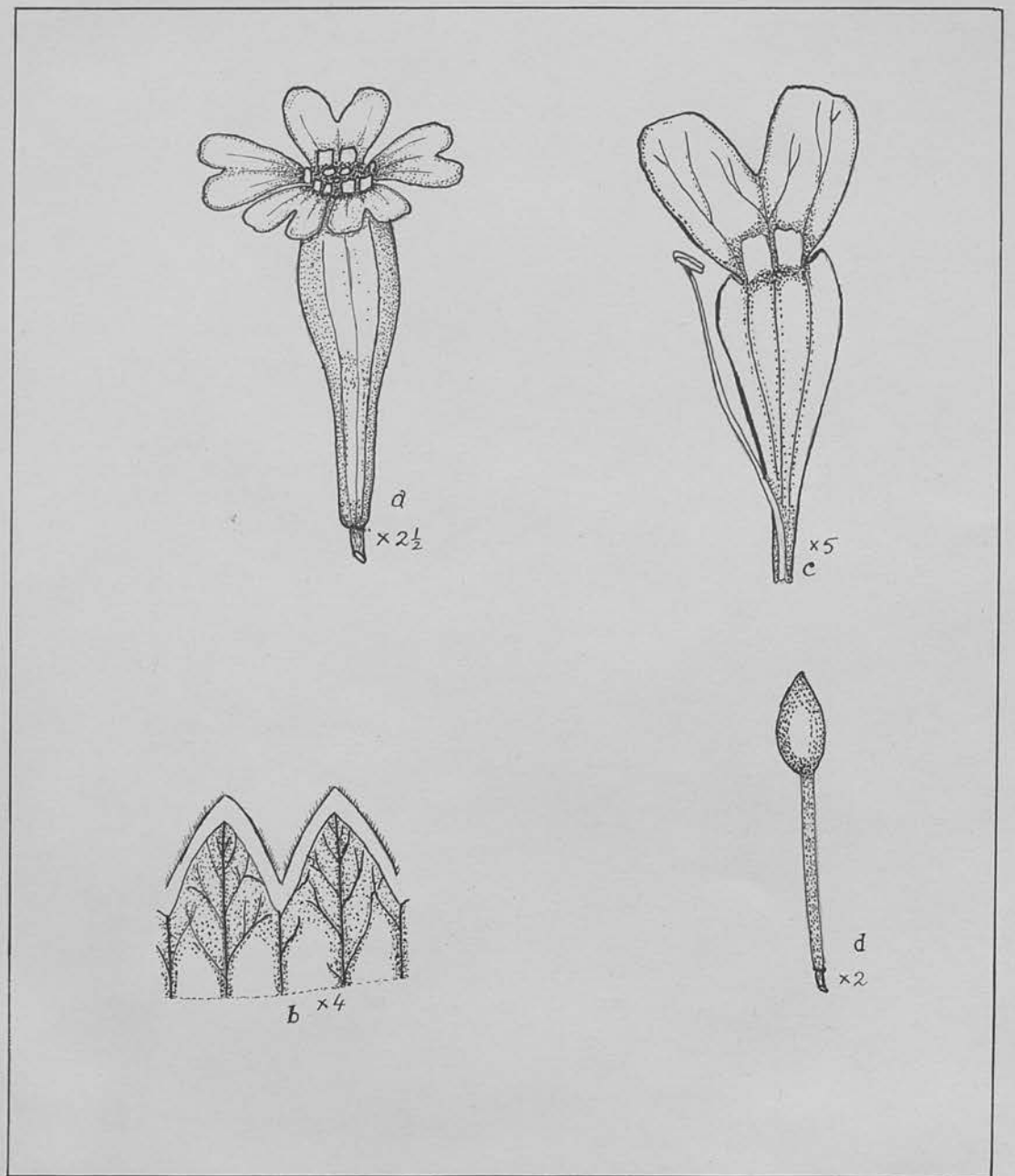


Fig.18.Silene pulchella :a-flower;b-calyx teeth;
c-petal ;d-capsule.

rosea,1.3-1.5 cm.longa,in sicco purpurea;unguis 7.5-8.0 mm. longus,breviter exsertus,glaber,superne dilatatus et obtuse auriculatus;lamina 6.0-7.0 X 7.0-8.0 mm.,obcordata,ad medium in lobos oblongos ad apicem rotundatos bipartita;ligulae binae,1.3-1.8 mm.longae,oblongae,obtusae,crenulatae vel denticulatae.Filamenta 1.0-1.2 cm.longa,glabra,exserta.Styli tres,6.0-8.0 mm.longi,exserti,puberuli.Anthophorus 1.7-1.9 cm.longus,basi brevissime puberulus,superne glaber.Capsula 6.0-9.0 X 4.3-5.0 mm.,ovoideo-oblonga,anthophoro duplo vel triplo brevior,calyce inclusa.Semina brunea,1.0-1.3 mm.longa, dorso canaliculata,faciebus plana.

Turkey- Prov.Van,dt.Baskale:Ispiriz dag,3200m.,among limestone rocks,31-7-1954,Davis 23775 O.Polunin [holo.K.,iso.E.] ; Erek dag,2400m.,shady volcanic cliff,18-7-1954,Davis 22940 O.Polunin.
Prov.Hakkari:Cilo Tepe,3000m.,cliff ledge,8-8-1954,Davis 24032 O.Polunin.

85. S.brevicaulis Boiss.,Diagn.Pl.Nov.Or.,Ser.1.i,34 (1842).

Caespitose perennial,(3.0)4.3-13.5 cm.tall.Caudex 7.0-22.0 cm.long,2.0-4.5 mm.wide,ascending or semi-decumbent, becoming branched and suffruticose,covered with bases of old leaves.Stem erect,arcuately erect,terete,leafy,simple,conspicuously hirsute,sometimes hispidulous,sparingly glandular below,becoming dense & viscid above;middle internodes 2.5-4.9 cm.long.Caudical & lower cauline leaves rosulate,petiolate,1.3-6.0 cm.long,

1.5-5.0 mm.wide,lanceolate,linear-lanceolate or oblanceolate, attenuated into petiole,base with hyaline margin;cauline leaves subsessile or sessile,1.6-4.7 cm.long,2.0-10.0 mm.wide,lanceolate or oblong-lanceolate;all leaves acute,3-nerved at the base, hirsute & sparsely glandular.Flowers hermaphrodite,erect,solitary or 2-3 in a dichasial cyme.Bracts equal,like the cauline leaves. Pedicels of terminal flowers 4.0-7.0 mm.long,and those of lateral ones 1.0-1.7 cm.long.Calyx 2.4-2.7 cm.long,3.5-4.0 mm.diam., cylindrical-clavate,truncate,with 10 pinkish anastomosed nerves, hirsute & viscidly glandular,in fruit more or less constricted below the capsule;teeth 2.5-4.0 X 1.5-2.3 mm.,unequal,lanceolate, sometimes ovate,acute,with hyaline villose margin.Petal white, 1.5-1.8 cm.long,claw 9.0-10.0 mm.long,exserted,smooth;auricles obtuse or acute,sometimes true auricles lacking;limb6.5-8.0 X 3.0-5.0 mm.,oblong,more or less cuneate at the base,bipartite into 1/3 of its length into oblong lobes;ligules two,1.0-1.3 mm. longlanceolate,acute or obtuse.Filaments exserted,smooth.Styles 3,exserted,hairy.Anthophore 1.15-1.35 cm.long,smooth.Capsule 6.0-7.5 X 3.5-4.0 mm.,ovoid,1½-2 times shorter than anthophore, included.Seed dark brown,with flat face & acutely grooved back, granulate.Hs. or Hp.

Key to the varieties.

Plants 3.0-8.0 cm.tall;cauline leaves 8.0-16.0 mm.long,2.0-4.5 mm.wide,linear-lanceolate to lanceolate;limb oblong-cuneate .....a.var.brevicaulis.

Plants (5.0)8.0-13.5 cm.tall;cauline leaves 2.4-4.7 cm.long, 6.0-10.0 mm.wide,lanceolate to oblong-lanceolate or oblanceolate;

limb obovate .....b.var.latifolia

a. var. brevicaulis . Boiss.,Fl.Or.,i,623 (1867);Rohrb.,Monogr. Sil.,130 (1868) .Plate 14.

Plants 3.0-8.0 cm.tall.Caudical leaves rosulate; cauline leaves 8.0-16.0 mm.long,2.0-4.5 mm.wide,linear-lanceolate, lanceolate or oblanceolate ,3-nerved.Flowers usually solitary, seldom 2-3.Limb oblong,more or less cuneate at the base.

Type- Turkey-in monte Ak dag,Aucher 440 [holo.G!;iso.K!]

TURKEY- Cataonia,Ak dag,Montb.2054

b. var. latifolia Boiss.,Fl.Or.,i,623 (1867);Rohrb.,Monogr.Sil., 130 (1868)[lusus 2].

Plants (5.0) 8.0-13.5 cm.tall.Caudical leaves often disappearing from the old plants;cauline leaves 2.4-4.7 cm.long, 6.0-10.0 mm.wide,lanceolate or oblanceolate,seldom narrowly lanceolate,Flowers usually 2-3 ina dichasial cyme.Limb obovate.

Type- Turkey-in fissuris rupium verticalium montis Beg dagh? Cataoniae,Hausskn. [holo.G!;iso.K!]

TURKEY- Prov. Mardin :Mardin,9-6-1889,Sint.1020; ibid. a1900, Post ;Kaletmere,17-5-1951,Atilla .Prov.Maras:Ahir dag,1800m., July 1907,Harad.1631

Geogr.(of sp.) Endemic to Turkey

Habitat-Rocky places,sometimes in clefts of rocks,especially vertical ones;alt.-1800 m..Fl.-June & July.

Plate
14

Plate 14-Silene brevicaulis Boiss.

S.brevicaulis is closest to S.depressa var.Meyeri (Fenzl)Rohrb. & S.commelinifolia var.isophylla Bornm.;from the first it differs in the following points-i. stem (including leaves) pubescent & hirsute,often hispidulous,but always sparingly glandular below & densely so above;ii. lanceolate acute calyx teeth; iii. auriculate claw;iv. oblong-cuneate limb; v. shape of capsule & its length in relation to that of anthophore.It is set off from S.commelinifolia var.isophylla by its usually solitary flowers or 2-3-flowered cyme,by its calyx with truncate base which is not at all inflated,by its oblong-cuneate or obovate petal limb,and by the size of capsule which is usually smaller.

S.brevicaulis is also related to S.antitaurica Chowdhuri & S.Davisii Chowdhuri ,which I have discussed under those species.

86. S.antitaurica Chowdhuri,sp.nov. Plate 15 ;fig.19.

Affinis S.Boryi Boiss. sed habitu valde compacto, foliis caulinis confertis internodiis multo longioribus,ungue petalino obtuse auriculato recedit.

Herba perennis,pumila,saxatilis,basi multicipiti-subcaespitosa,caudicibus brevibus lignosis ramosissimis dense compactis arcuatis vel geniculato-erectis praedita.Caules floriferi erecti vel ascendenti-erecti,simplices vel subramosi, 3.1-4.9 cm.alti,0.7-1.5 mm.lati,teretes,ut folia leviter glanduloso-pubescentes,superne dense glanduloso-puberuli,haud

viscidi;nodis incrassatis;internodiis infimis abbreviatis, mediis 3.0-8.5 mm.longis.Folia caulina numerosa,conferta, erecta,viridio-flavescentia,omnia lanceolata vel lineari-lanceolata, 2.0-3.75 cm.longa,2.0-3.5 mm.lata,basin calycis valde superantia, basi in petiolum gradatim attenuata,ciliata,ad apicem acuta vel acuminata,subtus prominenter 3-5-nervia,basi membranaceo-dilatata, villosa,costa mediana pallida;folia caudicalia emarcida sed persistentia.Bracteae aequales,anguste ovato-lanceolatae,1.9-2.38 cm.longae,2.5-2.8 mm.latae,basi trinerves,anguste membranaceo-marginatae ciliolatae,pilis longis glanduloso-villosis et pilis brevibus glangulosis puberulae.Pedicelli stricti,erecti, breves (2.0-2.8 mm.longi),glandulosi.Flores solitarii, hermaphroditi .Calyx 2.7-3.0 cm.longus,3.3-4.0 mm. diametro, cylindrico-clavatus,membranaceus,nervis 10 purpurascentibus superne anastomosantibus praeditus,minute pubescens,glanduloso-pilosus,in fructu infra capsulam paullum constrictus,ad apicem haud contractus,basi truncato-umbilicatus;dentes anguste triangulares vel ovato-triangulares,inferne subconstricti,acuti. Petala rosea,1.7-1.9 cm.longa;unguis 9.0-10.5 mm.longus, breviter exsertus,glaber,superne dilatatus et obtuse auriculatus; lamina 7.5-9.0 X 5.0-6.3 mm.,cuneato-obcordata,ad 2/5 bipartita, lobis 3.0-4.3 X 3.0-3.5 mm.,oblongis ad apicem rotundatis praedita;ligulae binae,0.9-1.5 X 0.7-1.0 mm.,oblongae,obtusae, crenulatae vel denticulatae.Filamenta 9.0-13.0 mm.longa,exserta, glabra.Styli tres, 6.0-6.5 mm.longi,exserti,superne paullum minuti-pubescentes.Anthophorus 1.8-2.15 cm.longus,brevissime puberulus.Capsula 8.0-9.7 X 3.5-4.5 mm.,ovoideo-oblonga, anthophoro duplo vel triplo brevior,calyce inclusa.Semina

Plate 15

Plate 15-Silene antitaurica Chowdhuri

Fig.19

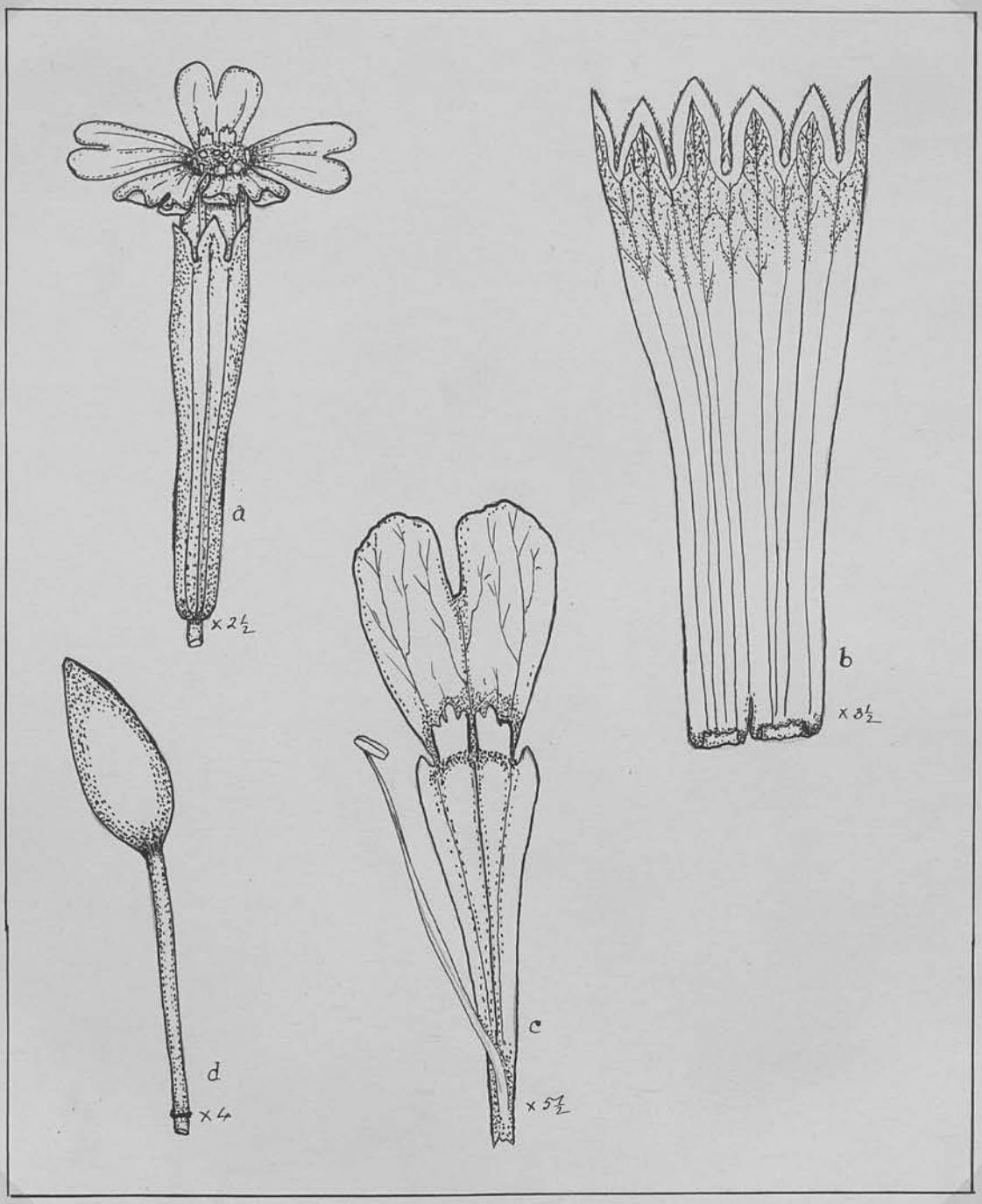


Fig.19.Silene antitaurica:a-flower;b-calyx split open showing teeth and nervation; c-petal; d- capsule.

brunea,0.9-1.3 mm.longa,reniformia,paullum compressa,dorso leviter canaliculata papillosa,faciebus plana.

Turkey-Prov. Maras,dt.Goksun:Hobek dag (S.W of Goksun),1800-2000m.,on vertical limestone cliff,21-7-1952,Davis 20179 Dodds & Cetik [holo.K.;iso.E.]

In addition to the differentiae cited above,the species generally differs from S.Boryi Boiss. in having smaller caudical & lower cauline leaves,those often disappearing from the matured plants;other cauline leaves are crowded and bracts nearly equaling the calyx.The leaves in this species vary from linear-lanceolate to lanceolate and the number of nerves varies from 3 to 5,and more over the plants are not at all viscid.This species has been described from 4 sheets collected by P.H.Davis from Turkey.Further studies on abundent material may prove that S.antitaurica is only a subspecies of S.Boryi Boiss./In habit S.antitaurica resembles S.brevicaulis Boiss., but differs from the latter primarily in its more abundant upper cauline leaves,long bracts that exceed the calyx,pink petals, hairy anthophore,and in plants not being viscid.

87. S.commelinifolia Boiss.,Diagn.Pl.Nov.Or.,Ser.1.i,35 (1842).

Caespitose perennial,4.5-16.0 cm.tall.Caudex erect, ascending or arcuate at the base,branched,with leaf scars and leaf bases.Stem erect, sometimes arcuate,terete,leafy,simple below,usually sparingly branched from the middle upwards,

puberulent & hirtellous throughout,sparingly glandular below, becoming dense and viscid above;middle internodes 2.0-4.2 cm. long.Caudical leaves rosulate,petiolate,1.8-8.7 cm.long,1.5-8.0 mm.wide,linear-lanceolate,lanceolate or oblanceolate,seldom linear,attenuated into petiole,straight,sometimes slightly curved,base with hyaline ciliate margin,acute or acuminate, seldom obtuse or nearly so;cauline leaves conspicuous,sessile, 0.7-4.2 cm.long,0.3-2.4 cm.wide,ovate with cordate base,sometimes lanceolate,acute;all leaves 3-5-nerved,hirtellous & sparsely glandular.Flowers hermaphrodite,erect,usually 3-5 or 7 in a dichasial cyme,sometimes solitary & terminal.Bracts equal, like the cauline leaves.Pedicels 4.0-10.5 mm.long.Calyx 3.0-3.5 cm.long,4.0-6.5 mm.diam.,cylindrical-clavate,umbilicate,with 10 purplish anastomosed nerves,glandular-puberulent & viscid, in fruit clavate or oblong-clavate,more or less inflated;teeth 3.8-5.5 X 3.0-4.0 mm.,lanceolate,acute,with hyaline ciliate margin.Petal white,2.4-3.5 cm.long; claw 1.8-2.6 cm.long,exserted, smooth;auricles acute;limb 6.0-9.0 X 3.5-5.0 mm., oblong, bipartite into oblong-linear lobes;ligules two,1.0-1.8 mm.long, triangular,acute.Filaments exserted,smooth.Styles 3,exserted, hairy.Anthophore 1.8-2.3 cm.long,smooth.Capsule 9.0-17.0 X 4.3-5.0 mm.,oblong-ovoid,as long as or 1½-2 times shorter than anthophore, included.Seed dark brown,0.8-1.3 mm.long,with flat face & grooved back,granulate.Hp.

Key to the varieties.

Leaves dimorphic: cauline leaves ovate with cordate or subcordate bases;caudical leaves lanceolate or oblanceolate

.....a.var.commelinifolia

Leaves monomorphic,lanceolate or linear-lanceolate,sometimes oblanceolate .....b.var. isophylla

a. var. commelinifolia . Boiss.,Fl.Or.,i,624 (1867);Rohrb.,Monogr. Sil.,128 (1868).

Syn. S.commelinifolia var.heterophylla Fenzl in Ky.Pl.Pers.,ms.
S.umbrosa Bornm.,Fl.Pers.,no.51 (1905),ms.

Caudical leaves 2.3-8.7 cm.long,1.8-8.0 mm.wide,linear-lanceolate,lanceolate to oblanceolate;cauline leaves 0.7-4.2 cm.long,0.7-2.4 cm.wide,ovate with cordate or subcordate bases.

Type- In Persiae monte Zerdkou,Aucher 442 [holo.G.;iso.K!,BM!]

IRAQ- Mt. of Pir Omar Gudrun,15-1800m.,June 1867,Hausskn.;ibid. 2000m.,7-6-1948,Rawi 12101

IRAN- Elbrus above Passgala,Ky.309 ;Schahu,21-3000m.,July 1867, Hausskn.;Mishon dag,12-7-1929,Gilliat-Smith 2386 ;Elbrus,opp. Keredj,21-5-1937,Rechinger 347; Elbrus,Totschal,Scheheristanek 2200m.,3-6-1902,Bornm.6373;Mishan dag,2400m.,12-6-1924, Grossheim & Schischkin 302;Bakhtiari,sine loco,Sawy.

b. var. isophylla Bornm. in B.B.C.,xix,216 (1905).

Syn. S.iranica Bunge in It.Pers.,1859.,ms.
S.commelinifolia forma angustiora Boiss.,Fl.Or.,i,624(1867)

Leaves monomorphic,linear-lanceolate,lanceolate or oblanceolate;caudical leaves 1.8-7.0 cm.long,1.5-6.3 mm.wide; cauline leaves 1.7-2.8 cm.long,3.0-5.0 mm.wide,sessile.

Type-Turkey-in Armenia,Aucher 4206 [holo.G.;iso.K!,BM!]

IRAN- Hills of Sir,2100m.,16-5-1929,Cow.& Darl.2189 ;Derband, 1950m.,22-5-1929,Cow.& Darl.2385 ;Elwend,a1882,Polak ; North Iran,sine loco.a.1882,Polak.

Geogr. (of sp.) Turkey,Iraq,Iran & Caucasus

Habitat (of sp.)- Mountain regions;alt.-1950-3000m..

Fl.-May-July.

S.commelinifolia resembles S.lazica Boiss.,through its var. commelinifolia ,& is related to S.brevicaulis Boiss. through its var.isophylla.It is quite distinct from S.lazica , as it has a reduced few-flowered dichasium,cylindrical-clavate calyxand oblong bipartite limb.It also differs from S.lazica by its less dense indumentum,& 3-5-nerved cauline leaves.It can easily be distinguished from S.brevicaulis by its shorter calyx which is not inflated,and oblong-cuneate limb.

88. S.microphylla Boiss.,Diagn.Pl.Nov.Or.,Ser.1.i,33 (1842);Boiss., Fl.Or.,i,624 (1867);Rohrb.,Monogr.Sil.,135(1868); Parsa,Fl.de l'Iran,vol.1.ii,fig.812 & 813 (1951).

Perennial,5.0-16.0 cm.tall.Root massive,with a multicipital crown. Caudex slender,ascending,sparingly branched,covered with the bases of old leaves.Stem ascending or erect,simple or sparingly branched,leafy,terete,valvety-grey with deflexed hairs, often hirtellous,becoming sparsely glandular above.Caudical & lower cauline leaves small,5.0-9.0 mm.long,2.5-4.0 mm.wide,ovate- or lanceolate-spathulate,attenuated into short petiole,base with

hyaline ciliate margin,apex obtuse;other cauline leaves conspicuous,7.0-16.0 mm.long,3.0-7.0 mm.wide,ovate,seldom oblong-lanceolate,sometimes obovate,obtuse;all leaves greyish with dense retrorse hairs and more or less hirtellous.Inflorescence a dichasial cyme,1-3-or 5-9-flowered.Bracts equal,lanceolate. Pedicels 2.0-7.0 mm.long,erect.Flowers hermaphrodite,erect. Calyx 2.5-2.7 cm.long,3.0-5.0 mm.diam.,cylindrical- or oblong-clavate,umbilicate,with 10 pinkish anastomosed nerves, glandular-puberulent,in fruit clavate with a constrction below the capsule;teeth 2.8-3.3 X 2.0-2.5 mm.,ovate,obtuse, with hyaline ciliate margin.Petal white,2.0-2.2 cm.long; claw 1.4-1.5 cm.long,more or less exserted,smooth,exauriculate; limb 6.0-7.0 X 4.0-5.0 mm.,oblong,bipartite into 2/3 of its length into linear lobes;ligules two,1.3-2.0 mm.long,oblong-linear,emarginate.Filaments exserted,smooth.Styles 3, exserted, hairy.Anthophore 1.1-1.25 cm.long,smooth.Capsule 1.1-1.3 X 0.4-0.55 cm.,oblong-ovoid,as long as anthophore,included. Seed dark brown,with flat face & grooved back,granulate.Hp.

Type- In monte Persiae Dalmkou,Aucher 4213 [holo.G.;iso.K!,BM!]

IRAN- Gilan,Fischer; 40 m. W.of Ispahan,1350m.,22-4-1929, Cow. & Darl.674 ;60 mm.W.of Ispahan,1500m.,22-4-1929,Cow.& Darl. 1142

Geogr. Endemic to Iran.

Habitat- On mountains;alt.-13-1500m..Fl.-April

S.microphylla is probably closely related to S.Boryi var.tejedensis (Boiss.)Rohrb. but at the same time is connected to S.minutifolia Chowdhuri in general habit,leaf shape,and

the nature & distribution of indumentum.S.microphylla shows some similarity to var.tejedensis in the shape of the cauline leaves and their distribution on the stem,but easily set off from the latter by its ascending habit,shape of the petal,& relative length of capsule and anthophore.It differs further from the var.tejedensis by its exauriculate petal.

89. S.minutifolia Chowdhuri,sp.nov. Plate 16;fig. 20.

Affinis S.microphyllae Boiss. sed foliis minutissimis, bracteis ovatis,floribus angustioribus,dentibus calycis ovatis obtusis,laminis petalorum purpurascentibus oblongis emarginatis, unguibus auriculatis recedit.

Herba perennis, caespitosa,humilis,multicaulis.Radix crassa,verticalis,elongata,lignea.Caudices numerosi,breves, filiformes,foliosi,simplices,decumbenti-ascendentes.Caules floriferi tenues,4.5-8.1 cm.alti,0.3-1.5 mm.lati,teretes, violascentes,e basi arcuato-erecti,simplices vel a medio vel supra 1-2 ramosi,sparse glandulosi et subretrorse puberuli, superne dense glanduloso-pubescentes.Folia omnia parva,uninervia, subcarnosa;inferiora anguste lanceolata,4.5-6.3 mm.longa,1.3-1.5 mm.lata,subsessilia,ad apicem obtusa vel rotundata,canescenti-puberula;superiora ovato-lanceolata,4.5-6.0 mm.longa,2.0-2.8 mm.lata,sessilia,,acuta,canescenti-tomentulosa et glanduloso-puberula.Bracteae aequales,ovato-acuminatae,3.5-5.0 X 1.8-3.0 mm., crispule puberulae,tota longitudine anguste membranaceo-marginatae, villosae.Pedicelli stricti,4.0-12.5 mm.longi,glanduloso-pubescentes

Flores hermaphroditi,1-3,in apice caulis vel ramulorum solitarii,terminales longe pedicellati,laterales brevissime pedicellati. Calyx 1.5-1.65 cm.longus,3.0-3.5 mm.diametro, tubulosus,membranaceus,glanduloso-puberulus,basi truncatus, 10-nervius,nervis violascentibus,medianis ad apicem latis, commissuralibus superne in venulas plures abeuntibus;dentes 1.8-2.5 X 1.5-1.8 mm.,ovati,obtusi,saepius ad apicem emarginati, late membranaceo-marginati,ciliolati,in fructu ad apicem haud contracti.Petala 1.2-1.35 cm.longa,rosea,subtus viridia; unguis calycem non vel vix superans,superne dilatatus et obtuse auriculatus,glaber vel minute ciliolatus;lamina 5.3-6.0 X 3.5-4.0 mm., oblonga,emarginata;ligulae binae,1.0-1.5 X 0.5-0.8 mm., oblongae,denticulatae.Stamina exserta;filamenta 1.3-1.43 cm. longa,glabra.Styli tres,4.5-7.0 mm.longi,exserti,pubescentes, ad apicem recurvi. Anthophorus 7.0-8.5 mm.longa,glaber. Capsula ignota.

Persia- Barf Khanneh Yeyd, 3900 m.,in clay soil at the top of granite screes with thyme etc.,22-7-1932 ,Balls 131 [holo.E.]

Plate 16

ROYAL BOTANIC GARDEN
EDINBURGH.

Silene minutifolia Chowdhuri, spec. nov.
Det. Chowdhuri 19-7 1955

FLORA OF PERSIA 131.

silene sp.
Barf Khanneh Lloyd. Alt. 13,000 ft.
Flowers bright pink with green. buff reverse. leaves grey + slightly woolly. Petals slightly tucked in at ends. ring of small petals at top of perianth tube. Growing in wet clayey soil at top of granite screes. with Lupins etc.
Date 22nd July 1932. Coll. H. K. Bella.

Plate 16-Silene minutifolia Chowdhuri

Fig.20

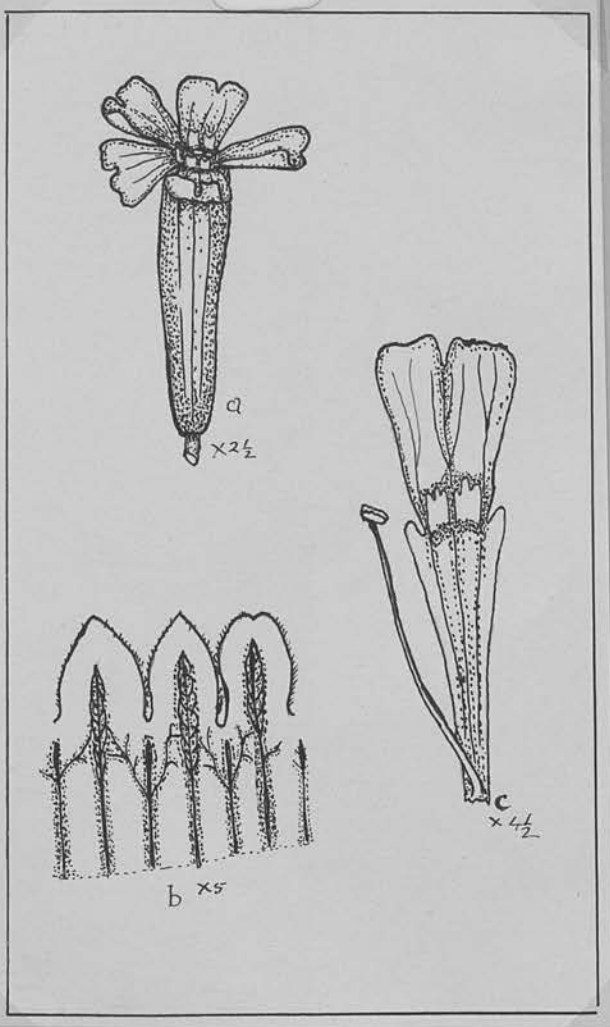


Fig.20.Silene minutifolia:
a-flower;b-calyx teeth
c-petal.

SECTION 24 MACRANTHAE

The 20 species of this section are characterized by their low stature,filiform caudex & stem,and linear or linear-lanceolate leaves.The flowers are rather small,solitary or 2-3 or 5 in a dichasial cyme.The calyx is glabrous or glandular-puberulent, clavate,obconical-cylindrical or obconical.The petal is usually bipartite and ligulate,with a smooth or ciliate,exauriculate claw.

The species fall into 3 subsections depending on their habit,nature of stem,shape & size of calyx,and lastly on the presence and absence of indumentum.

The subsect. Dianthifoliae,comprising 4 species all from Turkey,Syria & Palestine,is characterized by its more or less glabrous habit,subscapiform stem,and obconical or obconical-cylindrical calyx which is glabrous & more or less subcoriaceous. Its habit,indumentum,calyx shape all suggest an affinity with section Sclerocalycinae. In fact one or two species of this subsection were placed by Post in the same group with some members of the section Sclerocalycinae .But reduction in size of plant,accompanied by reduction of the inflorescence to solitary flowers,makes this subsection quite distinct from Sclerocalycinae.

The subsect. Saxifragae,containing 12 species is a Mediterranean one with plants having a caespitose habit,stem leafy and filiform,and calyx cylindrical-clavate or clavate, very rarely campanulate.

The 3rd subsection,Pulvinatae ,comprising 4 species, has

a peculiar distribution: 3 species from the adjacent areas of Greece and Turkey,but S.heterodonta from N.W. Africa. Nevertheless all 4 species show a well-developed pulvinate habit,usually glandular-puberulent & viscid,and stem scapiform bearing 1 or 2-3 flowers in a cyme

Key to the subsections and the Oriental species.

1a. Stem leafy,scabrous-puberulent;calyx clavate or clavate-campanulate 24B.Subsect.Saxifragae

1b. Stem scapiform,glabrous or glandular-puberulent above; calyx obconical or obconical-cylindrical,rarely clavate-campanulate :

2a. Plants without a cushion at the base,glabrous throughout; calyx obconical-cylindrical 24A.Subsect.Dianthifoliae

3a. Claw auriculate;anthophore less than 10.0 mm.in length;capsule as long as or longer than anthophore 91.S.dianthifolia

3b. Claw exauriculate;anthophore more than 10.0 mm. in length;capsule shorter than anthophore .....90. S.Porteri

2b. Plants with a cushion base;,usually glabrous below, becoming glandular- or hirtellous-puberulent & viscid above;calyx obconical or clavate-campanulate 24C.Subsect.Pulvinatae

SUBSECTION 24A. DIANTHIFOLIAE

90. S.Porteri Post in Boiss.,Fl.Or.,Suppl.,104 (1888);Williams in Journ.Linn.Soc.,xxxii,90 (1896);Post,Fl.Syr.Pal.& Sinai,ed.2.i,187 (1932).

Caespitose perennial,5.0-20.0 cm.tall.Caudex short,erect, many-stemmed,becoming branched & more or less suffruticose,covered with bases of old leaves.Stem erect,terete,simple,pruinose-csabrous below,becoming glabrous and viscid above;middle internodes 1.0-3.2 cm.long.Caudical leaves rosulate,2.3-4.7 cm.long,2.5-4.0 mm.wide,linear-spathulate,attenuated into a short petiole,base with hyaline ciliate margin,scabrous;middle cauline leaves more or less reduced,bract-like,linear,acute;upper ones linear-subulate, with hyaline ciliate margin at the base,glabrous.Flowers usually solitary,sometimes 2-3 in a cyme,hermaphrodite,erect.Bracts equal,like the upper cauline leaves.Pedicels 9.0-23.0 mm.long, strict,erect.Calyx 2.4-2.6 cm.long,3.0-3.5 mm.diam.,obconical-cylindrical,subcoriaceous,umbilicate,with 10 greenish-red anastomosed nerves,in fruit clavate;teeth 2.0-2.8 X 2.0-3.0 mm.,ovate or ovate-triangular,obtuse or emarginate,with hyaline ciliate maegin.Petal 1.45-1.7 cm.long;claw 8.5-10.0 mm.long, exserted,smooth,exauriculate;limb 6.0-7.0 X 2.3-3.0 mm.,cuneate, bipartite into oblong-linear lobes;ligules two,1.3-1.5 mm. long,lanceolate,acute.Filaments exserted,smooth.Styles 3,exserted, hairy.Anthophore 1.3-1.5 cm.long,smooth.Capsule 8.0-10.5 X 4.0-4.5 mm.,ovoid-oblong,shorter than anthophore,included. Seed brown,with flat face & grooved back.Ch.

Type-Turkey-in jugo Ziaretdagh Amani Syriae borealis,Post
[holo.G.;iso.BM!]

Geogr. Endemic to the area cited above.
Habitat- Alpine region .Fl.-June-Sept.

91. S.dianthifolia J.Gay in Tchihat.,Asie Min.Bot.,i,193 (1860).

Caespitose perennial,7.0-50.0 cm.tall.Root woody, with a multicipital crown.Caudex subterranean,4.0-9.5 cm.long, 2.0-6.5 mm.wide,prostrate or ascending,sometimes erect,usually compactly branched,with leaf scars in the old part and leaf bases on the young portion.Stems few to many,erect,terete, subscapiform,simple,sometimes sparingly branched above,glabrous, glaucous,more or less viscid above;middle internodes 1.3-8.5 cm.long.Caudical leaves rosulate,1.5-6.7 cm.long,1.0-3.0 mm.wide,linear,linear-lanceolate,or linear-oblanceolate, attenuated into the petiole,base with hyaline ciliate margin; cauline leaves in a few pairs,more or less bract-like,somewhat remote,0.6-5.1 cm.long,1.5-2.0 mm.wide,linear,with hyaline ciliate margin at the base;all leaves 1-nerved,acute,glabrous. Flowers hermaphrodite,erect,solitary,terminal,or 2-5 in a cyme.Bracts equal,linear or setaceous,1-nerved,glabrous.Pedicels 0.5-3.8 cm.long,erect.Calyx 1.6-1.9 cm.long,3.5-4.0 mm.diam., obconical-cylindrical,slightly umbilicate,glabrous,with 10 purplish anastomosed nerves,in fruit clavate;teeth 2.0-2.8 X 2.0-2.5 mm.,ovate,obtuse or emarginate,with wide hyaline ciliate margin.Petal white or greenish white,1.5-1.8 cm.long;claw 9.0-10.0 mm.long,exceeding calyx,smooth;auricles obtuse,acute or

true auricle lacking;limb 6.0-8.0 X 4.5-5.3 mm.,cuneate,bipartite into oblong-linear lobes;ligules two,1.3-2.0 mm.long,oblong, obtuse,acute or denticulate.Filaments exserted,smooth.Styles 3,included,smooth.Anthophore 7.0-9.5 mm.long,smooth.Capsule 8.0-12.5 X 4.5-5.5 mm.,ovoid-oblong,as long as or slightly longer than anthophore,slightly protruding calyx.Seed brown, 0.9-1.3 mm.long,with flat striate face & obtuselt grooved granulate back.Chh.

Key to the varieties.

Plants 30.0-50.0 cm.tall;stem branched above,2-5-flowered; caudical leaves 2.5-6.7 cm.long,linear-lanceolate .....a.var.dianthifolia.

Plants below 20.0 cm.in height;stem simple,1-fowered;caudical leaves 1.5-2.5 cm.long,narrowly lanceolate or oblanceolate .....b.var.pumila

a. var. dianthifolia . Boiss.,Fl.Or.,i,650 (1867);Rohrb.,Monogr. Sil.,128 (1868).

Syn. S.dianthifolia J.Gay in Tchihat.,Asie.Min.Bot.,i,193(1860); non Otth (1824);non Reichb.

S.fruticulosa Fenzl in Ky.Pl.Exs.;non Sieber in DC.,Prodr., i,376 (1824);non Willd.

Plants 30.0-50.0 cm.tall,with sparingly branched stem. Leaves 2.5-6.7 cm.long;caudical ones linear-lanceolate or linear,acute.Flowers 2-5 in a dichasial cyme.Capsule slightly protruding calyx

Type- Turkey-alpinis Ciliciae Bulgardagh supra Bulgarmaden, Bal. [holo.K!]

b. var. pumila Chowdhuri,var.nov.

Planta 7.0-20.0 cm.alta.Caules simplices.Folia caudicalia 1.5-2.5 cm.longa,lanceolata vel oblanceolata,raro obovata, plus minus obtusa.Flores solitarii vel bini.Capsula calyce inclusa.

Type-Turkey-Cilician Taurus:Bulgarmaden,yr.1855,Bal.804 ("S.dianthifolia forma humilior ") [holo.K.]

TURKEY- Prov.Maras,dt.Cardak:Berit dag,2800m.,26-7-1952,Davis 20294;ibid. 2900m.,29-7-1952,Davis 20356;dt.Goksun:Binboga dag, on Isik dag,above Karliya,27-2800m.,15-7-1952,Davis 20019. Bulgar Magara,Cilician Taurus,a1895,Siehe 533;between Bulgar Magara & Maaden,180m.,July & Aug.1853,Ky.104. Prov.Mersim: at Fillsspallin,2700m.,Kysel depe,2800m.,1895,Siehe 568 .

Geogr. Endemic .

Habitat-Alpine.;alt.-2700-2900m..Fl.-July & Aug.

S.dianthifolia is closely related to S.Porteri Post both in habit and absence of indumentum.The shape & structure of the calyx is the same in both species.But S.dianthifolia differs from S.Porteri in its short calyx which has pinkish or purplish nerves,ligulate petal,and by the relative length of the capsule and anthophore.Its affinity with S.caramanica Boiss.& Heldr. I have discussed under that species.

Var.dianthifolia is known only from the type locality,whereas var.pumila is more common.

(Bulgardagh above Bulgarmaden, Balansa)

SUBSECTION 24B. SAXIFRAGAE

92. S.Urvillei Schott,ex Urv. in Mem.Soc.Linn.Par.,i,304 (1822); Boiss.,Fl.Or.,i,650 (1867);Rohrb.,Monogr.Sil.,192(1868)

Syn. S.juniperina Kunth ex Rohrb.,Monogr.Sil,,193(1868).

Caespitose perennial,4.0-14.0 cm.tall.Root woody,with a multicipital crown.Caudex slender,reaching a length of 30.0 cm. & width of 4.0 mm.,branched,prostrate to decumbent,with marcescent shreds of old leaves.Stem erect,terete,leafy,simple, or sparingly & pedicellately branched above,scabrous-puberulent below,becoming glabrous above; nodes more or less swollen; middle internodes 0.5-1.6 cm.long.Leaves monomorphic,linear-subulate or linear,pointed,spreading,with clusters of small leaves in axils,serrate-ciliate,base with hyaline ciliate margin;lower leaves more or less puberulent;upper ones gradually reduced above,glabrous.Flowers solitary or 2-3 in a cyme, hermaphrodite,erect.Bracts equal,like the upper cauline leaves, with scarious smooth margin.Pedicels 6.0-12.0 mm.long,erect or ascending.Calyx 1.1-1.25 cm.long,2.3-2.8 mm.diam.,cylindrical-clavate,subcoriaceous,truncate,with 10 purplish more or less anastomosed nerves,glabrous;teeth unequal,1.8-2.3 X 1.5-2.0 mm., lanceolate,acute,often acute teeth alternate with obtuse ones, with wide hyaline scarious margin.Petal white with purplish reverse,1.0-1.1 cm.long;claw 5.5-6.0 mm.long,equaling calyx, smooth,exauriculate;limb 4.5-5.0 X 1.5-2.3 mm.,oblong-cuneatem bipartite (2/3) into linear or oblong-linear lobes;ligules two,0.3-0.5 mm.long,ovate.Filaments exsert,smooth.Styles 3, smooth,included.Anthophore 4.5-6.0 mm.long,scabrous.Capsule

5.0-6.3 X 2.5-3.3 mm.,oblong,as long as anthophore,included, Seed not seed.Chh.

Type -In summo cacumis insulae Coi,inter rupes fere nudas ad altitudinem 400 hexapodum,Urv. [holo. Paris]

Aegean Is. = Samos Is-sine loco,17-6-1886,Forsyth 357

Lesbos (Mitilini)-In Mt.Olympia at Ajassos,19-5 -1934, Rechinger 5558

Kos Is.-Mt.Kikaio(Dicheo),800m.,7-6-1935,Rechinger 8039

Geogr. Antalya in Turkey,islands of Samos,Lesbos & Kos.

Habitat- In mountains ;alt.-950m..Fl.-May & June.

S.Urvillei is unique in the section in several details, particularly in its subcoriaceous,glabrous calyx & linear pointed leaves.Apparently it is not closely related to any other Oriental Silene.The leaf character suggests to some extent its affinity with the members of the subsect. Masmenae.But the habit of the plant,structure of the calyx & minute fascicles of leaves in axils of main leaves are quite distinct from all other species. These characters suggest an affinity with the genus Acanthophyllum , but the presence of 3 styles and commissural calyx nerves keeps it distinct from that genus.

The species is monomorphic.

SUBSECTION 24C PULVINATAE

93. S.oreades Boiss. et Heldr.,Diagn.Pl.Nov.Or.,Ser.1.viii,92(1849); Boiss.,Fl.Or.,1,653(1867);Rohrb.,Monogr.Sil.,139(1868)

Syn.S.saxifraga var.oreades (Boiss.&.Heldr.)Rohrb.,Monogr.Sil. 139 (1868).

Pulvinately caespitose perennial; cushion 3.0-13.0 cm. across,3.0-8.5 cm.in height.Caudex 3.5-16.7 cm.long,2.0-10.0 mm. wide,woody,compactly branched,producing a cushion in old plant; some of the branches are subterranean and bear vegetative buds, erect,oblique or decumbent,young part covered with old leaves. Stem 4.5-10.3 cm.tall,scapiform,erect,filiform,simple,sometimes sparingly & pedicellately branched above,glabrous below,becoming densely glandular-puberulent and viscid above;middle internodes 1.3-2.5 cm.long.Caudical leaves rosulate,7.0-16.0 mm.long,1.0-1.8 mm.wide,linear or linear-lanceolate,attenuated into a short petiole,obtuse,glabrous,with hyaline margin at the base;cauline leaves in a few pairs,reduced,remote,bract-like,5.0-12.0 mm.long, 0.9-1.0 mm.wide,linear;upper ones glandular-puberulent;all leaves with serrate-ciliate margin.Flowers solitary,or 2-3 in a dichasial cyme,hermaphrodite,erect.Bracts equal,similar to cauline leaves. Pedicels 3.0-20.0 mm.long,erect.Calyx 7.0-7.5 mm.long,3.0-3.5 mm.diam.,obconical,truncate-umbilicate,glandular-puberulent & viscid,with 10 pinkish anastomosed nerves;teeth 1.5-2.0 X 1.5-2.0 mm.,oblong,obtuse or emarginate,with wide hyaline ciliate margin; in fruit campanulate with more or less constricted base.Petal white,purplish on the reverse,7.0-8.5 mm.long;claw 4.5-5.3 mm.long, slightly exceeding calyx,exauriculate,smooth,or ciliate;limb 2.8-3.7 X 2.5-3.5 mm., obovate- or obcordate-cuneate,bipartite to 2/5 of its length,ligules two,1.0-1.5 mm.long,triangular, obtuse or acute,sometimes oblique.Filaments more or less exserted, smooth.Styles 3,(4-5),included,hairy.Anthophore 2.0-3.5 mm.long, smooth.Capsule 4.0-6.5 X 3.0-4.0 mm.,ovoid,1½-2 times as long as anthphore,included.Seed grey-brown,0.9-1.3 mm.long,with flat

striate face and obtusely grooved granulate back.Chc.

Type-Turkey-in fissuris rupium montis Gheidagh Pamphylioe supra Alaya,et montis Stravos Pisidioe,Heldr. [holo.G.]

TURKEY-Prov.Antalya :Calbali dag,2000-2100m.,14-7-1949,Davis15286; N.W. of Ak dag (S.of Geyik dag) nr.little lake,28-8-1947,Davis 14339;Geyik dag,2250-2700m.,31-8-1947,Davis 14564;Calbali dag, between Kar Cukur & Fesliken yayla,1800m.,14-7-1949,Davis 15403 . Prov.Isparta,dt.Sutcular(Isauria),Dedegol dag,above Oruz yayla, 2400m.,2-8-1949,Davis 15965

Geogr. Endemic to Anatolia,from Lycia to Isauria.

Habitat- In vertical cliff,on rocks & scree;alt.-18-2700m..

Fl.- July & Aug.

This species was reduced to a variety of S.saxifraga Linn. by Rohrbach,and this treatment was followed by Williams.S.oreades differs from S.saxifraga in its cushion habit,more or less thick leaves,scapiform stem,shape of the flowering and fruiting calyx,and shape of the capsule.I have,therefore followed Boissier in keeping S.oreades as a distinct species.Its relationship with S.saxifraga & S.fruticulosa Sieb.,as pointed out by Boissier and Rohrbach,is less close than its affinity with S.Barbeyana Heldr. from Greece.

SECTION 26 CUCUBALOIDEAE

The species of this section have ovate or ovate-lanceolate, 1-5-nered leaves, simple or compound dichasial cymes, calyx cylindrical-clavate becoming clavate in fruit with a constricted base, and rosey or pinkish bipartite petal. In habit some species show a certain resemblance to the genus Cucubalus .

All the species of this section fall into two subsections on habit, calyx shape & length, and form of petal and inflorescence.

Subsect. Schaftae comprising 3 species, from the Orient and S. Russia, characterized by weak stems and 2-3- or 1-flowered inflorescence, calyx long & narrow, cylindrical or cylindrical-clavate, and lobes of the petal entire. This subsection shows some relationship with sect. Paniculatae through S. fruticosa Linn. and S. Pichleri Stapf, but differs from it by weak habit, and few-flowered inflorescence.

Subsect. Sinenses, comprising about 15 species, is mostly from China and only 3 from India. The plants are usually tall, erect and branched, with leaves ovate-lanceolate 3-5-nerved, inflorescence usually a compound dichasial cyme, calyx clavate or cylindrical-clavate, and lobes of petal usually emarginate.

Key to the subsections and the Oriental species.

1a. Caudex long, slender; stems few, more or less dwarf, erect to ascending, usually simple; leaves 1-nerved, often fasciculate; calyx long, cylindrical-clavate; inflorescence 1-3- (5)-flowered; lobes of petal entire
.....26A. Subsect. Schaftae

2a. Caudical leaves large; cauline leaves not fasciculate;

calyx greenish with lanceolate-subulate teeth;petal white;capsule 3-4 times as long as anthophore 94.S.macronychia

2b. Caudical leaves small;cauline leaves fasciculate;calyx pinkish with ovate teeth;petal pink;capsule as long as anthophore 95.S.Schafta

1b. Caudex short,stout;stems usually tall,erect,branched;leaves usually 3-5-nerved,seldom fasciculate;calyx short,clavate; inflorescence many-flowered;lobes of petal emarginate 26B.Subsect.Sinenses

SUBSECTION 26A. SCHAFTAE

94. S.macronychia Boiss.,Fl.Or.,Suppl.,100 (1867);Williams in Journ. Linn.Soc.,xxxii,105 (1896).

Perennial,8.5-36.0 cm.tall.Root slender,woody,with a multicipital crown.Caudex ascending or ascending-erect,usually simple,sometimes 1-3-branched ,with marcescent shreds of old petioles.Stem erect or arcuately erect,terete,leafy,simple, sometimes sparingly branched from the base upwards,pubescent & hirsute with long septate hairs and viscid,seldom somewhat glandular especially above.Caudical leaves petiolate,usually somewhat large, 2.8-7.5 cm.long,7.0-15.0 mm.wide,oblong-lanceolate, or oblong-oblanceolate,attenuated into short petiole,base with hyaline ciliate margin; apex obtuse or mucronate;cauline leaves sessile,1.5-2.8 cm.long,8.0-20.0 mm.wide,ovate or ovate-lanceolate, acute,faintly 3-5-nerved at the base;all leaves with ventral surface glabrous or sparsely puberulent,and dorsal surface

densely puberulent and more or less hispidulus.Flowers solitary, or 2-3 in a dichasial cyme,hermaphrodite,sweet scented,erect. Bracts equal.,ovate,acuminate.Pedicels 1.0-4.7 cm.long,erect or ascending.Calyx 2.1-2.5 cm.long,3.0-4.5 mm.diam.,cylindrical or cylindrical-clavate,truncate,greenish,with 10 anastomosed nerves,glandular-puberulent & hispid,viscid,in fruit clavate; teeth 4.5-8.0 X 1.5-2.5 mm.,lanceolate-subulate,with hyaline ciliate margin.Petal white,3.3-3.8 cm.long;claw 2.7-3.0 cm. long,exceeding calyx,smooth,exauriculate;limb 6.0-8.0 X 3.5-5.3 mm., cuneate,bipartite into linear-oblong lobes;ligules two,1.0-1.9 mm.long,triangular,acute.Filaments exserted,smooth.Styles 3, exserted,hairy.Anthophore 3.5-6.0 mm.long,smooth.Capsule 1.2-1.45 X 0.4-0.45 cm.,oblong,3-4 times as long as anthphore,included. Seed not seen. Hs.or Ch.

Type-In valle Kuram Affghaniae inter pagos Pewar et Alikhel 6-7500',Aitch.473 [holo.G.;iso.K!]

AFGHANISTAN- Hariab valley,2100m.,May 1879,Collett 21.

Geogr. Endemic.

Habitat- In plains;alt.-18-2250m..Fl.-May & June

S.macronychia exhibits sufficient resemblances to S.Schafta Gmel. in habit,leaves,long cylindrical-clavate calyx, and oblong capsule to indicate a relationship,but it can be easily distinguished by the relative size of the caudical & cauline leaves,colour and teeth of calyx and flower colour.

95. S.Schafta G.Gmel. ex Hohen. in Bull.Soc.Nat.Mosc.,iv,397(1838); Boiss.,Fl.Or.,i,655 (1867);Rohrb.,Monogr.Sil.,132(1868)- Fisch.et Mey., Sert.Petropol. 2.Bot.Reg.,t.20(1846).

Dwarf perennial,5.0-17.0 cm.tall.Root woody,with a multicipital crown.Caudex slender,ascending or decumbent,sparingly branched, often covered with bases of old petioles.Stem slender,terete, leafy,ascending or arcuately erect,simple below,sparingly branched from the middle upwards; usually puberulent,sometimes hirtellous;nodes more or less swollen;middle internodes 3.1-5.4 cm.long.Leaves monomorphic,obovate or oblong-obovate,acute, puberulent,sometimes fasciculate;cauline leaves 1.7-2.3 cm,long, 4.0-6.3 mm.wide,sessile or subsessile;caudical ones petiolate. Flowers hermaphrodite,erect,solitary,or 2-3 in a dichasial cyme. Bracts equal,ovate,acuminate,ciliate.Pedicels 1.7-2.5 cm.long. Calyx 2.0-2.3 cm.long,2.7-3.3 mm.diam.,cylindrical-clavate, truncate,pale pink,with 10 purplish anastomosed nerves,in fruit oblong-clavate;teeth 2.0-3.0 X 1.5-1.8 mm.,ovate,obtuse,with hyaline ciliate margin .Petal pink,1.8-2.2 cm.long;claw 1.1-1.2 cm.long, exserted,smooth,exauriculate;limb 7.0-10.0 X 3.0-5.0 mm.,obovate-cuneate,bipartite into oblong-obovate lobes;ligules two,0.3-0.5 mm.long,obtuse.Filaments exserted,smooth.Styles 3,exserted,smooth. Anthophore 1.2-1.45 cm.long,smooth.Capsule 9.5-11.0 X 4.0-5.0 mm., oblong,somewhat shorter than anthophore,included.Seed dark brown, 1.3-1.5 mm.long,with flat tuberculate face & flat papillose back.Hp.

Type-Caucasus-in rupestribus montis Keridachi in tr. Suwant, alt.2500-4000' ,

IRAN-Prov.Yehlah-Sehisserah,Aug.1936,Lindsay 1436 ;between Kaswwin & Renkt,Oct.1868,Hausskn.20096;in Mt.Djulfeckkuh,Aucher 4227.

Geogr. N.Persia & Caucasus.
Habitat-In mountains & rocky places;alt.-750-1200m.Fl-Aug.- Oct.

SECTION 28 COMPACTAE

The 5 species of this section are biennials(sometimes behaving as perennials) , and of medium stature.The species are characterized by their glabrous and more or less glaucescent, ovate-lanceolate or lanceolate leaves,stem usually simple, cauline leaves gradually reduced above,and by a more or less compact,umbel-like or corymb-like dichasial cyme,petal pinkish, entire,ligulate.In the character of the leaves and their distribution on the stem,and in their glabrousness & glaucous bloom the section shows some similarity to sect. Brachyanthae on one hand & sections Inflatae and Leiocalycinae subsect. Muscipulae on the other hand. But sect. Compactae is quite distinct from these in the characters of inflorescence,petal shape and long narrow calyx.

Out of 5 species,only 2 species grow in the Orient.

Key to the Oriental species.

Caudical leaves lanceolate-spathulate;cauline leaves ovate,obtuse; stem sparingly branched,branches many-flowered;limb oblong-elliptical or obovate,entire,seldom emarginate .....96. S.compacta

Caudical leaves lanceolate;cauline leaves linear-lanceolate,acute; stem branched,branches few-l-flowered;limb cuneate,more or less bilobed 97.S.Reuteriana

96.S.compacta Fisch. ex Hornem.,Hort.Hafn.,i,417 (1813);Boiss.,Fl.Or., i,528(1867);Rohrb.,Monogr.Sil.,149(1868)-Reichb.,Ic. Fl.Germ. Helv.,vi,t.284.fig.5093(1844);Loudon,

Lad.Fl. Gard.Or.Peren.,i,t.25,fig 1(1843);Bouloumoy, Fl.Lib.Syr.,t.48.fig.6 (1930)

Syn. S.Armeria M.Bieb.,Fl.Taur. Cauc.,i,339 (1808);non Linn . (1753);non Asso. (1779);non Pallas(1797)

S.bella Clarke, Trav.,i,746 (1813)

S.purpurea Knowl.et Westcott,Fl.Cab.,i,87(1837)

S.orientalis Milt.ex Wochenschr.f.Gartn.U.Pflzkunde 1858, 110

S.compacta var.humilis Boiss.,Fl.Or.,i,582(1867)

S.Armeria subsp.compacta Schmalh ex Komarov,Fl.U.R .S.S., vi,615(1936)

S.Armeria var.compacta Fedtsch et.Fler. ibid.

Biennial or short-lived perennial,5.7-120.0 cm.tall.Root woody,tapering,with a simple leafy crown.Caudex short,thick,simple, sometimes 1-2-forked,each bearing a flowering shoot,with marcescent shreds of old petioles.Stem erect,seldom more or less arcuate at the base,terete,more or less stout,leafy,usually simple below, sparingly branched above,seldom branched throughout,branches alternate,often equaling the main axis,glabrous & glaucescent, often purplish from the base upwards.Caudical & lower cauline leaves rosulate,3.3-8.1 cm.long,5.0-13.0 mm.wide,lanceolate-spathulate,sometimes lanceolate or oblanceolate,more or less attenuated into petiole,base with hyaline margin,obtuse or round at the apex;cauline leaves 3.5-7.0 cm.long,5.0-12.0 mm.wide, ovate,oblong-ovate,rarely oblong,base amplexicule,apex obtuse or nearly so;all leaves glabrous,glaucous.Inflorescence an umbellate or corymb-like dichasial cyme,usually many-flowered,

but those of lateral branches few-to 1- flowered. Bracts of the involucre oblong-ovate, acute; bracteoles ovate or ovate-lanceolate, membraneous. Pedicels 1.5-5.0 mm. long, erect. Flowers hermaphrodite, erect. Calyx 1.65-1.8 cm. long, 3.0-4.0 mm. diam., tubular-clavate, membraneous, with 10 slightly anastomosed nerves, glabrous, umbilicate; teeth 1.5-2.0 X 1.3-1.5 mm., ovate, obtuse, sometimes acute, with hyaline ciliate margin. Petal pink, 1.1-1.65 cm. long; claw 6.0-10.0 mm. long, equaling calyx tube, seldom more or less exserted, smooth; auricles minute or obscure; limb 5.0-6.5 X 2.5-4.5 mm., elliptical, oblong-elliptical or obovate, entire, seldom emarginate; ligules two, 2.5-3.3 mm. long, lanceolate, acute. Filaments exserted, smooth. Styles 3, exserted, hairy. Anthophore 0.7-1.08 cm. long, smooth. Capsule 6.0-9.5 X 3.0-3.5 mm., oblong, as long as anthophore, somewhat protruding calyx. Seed dark brown, 0.8-1.3 mm. long, with flat striate face & grooved granulate back. Th. or Hs.

TURKEY- Prov. Rize: Flussgeroll, 10km., E. of Rize, 50m., 3-7-1931, Gorz 718 ; Rize, 150m., 2-7-1931, Gorz 711; Cimil, 2000m, July 1886, Bal. 1417; ibid. July 1886, Parquet. Prov. Giresun : Tamdere Yavuz Kemal, nr. Karinea, 1500m., 17-8-1952, Davis 20760 . Prov. Erzurum/ Gumusane: Koprobachu (Keuproberchu) between Bayburt & Erzurum, 12-1500m., Aug. 1853, Huet. Pontus : Sumila, 5-8-1889, Sint. 1571. Armenia, sine loco, Calv. & Zohrab 854; Maki, 480m., 27-6-1933, Balls 409; sine loco, Zohrab . Prov. Erzincan: Kesis dag, 5-7-1944, Basar.. Prv. Kastamonu: Nure Nahas, 28-8-1892, Sint. 5127; Tosya, Goekdsshervis at Mt. Bellorva, 9-8-1892, Sint. 4550. Prov. Elazig: Harput above Pekenik, 12-6-1889, Sint. 767 ; Harput, nr. Horzek, 1-6-1889, Sint. 672; Elazig, July 1944, Savi; Gumush Hane, 990m., 28-8-1934, Balls 1390a; Ali dag, Talas, 1560m., 17-6-1934, Balls 1390.

Prov. Ankara: Berystepe, 10-6-1932, Kotte; Beynam woods, 5-7-1947, Davis 1302; Yabanabat, Wegnah Gevede, Berystepe, 13-7-1933, Kotte ; Beynam, 3-7-1937, Gassner 827; Kleinasien-Hacin, 21-6-1893, Manissad. 243. Prov. Amasya: Kalkboden, Manissad. 424; Ak dag, 8-1200m., 11-6-1889, Bornm. 78. Prov. Van: 5km., N. of Satak, 25-7-1954, Davis 23200. Ahlat, 4-7-1947, Basar.; Yalova, July 1943, Basar.; Kutul Mueyzinler, 14-7-1947, Heilb. & Basar.; Sarikamis, Ormani, 21-7-1947, Heilb. & Basar.; Afyon, 20-5-1938, Heilb. ; Hadimkoy, Kestanelik, July 1945, Mete .

Prov.Maras;Berit dag,10-8-1865,Hausskn..Prov.Hatay:Nur daglari (Amanus) Kusliji dag,15-1950m.,Aug.1908,Harad.2519;Nur daglari, July 1891,Post ;ibid. Aug.1906,Harad.389;ibid. Mt.Medyk above Telle,Ky.115. Prov. Isparta:dt.Sutkular,Dedagol dag,between Darebuku & Selkose,9-1100m.,Davis 15857. Prov.Bursa:Ulu dag, July 1874,Pichler 22;ibid. Noe ;Gokdere,23-6-1935,Kranse 4861. Prov. Mugla: Sundrus dag,1200m.,Davis 13560 .Prov. Izmir: Golciik,12-8-1941,Kasp.. Lydia,Mt.Tomolo,21-7-1854,Bal.

IRAQ- Kurdistan ,yr.1840,Strang.

Geogr. Bulgaria,Greece,Turkey,Iraq,Iran & Caucasus.

Habitat- Rocky places,and open bushy places;alt.-50-1950 m..
Fl.-June- Aug.

97. S.Reuteriana Boiss. et.Bl., Diagn.Pl.Nov.Or.,Ser.11.v,54(1856); Boiss.,Fl.Or.,i,582 (1867);Rohrb.,Monogr.Sil.,150 (1868)-Bouloumoy,Fl.Lib.Syr.,t.48,fig.3 (1930)

Syn. S.laeta Ehrbg. ex Rohrb.,Monogr.Sil.,150(1868);non A.Br. (1843)

Tall biennial or short-lived perennial,20.0-103.0 cm.tall. Root deep-seated,with a simple leafy crown.Caudex short,thick, usually simple,covered with the bases of old petioles.Stem erect, terete,leafy,branched from the base upwards,branches ascending, slender,long,opposite,glabrous & glaucescent;nodes more or less swollen;middle internodes 1.9-6.3 cm.long.Caudical leaves rosulate, 4.1-9.3 cm.long,3.0-6.3 mm.wide,lanceolate to linear-lanceolate, attenuated at the base,base with hyaline margin,persistent;cauline leaves in a few pairs,more or less remote,2.1-6.3 cm.long,5.0-10.0 mm.wide,linear-lanceolate,sometimes lanceolate or linear;all leaves acute or nearly so,glabrous,glaucous,faintly 3-nerved at the base. Inflorescence an umbellate or corymb-like cyme,terminal cyme

many-flowered,lateral ones few-1-flowered.Bracts of involucre small ovate,acuminate;bracteoles membraneous,ovate-lanceolate,acute. Pedicels 2.0-5.0 mm.long,erect or ascending.Flowers hermaphrodite, erect.Calyx 1.7-1.83 cm.long,3.0-3.5 mm.diam.,tubular-clavate, membraneous,umbilicate,with 10 anastomosed nerves,glabrous;teeth 1.8-2.0 X 1.5-1.8 mm.,ovate,obtuse,seldom acute,often sagitate at the apex,with wide hyaline ciliate margin.Petal pink,1.2-1.5 cm.long;claw 7.5-9.0 mm.long,exserted,smooth;auricles minute, sometimes obscure;limb 4.5-6.0 X 3.0-4.5 mm.,cuneate,bilobed; ligules two,2.5-3.0 mm.long,lanceolate,acute.Filaments exserted, smooth.Styles 3,hairy,exserted.Anthophore 7.0-9.7 mm.long,smooth. Capsule 8.0-10.0 X 4.0-5.0 mm.,oblong,as long as or slightly longer than anthophore,slightly exceeding calyx.Seed dark brown, 0.8-1.3 mm.long,with flat striate face & grooved granulate back. Th.or Hs.

Syntypes- Ad Solima Libani,Blanche [G.],Aug.1847;in arenis ferruginosis Libani inter El Meroudj et Beckfai,Gaillardot, July,1853.[G.]

LEBANON- Ayn-Zahalta,Bornm.11436; ibid. 11-1300m.,26-5-1877,Ball; between Biskanta & Bikfayya,1200m.,13-6-1877,Bornm.169 ;between Maruy & Bikfayya,5-7-1813,Gaill.368; sine loco.1800m.,Lowne .

Geogr. Endemic to Lebanon.

Habitat- Sany places ;alt.-1000-1800m.,Fl.-July & Aug.

S.Reuteriana is monomorphic.Although obviously related to S.compacta Fisch. & its allies,it is distinct in its branching habit,linear-lanceolate leaves,& cuneate bilobed petal.The lower branches are long,slender and few - 1-flowered.

SECTION 29 SUCCULENTAE

The 5 species comprising this section consist of both annual & perennial plants which are adapted to xerophytic conditions.In addition to the raceme-like or monochasial inflorescence and smaller basal leaves,the group is distinguished having thick & usually more or less fleshy leaves,conspicuously exserted petals,oblong-clavate or clavate calyx,and oblong capsule. On the basis of duration of life,the species fall into 2 groups.

One group has 3 species which are all perennials,and provided with thick and fleshy leaves;these species are closely related to one another.The 2nd group comprising 2 annual species has less fleshy leaves.

Key to the Oriental species.

Plants perennial :

Leaves 1.0-3.4 cm.long,4.0-9.0 mm.wide,oblong,ovate,or ovate-lanceolate,obtuse or round at the apex;calyx 2.0-2.55 cm. long,oblong-clavate from umbilicate base,with lanceolate acuminate teeth;limb obovate-cuneate;capsule oblong 98.S.succulenta

Leaves 6.0-12.0 mm.long,2.0-3.5 mm.wide,ovate or obovate,acute; calyx 1.4-1.6 cm.long,clavate from a truncate base,with ovate obtuse teeth;limb cuneate;capsule ovoid 99.S.thymifolia

Plants annual 100.S.villosa

98. S.succulenta Forsk.,Fl.Aegypt.Arab.,89 (18775);Boiss.,Fl.Or.,i, 648(1867);Rohrb.,Monogr.Sil.,134(1868)-Bouloumoy, Fl.Lib. Syr.,t.47.fig.6 (1930).

Perennial,10.0-30.0 cm.tall.Root thick,fusiform,deep-seated, with a multicipital crown.Caudex slender,prostrate,branched, often covered with bases of old leaves.Stem stout,weak,prostrate to ascending,more or less diffuse,branched,terete,leafy,valvety-papillose,viscid,somewhat glandular;middle internodes 2.5-3.2 cm. long.Caudical & lower cauline leaves 1.0-1.7 cm.long,5.0-9.0 mm. wide,obovate- or oblong-spathulate,base with hyaline ciliate margin;other cauline leaves 2.0-3.4 cm.long,4.0-7.0 mm.wide, oblong,obovate,ovate-lanceolate or lanceolate;all leaves thick & fleshy,obtuse or round at the apex,papillose,sometimes glandular. Inflorescence a raceme-like cyme,sometimes a dichasial cyme. Bracts equal,like the cauline leaves.Pedicels 6.0-13.0 mm.long, erect or spreading.Flowers hermaphrodite,erect.Calyx 2.0-2.55 cm. long,4.0-5.5 mm.diam.,oblong-clavate,umbilicate,with 10 greenish anastomosed nerves,hirsute or papillose,viscid,often somewhat glandular;teeth 4.5-7.5 X 1.5-3.0 mm.,lanceolate,acuminate,at length recurved,with hyaline ciliate margin.Petal white,2.3-2.85 cm.long;claw 1.5-1.8 cm.long,conspicuously exserted,smooth, exauriculate;limb 7.5- 10.0 X 3.0-5.5 mm.,usually obovate-cuneate, bipartite into oblong-spathulate lobes;ligules two.1.3-2.0 mm. long,oblong-lanceolate,obtuse or acute.Filaments exserted,smooth. Styles 3(2-4),hairy,exserted.Anthophore 7.5-9.3 mm.long,pilose. Capsule 9.0-12.0 X 5.0-6.3 mm.,oblong,as long as,or somewhat longer than anthophore,included.Seed brown,0.8-1.3 mm.long,with

flat face & slightly brooved back,striate. Hp.

Type- Egypt- Alexandriae ad Cata-combas,Forsk.[holo.Stockholm].

SYRIA- sine loco. 29-5-1937,Gombault 2024; ibid. Osborne 44 .

LEBANON- Saida & Begiantha,5-6-1858,Gaill.1884 ;Saida,Bl.

PALESTINE- Between Gaza & Jaffa,Decaisne ;Sarona,16-9-1880, Sint. & Rigo 1043 ;Jaffa ,18-3-1897,Bornm.190 ;ibid. 1-200 m., 18-5-1906,Dinsmore 1072;ibid.10-5-1911,Dinsmore 5072;Bet Yam,nr. Jaffa,24-6-1941,Davis 3726;Acre,14-3-1942,Davis 4105;Behah,April 1917,White ;Haifa,a1872,Schumberger;ibid,Lowne ;Tel-Aviv,5-5-1935, Eig & Grizi 321; Dyze,April 1872,Hayne ;Binyamina,Caesarea,8-4-1942, Davis 4561.

SINAI- sine loc. yr.1883,Hart .

Geogr. Tunisia,Libya,Egypt.Crete,Syria,Palestine & Sinai.

Habitat- Coastal sand .Fl.-April- June.

99. S.thymifolia Sibth. et Sm.,Fl.Graeca.Prodr.,i,292 (1806);v,8. t.411 (1825);Boiss.,Fl.Or.,i,648 (1867);Rohrb., Monogr.Sil.,230 (1868)-Prodan,Fl.Deter.& Descr.Pl. Ruman.,ii,t.43,fig.3 (1923).

Perennial,16.0-50.0 cm.tall.Root woody,deep-seated,with a multicipital crown.Caudex slender,prostrate,simple or branched, often with the bases of old leaves.Stem prostrate to ascending, terete,leafy,branched,velvety grey with dense retrorse hairs.Leaves monomorphic,small,6.0-12.0 mm.long,2.0-3.5 mm.wide,ovate or obovate,acute,fleshy,papillose or hirtellous,sometimes more or less fasciculate,lower leaves with hyaline ciliate margined base. Inflorescence a raceme-like cyme,sometimes a dichasial cyme.Bracts equal,like the cauline leaves.Pedicels 3.0-7,5 mm.long.Flowers

hermaphrodite,erect.Calyx 1.4-1.6 cm.long,4.5-5.3 mm.diam., clavate,truncate,with 10 pinkish anastomosed nerves,villose, viscid,usually sparingly glandular;teeth 1.5-2.0 X 1.5-2.3 mm., ovate,obtuse,with hyaline ciliate margin.Petal white,often with greenish reverse,1.2-1.45 cm.long;claw 8.0-8.5 mm.long,equaling calyx,smooth,exauriculate;limb 4.0-6.0 X 2.5-3.0 mm.,cuneate, bipartite into oblong-linear lobes;ligules two,0.5-1.0 mm.long, ovate,obtuse.Filaments exserted,smooth.Styles 3, exserted,hairy. Anthophore 4.5-6.0 mm.long,hairy,thick.Capsule 7.0-9.0 X 5.0-5.5 mm.,ovoid,somewhat longer than anthophore,included.Seed dark brown, 1.0-1.5 mm.long,with flat striate face & grooved tuberculate back. Hp.

Syntypes- In Cypri insulae et Cariae,arenosis maritimis,Sibth. [Oxford].

TURKEY- Prov.Istanbul:Kila nr. Istanbul,4-7-1897,Aznavour. Kosaeli Kandiranin Dogusunda,17-71945,Kasap.

Geogr. Eastern Greece,Turkey & Cyprus.

Habitat- Coastal sand .Fl.-July .

S.thymifolia is closely allied to S.succulenta Forsk. and S.pontica Brandza in having a prostrate habit & thick fleshy leaves,but it differs from both in the following diagnostics:stem leaves small,ovate or obovate,acute and more markedly branched stem (here the difference from S.succulenta is particularly well marked);limb which is cuneate or oblong-cuneate.It differs, further from S.succulenta by its clavate calyx having a truncate base and by the ovate obtuse calyx teeth.

100. S.villosa Forsk.,Fl.Aegypt.Arab.,88 (1775);Boiss.,Fl.Or.,i,592 (1867);Rohrb.,Monogr.Sil.,110 (1868)-Reichb.,Ic.Fl. Germ.Helv.,t.278,fig.5066(1844)[S.sericea]

Syn. S.villosa Forsk.,Fl.Aegypt.Arab.,88 (1775);non Forsk., Fl.Aegypt.Arab.,210 (1775);non Moench(1794);non Cambess (1828);non Holl (1867);non Schimper;non Welwitsch

S.canopica Delile,Ill.Fl.Aegypt.,no.442 (1813);non Boiss. (1867)

S.sericea Reichb.,Ic.Fl.Germ.Helv.,v.(1844);non All(1785); non Guss.(1842).

Annual, 5.0-25.0 cm.tall,from a deep-seated tap-root.Stem procumbent or ascending,terete,leafy,branched from the base upwards, papillose-viscid,sparingly glandular.Caudical & lower cauline leaves rosulate,more or less petiolate,1.3-3.0 cm.long,4.0-9.0 mm. wide,oblong-lanceolate,attenuated into petiole,base with hyaline ciliate margin;other cauline leaves sessile,1.5-4.7 cm.long, 5.0-11.0 mm.wide,oblong-lanceolate or lanceolate;all leaves slightly thick,1-nerved,obtuse,papillose & viscid,sometimes sparingly glandular.Inflorescence a raceme-like cyme;axis simple, sometimes 1-3-branched. Bracts unequal,oblong-linear or lanceolate, ciliate.Pedicels 5.0-18.0 mm.long,erect,sometimes deflexed in fruit.Flowers hermaphrodite,erect.Calyx 1.3-2.3 cm.long,3.5-4.3 mm. diam.,cylindrical,truncate-umbilicate,with 10 greenish or pinkish anastomosed nerves,viscidly glandular & puberulent,in fruit clavate with the base narrowed below the capsule and the

apex more or less contracted;teeth 1.3-2.8 X 1.0-2.0 mm., ovate or lanceolate,obtuse,with hyaline ciliate margin.Petal pink or white,1.3-2.2 cm.long;claw 8.0-11.0 mm.long,conspicuously exserted, smooth,exauriculate;limb 5.0-11.0 X 5.0-6.5 mm.,obcordate-cuneate, bipartite into oblong-obovate lobes;ligules two,1.0-1.3 mm.long, ovate,obtuse.Filaments equaling claw,smooth.Styles 3, included, hairy.Anthophore 7.5-13.0 mm.long,smooth or scabrous.Capsule 7.0-13.0 X 4.5-6.5 mm.,oblong-ovoid,as long as or somewhat longer than anthophore,included.Seed dark brown,0.8-1.0 mm.long, with flat face & grooved back.Th.

Type- Prope Pyramides Gizenses ad agrorum margines florens fine Januar.,Forsk. [holo. Stockholm].

PALESTINE- Negov Revivin,12-4-1952,Angelis .

ARABIA- Shaf,5m. S.of Kuwoit,March 1933,Dickson 30 &30A.;Ras Tamura,N.of Qalif,3-4-1942,Dickson 488; W. of Tubail(Taphini Road),90m.,7-4-1949,Dickson 584; on road to Hufuf,S.W.of Abquick oil field,23-3-1947,Dickson 532; Holesnes,75 miles E. & N.E. pf Riyadh,Central Arabia,11-3-1865,Pelly ;Oman Bareimi,1937,Darling 454; sine loco. Burton ;nr. Windiyal,yr.1914,Shakespear .

SINAI- Wadi Gharandel & Rambey,Lord ;W. El.Humur at El Ramala, 14-4-1937,Shabetai 176 & 425 ;Arabia Petraea,yr.1849,Mcdonald.

IRAN- i. Kischm ls. yr.1893,Bornm.96.
ii.Bahrain ls.-Jebel Dukhan,17-3-1936,Fernandez 568; N.W.of pipe line end,11-3-1950,Good 44; desert ,nr. the well at Sakhara,4-3-1950,Good 43; N. flank of Jebel Dukhan 16-3-1950,Good 42 .

Geogr. Spain,Algeria,Tunisia,Libya,Egypt,Sinai,Arabia,Palestine & Is of Persian Gulf.

Habitat- Desert and sandy places;alt.-1 -90 m..Fl.-March & April.

The calyx teeth in S.villosa have been described by Rohrbach as lanceolate & acute.Williams also supported this view.Boissier described them as ovate,obtuse.Post & Muschler agree with Boissier.I have examined a fairly large number of specimens & have found that the calyx teeth are either lanceolate or ovate,but in both cases they are obtuse.

S.villosa is said to differ from S.littorea Brot. by its lanceolate acute calyx teeth and in the form of the seed.These alleged differences seems to have no value.The calyx teeth are obtuse in both species.Considering the variation of seed form in some polymorphic species , I am unable to support Rohrbach in according specific rank to S.littorea Brot.. However further investigation on abundant material of S.littorea will prove or disprove its validity as a species.

cf. Spp. in Melandrium !

SECTION 30 MELANDRIFORMES

The 3 species comprising this section consist of biennial or short-lived perennial plants.The plants are tall,branched and leafy.The flowers are usually unisexual and are borne on separate plants;and the female flowers consist of 3-5 carpels. The capsule which are usually ovoid-oblong are subsessile.

Key to the Oriental species.

Flowers unisexual,male & female flowers borne on two different plants; carpel (3) 4-5;capsule ovoid-conical .....101. S.alba

Flowers bisexual;carpels usually 3;capsule ovoid-oblong 102.S.noctiflora

101. S.alba (Mill.)Krause in Strum.Fl.Deutschland,ed.2,v,98(1901)-Fitch & Smith,Ill.Brit.Fl.ed.5,t.141(1924);Hegi, Ill.Fl.Mittl-Eur.,iii,t.100,fig.4 (1910).

Syn. Lychnis dioica b & Linn.,Sp.Pl.1.436 (1753).
Lychnis alba Mill.,Gard.Dict.,ed.8.no.4 (1768).
L.arvensis Schkuhr,Handb.,i,403 (1791).
Saponaria dioica Moench,Method.,76 (1794).
Lychnis vespertina Sibth.,Fl.Oxon.,146(1794)
L.pratensis Rafn.Danm.et Holst.,Fl.,11 (1796-1800)
Silene dioica Clairv.,Man.,145(1811);non Fisch.& Mey.(1830)
Melandrium pratense Roehl.,Deutschl.Fl.,2.Aufl.,i,274(181?

Agrostemma dioicum Don,Gen.Syst.,i,416(1831).

Saponaria vespertina Fenzl in Endl.,Gen.,974 (1841).

Melandrium vespertinum Fries in Bot Notiser,170(1842).

M. dioicum Coss.& Germ.,Fl.Par.,ed.1,28 (1845).

Silene pratensis Gren.& Godr.,Fl.France,i,216(1848).

Melandrium album (Mill,)Garcke,Fl.Deutschl.4.Aufl.,55(1858).

Silene alba Krause in Strum.Fl.Deutschl.,ed.2,v,98(1901);
non Muhlenb.,Cat.45(sine descriptione)

Annual or biennial or short-lived perennial,dioecious, 30.0-85.0 cm.tall.Root woody,with a multicipital crown.Stem erect,terete,leafy,usually branched,covered with shoft spreading hairs & slightly glandular & viscid above.Caudical & lower cauline leaves rosulate,petiolate,3.0-7.5 cm.long,10.0-23.0 mm. wide,oblanceolate,elliptical or ovate-lanceolate,attenuated into petiole,base with hyaline margin;other cauline leaves sessile, 4.8-10.0 cm.long,1.1-2.5 cm.wide,lanceolate,oblong-lanceolate or elliptical,sometimes ovate-lanceolate;all leaves hairy,acute or acuminate.Inflorescence a lax dichasial cyme.Bracts equal, ovate or ovate-lanceolate,acuminate,villose.Pedicels 5.0-15.0 mm. long,rtrct or ascending.Flowers unisexual,slightly scented. Calyx 1.8-2.3 cm.long,7.5-11.0 mm.diam.,with truncate base, pubescent with long shoft hairs,in male flowers cylindrical, 10-nerved,in female flowers ovoid,20-nerved,nerves anastomosed; teeth 4.8-6.5 X 2.8-5.0 mm.,lanceolate or linear-lanceolate,obtuse or nearly so.Petal white, 1.5-2.5 cm.long;claw 1.1-1.8 cm.long, slightly exserted,smooth,auriculate;limb 4.0-7.0 X 4.0-5.3 mm.,

obovate,bipartite beyond middle into obovate lobes;ligules two,oblong,crenulate.Filaments equaling claw,smooth.Styles 5 (3-5),included,hairy.Anthophore 2.0-2.5 mm.long.Capsule ovoid-conical,sometimes oblong-ovoid,subsessile,included. Seed greyish brown,1.3-1.5 mm.long.

TURKEY- Prov. Rize: Cimil,2000m.,July 1866,Bal.

Geogr. Throughout Europe,Turkey,Lebanon,Siberia,North Africa & North America.

Habitat- Rocky places ;alt.-2000m. Fl.-May-Aug.

102. S.noctiflora Linn.,Sp.Pl.,ed.1.419 (1753);Boiss.,Fl.Or.,i,581 (1867);Post,Fl.Syr.Pal.& Sinai,ed.2.i,172 (1932)- Reichb.,Ic.Fl.Germ.Helv.,v,t.276,fig.5063(1844).

Syn. Cucubalus noctiflorus Mill.,Gard.Dict.,ed.8.no.8(1768).
Lychnis noctiflora Schreb.,Spic.,31(1771).
Silene dichotoma Gilib.,Fl.Lithuan.,ii,169(1781);non Ehrh. (1792).
S.viscida Moench,Method.,708(1794);non Spreng.(1815).
Saponaria noctiflora Fenzl in Endl.,Gen.Pl.,972(1840).
Melandrium noctiflorum Fries in Bot Notiser.,178(1842).
Elisanthe noctiflora Willk.,Ic.Descr.Pl.Eur.Austr.Occ.,i, 78 (1852).
Silene pauciflora Kit.in Linnaea,xxxii,537(1863);non Salzm.;non Ucria (1796);non Tornab.(1890)

Annual or biennial,20.0-80.0 cm.tall. Stem erect,terete, leafy,usually simple below,branched above,sometimes branched

throughout,coarsely hirsute & sparingly glandular ,viscid above; middle internodes 3.0-8.7 cm.long.Caudical & lower cauline leaves rosulate,petiolate,5.5-7.3 cm.long,0.9-1.5 cm.wide,oblanceolate ovate-lanceolate,obovate or lanceolate,attenuate into petiole, base with hyaline ciliate or villose margin;other cauline leaves sessile,6.0-10.0 cm.long,1.5-2.5 cm.wide,oblong-lanceolate, elliptical-lanceolate or lanceolate;all leaves acute,3-5-nerved, hirsute or with shoft spreading hairs.Inflorescence a perfect dichasial cyme,lax.Bracts equal,ovate-lanceolate,acuminate. Pedicels 7.0-13.0 mm.long,erect or ascending.Flowers hermaphrodite, erect.Calyx 1.5-1.8 (2.5) cm.long,3.0-3.5 mm.diam.,cylindrical, sometimes cylindrical-clavate,truncate,hirsute,viscid,somewhat glandular,with 10 greenish anastomosed nerves,in fruit ovoid - oblong,slightly inflated;teeth 3.5-5.0 X 1.0-1.5 mm.,lanceolate, acuminate,with hyaline ciliate margin.Petal white or pink, 1.8-2.6 cm.long;claw 1.2-1.8cm.long,exserted,smooth,obtusely auriculate;limb 6.0-8.0 X 4.0-5.0 mm.,obovate-cuneate or cuneate,bipartite into ½ its length,lobes obovate;ligules two, 0.7-1.3 mm.long,oblong,crenulate.Filaments exserted,smooth. Styles 3,exserted,hairy.Anthophore 2.5-3.0 mm.long.Capsule ovoid-oblong,subsessile,included.Seed reddish brown,0.8-1.0 mm. long.

Linnaean specimen-In Suecia,Germania [L!]

TURKEY- Prov.Ankara :Hacikadun valley,nr.Kecioren,11-6-1952, Davis 18785 .Prov.Antalya:Elmali,17-8-1860,Bourg.48.

Geogr. Middle & South Europe,Siberia,Turkey & North America.

Habitat- Woods ;alt.- 12-1500m..Fl.-Aug. & Sept.

S.noctiflora Linn. is similar in appearance and in indumentum with S.alba (Mill.)Krause. The inflorescence, shape of the leaf and petal,and shape of capsule are so similar that it becomes difficult to distinguish one plant from the other unless one examines the flowers.In S.noctiflora, the flower is hermaphrodite usually with 3 styles, whereas in S.alba (Mill.)Krause the flower is unisexual usually with 4 or 5 styles.

SECTION 31 SAPONARIOIDEAE

103. S.nana Kar. et Kir. in Bull.Soc.Imp.Des.Nat.de Mosc.,xv,169 (1842);Boiss.,Fl.Or.,i,581(1867);Rohrb.,Monogr.Sil., 157(1868)-Komarov,Fl. U.R.S.S.,vi,t.xli,fig.2 (1936).

Syn. S. nana Kar.& Kir. (1842);non Nym.(1878).

Tufted,dwarf annual,2.5-8.7 cm.tall,from a slender tap-root.Caudex short,more or less swollen,simple or branched, leafy.Stem erect,sometimes ascending,terete,leafy,usually glabrous,seldom sparingly puberulent below;middle internodes 6.0-28.0 mm.long. Caudical leaves rosulate,subsessile,1.2-6.8 cm.long,2.0-10.0 mm.wide,lanceolate,oblanceolate,or linear-lanceolate,tapering towards the base,base with hyaline margin; cauline leaves 2.6-6.2 cm.long,3.0-12.0 mm.wide,oblong-lanceolate to linear-lanceolate,sessile;all leaves 1-nerved,glabrous,obtuse to acute,often round at the apex,margin villose.Inflorescence a dichasial syme,often bearing flowers in a monochasial cyme. Bracts equal,like the upper cauline leaves.Pedicels 7.0-28.0 mm. long,spreading,arcuately-erect or erect.Flowers hermaphrodite, erect.Calyx 1.0-1.2 cm.long,4.0-5.0 mm.diam.,oblong-cylindrical, greenish,glabrous,truncate-umbilicate,with 10 anastomosed nerves, in fruit clavate & slightly inflated;teeth 2.5-3.0 X 2.0-2.5 mm., lanceolate,acute,with narrow hyaline ciliate margin.Petal white, 8.5-11.0 mm.long;claw 7.5-9.0 mm.long,smooth;auricles usually obscure,sometimes conspicuous;limb 1.0-2.3 X 1.0-1.8 mm.,oblong, usually tridentate;ligules two,0.3-0.5 mm.long,lanceolate,acute. Filaments included,smooth.Styles 3,exserted,or included,hairy.

Anthophore 2.0-2.5 mm.long,smooth.Capsule 7.0-9.0 X 5.0-7.5mm., ovoid-oblong,3-4 times as long as anthophore,included.Seed brown,deeply reniform,1.5-2.3 mm.long,with flat and smooth face,back deeply & acutely grooved with two wavy wings.Th.

Type- Russia-in fossis Songoriae non procula fonte Sassytepastan.

IRAN- Kerman,April 1859,Bunge;ibid.Bunge 200.

AFGHANISTAN- Hari-rud-valley,6-4-1885,Aitch. 170.

BELUCHISTAN- Peshin,1530m.,14-4-1889,Lace 3567;Yaru Karez,1500m., March 1889,Lace 3567; Muslung,yr.1851,Stocks 1084.

Geogr. South West Russia,Iran,Afghanistan & Beluchistan.

Habitat- In plains ? & sandy soil;alt.-1500m. Fl.-March & April.

This extremely interesting plant is totally unlike any other species in the Orient.It is unique in several features, particularly in the petal form,the more or less inflated calyx, winged seed,broad crowded leaves and glabrous habit give the species a very distinct taxonomic position.

SECTION 32 RIGIDULAE

The 14 species of this section are uniform in their vegetative characters : rigid & branched stem,usually puberulent below becoming glabrous and viscid above;branches filiform; inflorescence a lax dichasial cyme;calyx cylindrical-clavate or cylindrical;petal bipartite & ligulate,with ciliate or smooth claw;filaments smooth or ciliate;the capsule ovoid or ovoid-oblong.These species are distributed in the countries round the Mediterranean sea;one or two species extend to Russia & India.

Key to the Oriental species.

1a. Seed with flat face & back;capsule ovoid 104.S.picta

1b. Seed with flat face & grooved back :

2a. Filament & claw ciliate 105.S.Kotschyi

2b. Filament & claw smooth :

3a. Limb oblong,bipartite to the middle;anthophore hairy 106.S.linearis

3b. Limb cuneate,bipartite;anthphore scabrous:

4a. Capsule ovoid-oblong,twice as long as anthphore 107.S.chaetodonta

4b. Capsule oblong,as long as anthphore 108.S.arenosa

104. S.picta Pers.,Syn.,i,498 (1805);Rohrb.,Monogr.Sil.,159(1868); Post,Fl.Syr.Pal.& Sinai,ed.2,i,181(1932)- Sibth.& Sm., Fl.Graec.,v,t.421 (1825);Sweet,Brit.Fl.Gard.,i,t.92 (1825);Bouloumoy,Fl.Lib.& Syr.,t.50,fig.3 (1930).

Syn. S.picta Pers.,Syn.,i,498(1805);non Desf.(1804)[Syn. of S. portensis L.];non Reichb.(1832).

S.juncea Sibth.& Sm.,Prodr.Fl.Graec.,i,295(1806);non Roth,(1797).

S.Reinwardtii Roth,Cat.,iii,42(1806)

S.syriaca Reuter in Cat.Hort.Genev.,3 (1857)

S.anastomosans Lag.,Gen.& Sp.,15(1816)

S.reticulata Link,Enum.Hort.Berol.,i,426(1821);non Desf.(1798)

S.filiformis Ehrbg. ex Otth in DC.,Prodr.,i,376(1824)

S.rigidula Sibth.& Sm.,Prodr.Fl.Graec.,i,299(1806).

S.bicolor Friv. ex Rohrb.,Monogr.Sil.,158(1868);non Thore (1803);non Moench (1794).

Annual,biennial or short-lived perennial,25.0-75.0 cm.tall. Caudex 3.0-7.0 mm.wide,short,simple,covered with bases of old leaves.Stem erect,terete,usually pale pinkish below,greenish above,sparsely or densely puberulent below,becoming glabrous & viscid above,usually simple below,branched above,sometimes branched throughout,paniculate-corymbose;branches usually spreading long & slender,sometimes short;middle internodes 1.0-3.5 cm.long. Caudical & lower cauline leaves rosulate,petiolate,2.5-8.4 cm. long,5.0-20.0 mm.wide,spathulate,obovate,oblong- or linear-lanceolate,sometimes oblanceolate,attenuated into petiole,more or less puberulent,base with hyaline ciliate margin,obtuse,

acute or mucronate;other cauline leaves sessile,1.3-5.0 cm.long, 2.5-7.0 mm.wide,lanceolate,oblanceolate,linear-lanceolate or linear-oblanceolate,acute,upper ones linear or linear-setaceous, glabrous,ciliate at the base.Inflorescence a compound dichasial cyme,lax,rarely lateral branches short forming an umbellate cyme. Bracts equal,like the upper cauline leaves.Pedicels 5.0-20.0 mm. long,erect,ascending.Flowers hermaphrodite,erect.Calyx 1.5-1.8 cm.long,3.0-5.0 mm.diam.,cylindrical-clavate with truncate-umbilicate base,glabrous,with 10 pinkish anastomosed nerves,in fruit clavate with a constriction below the capsule;teeth 2.5-3.0 X 1.5-2.0 mm.,usually triangular acute alternating with ovate obtuse,sometimes all triangular acute or ovate obtuse,with hyaline ciliate margin.Petal pink,sometimes white with pink nerves,1.0-1.5 cm.long,claw 6.0-9.0 mm.long,exserted,smooth, exauriculate;limb 4.0-6.0 X 2.5-3.0 mm.,cuneate,bipartite to 1/3-1/2 of its length into oblong-obovate or oblong-ovate lobes; ligules two,0.8-1.3 mm.long,oblong,laciniate.Filaments exserted, smooth.Styles 3, equaling claw,hairy.Anthophore 6.0-10.0 mm.long, hairy.Capsule 7.0-8.5 X 4.0-4.5 mm.,ovoid,as long as or somewhat shorter than anthophore,included.Seed dark brown,1.0-1.5 mm.long, with flat face & back,granulate.Th.or Hs.

Type-Prope Dax (Dept.des Landes) Nune in hort.Colitur.

TURKEY- Prov.Mersin:Gulnar dere,Gulnar,6-6-1950,Atilla.Prov. Antalya: between Elmali & Vinioo,25-6-1883,Pichler ;Cragus mountains ,Forbes ;Kargichai,between Darbanas & Desiye dere (N. of Alnaya),1000m.,24-8-1947,Davis 14406.

RHODES- Mt.Prophet Elias,nr.Salakos,11-5-1935,Rechinger 7156; Embosa,400m.,15-5-1953,Rechinger 7275;Mt.Akramiti at Siana, 18-5-1935,Rechinger 7432;Mt.Elias,nr.Archangeles,400m.,25-6-1935, Rechinger 8425;sine loco. 23-5-1870,Bourg.12

SYRIA- sine loco. al860,Hook.& Hanb. ;Mt.Nusairy,Ain Halakim, 750-900m.,June 1910,Harad.3502;Leontes valley,Lowne .

LEBANON- Beirut,June 1846,Boiss.;ibid. 14-6-1845,Gaill. 56 &366; ibid. 15-9-1880,Sint.& Rigo 1047;ibid. Ehrbg.; ibid.al863-4,Lowne ; ibid. June 1871,Post ;ibid.al866,Hausskn.;Baynu,660m.,14-6-1943, Davis 6355A ;Baalbek,1050m.,16-7-1855,Ky374;ibid.Oct.1832,Bove 472 & 474;Cedan of Hadet,8-9-1884,Post .

PALESTINE- Wadi Tawahin (Safad),3-5-1942,Davis 4596;El Khadi, above El Bini,26-2-1942,Davis 3970;between Tiberias & Migdal, 5-1-1942,Davis 3864.

Geogr. Greece,Crete,Rhodes,Turkey,Syria,Lebanon & Palestine.

Habitat- Sandy places,fields,rocky places & on mountains;

alt.- 400- 1050m. Fl.- March - July.

S.picta was described by Persoon in his Synopsis,i, 498 (1805) with the following brief description " glabra,caule dichotomo,foliis linearbus,caulinis setaceis,calyce clavato petalisque venosis,nervisque rubris reticulatis.Hab.prope Dax (dept. des Landes) Nune in hort".Sibthorp & Smith described S.juncea in their Prodromus Florae Graecae,i,295 (1806),in which the place of collection is given as Asia Minor.In the same Prodromus,they described another plant from the mountain Hymetto near Athens [page 299] under the name S.rigidula .In the original description the difference pointed out was the character of the basal leaves,ligules & indumentum.

Following Sibthorp & Smith,Boissier keep them distinct. Rohrbach also admitted them as good species,but change the name S.juncea to S.picta .The characters used by these authors to distinguish these two plants are-i.caudical & lower cauline leaves - lanceolate or linear-lanceolate,acute in S.rigidula,instead of obovate or spathulate,obtuse in S.picta;ii. calyx teeth ovate-obtuse in S.rigidula & lanceolate acute in S.picta ; iii. calyx

umbilicate in S.rigidula while in S.picta not umbilicate;iv. pedicels long in S.rigidula.The character of limb & its lobes varies in both,especially in S.picta.

These characters have been individually investigated, and it has become clear that there is no justification for differetiating the plants as two species.Most of the characters have wide range of variation which appears to be of a fluctuating nature.The leaves,especially the basal ones,vary from linear-lanceolate to lanceolate or obovate,attenuated into petiole; plants glabrous to puberulent,especially below.The calyx is slightly umbilicate in all cases,and the width of calyx (consequently the degree to which the white membraneous margin grows) varies greatly even in the same specimen.As regards the lobes & ligules of the petal,it is very difficult to separate one plant from another in these characters;they fluctuate in size,shape and also in the degree to which the lamina is incised.

So far as the length of pedicel is concerned,it seems to vary in the two taxa,though the variation is not so pronounced.A plant collected from Palestine by Davis [no.3970] has all the characters of S.picta,but the length of pedicels varies from 0.7-3.5 cm. ie. they are usually longer than the calyx .Another plant collected from Beirut by Post shows a similar pedicel character.On the other hand,there are many specimens where the plants have linear-lanceolate or lanceolate puberulent leaves,but the pedicels are short(3.0-7.0 mm.in length).

Rohrbach cited Greece,Crete & Rhodes as the geographical range for S.rigidula,and Turkey,Syria,Lebanon & Palestine for S.picta.Post considers that both S.picta & S.rigidula grow in

Syria,Palestine & Lebanon.

Thus being no constant morphological difference correlated with geographical isolation,S.picta & S.rigidula have been considered by the writer as one species.Further,with the available herbarium material it is not possible to separate any variety,even on the length of pedicel.

S.picta is closely allied to S.echinosperma Boiss., but differs from it in the following diagnostics: more markedly branched inflorescence,calyx teeth,ovoid capsule,and seed with many rows of granules.

105. S.Kotschyi Boiss.,Diagn.Pl.Nov.Or.,Ser.1.i,40 (1842).

Annual,seldom biennial or short-lived perennial, 7.0-65.0 (70.0) cm.tall.Root slender,deep-seated,abruptly expanded into a simple or forked leafy caudex. Stem erect,terete, slender,leafy,purplish from the base upwards,pruinose-viscid or hirtellous below,becoming glabrous & viscid above,usually simple below,dichotomously branched from the middle above;branches filiform,more or less divaricate & rigid;middle internodes 1.5-6.3 cm.long.Caudical & lower cauline leaves rosulate,petiolate,1.2-3.0 cm.long,1.5-6.0 mm.wide,linear-lanceolate,sometimes oblanceolate- or obovate-spathulate,attenuated into petiole,base with hyaline ciliate margin,apex acute,obtuse or mucronate;other cauline leaves sessile,0.9-3.2 cm.long,1.0-4.0 mm.wide,linear-lanceolate, or linear,acute;all leaves 1-nerved,pruinose or puberulent,often plicate,sometimes more or less fasciculate .Inflorescence a dichasial cyme.Bracts subequal,like the upper cauline leaves or

setaceous.Pedicels 0.6-2.5 (3.0) cm.long,filiform,rigid,erect or ascending.Flowers hermaphrodite,terminal ones with long pedicels. Calyx 7.0-14.0 mm.long,2.3-3.0 mm.diam.,cylindrical-clavate,umbilicate,with 10 pinkish anastomosed nerves,puberulent or scabrous,sometimes hirtellous,seldom glabrous,in fruit clavate with the base narrowed below the capsule;teeth 1.0-3.3 X 1.3-1.8 mm.,lanceolate,acuminate,with hyaline ciliate margin. Petal usually pink,6.5-13.0 mm.long;claw 3.5-6.0 mm.long, equaling calyx tube,smooth or ciliate;auricles obtuse,acute, round or obscure;limb 3.0-7.0 X 2.0-2.8 mm.,cuneate,bifid into linear lobes;ligules two,ovate,obtuse.Filaments exserted,ciliate. Styles 3, exserted,hairy.Anthophore 2.5-7.0 mm.long,hairy. Capsule 5.0-9.0 X 3.0-5.0 mm.,ovoid-oblong or ovoid, as long as or 1½-2 times longer than anthophore,somewhat exserted.Seed brown,0.5-1.0 mm.long,with flat face & grooved back.Th.or Hp.

Key to the varieties.

1a. Flowers pink :

2a. Caudical & lower cauline leaves linear-lanceolate,often plicate,pruinose,or more or less hirtellous;calyx 1.0-1.3 cm.long,with pink nerves;petal 1.0-1.4 cm.long;capsule ovoid-oblong :

3a. Plants above 10.0 cm.in height;leaves pruinose .....a.var.Kotschyi

3b. Plants below 10.0 cm.in height;leaves hirtellous .....b.var.maritima

2b. Caudical & lower cauline leaves obovate-lanceolate,flat, tomentulose;calyx 7.0-9.0 mm.long,with greenish nerves;

petal 6.5-8.0 mm.long;capsule ovoid

.....c.var.exsudans

1b. Flowers white :

4a. Stem dichotomously branched from the base upwards;branches more or less divaricate,diffuse,rough-papillose below; pedicels longer than calyx

.....d.var.cassia

4b. Stem dichotomously branched from the middle upwards, branches ascending,puberulent below;pedicels as long as or shorter than calyx

.....e.var.stenocalyx

a. var. Kotschyi , Boiss.,Fl.Or.,i,602(1867);Williams in Journ.Linn. Soc.Bot.,xxxii,120 (1896);Post,Fl.Syr.Pal.& Sinai,ed.2,i,180(1932).

Syn. S.lepta J.Gay in Bal.Pl.Exs,,no.800(1885)ms.

Plants 10.0-65.0 cm.tall.Stem slender,branched from the middle upwards;branches filiform,rigid.Caudical & lower cauline leaves linear-lanceolate.Pedicels of terminal flowers longer than calyx and those of lateral ones somewhat shorter than calyx.Calyx pink nerved.Petal pink.Capsule ovoid-oblong,as long as anthophore.

Syntypes-In Tauro,Ky. Pl.exs.no.85 [G.];Syria,prope Antab,Aucher Pl.exs.no.425 [G.;K!,BM!]

TURKEY- Prov.Mersin: Boulouki,13-6-1855,Bal.800.

Cilicia,Giosna,May1895,Siehe 197. Prov.Seyhan,dt.Feke: between Suphan dere & Belankoy,1000m.,2-7-1952,Davis 19551. Prov.Maras: Maras,600m.,15-7-1865,Hausskn.;dt.Elbistan,Kapidere,31-7-1952, Davis 20402. Prov.Maras/ Gaziantep: between Maras & Gaziantep, June 1907,Harad.1480.Prov.Malatya:Kernek,July 1936,Gleisberg 195.

SYRIA- Aleppo,1700m.,a1867,Hausskn. ;ibid. June 1834,Montb.1948.

b. var. maritima Boiss.,Fl.Or.,i,602 (1867).

Syn. S.lepta forma refracta J.Gay in Bal.Pl.exs.,no.801(1885)ms.
S.microsperma Fenzl,Pugill Pl.Nov.Syr.,9(1842).

Plants 7.0-10.0 cm.tall.Stem branched;middle internodes especially the lower ones very short.Caudical & lower cauline leaves subspathulate or lanceolate,attenuated into petiole.Pedicels as long as or slightly longer than calyx.Capsule ovoid-oblong, somewhat longer than anthophore,

Syntypes -In arenosis maritimis Ciliciae ad Mersina,Bal. [holo.G.; iso.K!,BM!];Syriae prope Suadieh,Ky. [G.]

TURKEY- sine loco.,Aucher 429.

SYRIA- Lattakia,6-6-1884,Post

c.var. exsudans (Boiss.& Heldr.)Williams in Journ.Linn.Soc.Bot.,xxxii, 120 (1896).

Syn. S.exsudans Boiss.& Heldr.,Diagn.,1,viii,76(1849).
S.microsperma Fenzl forma Rohrb.,Monogr.Sil.,164(1868)

Plants 6.0-12.0 cm.tall.Stem dichotomously branched;branches divaricate,puberulent with crisp hairs,glabrous & viscid above. Caudical & lower cauline leaves subspathulate or lanceolate, attenuated into petiole.Pedicels 2-3 times longer than calyx,rigid.

Capsule ovoid,usually 1½-2 times as long as anthophore.

Type-In arenosis maritimis protus Tchinova Lyciae,Heldr. [holo.G.; iso.K!,E!,BM!]

TURKEY- Prov.Antalya:Atbuku,between Antalya & Finike,10m.,7-5-1936, Tengwall 549; Lara,3-5-1936,Tengwall 508;Lara,Eski Romaharebeleri, 23-5-1950,Heilb.& Atilla ;at Catarrhaetum,July 1845,Heldr..Prov. Mersin:Anamur,May1872,Peronin 10

d.var. cassia (Boiss.)Williams in Journ.Linn.Soc.,xxxii,120(1896).

Syn. S.cassia Boiss.,Diagn.,1.viii,78 (1849).

Stem branched from the base,rough-papillose below, glabrous & viscid above.Caudical & lower cauline leaves linear-lanceolate.Pedicels longer than calyx.Calyx green nerved,appressed-papillose.Petal white.Capsule ovoid-oblong,somewhat longer than anthophore.

Type-In Sylvaticis jugi Cassii ubi exemplaria pauca Jun.1846,Boiss. [holo.G.]

PALESTINE- Jaffa,1-20m.,12-7-1912,AC. B1516.

e. var. stenocalyx (Lindberg)Chowdhuri,comb.et stat.nov.

Syn. S.stenocalyx Lindberg in Act.Soc.Sie .Fen.Nov.,Ser.B.,11, no.7,15 (1946).

Plants 20.0-70.0 cm.tall.Stem branched from the middle above,densely appressed puberulent below,glabrous & viscid above; branches ascending.Caudical & lower cauline leaves subspathulate or lanceolate,attenuated into petiole.Pedicels as long as or somewhat longer than calyx. Petal white.Capsule ovoid-oblong,as long as

anthophore.

Type- Famagusta,Salamis-in arenoso maris & in colle arenoso juxta, Lindberg, [iso.K!]

Geogr.(of sp.) Turkey,Syria,Lebanon,Palestine & Iran.

Habitat- (of sp.)-Usually in sandy places,sometimes in woods; alt.-1-600m. Fl.-June & July.

106. S.linearis Decaisne,Fl.Sinaica,in Ann.Sc.Nat.,Ser.11,iii,276 (1835);Boiss.,Fl.Or.,i,602(1867);Rohrb.,Monogr.Sil., 162(1868);Post,Fl.Syr.Pal.& Sinai,ed.2.i,180(1932).

Syn. S.linearis Decaisne,Fl.Sinaica (1835);non Sweet .
S.microsperma Fenzl in Russegg.Reise,11,916;non Fenzl, Pugill (1842).
S.adhaerens Ehrbg.herb in Rohrb.,Monogr.Sil.,162(1868).

Annual,biennial or short-lived perennial,15.0-40.0 cm.tall. Root more or less woody,deep-seated,abruptly expanded into a leafy simple or forked caudex.Stem erect,terete,greenish,puberulent, glabrous & viscid above,sometimes scabrous-puberulent & viscid above,usually branched from the middle upwards;branches more or less divaricate,filiform,rigid;middle internodes 2.0-4.5 cm.long. Caudical & lower cauline leaves rosulate,petiolate,1.5-3.0 cm. long,2.5-4.6 mm.wide,linear-lanceolate or linear,attenuated into petiole,base with hyaline ciliate margin;other cauline leaves sessile,1.6-3.2 cm.long,1.5-2.5 mm.wide,linear or linear-subulate, ciliate at the base;all leaves 1-nerved,acute,puberulent or more or less glabrous,straight or slightly curved,seldom with short

sterile leafy shoots in axils. Inflorescence a dichasial cyme, compound, lax. Bracts equal, ovate, acuminate, with narrow hyaline ciliate margin. Pedicels 5.0-17.0 mm. long, filiform, erect or ascending. Flowers hermaphrodite, erect. Calyx 1.2-1.4 cm. long, 2.0-2.5 mm. diam., cylindrical-clavate, umbilicate, with 10 greenish, seldom pale pinkish anastomosed nerves, glabrous or scabrous-puberulent, in fruit clavate with a constriction below the capsule; teeth unequal, 2.0-3.0 X 1.0-1.5 mm., triangular acute or ovate acuminate, sometimes ovate acute alternates with ovate obtuse teeth, with hyaline scarious margin. Petal white, livid or yellowish, 1.2-1.45 cm. long; claw 6.0-8.5 mm. long, more or less exserted, smooth; auricles small, acute, sometimes obscure; limb 4.0-6.0 X 1.0-1.5 mm., oblong, bipartite into oblong-linear or linear lobes; ligules two, 0.7-1.3 mm. long, oblong, crenulate. Filaments exserted, smooth. Styles 3, exserted, hairy. Anthophore 6.0-7.0 mm. long, hairy. Capsule 6.0-7.5 X 2.8-3.0 mm., ovoid-oblong, as long as anthophore, included. Seed brown, 0.7-1.0 mm. long, with flat smooth face & grooved granulate back. Th. or Hs.

Type-Le desert du Sinai, Decaisne [holo. Paris].

PALESTINE- Jericho, 21-6-1941, Davis 3704 ; East of Jerusalem, 200-800m., 10-5-1910, AC. 3511; Good Samaritan's Inn, 17-8-1913, AC. B4785; Wadi Kedron, 6-12-1942, Davis 5108; Dead sea, at the mouth of Amon, 29-6-1941, Davis 3754; between Khan Hatrur & the monastry of St. George in Wadi Kelt, 17-6 1941, Davis 3657; Jerusalem, Ain Terra, 400m., 15-5-1912, AC. B2785.

ARABIA PATRAEA- Wadi Hebran, 24-4-1835, Schimper 222; Rano nr. Mabraka, 70m. N.E. of Jeddon, 450m., 11-3-1940, Trott 189.

SINAI- Desert, June 1832, Bove 178

Geogr. Egypt, Sinai, Arabia Patraea, Palestine & Syria.

Habitat- Desert & hill sides; alt.-200-800m. Fl.-April-July.

S.linearis is allied to S.Kotschyi Boiss.,but differs from it in the following diagnostics: stem usually stout,greenish, and conspicuously puberulent;leaves usually narrow;calyx teeth triangular or ovate,acute,obtuse or acuminate,not ciliate; white petal with oblong limb;claw & filaments without cilia.

107. S.chaetodonta Boiss.,Diagn.Pl.Nov.Or.,Ser.1,i,39 (1842);Boiss., Fl.Or.,i,605(1867);Rohrb.,Monogr.Sil.,162(1868); Post,Fl.Syr.Pal.& Sinai,ed.2.i,182(1932)-Komarov, Fl.U.R.S.S.,vi,t.xli,fig.4 (1936).

Syn. S.modesta Boiss. & Bl.,Diagn.,11.vi,33(1859).
S.chaetodonta var.modesta Boiss.,Fl.Or.,i,606(1867)
S.debilis Stapf in Denkschr.Akad.Wien.,li,282(1886)

Annual,7.0-45.0 cm.tall,from a deep-seated tap-root.Stem erect,terete,greenish or purplish from the base upwards,usually branched throughout,sometimes simple below,scabrous-puberulent below,becoming glabrous & viscid above,hairs minute,deflexed; branched ascending or arcuate,filiform,rigid,usually in turn dichotomously branched;middle internodes 3.0-4.5 cm.long. Caudical & lower cauline leaves rosulate,petiolate,1.7-4.0 cm. long,1.3-3.0 mm.wide,linear-lanceolate,attenuated into petiole, with hyaline base;other cauline leaves sessile,2.0-4.4 cm.long, 1.0-3.5 mm.wide,linear or linear-subulate;all leaves 1-nerved, acute,ciliate towards the base.Inflorescence a dichasial cyme, compound,lax.Bracts equal,like the upper cauline leaves.Pedicels of terminal flowers 5.0-15.0 mm.long,& those of lateral flowers 2.0-3.5 cm.long,erect or ascending.Flowers hermaphrodite.Calyx

1.2-1.4 cm.long,3.0-4.0 mm.diam.,cylindrical-clavate,slightly umbilicate,with 10 greenish nerves,commissural nerves bifurcating & becoming anastomosed with the median ones,glabrous,sometimes scabrous at the nerves,in fruit clavate or oblong-clavate with base narrowed below the capsule;teeth 2.3-3.5 X 1.0-1.5 mm., lanceolate,acuminate,or subulate,with hyaline scarious margin. Petal pink,seldom greenish yellow,1.15-1.3 cm.long;claw 6.0-7.0 mm.long,equaling calyx,smooth;auricles acute,obtuse,sometimes obscure;limb 5.0-6.0 X 2.0-2.8 mm.,cuneate,bipartite to the middle into oblong lobes;ligules two,1.0-1.5 mm.long,oblong, oblong-ovate,obtuse or crenulate.Filaments smooth,.Styles 3, hairy.Anthophore 4.0-6.0 mm.long,scabrous.Capsule 7.0-10.0 X 3.5-4.0 mm.,ovoid-oblong,twice as long as anthophore,included. Seed grey brown,0.7-1.0 mm.long,with flat striate face & obtusely grooved granulate back.Th.

Type- In Persia australi,Aucher Pl.exs.no.4223 [holo.G.;iso.K!,BM!]

TURKEY- Armenia,Paschtasch & Rhoztu,27-6-1889,Sint. 967.Prov. Mardin: Kasmi,21-6-1888,Sint.1128.

PALESTINE- Philistaea,at Gaza,29-5-1897,Bornm.182.

IRAQ- Mosul,a1841,Ky.91; Greater Zab,nr.Eski Kellet,300m.,11-5-1947, Gillett 8188 ;Jebel Avwoman,Biyara,450m.,6-6-1948,Gillett11743; Rowandiz Gorge,540m.,17-7-1932,Guest 3015;Jebel Mahmour,700m., 30-5-1948,Gillett 11235.

IRAN- Ecbatanensis,yr.1882,Polak ;S.of Khonar,23-4-1885,Stapf 299; Mischdichir,16-6-1885,Stapf 1939

AFGHANISTAN- Hari-rud-valley,yr.1885,Aitch.1023; sine loco.a1852, Griff.

minor variant. pittodes Boiss.,Fl.Or.,i,606 (1867)

Syn. S.pittodes Bienert in Bunge Pl.exs.(1859)

S.chaetodonta var.pittodes Boiss.Fl.Or.,i,606(1867).

Plant dwarf,7.0-20.0 cm.tall,more viscid.Flowers shortly pedicellate.

Type- In persia ad Schurab inter Ispahan & Teheran,Bunge [holo.G., iso.K!]

Geogr.Turkey,Palestine,Lebanon,Iraq,Iran,Afghanistan & Caucasus.
Habitat- Coastal sand & on mountains;alt-300-700m.Fl.-May & June.

108. S.arenosa C.Koch in Linnaea,xv,711(1841);Rohrb.,Monogr.Sil.,161 (1868)-Stschegl in Bull.Soc.Nat.Mosc.,t.v.fig.1(1853).

Syn. S.leyseroides Boiss.Diagn.1.i,41(1842).
S.linearis var.tenella Fenzl in Ky.Pl.exs.no.453(1845)ms.
S.salsa Boiss.,Diagn.1.viii,77(1849).
S.Kowalenskyi Stschegl in Bull.Soc.Nat.Mosc.,i,322(1853).

Annual,3.0-35.0 cm.tall.Root slender,deep-seated,expanded above into a leafy caudex.Stem slender,erect,terete,greenish, sometimes pale purplish from the base upwards,usually branched throughout,sometimes simple below,puberulent or hirtellous below, glabrous & viscid above;middle internodes 0.8-2.7 cm.long.Caudical & lower cauline leaves rosulate,petiolate,0.8-3.0 cm.long,1.0-3.0 mm.wide,linear-lanceolate,attenuated into petiole,scabrous-puberulent or glabrous;other cauline leaves sessile,1.2-5.3 cm.long, 0.5-2.0 mm.wide,linear,often subulate,glabrous;all leaves 1-nerved, ciliate at the base,straight or slightly curved,nearly acute, sometimes more or less plicate.Inflorescence a compound dichasial

cyme.Bracts unequal,setaceous,with hyaline ciliate margin. Pedicels 0.5-2.5 cm.long,erect & ascending.Flowers hermaphrodite. Calyx 1.0-1.25 cm.long,2.8-3.3 mm.diam.,clavate from a truncate base,with 10 greenish sparingly anastomosed nerves,glabrous, sometimes scabrous or puberulent along the nerves;teeth 2.8-3.3 X 1.0-1.5 mm.,lanceolate or triangular,acute,with hyaline ciliate margin.Petal white,rarely pink,1.0-1.3 cm.long;claw 5.5-7.0 mm. long,exserted,smooth;auricles minute or obscure;limb 4.5-6.0 X 1.3-2.3 mm.,cuneate,bipartite to the middle into linear lobes; ligules two,1.0-1.3 mm.long,oblong,or ovate,obtuse or crenulate. Filaments exserted,smooth.Styles 3, exserted,hairy.Anthophore 5.0-8.0 mm.long,scabrous.Capsule 5.0-9.0 X 3.0-4.0 mm.,oblong, as long as anthophore,included.Seed brown,0.3-0.5 mm.long,with flat face & grooved tuberculate back.Th.

Type- Prope flumen Araxin in arena frequenter,Koch [holo.Berlin]

IRAQ-sine loco. Watson;Babylonem,Aucher 448;Damour,Aucher 432 ;

IRAN- Nr.Tabriz,yr.1928,Gilliat-Smith 2321;Nemeckderya,nr.Shiraz, Ky.453;Nr.Chaldaca,Sept.1928,Legrain 19;Failancha Is.24-3-1936, Dickson 289;Maskan Is.nr.Kuwait,18 miles S.W of Kuwait,15m.,8-5-1942,Dickson 492.

AFGHANISTAN-sine loco.yr.1852,Griff.316,570,889,1645; Kabul, 24-6-1935,Hay 295;ibid. Collett & Gamble

Geogr. Caucasus,Iraq,Iran,Afghanistan & India.

Habitat- Sandy & gravelly places or nr. sea coast.Fl.-May & June

The nearest allies are S.Kotschyi Boiss. & especially S.linearis Decaisne .It is distinguished from the former by its smooth claw & filaments,clavate calyx having a truncate base,calyx nerves greenish ,sparingly branched ,anastomosed and scabrous or sparingly puberulent,scabrous anthophore & oblong capsule.It differs from S.linearis by its cuneate limb,scabrous anthophore and oblong capsule.

SECTION 33 ATOCION

The 19 species comprising this section consist of annual plants which are obviously adapted to semi-xerophytic conditions. In addition to the slender ephemeral root and comparatively smaller basal leaves,the group is characterized by the dichasial inflorescence which often passes on to a monochasial cyme,especially above,the tubular,tubular-clavate or oblong-clavate or oblong calyx,which become clavate in fruit with constricted base and contracted apex, & by the ovoid or ovoid-oblong capsule,In addition to these characters,the petal is mostly entire or emarginate,rarely bifid.

The species of this section fall into 3 subsections on the basis of seed shape,shape & degree of incision of petal,& the inflorescence.

Subsect. Rubellae contains 8 species distinguished by their regular dichasial,corymb-like cyme,shortly pedicellate flowers & entire petal.It is further distinguished by the seed having an ear-shaped depression on the face.

Subsect. Delicatulae contains 3 species & is best distinguished from the other two subsections by its globose, umbilicate seed.

Subsect. Divaricatae contains 8 species,most of them characterized by their divaricate branches,lax inflorescence which sometimes passes on to a monochasial cyme,& long pedicels of the flowers.It is further set off from the other two by the seed having a flat face.

The species of this section are distributed in the Mediterranean countries.

Key to the subsections & the Oriental species.

1a. Seed subglobose,umbilicate,with a pore at each side of the umbilicus 33B.Subsect.Delicatulae

2a. Limb oblong- or obovate-cuneate,bipartite,with a tooth on each side at the base;plants usually tall;inflorescence more or less congested. 111.S.aegyptiaca

2b. Limb obovate-cuneate,entire,seldom emarginate,tooth at the base is absent;plants of low stature;inflorescence lax 112.S.delicatula

1b. Seed more or less compressed,not umbilicate:

3a. Seed with an ear-shaped depression on the face;branches not divaricate;inflorescence dense,corymb-like;pedicels short . .....33A.Subsect. Rubellae

4a. Ligule one;plants glandular-puberulent & viscid; calyx glandular-puberulent,pinkish;capsule ovoid, as long as anthophore 110.S.fuscata

4b. Ligules two;plants eglandular & not viscid;calyx glabrescent or sparingly puberulent,white;capsule ovoid-oblong,2-3 times as long as anthophore 109.S.rubella

3b. Seed with flat face;branches more or less divaricate; inflorescence lax,often passing above into a monochasium; pedicels,especially the lower ones,long 33C.Subsect.Divaricatae

SUBSECTION 33A RUBELLAE

109. S.rubella Linn.,Sp.Pl.,ed,1.419 (1753); Boiss.,Fl.Or.,i,598 (1867);Rohrb.,Monogr.Sil.,155(1868);Williams in Journ.Linn.Soc.,xxxii,113(1896)-Delile,Fl.Aegypt., t.29,fig.3(1812);Sibth.& Sm.,Fl.Graec.,v,t.426(1825); Reichb.,Ic.Fl.Germ.Helv.,vi,t.284,fig 5078(1844).

Syn. S.rubella Linn.,Sp.Pl.,1.419(1753);non Suffr.(1802);non Bory;non Wulf.;non DC.(1815);non Bluff.;non Lapeyr.(1818);non Soy-W.& Godr.

S.patula Lag.in Anal.Cienc.Nat.,102(1802);non Desf.(1798)

S.inaperta DC.,Fl.Fr.,iv,750(1805);non Linn.(1753);non Sibth.& Sm.(1825);non Bertol.(1839);non Hayward (1914).

S.pseudolinum Ramond,Pyr.Ined., in DC.,Fl.Fr.,iv,750(1805)

S.crispa Poir.,Encycl.,vii,162 (1806);non Moench (1794).

S.oblongifolia Otth in DC.,Prodr.,i,369(1824)

S.turbinata Guss., Prodr.,Fl.Sic.,i,506(1827)

S.antirrhina Hort.Madr.ex Otth in DC.,Prodr.,i,378(1824); non Linn.(1753).

S.glutinosa Duf. in Mem.Mus.,xiv,219(1827);non Pers.(1805) non Zois.;non Hampe

S.babylonica Boiss.,Diagn.,11.i,71(1849)

S.segetalis Duf. in Bull.Soc.Bot.Fr.,vii,241(1860)

S.argillosa Munby ibid,xi,14(1864)

S.colorata Willd. Herb.8626 ex Rohrb.,Monogr.Sil.,155(1868) non Poir.(1789);non Friv.(1835);non Fenzl;non Schousab.(1813)

S.erigens Willd.Herb. 8626 ex Rohrb.,Monogr.Sil.,155(186

S.undulata Pourr. in herb.salvad. no.109;non Ait.
Oncerum rubellum Dulac,Fl.Hautes-Pyren.,257(1867)
Silene rubella var. laxa Boiss.,Fl.Or.,i,598(1867)
S.stricta Aschar. in Herb.Holm.Lindm.(1891);non Linn,(1756)
non Lapeyr.(1813);non Sprengl(1825).

Annual,19.0-62.0 cm.tall,from a slender deep-seated taproot. Stem erect,often arcuate at the base,terete,leafy,usually branched throughout,sometimes simple below,puberulent or scabrous-puberulent, sometimes more or less glaucescent;branches alternate,ascending, equaling main axis;middle internodes 4.0-16.0 cm.long.Caudical & lower cauline leaves rosulate,petiolate,1.0-7.5 cm.long,4.0-15.0 mm.wide,oblong-spathulate or oblong-lanceolate,attenuated into petiole,base with hyaline ciliate margin,obtuse or round at the apex,puberulent;other cauline leaves sessile,1.5-8.0 cm.long, 3.0-15.0 mm.wide,oblong-lanceolate or lanceolate,acute,obtuse or round at the apex,ciliate at the base;all leaves 1-nerved,often with undulate margin.Inflorescence a compound dichasial cyme; branches dense & corymbose.Bracts unequal,ovate,acuminate,with hyaline ciliate margin.Pedicels 2.0-5.0 mm.long,erect & ascending. Flowers hermaphrodite,erect.Calyx 1.1-1.35 cm.long,3.0-4.0 mm. diam.,cylindrical-clavate from a truncate base,membraneous,white, with 10 more or less anastomosed nerves,sparingly puberulent,in fruit turbinate-clavate;teeth often purplish,2.0-2.5 X 1.5-2.0 mm., ovate with round apex,with hyaline ciliate margin.Petal pink, 9.5-12.5 mm.long;claw 6.5-8.3 mm.long,equaling calyx,smooth, exauriculate;limb 3.0-4.3 X 1.3-2.0 mm.,obovate-cuneate,entire or emarginate;ligules two,0.9-1.3 mm.long,oblong,obtuse.Filaments

included,smooth.Styles 3,exserted,hairy. Anthophore 3.5-4.5 mm. long,smooth.Capsule 7.5-9.5 X 3.0-4.5 mm.,ovoid-oblong,2-3 times as long as anthophore,included.Seed dark brown,0.7-1.0 mm. long,with concave face & grooved back.Th.

Linnaean specimen - In Lusitania [L!]

CYPRUS- Kythraca ,11-4-1880,Sint.& Rigo 251 ;Prealuma,Druce 63; Syrianohuri,15 m.,30-3-1935,Syngr.641.

SYRIA- Irbid,Bosrah,6-5-1886,Post ;Damascus,Gaill.1644.

PALESTINE- Hullah,April 1877,Post 232; Jericho,(-)230m.,24-2-1910, Dinsm. 4534;Beisan (-) 100m.,29-2-1912,AC. B534;Beil Alfa(Esdraelon), 18-3-1942,Davis 4152.

IRAQ- Babylon,2-4-1893,Bornm.94;Bagdad,March 1930,Guest 360;Bagdad, Karadah,13-4-1932,Guest 1996; Nr. Suweira,35m.,15-3-1947,Gillett 6526;Qaraglian,April 1929,Rogers 0129;nr. Bagdad,April1938, Lazar 493 ;ibid.,yr.1853,Boiss. ;Bagdad,Rustom farm,19-3-1931, Lazar 1136;ibid.,Lazar 5 ;sine loco,Watson ;Bagdad,Schlafli 130; Karadah,Graham .

IRAN- nr. Khaniqui,60m.,19-3-1929,Cow.& Darl.234;Hamidiah,Noel 4; sine loco.,Threlfall .

Geogr. Algeria,Libya,Egypt,Spain,Portugal,Belearic Is,Sardinia, Sicily,Rhodes,Cyprus,Syria,Palestime,Iraq & Iran.

Habitat- Cultivated fields ;alt.- 60m.- (-) 230m.Fl.-Feb.- April.

S.rubella Linn. is obviously most closely related to S.Bergiana Lindm. as demonstrated by the similar habit,inflorescence, & colour of calyx & petal;but is differs from the latter species in its short pedicels,cylindrical-clavate calyx,obovate-cuneate & emarginate limb,& by the ovoid-oblong capsule.It is also related to S.fuscata Link.,as has been mentioned under that species.

110. S.fuscata Link. in Brot.,Fl.Lusit.,ii,187(1804);Boiss.,Fl.Or.,i, 600 (1867);Rohrb.,Monogr.Sil.,153(1868)-Moris,Fl. Sard.,i,t.15(1837);Bouloumoy,Fl.Lib. Syr.,t.47.fig.1 (1930).

Syn. S.divaricata Otth in DC.,Prodr.,i,376(1824);non Clem. (1806);non Sibth.& Sm.(1806);non Ehrbg.
S.pseudo-atocion Guss.,Pl.rar.,180(1826);non Desf.(1798); Thompson (1906).
S.undulifolia Sweet,Hort.Brit.,3,65(1839)
S.simplicicorona Mutel,Fl.Fr.,i,148(1834)
S.undulatifolia Moris,Strip,Sard,Elench.,i,8(1827)
S.sicula Bertol.,Fl.Ital.,iv,609(1839);non Pers.(1826); non Cyr.;non Ker-Gawl.;non Ucria
S.Sassiana Bertol.,Fl.Ital.,iv,609(1839)
S.articulata Kunze in Flora,xxix,696(1846);non Viv.(1824).

Annual,10.0-35.0 cm.tall,from a slender deep-seated taproot. Stem erect,terete,leafy,often fistulose,usually purplish from the base upwards,puberulent below with crisp hairs,glandular-puberulent & viscid above,usually branched throughout;branches arcuately erect;middle internodes 3.5-8.4 cm.long.Caudical & lower cauline leaves rosulate,petiolate,2.8-6.0 cm.long,6.5-13.0 mm.wide,oblong-spathulate,attenuated into petiole,scabrous,midrib especially on the dorsal surface with crispule hairs,base with hyaline ciliate margin;other cauline leaves sessile,2.3-6.5 cm.long,5.0-15.0 (20.0) mm.wide,oblong-lanceolate or lanceolate,sparingly puberulent & sparsely glandular;all leaves 1-nerved,obtuse,seldom acute,margin often undulate.Inflorescence a dichasial,compound,

lateral branches dense and corymbose.Bracts unequal,ovate,acuminate, glandular-puberulent.Pedicels 0.3-3.5 cm.long,erect,sometimes spreading in fruit.Flowers hermaphrodite.Calyx 1.05-1.3 cm.long, 3.0-3.3 mm.diam.,cylindrical-clavate,umbilicate,purplish,with 10 anastomosed nerves,glandular-puberulent,in fruit clavate;teeth 1.0-2.5 X 1.3-1.5 mm.,ovate,obtuse,with hyaline ciliate margin. Petal pink,1.1-1.35 cm.long;claw 7.5-9.0 mm.long,equaling calyx, smooth,exauriculate;limb 3.5-4.5 X 1.5-2.0 mm.,obovate-cuneate or oblong-obovate,entire or emarginate;ligule one,2.0-2.5 mm.long, oblong,retuse.Filaments exserted,smooth.Styles 3,exserted,hairy. Anthophore 4.0-6.0 mm.long,smooth.Capsule 5.0-8.0 X 4.0-5.0 mm., ovoid,as long as anthophore,included.Seed dark brown,1.0-1.3 mm. long,with concave tuberculate face & flat or more or less convex back with 3-4 rows of granules.Th.

Types- Portugal-in collibus circa Cabeca de Monta chique,nec non circa Obidos et alibi in Estremadura,Link.

LEBANON- Saida,22-1-1853,Bl.9 ;Beirut,Gaill.

PALESTINE- Magdala,(-)200m.,4-4-1911,Dinsm.1606; Jaffa ,1-20m., 24-3-1910,Dinsm. 1472; Yibnah,25m.,5-4-1911,AC. 3606;Ramalh 20-2-1928,Zohrab,Fein.& Spindel 46.

Geogr. Algeria,Portugal,Spain,Sardinia,Sicily,Italy,Greece,Syria, Lebanon & Palestine.

Habitat- Fields along the coast;alt.- 25m-(-)200 m.Fl.-Jan-May.

S.fuscata Link. is closely allied to S.pseudo-atocion Desf. but generally differs from it in having an umbilicate, somewhat short calyx with ovate,obtuse teeth,and in the smooth

& short anthophore.

The habit of S.fuscata is most like that of S.rubella Linn.,although the latter species is usually sparsely puberulent & eglandular.The two are alike in that their inflorescences are similar & the flowers are shortly pedicellate.But S.fuscata differs from S.rubella Linn. in its umbilicate purplish calyx which is viscidly glandular ,and by its comparatively long anthophore.

SUBSECTION 33B. DELICATULAE

111. S. aegyptiaca (Linn.)Linn.fil.,Suppl. Pl.,241(1781)

Annual,6.0-37.0 cm.tall,from a tapering,deep-seated taproot.Stem erect,often ascending,terete,leafy,usually purplish from the base upwards,crisp-puberulent throughout,often sparingly glandular below,becoming dense & viscid above,generally branched , sometimes simple below;middle internodes 1.5-8.0 cm.long.Caudical & lower cauline leaves rosulate,petiolate,1.3-6.0 cm.long,3.0-15.0 mm.wide,ovate-spathulate,attenuated into petiole,obtuse or mucronate, sometimes acute,base with hyaline ciliate margin;other cauline leaves sessile,1.2-3.7 cm.long,2.3-16.0 mm.wide,ovate,ovate-lanceolate,or lanceolate,ciliate towards the base,obtuse or acute; all leaves 1-nerved,crisp-puberulent,often somewhat glandular, with wavy or smooth margin.Inflorescence a compound dichasial cyme,usually dense & corymbose.Bracts equal,or nearly so ,ovate- or linear- lanceolate,membraneous,or herbaceous,ciliate,glandular-puberulent .Pedicels of terminal flowers 6.0-30.0 mm.long.Flowers

hermaphrodite,erect,lateral ones subsessile.Calyx 9.5-21.0 mm. long,2.5-3.3 mm.diam.,cylindrical,umbilicate,usually purplish, sometimes greenish,with 10 anastomosed nerves,glandular-puberulent, in fruit clavate;teeth 1.3-2.0 X 1.0-1.5 mm.,oblong-ovate,obtuse, with hyaline scarious or ciliate margin.Petal pink,7.0-15.0 mm. long;claw 3.5-8.0 mm.long,more or less exserted,smooth,seldom sparingly ciliate;auricles minute,acute;limb 3.5-7.5 X 2.5-4.0 mm., oblong-cuneate or oblong-obovate with cuneate base,bilobed,with two small lateral outgrowths on the sides;ligules two,0.7-1.5 mm. long,ovate,or oblong,obtuse.Filaments exserted,smooth.Styles 3, exserted,hairy.Anthophore 6.0-14.0 mm.long,smooth.Capsule 5.0-8.5 X 3.0-4.3 mm.,ovoid-oblong,as long as or somewhat shorter than anthophore,included.Seed dark brown,0.5-1.3 mm.long,subglobose, umbilicate,granulate.Th.

Key to the varieties.

Plants 20.0-37.0 cm.tall,crisp-puberulent,more or less glandular throughout;calyx 1.3-2.1 cm.long; seed 1.0-1.3 mm.long .....a.var.aegyptiaca

Plants 6.0-15.0 cm.tall,puberulent throughout,glandular above; calyx 0.7-1.5 cm.long;seed 0.5-0.8 mm.long .....b.var.atocioides

a.var.aegyptiaca .Boiss.,Fl.Or.,i,600(1867);Rohrb.,Monogr.Sil.,156 (1868)- Sibth.& Sm.,Fl.Graec.,v,t.427(1825); Jacq.,Hort.Vindob.,iii,t.32(1776);Bouloumoy,Fl.Lib. Syr.,t.50.fig.1 (1930)

Syn. Cucubalus aegyptiacus Linn.,Sp.Pl.,ed.1,415(1753)

S.atocion Jacq.,Hort.Vindob.,iii,19 (1776)

S.orchidea Linn.fil,Suppl. Pl.,241(1781)

S.aegyptiaca var. retroflexa Pers.,Syn.,i,500(1805)

S.retroflexa Steud.,Nomencl.Bot.,ed.11.587(1841)

S.spathulata Willd.,Herb.no.8646,ex Rohrb.,Monogr.Sil.,156 (1868);non M.Beib.(1808);non Schur

S.atocia St.Lag.in Ann.Soc.Bot.Lyon,vii,134 (1880)

S.aegyptiaca var.umbrosa Nabelek,It.Turc.Pers.,45(1923)

Stem 20.0-37.0 cm. long.Leaves 3.0-13.0 mm.wide.Calyx reddish or greenish,1.3-2.1 cm.long,obscurely nerved.Seed 1.0-1.3 mm.long.

Linnaean specimen- In Aegypto [L!]

TURKEY- Cappadocica,Hadjin,Manissad.869.Prov.Mersin:Guzeldere, 2-4-1855,Bal.808;Mersin,Siehe 554.Prov.Seyhan:Adana,19-3-1933, Meinertz.;Pozanti,720m.,6-4-1934,Balls .Cilician Taurus, Kassan Oghlu,Cedrorum,1500m.,15-5-1859,Ky.89;Cilicia,Gusgutathal(Gerolle) yr.1896,Siehe 396; sine loco. Montb. ;ibid. Aucher 435;ibid. April 1834,Montb.1335. Prov.Maras:Berit dag,1800m.,14-5-1934, Balls 1089.Prov.Mardin:Mardin,3-6-1885,Sint.915.Prov.Gaziantep: Gaziantep,600m.,6-4-1865,Hausskn.;ibid. Balls 668.Prov.Hatay; Iskenderun,March 1931,Rogers 6574.

CYPRUS- Larnaca,Skarinou,17-3-1941,Davis 2681;nr.Amathus,27-2-1947, Mavrom. ;Yayla above Halefka,600-900m.,27-3-1941,Davis 2846; Abbots field,Lascelles ;Halefka forest,450m.,3-4-1950,Chapm. 116; sine loco. Sibth.;Carpass,Felsengebrige,nr. Akathu ,4-5-1880, Sint.& Rigo 242;Akathu,4-5-1880,Sint.& Rigo 250;Kythraea,25-3-1880, Sint.& Rigo 250;Lefkara,600m.,19-3-1941,Davis 2732;Monastere Aronenin,600-900m.,26-5-1912,Harad. 380; North range above Halefka,March 1930,Norman 431; Yerasa,300m.,17-5-1949,G.A.M. ; Nicosia,225 m.,22-4-1950,Chapm.539.

LEBANON- Beirut,May 1896,Post ;ibid. Mitchell ;ibid, Osborne 42 .

PALESTINE- Hierosolyma,Feb.1853,Roth ;sine loco. 1863-4,Lowne ; nr.Tiberias,21-2-1942,Davis 3993;Gaza,yr.1917,White ;Jerusalem, 15-2-1931,Eig 121 ;ibid. April 1846,Boiss.; Ramleh to Jerusalem, 800m.,31-i-1903,AC.333; Ramleh,Khulda village,11-3-1926,Fishelson 92: E. of Jordon,1873,Paine ;Nablus,600m.,26-3-1911,AC.6333;Magdala, (-)200m.,15-5-1911,AC. 8333;Sejed,1-3-1911,AC. 2333;Hebron(Judea)

Hayne ;Jerusalem,valley of Hemmon,Hayne ;Ain Karmi,April 1928, Edward 243;Us-Salt,April 1886,Post ;Makur,Hayne; Nr.Deir,Ballut-el-Kafr & Kibbah,Ogelvic ;Amman,750m.,7-3-1922,Buxton 13;Wadi Ninonin,600m.,9-3-1922,Buxton 64.

IRAQ- Mosul,16-3-1930,Rogers 0542;Matin,1500m.,15-5-1947,Rawi 8717; Rabatke, Rowanduz Gorge,23-3-1930,Guest 594;ibid. 18-4-1932, Guest 2107; N.of Rowanduz,25-3-1931,Guest 734;Amadia,1050m., 28-3-1931,Guest 1272;Zakho Pass,750m.,25-4-1932,Guest 2251;Swara Tukka,1050m.,23-4-1932,Guest 2639.

IRAN- Kuh Sefin,at Schaklova,12-1400m.,9-5-1893,Bornm.975;ibid. 11-1400m.,9-5-1947,Gillett 8092.

b. var. atocioides (Boiss.)Chowdhuri,comb.et stat.nov.

Syn. S.atocioides Boiss.Diagn.Pl.Nov.Or.,Ser.1,v,83(1844).

Plant 6.0-15.0 cm.tall,pubescent throughout,becoming glandular above.Cauline leaves lanceolate or linear-lanceolate. Calyx 7.0-15.0 mm.long,greenish or pinkish.Seed 0.5-0.8 mm.long.

Type- Turkey-in Caria, a 1843,Chr. Pinard [holo.G.;iso.K!,BM!]

TURKEY- Pamphylia,March 1845,Heldr..Prov.Antalya,dt.Gebiz: Bozburun dag,600m.,25-7-1949,Davis 15672;Bozburun dag,between Tasli yayla & Tozlu dere,27-4-1949,Davis 15772;Mt. Techary Klar, nr. Antalya,20-4-1860,Bourg.49;sine loco,Forbes 154;Belkis, 150m.,29-3-1936,Tengwall 218.

Geogr.(of sp.) Algeria,Tunisia,Egypt,Palestine,Lebanon,Syria, Turkey,Cyprus,Iraq & Iran.

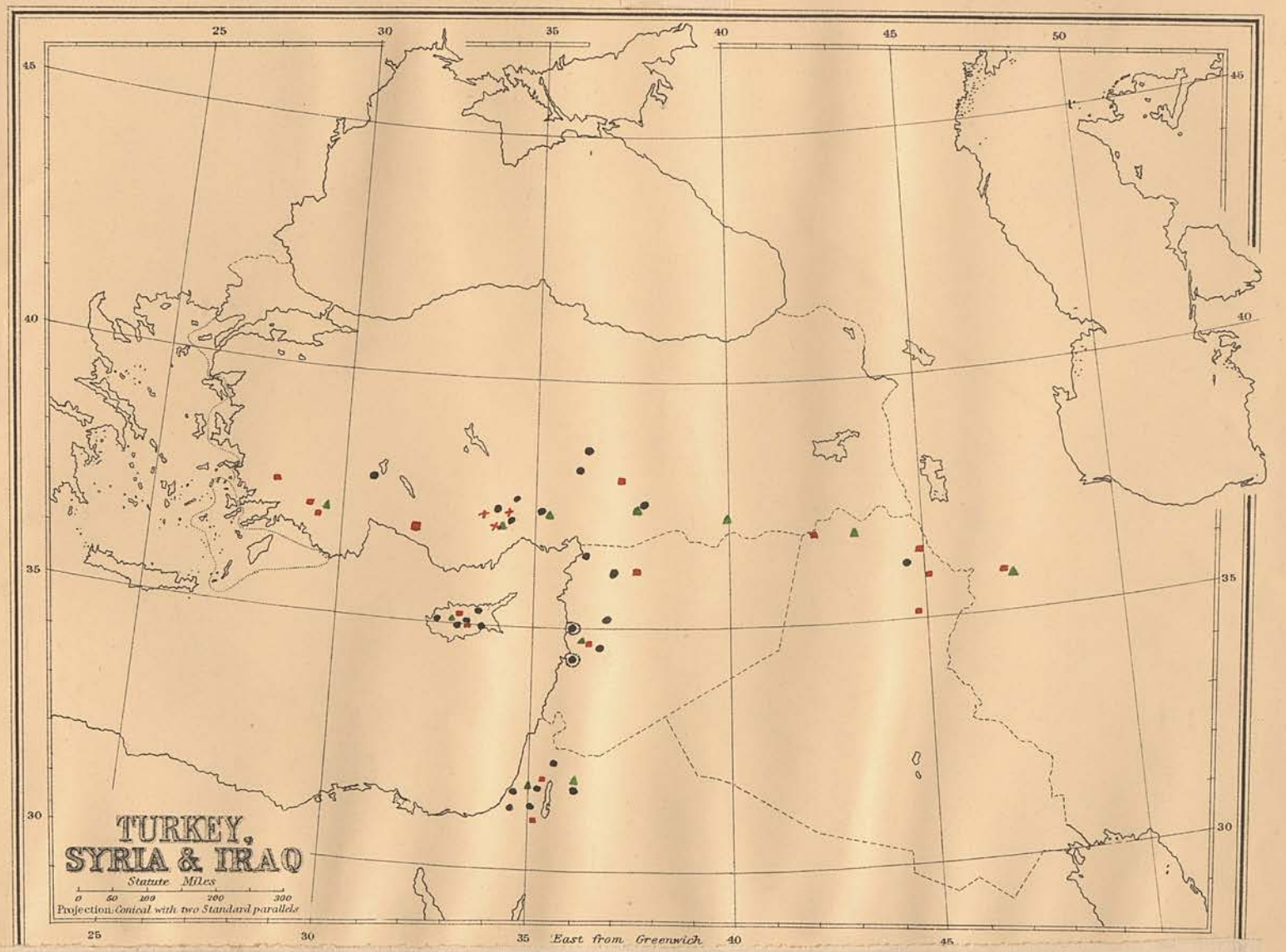
Habitat- (of sp.) Fields,sandy or rocky places,sometimes on mountains;alt.-1m-1400m.Fl.-March- May.

Although S.atocioides Boiss.(from S.W.Anatolia) has been said to differ from S.aegyptiaca (Linn.)Linn.fil.,because of its herbaceous bracts,smaller and shorter capsule and smaller

seeds, examination of these characters shows that S.atocioides is untenable as a species. I have examined a sufficient quantity of material at Kew collected from different countries. The herbaceous bract is not usually confined to S.atocioides from Turkey alone. The bracts in this species, and as well as in S.aegyptiaca, vary from ovate and membraneous to ovate & herbaceous, and from lanceolate & membraneous to lanceolate & herbaceous. I have plotted on the map [Map 7] the distribution of specimens having different types of bracts. It will be apparent from the map that plants with different types of bracts occur together in different countries of the Orient, without any geographical correlation.

The other points of difference, ie. short capsule in S.atocioides , is not true . The length of capsule in both taxa varies from 5.0-8.5 mm. Similarly the length of the calyx also varies in both species, and their range overlaps. The only difference worth mentioning is the size of the seed. In S. aegyptiaca the seed is large and varies from 1.0-1.3 mm. in length, whereas in S.atocioides it varies from 0.5-0.8 mm. This difference in size of the seed alone does not justify the retention of S.atocioides as a distinct species. Therefore, considering the low stature of the plants & usually short hairs of stem & leaves, I have reduced S.atocioides to a variety of S.aegyptiaca . Apart from the above mentained differences, the calyx in this variety is usually short (0.7-1.5 cm.) & the upper cauline leaves are usually lanceolate or linear-lanceolate.

MAP 7.



Map 7. Distribution of Silene aegyptiaca on the character of the bract.

Key:-Plants with ovate membraneous bracts- ● :Plants with lanceolate membraneous bracts -✕ :Plants with lanceolate herbaceous bracts- ■ :Plants with ovate herbaceous bracts- ▲.

112. S.delicatula Boiss.,Diagn.Pl.Nov.Or.,Ser.1.i,41(1842);Boiss.,Fl. Or.,i,601(1867);Rohrb.,Monogr.Sil.,157(1868).

Syn.S.delicatula Boiss.,Diagn.,1.i,41(1842);non Bertol.(1839).

Tender annual, 12.0-25.0 cm.tall.Stem erect,or ascending, terete,leafy,branched from the base upwards,crisp-puberulent, becoming glandular-puberulent & viscid above;middle internodes 1.5-6.3 cm.long. Caudical & lower cauline leaves rosulate, petiolate,2.0-4.5 cm.long,5.0-17.0 mm.wide,ovate or ovate-oblong, attenuated into petiole,ciliate at the base;other cauline leaves sessile,1.3-2.8 cm.long,4.0-13.0mm.wide,ovate or ovate-lanceolate; all leaves acute,puberulent with crispule hairs.Inflorescence a dichasial cyme,sometimes upper portion passes into a monochasial cyme.Bracts unequal,lanceolate,acute,glandular-puberulent. Pedicels 3.0-20.0 mm.long,erect & ascending.Flowers hermaphrodite. Calyx 7.0-13.0 mm.long,2.5-3.0 mm.diam.,cylindrical-clavate, umbilicate,glandular-puberulent,with 10 anastomosed nerves,in fruit clavate with a constriction below the capsule;teeth 1.3-2.0 X 1.3-2.0 mm.,ovate,obtuse,with hyaline scarious or ciliate margin. Petal pink,8.3-13.0 mm.long;claw 5.0-7.3 mm.long,slightly exceeding calyx,smooth,exauriculate;limb 3.3-5.7 X1.5-4.5 mm., linear- or oblong-cuneate,sometimes obovate-cuneate,entire or emarginate;ligules two,0.7-1.3 mm.long,ovate,obtuse.Filaments exserted,smooth.Styles 3, exserted,hairy.Anthphore 4.0-6.0 mm. long,smooth.Capsule 5.0-7.0 X 3.5-4.0 mm.,ovoid,1-2 times as long as anthphore,included.Seed dark brown,0.8-1.3 mm.long, subglobose,umbilicate,tuberculate.Th.

Type-Turkey-in Cilicia,Aucher 484 [holo.G.;iso.K!]

TURKEY- Prov.Antalya: Elmali,March 1937,Gleisberg 391.Prov. Mersin: in valle Guzeldere,above Sedichig,12-4-1855,Bal. 805; Magara,Silifke,15-6-1950,Atilla .Cilicia,April 1834,Montb. Cilician Taurus,al836,Ky70.

Geogr. Endemic to Turkey.

Habitat- Shady places .Fl.-March-June.

SUBSECTION 33C. DIVARICATAE

113. S.sedoides Poir.,Voy. Barb.,11,164 (1789).

Annual ,5.0-28.0 cm.tall,from a deep-seated,slender taproot.Stem erect,ascending,or diffuse,terete,leafy,sparsely or densely puberulent below,becoming densely glandular-puberulent, hirsute & viscid above,branched from the base upwards;branches alternate,sometimes opposite,divaricate;middle internodes 1.0-3.4 cm.long.Caudical & lower cauline leaves rosulate,petiolate, 1.2-2.5 cm.long,3.0-9.0 mm.wide,oblong-spathulate or oblong, attenuated into petiole,base with hyaline ciliate margin, usually pubescent,often hirsute,seldom more or less glabrous; other cauline leaves sessile,0.5-2.0 cm.long,2.0-7.0 mm.wide, oblong- or linear-lanceolate,glandular-puberulent,often hirsute; all leaves 1-nerved,more or less thick,obtuse or round at the apex.Inflorescence a dichasial cyme,compound,usually upper part passes into a monochasial cyme.Bracts unequal,linear-lanceolate,or linear,glandular-puberulent.Pedicels of the lower flowers 1.5-2.2 cm.long,& those of upper ones 6.0-14.0 mm.long, erect at anthesis,becoming arcuately erect,seldom spreading after anthesis.Flowers hermaphrodite.Calyx 6.5-7.3 mm.long,1.8-2.0 mm.diam.,oblong,umbilicate,with 10 anastomosed nerves,puberulent

& viscidly glandular,in fruit clavate with a constriction below the capsule;teeth 1.0-1.3 X 0.7-1.0 mm.,ovate,obtuse, or round at the apex,with hyaline ciliate margin.Petal reddish, 5.5-7.0 mm.long;claw 4.3-5.0 mm.long,included,smooth,exauriculate; limb 1.3-2.0 X 0.8-1.3 mm.,obovate,entire or retuse;ligules two, 0.8-1.5 mm.long,lanceolate or oblong,acute or obtuse.Filaments included,smooth.Styles 3, included,hairy.Anthophore 2.0-2.8 mm. long,smooth.Capsule 5.0-6.5 X 2.0-2.3 mm., oblong,2-4 times as long as anthophore,included.Seed brown,0.5-0.9 mm.long, with flat tuberculate face & grooved granulate back.Th.

Key to the varieties.

Inflorescence a dichasial cyme,passing into a monochasial cyme above;capsule 3-4 times as long as anthophore;plants dwarf ..... a.var.sedoides

Inflorescence a regular dichasial cyme;capsule twice as long as anthophore;plants more or less tall,divaricately branched throughout .....b.var.pachyphylla

a. var.sedoides . Boiss.,Fl.Or.,i,598(1867);Rohrb.,Monogr.Sil.,164 (1868)-Sibth.& Sm.,Fl.Graec.,v,t.425(1825);Reichb., Ic.Fl.Germ.Helv.,vi,t.277,fig.5064(1844);Jacq., Coll.,Suppl.,112,t.14 (1796).

Syn. S.ramosissima Sibth.& Sm.,Fl.Graec.,Prodr.,i,599(1806); non Boiss.(1845);non Desf.(1798);non Willk. (1852).

S.sicula Cyr . ex Schrank in Denkschr.Bot.G.Regensb.,i'

46 (1822);non Bertol.(1839);non Persl (1826);
non Bert.(1839);non Ucria;non Ker-Gawl .

S.ramosa Otth in DC.,Prodr.,i,380(1824);non G.Don (1831).

S.Tommasinii Willk.,Strand. Steppengew.,109(1824);non Vis.(1829)

S.delicatula Bertol.,Fl.Ital.,iv,624(1839);non Boiss.(1842)

Stem 5.0-15.0 cm.long,branched from the base upto the middle, puberulent & more or less hirtellous throughout,becoming glandular & viscid above.Leaves small,oblong-spathulate,or oblong. Inflorescence a dichasium below,passing into a monochasial cyme above.Calyx oblong.Capsule 3-4 times as long as anthophore.

Type- Barby ,Poiret [Paris]

TURKEY- Prov.Antalya:Antalya,7-5-1860,Bourg.50;Gramboza Adasi 30-5-1950,Heilb.& Atilla .

RHODES-sine loco. 14-5-1870,Bourg.11.

CYPRUS- St.Andre,25-4-1880,Sint.& Rigo 243;Nicosia,180m.,April 1923,Huddle 22;Rizo-Karpaso,90-150m.,1=7-5-1912,Harad. 224;

PALESTINE- Ras-un-Nakurah,1-20m.,1-5-1913,Dinsm.3267.

LEBANON- Saida ,Gaill. ;Beirut,15-5-1878,Post 1086.

b. var. pachyphylla Hausskn.in Mittheil.Thuring.Bot.Ver.,v,51(1893).

Stem 20.0-28.0 cm.long,more or less thick,rigid,densely glandular-puberulent,viscid,branched throughout;branches divaricate. Caudical & lower cauline leaves more or less large,obovate-spathulate. Inflorescence a regular dichasial cyme.Calyx obovate-clavate. Capsule twice as long as anthophore.

Type- Attica ad Phaler,Laurion,Hausskn.

CYPRUS- Kyrenia Castle,5-4-1941,Davis 3047.

Geogr.(of sp.) Algeria,Libya,Balearic Is.France,Italy,Sicily, Greece,Austria,Crete,Rhodes,Cyprus,Turkey,Syria, Lebanon,Palestine & Iran

Habitat- (of sp.) Coastal sand .Fl.-April & May.

S.sedoides Poir. is a somewhat variable & polymorphic that has developed two morphologically distinct varieties.One is represented by the type of S.sedoides occurring throughout the Mediterranean.The other grows only in Greece & Cyprus. S.sedoides is most similsr to S.pinetorum Boiss.& Heldr. and S.pentelica Boiss. in habit,but differs from the former in its oblong calyx with more branched nerves,and oblong capsule 2-4 times as long as anthophore.It differs from the second by its irregular dichasium,arcuately erect or arcuate fruiting pedicels,& by the short included claw of the petal.

SECTION 34 LEIOCALYCINAE

The 11 species of this section are all annual & are characterized by slender ephemeral root,usually few basal leaves,and dichotomously branched stem & inflorescence.In addition to these features,the group is further characterized by the glabrous calyx with the apex contracted in fruit,& ovoid or ovoid-oblong,stipitate capsule.

The species fall into 2 fairly distinct subsections on the basis of the relative size of caudical & cauline leaves and presence or absence of pubescence from the plants.

Subsect. Creticae contains 4 species that usually have large & conspicuous caudical & lower cauline leaves,and are usually puberulent below,and glabrous & viscid above.The calyx is provided with more or less thick nerves which are sparingly anastomosed.Of these 4 species 2 are widely distributed in the Mediterranean & 2 are localized in N.E. Mediterranean countries.

Subsect. Muscipulae, comprising 7 species,is characterized by its conspicuous & large cauline leaves.The plants are glabrous, often viscid above,and the calyx is provided with less prominent nerves which are anastomosed.Out of 7 species,only one belongs to the New World;the rest occur in the Mediterranean countries.

Key to the subsections & the Oriental species.

1a. Plant puberulent below,glabrous & viscid above;caudical & lower cauline leaves large & conspicuous;other cauline leaves reduced & remote 34A.Subsect.Creticae

2a. Capsule oblong,as long as anthophore(8.0-11.0 mm.)
.....114.S.cariensis

2b. Capsule not oblong,2-4 times as long as anthophore:

3a. Calyx ovate-campanulate or subglobose in fruit;limb bipartite to the middle;capsule ovoid-globose,4 times as long as anthophore;seed large(1.3-2.0 mm.)
.....115.S.cretica

3b. Calyx clavate in fruit;limb emarginate;capsule oblong-ovoid,2-3 times as long as anthophore;seed small (0.7-1.0 mm) 116.S.tenuiflora

1b. Plant glabrous throughout,usually viscid above;cauline leaves large & conspicuous :.....34B.Subsect.Muscipulae

4a. Cauline leaves ovate,ovate- or oblong-lanceolate;calyx ovate,ovate-oblong,or ovate-campanulate;capsule ovoid, 4-5 times as long as anthophore;seed with flat face & back;plant not viscid :

5a. Plant tall;flowers large & usually horizontally spreading;calyx umbilicate;limb deeply bipartite; ligules present 117.S.Behen

5b. Plant of low stature;flowers small,erect;calyx with truncate base;limb bipartite to the middle;ligules absent 118.S.laevigata

4b. Cauline leaves linear-lanceolate or lanceolate;calyx cylindrical-clavate;capsule ovoid-oblong,1½-2 times as long as anthophore;seed with flat face & grooved back; plant viscid 119.S.Muscipula

SUBSECTION 34A. CRETICAE

114. S.cariensis Boiss.,Diagn.Pl.Nov.Or.,Ser.1,i,40 (1842);Boiss.,Fl. Or.,i,604 (1867);Rohrb.,Monogr.Sil.,161(1868).

Annual,15.0-38.0 cm.tall,from a slender,deepseated taproot. Stem slender,erect,terete,purplish from the base upwards,sparsely puberulent below,glabrous & viscid above,simple below,dichotomously branched above;middle internodes 1.5-3.7 cm.long.Caudical & lower cauline leaves rosulate,petiolate,linear-lanceolate,attenuated into petiole,base with hyaline ciliate margin;other cauline leaves sessile,1.7-5.0 cm.long,0.5-1.3 mm.wide,linear;all leaves 1-nerved,acute,glabrous.Inflorescence a compound dichasial cyme. Bracts equal,like the upper cauline leaves.Pedicels 1.8-6.7 cm. long,filiform,erect & ascending.Flowers hermaphrodite.Calyx 1.3-1.9 cm.long,3.0-4.0 mm.diam.,cylindrical-clavate,umbilicate, glabrous,with 10 pinkish sparingly anastomosed nerves;teeth unequal,2.8-3.5 X 1.3-1.8 mm.,triangular,acute,with hyaline scarious margin.Petal pink,1.2-1.5 cm.long;claw 6.0-7.5 mm.long, exserted,smooth;auricles obtuse,or erose-denticulate;limb 6.0-7.5 X 3.0-4.0 mm.,obcordate-or obovate -cuneate,emarginate; ligules two,2.8-3.5 mm.long,oblong-linear,or lanceolate,acute. Filaments exserted,smooth.Styles 3, exserted,hairy.Anthophore 8.0-11.0 mm.long,smooth.Capsule 9.0-12.0 X 4.0-5.0 mm.,oblong, as long as anthophore,included.Seed dark brown,0.3-0.5 mm.long, with flat face & grooved granulate back.Th.

Type- Turkey-in Cariae collibus montanis inter Jenidje et Gheyra,Jun.1842,Boiss. [holo.G.]

TURKEY- locus classicus,a1843,Pinard

Geogr. Endemic to Turkey.

Habitat- Fallow land .Fl.-June.

S.cariensis is closely related to S.Ungeri Fenzl from Greece.In habit,branched stem,and shape of calyx & petal they are very similar,but S.cariensis differs from S.Ungeri in having linear-lanceolate caudical leaves & an oblong capsule. It also shows some resemblance to S.coeli-rosa(Linn.)A.Br., but the latter is quite distinct in having usually 5 carpels, a narrow lamina,& seed with flat face & back.

115. S.cretica Linn.,Sp.Pl.,ed.1,420 (1753);Boiss.,Fl.Or.,i,584(1867); Rohrb.,Monogr.Sil.,167(1868)-Sibth.& Sm.,Fl. Graec.,v,t.422(1825);Reichb.,Ic.Fl.Germ.Helv.,vi, t.282 (1844);Lindman in Act.Hort.Berg.,iii,i. No.1B,fig.10 (1897) & 1,No.6,fig 15-20(1891).

Syn. S.parviflora Moench,Metod.,708(1794);non Zea;non Pers. (1805);non Hampe

S.rubella Suffr.,Cat.Pl.Frioul.,141(1802);non Linn.(1753); non Bory

S.annulata Thore,Chl.Land.,173(1803)

S.rubella Wulf.in Roem.,Arch.,iii,362(1835);non Soy-W.& Godr.

S.lychnidiflora Otth in DC.,Prodr.,i,375(1824)

S.clandestina Duby,Bot.Gallic.,77(1828);non Jacq. (1796).

S.Dilleniana Scholl in Desf.,Hort.Paris,3,264(1829)

S.amoena Hort Fenzl Adv.Bot.[2] in Del.Senu Hort.Vindob., (1851)

S.cretica var. annulata Rouy,& Fouc.,Fl.Fr.,iii,135(1896).

S.cretica var.typica b.annulata Fiori & Pao.,Fl.anal.

Ital.,i,363 (1898).

S.cretica ssp. annulata Hayek,Fl.Steierm.,i,344(1908).

Annual,15.0-35.0 cm.tall .Root slender,deep-seated,abruptly expanded into a leafy & simple caudex.Stem erect,terete,usually purplish from the base upwards,retrorse puberulent below,glabrous & viscid above,simple below,branched from the middle upwards, sometimes branched throughout;middle internodes 3.0-5.7 cm.long. Caudical & lower cauline leaves rosulate,petiolate,1.5-3.0 cm.long, 5.0-12.0 mm.wide,obovate-spathulate or oblong-obovate,attenuated into petiole,base with hyaline ciliate margin,obtuse or round at the apex,puberulent;other cauline leaves sessile,1.7-3.5 cm. long,2.5-12.0 mm.wide,lanceolate,or linear-lanceolate,acute, glabrous,often more or less plicate.Inflorescence a compound dichasial cyme,lax.Bracts equal,linear-subulate.Pedicels 2.5-5.0 cm.long,erect,filiform.Flowers hermaphrodite,sometimes pistillate with aborted stamens.Calyx 9.5-12.0 mm.long,3.0-3.5 mm.diam., cylindrical-campanulate with narrow base,umbilicate,glabrous, with 10 pinkish slightly anastomosed nerves,in fruit subglobose, or ovate-campanulate with abruptly narrowed base;teeth 2.0-2.5 X 1.5-2.0 mm.,ovate-triangular,acute,sometimes acute alternates with obtuse tooth,with hyaline scarious or finely ciliate margin. Petal pink,1.0-1.3 cm.long;claw 6.0-7.0 mm.long,equaling calyx, smooth,exauriculate;limb 4.0-6.0 X 2.3-3.5 mm.,obovate-cuneate, bipartite to the middle into obovate lobes;ligules two,1.3-2.0 mm. long,lanceolate,or linear,acute.Filaments smooth,included.Styles 3,included,hairy.Anthophore 1.5-3.0 mm.long,smooth.Capsule 7.0-8,5 X 5.0-6.0 mm.,ovoid-globose,4 times as long as anthophore,included.

Seed dark brown,1.3-2.0 mm.long,with flat face & grooved back, papillose.Th.

Type- In Creta [L!]

AEGEAN= Samos-Nr. Pyrgos,300m.,29-4-1948,Davis 1612;Mt.Kerki,600 m, 15-4-1934,Rechinger 4041.

Ikaria- Hag Kyrikas,500m.,18-4-1934,Rechinger4405a;ibid. 25-4-1940,Davis1599.

Rhodes- Prophet Elias,nr.Salakos,10-5-1935,Rechinger 7099.

Karpathos- Mt.Lasto,12-5-1883,Pichler 106.

Geogr. Spain,Sardinia,Corsica,Sicily,Italy,Greece,Crete, & Turkey.
Habitat- Fields & hillsides ;alt.- 300-600m. Fl.-April & May.

116.S.tenuiflora Guss.,Pl.rar.,177(1826);Boiss.,Fl.Or.,i,585(1867); Williams in Journ.Linn.Soc.,xxxii,130(1896); Lindman in Act.Hort.Berg.,1.No.6 ,6,fig.21-25 (1891)-Dill.,Hort.Eltham.,i,t.314(1732).

Syn. S.Panormitana Parlat.in Bertol.,Fl.Ital.,iv,610(1839).
S.portensis Friv.,Pl.Maced. ex Rohrb.,Monogr.Sil.,167(1868) non Linn.(1753).
S.cretica var.tenuiflora (Guss)Rohrb.,Monogr.Sil.,167(1868).

Annual, 10.0-30.0 cm.tall,from a slender,deepseated taproot. Stem erect,terete,usually purplish towards the base,puberulent below,glabrous & viscid above,branched from the middle upwards, sometimes branched throughout;middle internodes 2.0-4.5 cm.long. Caudical & lower cauline leaves rosulate,petiolate,1.6-3.2 cm.

long,3.5-11.0 mm.wide,obovate-spathulate,attenuated into petiole, base with hyaline ciliate margin,obtuse;other cauline leaves sessile,1.7-3.8 cm.long,1.5-4.5 mm.wide,lanceolate,linear-lanceolate, acute,glabrous. Inflorescence a compound dichasial cyme,lax. Bracts equal,linear-subulate,ciliate at the base.Pedicels 1.3-5.0 cm.long,filiform,erect & ascending.Flowers hermaphrodite.Calyx 1.25-1.5 cm.long,2.5-3.0 mm.diam.,cylindrical-clavate,umbilicate, glabrous,with 10 pinkish sparingly anastomosed nerves,in fruit clavate;teeth 2.3-3.0 X 1.3-1.5 mm.,triangular,acute,with hyaline ciliate margin.Petal pink,1.0-1.5 cm.long;claw 7.7-11.0 mm.long, equaling calyx,smooth or ciliate,exauriculate;limb 2.3-3.5 X 1.8-2.5 mm.,oblong-cuneate,emarginate;ligules two,0.8-1.3 mm.long, oblong,obtuse.Filaments included,smooth.Styles 3, included, hairy.Capsule 7.0-14.0 X 4.0-5.0 mm.,oblong-ovoid,2-3 times as long as anthophore (3.5-4.5 mm.long,smooth),included.Seed dark brown,0.7-1.0 mm.long,with flat face & grooved back,tuberculate. Th.

TURKEY- Dardenalles,nr.Kurschunlu,28-5-1883,Sint. 140.

CYPRUS- dt.Limasol,Platres,1005m.,21-4-1939,Kennedy1679;ibid. 870m., 13-5-1939,Kennedy1680;Aphamis,900m.,6-5-1939,Kennedy 1681;Platres, 870m.,18-6-1938,Kennedy 1185;ibid. 960m.,2-5-1937,Kennedy 359; between Platres & Aphamis,900m.,11-4-1941,Davis 3123;ibid. 900m., 22-4-1941,Davis 3183 ;Kyrenia ,May 1931,Tracey 12;Kryos Potamos 870 m.,29-5-1938,Kennedy1184;Chrysorogiatissa,8-5-1941,Davis 3361.

Geogr. Italy,Sicily,Greece,Crete,Turkey & Cyprus.

Habitat- Plains ;alt.- 800-1020 M. Fl.-April-June.

S.tenuiflora has been confused with S.cretica Linn. which it closely resembles.Lindman has carefully studied the characters of the plants in the living state,& has shown that the two species are quite distinct in floral characters.The characters in which the two species differ appear in the tabular comparison [Tab.6]. Following Boissier,Lindman & Williams,I have treated it as a distinct species.

TABLE 6 .

Synoptical comparison of the morphological characters distinguishing S.cretica Linn. from S.tenuiflora Guss.

Characters.	S.cretica	S.tenuiflora
Calyx	9.5-12.0 X 3.0-3.5 mm., cylindrical-campanulate,abruptly narrowed at the base,in fruit subglobose or ovate-campanulate with narrow base	12.5-15.0 X 2.5-3.0 mm., cylindrical-clavate,clavate in fruit.
Petal	1.0-1.3 cm.long;limb 4.0-6.0 X 2.3-3.5 mm.,obovate-cuneate, bipartite to the middle into obovate lobes.	1.0-1.5 cm.long;limb 2.3-3.5 X 1.3-2.5 mm.,oblong-cuneate, emarginate.
Anthophore	1.5-3.0 mm.long.	3.5-4.5 mm.long.
Capsule	ovoid-globose,4 times as long as anthophore	oblong-ovoid,2-3 times as long as anthophore
Seed	1.3-2.0 mm.long, papillose.	0.7-1.0 mm.long,tuberculate.

SUBSECTION 34B. MUSCIPULAE

117. S.Behen Linn.,Sp.Pl.,ed.1,418 (1753);Boiss.,Fl.Or.,i,583 (1867); Rohrb.,Monogr.Sil.,169(1868)-Sibth.& Sm.,Fl.Graec.,v, t.416(1825);Dill.,Hort.Eltham.,t.317,fig.409

Syn. S.Behen Linn.,Sp.Pl.,1.418(1753);non Wirzen(1837)
S.ambigua Salisb.,Prodr.,302(1796);non Camb.(1850);non Turcz.(1842).
S.ignobilis Lowe Novit.in Transact.Phil.Soc.,vi,549(1838)
S.pseudo-Behen Boiss.,Diagn.,1.i,36(1842);non Schur
S.Behen var.minor Boiss.,Fl.Or.,i,584(1867)

Annual, 10.0-90.0 cm.tall.Root slender,deep-seated, expanded into a leafy caudex.Stem erect,terete,leafy,glabrous, glaucescent,simple below,branched above,sometimes branched throughout;middle internodes 2.5-8.7 cm.long.Caudical & lower cauline leaves rosulate,petiolate,2.3-5.9 cm.long,0.5-3.3 mm. wide obovate-spathulate or oblanceolate,attenuated into petiole, base with hyaline margin,obtuse,mucronate,sometimes acute, serrate-ciliate;other cauline leaves sessile,2.1-7.8 cm.long, 0.4-3.0 cm.wide,oblong-lanceolate,oblong-oblanceolate,obtuse or acute,with smooth or serrate-ciliate margin;all leaves 1-nerved,glabrous,glaucescent.Inflorescence a dichasial cyme, seldom it passes into a monochasium above.Bracts unequal,linear-lanceolate or lanceolate,acute or acuminate.Pedicels 0.6-2.5 cm. long,erect,or horizonatally spreading at anthesis,becoming stout, erect & rigid in fruit.Flowers hermaphrodite.Calyx 1.0-1.35 cm. long,5.0-6.3 mm.diam.,oblong-ovate,ovate-campanulate,umbilicate, usually white,sometimes pinkish,glabrous,with 10 pinkish

anastomosed nerves,in fruit ovate,seldom slightly inflated;teeth 1.3-2.0 X 1.0-2.0 mm., ovate,obtuse,with membraneous smooth or finely ciliate margin.Petal pink,1.1-1.3 cm.long;claw 9.0-10.0 mm.long, equaling calyx,smooth,exauriculate;limb 2.0-3.0 X 2.0-4.0 mm.,oblong, bipartite almost to the base into oblong-obovate lobes;ligules two,0.5-0.8 mm.long,oblong,with round or emarginate apex.Filaments included,smooth,pinkish.Styles 3,included,or exserted,pinkish,hairy.Anthophore 2.0-2.5 mm.long,smooth.Capsule 9.0-11.0 X 5.0-7.0 mm.,ovoid,4-5 times as long as anthophore, included.Seed dark brown,1.0-1.5 mm.long,with flat face & back, tuberculate.Th.

Linnaean specimen - In Creta [L!]

TURKEY- Trojanum,Renkoei,3-5-1883,Sint. 135.Bithynia,Mudani,12-5-1899,Bornm.4164.Prov.Izmir:Izmir,29-4-1854,Bal. 96.Caria,a1843, Pinard .Asia Minor,sine loco.,Aucher 430;ibid. Forbes 155 .Prov. Antalya:Elmali,above urbem,20-5-1860,Bourg.43;Cubuk Bogazi,22-5-1950,Heilb.& Atilla ;Kirkgoz,300m.,12-4-1936,Tengwall 331;Hafis Pasha,800m.,31-5-1936,Tengwall 729. Prov.Mersin:Guzel dere,April 1885,Bal..Cilicia,Corycos,Kalkberge,40m.,a1895,Siehe 83. Bergama,Akropol,22-4-1950,Heilb.

AEGEAN =Rhodes-Erianda,6-5-1870,Bourg.;Mt.Prophet Elias,Salakos, 600m.,11-5-1935,Rechinger 7159;Hag Elias,nr.Archangeles,400m., 25-6-1935,Rechinger 8423.

Ikaria- Hag Nikolaos,18-4-1934,Rechinger 4745.

Samos- Maratha Kampos,300m.,15-4-1934,Rechinger 4056.

CYPRUS- Limasol,nr.Phassouri,45m.,12-4-1938,Syngrad.1802; Hormathetis,60m.,31-3-1936,Syngrad.1221;Nicosia,180m.,23-3-1927, Huddli 21;sine loco,March 1902,Lascelles ;Larnaca,20-4-1912, Harad.59;Platres,1125m.,26-4-1938,Kennedy1183;Yalussa,22-4-1880, Sint.& Rigo 249;Andronikos,22-4-1880,Sint.& Rigo 249;Kythraea, 11-4-1880,Sint.& Rigo 249;Carpass,between Hagos Andronikos & Yalussa,22-4-1880,Sint.& Rigo249;between Apostolos & Chelones, 30m.,22-2-1941,Davis 2302;Parapedhi,10-4-1941,Davis 3084.

LEBANON- Saida,10-3-1853,Bl.5; ibid. 26-3-1853,Bl.58 ;ibid. 10-3-1855,Gaill. 881;Tripoli,18-4-1885,Post .

PALESTINE- Nazareth,yr.1863-4,Lowne ;sine loco. Hayne ;E.of

Jordon,1873,Paine; Wadi-El-Gib,1-7-1919,Johnson; Wadi-El-Kelt, 19-4-1911,AC.4653;N.W.of sea (-)394m.,24-5-1908,AC.2653;Hasbani, 4-4-1877,Post 398;Ajlun,760m.,5-5-1911,AC. 6653.

Geogr. Spain,Italy,Sicily,Sardinia,Greece,Crete,Turkey,Cyprus, Palestine,Lebanon,Algeria,Libya,Egypt & Canary Is.

Habitat- Field & rocky places;alt.-(-)394--800m.Fl.-Feb.-May.

The nearest species seems to be S.Holzmanni Heldr. known only from Arpedon Is.off the Greece coast,specimens of which I have not seen.S.Behen is distinguished from the latter by its slender stem & branches,oblong-ovate calyx which is umbilicate,lamina bilobed & minute,and by its short & few flowered inflorescence.It is further distinguished from S. Holzmanni by its tuberculate seeds.It also approaches S.Reinholdi Heldr. in general habit,position of the flowers at anthesis,leaf shape & that of calyx and petal,but the latter is clearly distinct as it has long pedicels,a truncate calyx, subglobose capsule & echinate seeds.

118. S.laevigata Sibth.& Sm.,Prodr.Fl.Graec.,i,295(1806);Boiss.,Fl. Or.,i,585(1867);Rohrb.,Monogr.Sil.,168(1868)- Sibth.& Sm.,Fl.Graec.,v,t.416(1825).

Annual,5.0-20.0 cm.tall. Root slender,deepseated,abruptly expanded into a leafy,usually simple caudex.Stem erect,terete, leafy,purplish,glabrous,glaucescent,usually dichotomously branched from the base upwards,sometimes simple below;middle internodes 2.5-7.3 cm.long.Caudical & lower cauline leaves rosulate,shortly petiolate,1.6-3.5 cm.long,4.0-12.0 mm.wide, ovate-spathulate,obtuse or round at the apex,base with hyaline

margin;other cauline leaves sessile,1.3-3.2 cm.long,0.5-2.9 cm. wide,ovate,oblong-lanceolate,or oblong-oblanceolate,obtuse,acute; all leaves 1-nerved,glabrous.Inflorescence a compound dichasial cyme.Bracts unequal,linear-lanceolate,acute.Pedicels of lower flowers 1.0-2.8 cm.long,and those of upper flowers 3.0-9.0 mm. long,slender,erect at anthesis,becoming stout,somewhat arcuate after anthesis.Flowers hermaphrodite.Calyx 7.0-8.3 mm.long, 2.8-3.0 mm.diam.,ovate or oblong-campanulate from a truncate base,purplish,glabrous,with 10 sparingly anastomosed nerves; teeth 1.0-1.3 X 1.0-1.3 mm.,ovate,obtuse,with hyaline smooth, sometimes finely ciliate margin.Petal pink,6.5-7.0 mm.long;claw 4.8-5.7 mm.long,equaling calyx,or included,smooth,exauriculate; limb 1.3-1.7 X 1.0-1.3 mm.,cuneate,bipartite to the middle into linear lobes;ligules absent.Filaments included,smooth.Styles 3,included,hairy.Anthophore 1.0-1.5 mm.long,smooth.Capsule 6.0-8.0 X 4.0-5.3 mm.,ovoid,4-5 times as long as anthophore, included.Seed dark brown,0.8-1.5 mm.long,with flat face & back, granulate.Th.

Type-In insula Cypro(insulae Cypro montosis),Sibth. [holo.Oxford; iso.K!]

CYPRUS- Mt.Troodos,22-6-1939,Lindberg ;ibid.,1500-1920m.,20-6-1912, Harad.415;ibid., 20-8-1880,Sint.& Rigo 766;Platres,1170m., 4-5-1937,Kennedy 351;ibid.,1080m.,26-4-1938,Kennedy 1179;ibid., 1110m.,2-5-1937,Kennedy350; ibid.,930m.,24-3-1937,Kennedy346 & 347;between Platres & Aphamis,22-4-1941,Davis 3185;dt.Larnaca, Vavatsinia,18-3-1941,Davis 2742;Chionistra,1710m.,30-5-1937, Kennedy349;Kryos Potamos ,1170m.,30-4-1937,Kennedy348 & 1181; Paputsa(Agros),9-4-1941,Davis 3104;Phiai,960m.,26-5-1938, Kennedy 1180;Khionistra,East,1860m.,4-7-1938,Kennedy1182;dt. Limasol,between Agios Theodoros & Zoopyi,10-4-1941,Davis 3077; Roudhkias valley in Paphos,8-5-1941,Davis 3382;spring of Platania, nr.Pedhoulas,1350m.,10-7-1940,Davis 1847;Sambos,April 1930,Druce

Geogr. Endemic to Cyprus.

Habitat- Rocky places & sides of mountains;alt.-930-1920m.

Fl.- March -July.

This endemic species is certainly related to S.Behen Linn.which also grows in Cyprus,has probably been derived from it,but it differs from S.Behen in quite a number of morphological characters: low stature,shape of the leaves,rather small flowers that are erect,calyx with truncate base,lamina less bifid & eligulate,and seed trisulcate at the back.

119. S.Muscipula Linn.,Sp.Pl.,ed.1,420 (1753);Boiss.,Fl.Or.,i,583 (1867);Rohrb.,Monogr.Sil.,170(1868)-Reichb., Ic.Fl.Germ.Helv.,vi,t.283,fig.5077(1844); Bouloumoy,Fl.Lib.Syr.,t.48,fig.4(1930).

Syn.S.Muscipula Linn.,Sp.Pl.,1.420(1753);non Otth(1824);non Guss .

Cucubalus dichotomus Lamk.,Fl.Fr.,iii,32(1778)

Silene stricta Lapeyr.,Hist.Abr.Pyr.,246(1813);non Linn. (1756);non Sprengl.(1825);non Achar. (1891).

S.bracteosa Bertol.,Fl.Ital.,vi,627(1844)

Muscipula australis Fourr. in Ann.Soc.Linn.Lyon,N.S.,xvi, 344(1868)

Silene arvensis Loscos ,Trat.de Pl.Arag.,31(1876);non Salib (1796).

S.Muscipula var.bracteosa Arcang,Comp.Fl.It.,1,90(1882)

S.Muscipula var.arvensis Rouy & Fouc.,Fl.Fr.iii,136(1896)

Annual, 7.0-40.0 cm.tall,from a slender,deepseated taproot. Stem erect,stiff,terete,leafy,glabrous,viscid above,usually

simple below,branched above,rarely branched throughout;middle internodes 1.2-8.0 cm.long.Caudical & lower cauline leaves rosulate,petiolate,1.6-5.9 cm.long,3.5-8.0 mm.wide,lanceolate- or oblanceolate-spathulate,attenuated into the petiole,base with hyaline serrate-ciliate margin,obtuse;middle cauline leaves sessile 2.3-4.9 cm.long,3.0-6.5 mm.wide,lanceolate or linear-lanceolate,acute,with smooth or sparingly ciliate margin; upper cauline leaves linear or awl-shaped;all leaves 1-nerved, glabrous.Inflorescence a compound dichasial cyme.Bracts subequal,linear-setaceous,with hyaline margin.Pedicels 1.05.0 mm. long,erect.Flowers hermaphrodite.Calyx 1.0-1.6 cm.long,3.5-4.3 mm.diam.,cylindrical,umbilicate,glabrous,with 10 anastomosed nerves,in fruit clavate with a constriction below the capsule; teeth 2.3-3.5 X 1.5-1.8 mm.,ovate-lanceolate,acute or acuminate, with hyaline ciliate margin.Petal pink,1.25-1.35 cm.long;claw 9.0-11.0 mm.long,equaling calyx tube,smooth;auricles minute, acute,obtuse,sometimes obscure;limb 2.5-4.5 X 1.5-3.0 mm.,cuneate, bilobed,or emarginate;ligules two,seldom one,1.0-1.8 mm.long, ovate-oblong,retuse,or denticulate.Filaments included,smooth. Styles 3,more or less exserted,hairy.Anthophore 4.0-6.0 mm.long, sparingly puberulent.Capsule 10.0-13.0 X 4.0-5.0 mm.,ovoid-oblong, 1½-2 times as long as anthophore,included.Seed dark brown,0.7-1.3 mm.long,with flat face & grooved back,granulate.Th.

Linnaean specimen- In Hispania,G.Narbonensi [L!]

LEBANON- Beirut,May 1880,Post 1181; Saida,21-4-1853,Bl.906.

PALESTINE- Latrun,240m.,16-4-1912,Dinsm.B1121;Jerusalem,800m.,2-8-1902,AC.5121;W. of Wadi Salihi,500m.,1-5-1911,AC.m1121;nr.Ebal,19-4-1942,Davis 4489.

Geogr. Spain,France,Belearic Is.Italy,Sicily,Greece,Lebanon, Syria,Palestine,Algeria and Morocco.

Habitat- Fields ;alt.- 240-800m. Fl.- April-June.

S. Muscipula is closely related to S.stricta Linn. from which it is best distinguished by the shape of fruiting calyx,calyx teeth,somewhat large usually auriculate petal, and by the shape of capsule and seed.

SECTION 35 LASIOCALYCINAE

The 11 species in this section are all annual.In all these the plant is branched above,pubescent or hirtellous,sometimes scabrous-puberulent.The inflorescence is a dichasial cyme but passes into a monochasial cyme above,while in 3 species the inflorescence is strictly a raceme-like monochasial cyme with the axis simple or branched. In S.squamigera Boiss. there is often a transition from a dichasial cyme to a monochasium.The calyx has prominent,greenish,more or less simple & thick nerves,and is contracted at the apex in fruit.The petal is usually bipartite; only in few species is emarginate or shortly bipartite.

On the character of the inflorescence,nature of indumentum on the calyx,degree of incision of the petal,and number of carpels,these species fall into 3 distinct subsections.

Subsect. Papillosae,comprising 3 species,has got thick prominent nerves on the calyx which are sparingly branched, scabrous-bristly or hirsute.The inflorescence is a regular dichasial cyme,the branches of the dichasium may be long & in turn sparingly or sparsely branched,or may be short& much branched forming a corymb-like inflorescence.The petal is less deeply bipartite than in the next subsection.Styles 3.

Subsect.Squamigerae contains 6 species which are characterized by their irregular dichotomous inflorescence, especially in the upper part;in 3 species there is only a monochasial cyme ;(so in this subsection there is a transition from a dichasial cyme to a monochasium.).The calyx is provided

with 10 thick more or less simple nerves which may bifurcate at their apices .The calyx is beset with dilated papyraceous papillae along the nerves.The petal is bipartite to the middle.Styles 3.

The third subsection, Eudianthe, contains 2 species where the inflorescence is lax,more or less regular dichasial cyme. The calyx,like subsect.Squamigerae,is provided with thick simple nerves,but it is smooth & usually lacks scales or papillae. But there is a membraneous rugulose scaly structure between the nerves which occasionally becomes prominent & develops papillae.The petal are emarginate.These species are unique in having generally 5 carpels.

Key to the subsections & the Oriental species.

1a. Styles usually 3;calyx papillose at the nerves :

2a. Calyx scabrous-bristly or papillose along the nerves; papillae never with bulbous base 35A.Subsect.Papillosae

3a. Dichasium lax,few-flowered;calyx cylindrical from an umbilicate base,setose at the nerves with long wavy & soft papillae;limb bipartite;seed with flat face 121.S.papillosa

3b. Dichasium congested,often corymb-like;calyx cylindrical-clavate from a truncate-umbilicate base,scabrous with short conical papillae along the nerves;limb emarginate or entire;seed with concave face 120.S.crassipes

2b. Calyx beset with dilated papyraceous papillae or papillae along the nerves;papillae always with bulbous base 35B.Subsect.Squamatae

4a. Caudical leaves oblong-spathulate;calyx cylindrical-clavate in flower & clavate in fruit;limb obcordate;capsule ovoid-oblong 122.S.squamigera

4b. Caudical leaves lanceolate or linear-lanceolate; calyx obovate in flower & fruit;limb cuneate; capsule ovoid-globose 123.S.vesiculifera

1b. Styles usually 5;calyx usually glabrous,sometimes rugose between the nerves 35C.Subsect.Eudianthe

SUBSECTION 35A. PAPILLOSAE

120. S.crassipes Fenzl,Pugill.Pl.Nov.Syr.,8 (1842);Boiss.,Fl.Or.,i, 586(1867);Rohrb.,Monogr.Sil.,172(1868)-Lindman in Acta Hort.Berg.,1,No.6.fig.28-30 (1891) & 111,1. No.1B,10(1897);Bouloumoy,Fl.Lib.Syr.,t.47(1930).[S.gonocalyx]

Syn. S.echinata Ky.Pl.Exs.,113 (1841)ms.;non Otth(1824);non Jaub. & Spach.(1842-43)
S.gonocalyx Boiss.,Diagn.Pl.Nov.Or.,Ser.1,i,38(1842).
S.glauca Zea in Poir.,Dict.,Suppl.,v,153(1817);non Salis. (1796);non Pourr.(1803);non Lag.(1816);non Sm. (1841)

Annual,10.0-45.0 cm.tall,from a deepseated taproot.Stem

erect,terete,usually greenish,sometimes purplish from the base upwards,leafy,scabrous with elevated dots or pubescent with short dense hairs,usually branched from the base above, rarely simple below;branches ascending,sometimes more or less divaricate;middle internodes 3.0-6.6 cm.long.Caudical & lower cauline leaves rosulate,shortly petiolate,1.5-3.0 cm.long, 4.0-8.5 mm.wide,oblong-spathulate,attenuated into petiole, base with hyaline ciliate margin,apex obtuse or round;other cauline leaves sessile,1.0-2.3 cm.long,2.8-6.5 mm.wide, oblong-lanceolate or lanceolate,sometimes linear-lanceolate, obtuse to acute,ciliate at the base;all leaves 1-3-nerved at the base,puberulent,scabrous-puberulent,seldom sparingly hirtellous.Inflorescence a compound dichasial cyme,often many-flowered corymb-like cyme.Bracts equal,linear-lanceolate, linear,acute,3-nerved at the base,ciliate at the base,scabrous. Pedicels 1.0-3.0 mm.long,erect or ascending.Flowers hermaphrodite.Calyx 1.3-1.5 cm.long,2.5-3.0 mm.diam., cylindrical-clavate with a truncate-umbilicate base,with 10 prominent,thick,greenish nerves often traversed by a few secondary nerves,scabrous with conical papillae especially along the nerves,in fruit clavate with a constriction below the capsule and contrcted apex;teeth 1.0-1.5 X 1.0-1.5 mm., ovate,with round or obtuse apex,sometimes slightly pinkish,with hyaline ciliate margin.Petal pink,1.1-1.4 cm.long;claw 7.5-9.0 mm. long,exserted,smooth,exauriculate;limb 3.5-5.0 X 1.5-2.5 mm., oblong-cuneate or oblong-obovate,entire or emarginate;ligules two, 0.8-1.5 mm.long,linear,acute.Filaments exserted,smooth.Styles 3, included,hairy.Anthophore 4.5-6.0 mm.long,smooth.Capsule 7.0-11.0 X

3.5-5.0 mm., ovoid,slightly acuminate,1½-3 times as long as anthophore,included.Seed dark brown,0.8-1.5 mm.long,with concave face & obtusely grooved back,tuberculate.Th.

Type - In Syria prope Svedia ad ostia Orontis et circa Aleppo, Ky.113 [iso.K!,BM!]

TURKEY- Prov. Gaziantep: from Gaziantep to Besne,660m.,10-3-1935, Balls B2240;Tara Tash,3-5-1935,Balls B2219;Gaziantep,Aucher 429; ibid.,yr.1832,Montb.;ibid.,1834,Montb.1992. Nimrud dag,20-5-1888, Sint.823.

SYRIA- Homs,600m.,1910,Harad.3227:Hammah,450m.,20-4-1908,Harad.1874; Montagnes,Kurd dag,12-1500m.,May 1907,Harad.1125;Pont de Murad, Baluk Gol,45m.,8=15-5-1911,Harad.4182;CoeliSyriaca,Rajak,930m., 16-5-1910,Bornm.11441.

LEBANON- Bscherre & Cedretum,1500m.,20-7-1855,Ky.270;Beirut, Gaill.1629;ibid.,April 1876,Post 170;between Saida & Tabaleyah, 30-4-1877,Post 399;sine loco.,Hayne .

PALESTINE- E.of Jordon,1873,Paine ;Mt.Ebal,19-4-1942,Davis 4498; Ayun Musa,500m.,22-4-1911,AC. m199;Dothan,300m.,18-5-1911,AC.b199; Jerash,530m.,3-5-1911,AC.G199;Jerusalem,800m.,22-3-1903,AC.4199; Galilaea,Safed,900m.,20-4-1897,Bornm. 174.

Geogr. Greece,Turkey,Syria,Lebanon,Palestine & Iran.

Habitat- Fields ;alt.- 45 m.-1500m.Fl.-March-May.

S.crassipes is closeest to S.linicola Gmel. from which it is very distinct in its less prominent & more anastomosed calyx nerves,short pedicels,dense & many-flowered dichasium, slightly exserted claw,and ovate slightly acuminate capsule. It is further distinguished by the shape of the fruiting calyx, being clavate in S.crassipes.It has no close relative in the Orient.

121. S.papillosa Boiss.,Diagn.Pl.Nov.Or.,Ser.1,i,39(1842);Boiss.,Fl. Or.,i,587 (1867);Rohrb.,Monogr.Sil.,172(1868).

Syn. S.papillosa Boiss.,Diagn.,1.i,39(1842);non Form.(1898)

Annual,5.0-40.0 cm.tall,from a slender root. Caudex short,2.0-6.5 mm.wide,leafy,simple or branched.Stem erect,terete, leafy,greenish,hirtellous & puberulent below,becoming minutely & sparsely puberulent above,dichotomously branched;branches divaricate;middle internodes 2.0-3.8 cm.long.Caudical & lower cauline leaves rosulate,petiolate,1.7-4.0 cm.long,4.0-8.0 mm. wide,oblong-lanceolate,lanceolate or oblanceolate,attenuated into petiole,base with hyaline serrate-ciliate margin,apex obtuse or mucronate;other cauline leaves sessile,1.5-5.0 cm.long,3.5-8.0 mm.wide,lanceolate or linear-lanceolate,acute or obtuse;all leaves 1-nerved,puberulent,serrate-ciliate.Inflorescence a lax dichasial cyme,few-flowered.Bracts unequal,linear-lanceolate, ciliate,puberulent.Pedicels 1.0-2.0 mm.long,erect.Flowers hermaphrodite.Calyx 1.25-1.5 cm.long,2.0-2.5 mm.diam.,cylindrical, umbilicate,with 10 prominent greenish nerves traversed by a few secondary nerves,setose at the nerves with long wavy & soft papillae,glabrous between the nerves,in fruit oblong-clavate with a constriction below the capsule & contracted at the apex; teeth 2.5-4.0 X 1.0-1.5 mm.,lanceolate,acute,with hyaline ciliate margin.Petal pink,1.15-1.45 cm.long;claw 7.0-9.5 mm. long,equaling calyx,smooth;auricles minute or wanting;limb 4.5-5.0 X 2.3-3.0 mm.,cuneate,bipartite into oblong lobes;ligules two,0.9-1.3 mm.long,lanceolate,acute.Filaments smooth.Styles 3,hairy.Anthophore 3.0-3.5 mm.long,smooth.Capsule 6.0-7.5 X 5.0-5.5 mm.,ovoid,twice as long as anthophore,included.Seed dark brown,0.5-1.0 mm.long,with flat face & grooved back.Th.

Type- Turkey-in arenosis Cariae,Aucher 483 [holo.G.]

TURKEY- Prov.Antalya: Antalya,30m.,22-4-1936,Tengwall 591;Lazar, Eski Romaharebeleri,23-5-1935,Heilb.& Atilla ;Kovanliyol, 22-5-1950,Heilb.& Atilla ;Sohili-Deliktus,26-5-1950,Heilb.& Atilla; Atbuku,between Antalya & Finike,10m.,7-5-1936,Tengwall 543. Prov. Mersin:Anamur,May 1872,Peronin 11 ;Guzeldere,12-4-1855,Bal. 807.

SAMOS Is.- Mt.Kerkis,above Meratho Kambos,600m.,1-5-1940,Davis 1676.

CYPRUS- Galata,nr.Kakopetria,24-4-1941,Davis3201;Drousha,on Vouni,600m.,1-5-1941,Davis 3256A;Kato Platres,870m.,7-5-1937, Kennedy 357;Platres Mandira,dt.Limasol,6-5-1939,Kennedy1683; Smyez Akamas,300m.,23-3-1948,Kennedy1609;Nikos ,600m.,21-4-1951, Merton 393;Platres ,6-5-1939,Kennedy1503.

Geogr. Turkey,Islands near Turkish shore,Cyprus,Lebanon & Syria.

Habitat- Mountains & maritime sands ;alt.- 10 m-870 m.

Fl.- May .

S.papillosa shows a considerable resemblance to S.lagenocalyx Fenzl of sect.Dichotomae in habit,leaf shape,indumentum and in shape of calyx,and is likely to be confused with that species,but it differs from the latter by its regular dichasial cyme,ovoid capsule,and less bifid petal.Yet this species is undoubtedly close to S.crassipes Fenzl in its dichasial inflorescence,indumentum of calyx nerves,and in similarity of flower & fruit.S.papillosa has therefore been placed in this section.

SUBSECTION 35B. SQUAMATAE

122. S.squamigera Boiss.,Diagn.Pl.Nov.Or.,Ser.1,i,38(1842);Boiss.,Fl. Or.,i,585(1867);Rohrb.,Monogr.Sil.,173(1868)- Jaub. & Spach,Ill.Or.,i,t.4(1842)[S.echinata]

Syn.S.echinata Jaub.& Spach,Ill.Or.,i,8(1842-43);non Otth (1824);non Ky.,Pl.Exs.,no.113(1841)ms.

Annual,24.0-40.0 cm.tall,from a deepseated,slender taproot.Stem erect,terete,usually purplish from the base upwards, usually simple below,branched from the middle above,sometimes branched throughout,scabrous-puberulent.Caudical & lower cauline leaves rosulate,petiolate,1.3-3.0 cm.long,4.0-6.0 mm.wide,oblong-spathulate,attenuated into petiole,base with hyaline ciliate margin;other cauline leaves sessile, 1.3-4.2 cm.long,2.5-5.5 mm. wide,lanceolate,oblanceolate,or linear;all leaves 1-nerved, scabrous or sparsely puberulent,obtuse or acute.Inflorescence a dichasial cyme,sometimes branches of the dichasium pass above into a monochasial cyme.Bracts subequal,linear,ciliate.Pedicels 1.0-5.0 mm.long,erect.Flowers hermaphrodite.Calyx 1.25-1.55 cm.long,2.5-3.5 mm.diam.,cylindrical-clavate,truncate-umbilicate, with 10 thick,prominent,simple nerves which are beset with dilated papyraceous papillae,in fruit clavate with a constriction below the capsule & contracted apex;teeth 1.5-2.5 X 1.3-1.5 mm., oblong-lanceolate,acute,with hyaline ciliate margin.Petal white,7.5-12.0 mm.long;claw 4.3-6.5 mm.long,equaling calyx,smooth; auricles minute,acute,sometimes obscure;limb 3.2-5.5 X 2.5-3.0 mm., obcordate,bipartite into obovate lobes;ligules two,1.0-1.5 mm.long, oblong,crenulate.Filaments equaling claw,smooth.Styles 3,exserted, hairy.Anthophore 7.0-9.0 mm.long,smooth.Capsule 7.0-8.5 X 3.5-4.0 mm.,ovoid-oblong,as long as anthophore,included.Seed brown,0.8-1.3 mm.long,with flat face & grooved granulate back.Th.

Type- Turkey-in aggeribus arenosis et collibus siccis Lydiae et Cariae in vallibus Meandri et Hermi,Jun.1842,Aucher 440 [holo.G.;iso.K!,E!,BM!]

TURKEY- Prov.Manisa:Manisa dag,yr.1867,Bal. ;ibid.,18-6-1854, Bal.100 ;ibid.,200-300m.,10-6-1906,Bornm.9138.Prov.Izmir: Bergam,between Izmir & Adramyti,June 1833,Montb.; Nif dag,4-500m., 6-7-1933,Schwarz .Prov.Antalya:Elmali,9-7-1883,Pichler 105 ; ibid.,13-6-1860,Bourg.51.

LESBOS ls. Mt.Ordymnon,at Antissa,24-5-1934,Rechinger 5860.

Geogr. Greece,Turkey & islands near Turkey.

Habitat- Rocky places,mountains & vine yards;alt.- 200-500m. Fl.- May-July.

The nearest species seems to be S.echinata Otth & S.trinervia Seb.& M. It is distinguished from the first by the scales on the calyx nerves which are papyraceous & long with 3-4 papillae in a row,by the white petals,and by the form of the seeds.It is distinguished from the second by its usually dichasial cyme(sometimes monochasial above),by the shape of the flowering calyx & in the shape and form of scales,by the white petals & by the shape of the capsule.It is also related to S.vesiculifera J.Gay whose affinity I have discussed under that species.

123. S.vesiculifera J.Gay,ap.Boiss.,Fl.Or.,i,586(1867);Rohrb.,Monogr. Sil.,173 (1868).

Annual, 40.0-72.0 cm.tall,from a deepseated taproot. Stem erect,terete, more or less leafy,purplish from the base upwards,scabrous-puberulent,simple below,branched above,lower

branches alternate & ascending,upper ones more or less divaricate; middle internodes 3.5-7.2 cm.long.Caudical & lower cauline leaves rosulate,petiolate,lanceolate to linear-lanceolate, attenuated into petiolate;other cauline leaves linear-lanceolate; all leaves 1-nerved,acute,scabrous, puberulent.Inflorescence a dichasial cyme,few-flowered.Bracts unequal,linear,acute. Pedicels 1.0-6.0 mm.long,erect.Flowers hermaphrodite.Calyx 1.5-1.63 cm.long,4.5-5.3 mm.diam.,obovate,umbilicate,with 10 thick,prominent,simple nerves which are beset with dilated papyraceous papillae,in fruit constricted below the capsule & with contracted apex;teeth 3.0-3.5 X 1.5-1.8 mm.,lanceolate, acute,with hyaline ciliate margin.Petal white,8.5 mm.long;claw 5.0 mm.long,equaling calyx,smooth;auricles minute or obscure; limb 3.5 X 1.8 mm.,cuneate,bipartite into linear lobes;ligules two,1.0 mm.long,truncate,emarginate.Filaments equaling claw, smooth.Styles 3,exserted,hairy.Anthophore 4.0-5.0 mm.long, smooth.Capsule 8.5-9.5 X 5.0-7.0 mm.,ovoid-globose,nearly twice as long as anthophore,included.Seed brown,0.9-1.5 mm.long, with flat face & grooved back,tuberculate.Th.

Type- Turkey-in regione montana Tauri ad Pylas Cilicicas,a1855, Bal.806 [holo.G.,iso.K!,E!,BM!]

Geogr. Endemic to the Cilician Taurus.

Habitat- On mountains .Fl.- July.

Although S.vesiculifera is known from the type collection, there can be no doubt of its validity as a distinct entity.This species is most closely related,& probably derived from S. squamigera Boiss.The scales of the calyx nerves are inflated

and often develop short projections.Other characters by which it differs from S.squamigera Boiss. have been referred to in the synoptical comparison between the two species [Tab. 7]

TABLE 7.

Synoptical comparison of the characters distinguishing S.squamigera from S.vesiculifera

Characters	S.squamigera	S.vesiculifera
Lower leaves	oblong-spathulate	lanceolate or linear-lanceolate.
Calyx	cylindrical-clavate,becoming clavate in fruit,hairs along the nerves in one row,with bulbous base,erect or curved upwards;teeth oblong-lanceolate,acute	obovate in flower & fruit;nerves bearing inflated membranaceous scales often with pointed projections;teeth lanceolate, acute.
Limb	obcordate,bipartite into obovate lobes	cuneate,bipartite into linear lobes.
Capsule	ovoid-oblong,as long as anthophore	ovoid-globose,twice as long as anthophore.

SECTION 38 DICHOTOMAE

The 5 species of this section consist of annual plants. S.dichotoma Ehrh. is the only one that sometimes behaves as a biennial or even as a short-lived perennial.In all these species the plant is always pubescent with crisp hairs,sometimes hirtellous. The leaves are oblanceolate,lanceolate,or linear-lanceolate, often 3-nerved,& the inflorescence is an one-sided raceme-like monochasial cyme,with the axis usually branched and with or without an alar flower.The pedicel is short and usually shows movements at and after anthesis.The calyx is oblong or cylindrical,becoming oblong-ovate or ovate after anthesis.Capsule ovoid-conical or ovoid-oblong,with a short anthophore.

Key to the Oriental species.

1a. Inflorescence a perfect dichasium below,with ultimate branches of one-sided raceme-like cymes :

2a. Petal usually white,bipartite beyond middle;ligules small,or represented by thickenings;capsule ovoid-oblong,3-5 times as long as anthophore;claw equaling calyx 124.S.dichotoma

2b. Petal pink,bipartite to 1/3 of its length;ligules conspicuous;capsule ovoid or ovoid-conical,1½-2 times as long as anthophore :

3a. Calyx oblong or oblong-cylindrical at anthesis,oblong-ovate after anthesis;teeth acuminate,ending in recurved tips;capsule ovoid 125.S.oxyodonta

3b. Calyx cylindrical at anthesis,ovate-clavate or clavate after anthesis;teeth acute,not recurved;capsule ovoid-conical 126.S.lagenocalyx

1b. Inflorescence a raceme-like monochasial cyme,axis simple, sometimes branched but without an alar flower :

4a. Calyx cylindrical at anthesis,oblong or ovate-oblong after anthesis;claw exserted;capsule twice as long as anthophore; seed 1.0-1.3 mm.long;flowers more or less crowded on the axis 128.S.Heldreichii

4b. Calyx oblong at anthesis,becoming ovoid after anthesis; claw equaling calyx;capsule 3 times as long as anthophore; seed 1.5-2.0 mm.long;flowers remote on the axis ..... .129 S.remotiflora

124. S.dichotoma Ehrh.,Beitr.,vii,144(1792);Boiss.,Fl.Or.,i,588(1867); Rohrb.,Monogr.Sil.,94(1868)-Sibth.& Sm.,Fl.Graec.,v, t.413 & 414(1825);Reichb.,Ic.Fl.Germ.Helv.,vi,t.280, fig.5071(1844).

Syn. S.dichotoma Ehrh.,Beitr.,vii,144(1792);non Gilib.(1781)[nom.illegit.]

S.trinervis Soland in Russel,Nat.Hist.Alepp.,ed.2,252(1794).

S.dichotoma Sibth.& Sm.,Prodr.Fl.Graec.,i,292(1806).

S.divaricata Sibth.& Sm.,ibid. 293(1806);non Clem.(1806); non Otth (1824); non Ehrbg.

S.iberica M.Beib.,Fl.Taur. Cauc.,i,335(1808)

S.membranacea Poir.in Lamk.,Encycl.,vii,164(1806)

S.sessiliflora Poir.,Encycl.,Suppl.,v,154(1817)

S.racemosa Otth in DC.,Prodr.,i,384(1824)

S.Sibthorpiana Reichb.,Fl.Germ.Exc.,865(1832)

S.Thirkeana C.Koch in Linnaea,xix,56(1847)

S.racemosa var.rubriflora Boiss.,Fl.Or.,i,588(1867).

S.racemosa var.Sibthorpiana Boiss.,Fl.Or.,i,589(1867).

S.racemosa var.iberica Boiss., ibid.

S.dichotoma var.racemosa(Otth)Rohrb.,Monogr.Sil.,94(1868).

S.reflexa Hort.Taurin.ex Rohrb.,ibid.

S.nocturna Pall.,Tabl.Taur.,50 ;non Linn.(1753).

Sdichotoma var.iberica Trautv. in Act.Hort.P.,v,2,354(1878).

S.racemosa var.bigibbosa Williams in Journ.Linn.Soc.,xxxii, 55(1896).

S.dichotoma var. prophyrostegia Bornm.(in Lit.) ex Post, Fl.Syr.Pal.& Syr.,ed.2,175 (1932).

S.Sibthorpiana var.glabrescens (Post)Dins.,ibid.

Annual,biennial or short-lived perennial,25.0-80.0 cm.tall. Root tapering,more or less woody,expanded into a leafy simple or branched caudex.Caudex 4.0-10.5 mm.wide,often covered with bases of old leaves.Stem erect,seldom arcuate at the base,terete,usually purplish from the base upwards,leafy,strikingly hirsute to puberulent,hairs straight or crispule,yellowish or white,somewhat tangled below,adpressed above,usually simple below,branched from the middle upwards,sometimes branched throughout;branches more or less stiff,ascending;middle internodes 2.5-4.7 cm.long. Caudical & lower cauline leaves rosulate,petiolate,3.5-16.6 cm. long,0.5-5.0 cm.wide,lanceolate,ovate-spathulate,oblong-lanceolate, seldom linear-lanceolate,attenuated into petiole,base with hyaline ciliate or villose margin,apex acute,obtuse,or mucronate;other cauline leaves sessile,2.7-10.0 cm.long,0.4-4.6 cm.wide,oblong- or linear-lanceolate,lanceolate,sometimes ovate,ciliate at the base,acute or obtuse;all leaves 3-5-nerved at the base,puberulent as in the stem.Inflorescence a perfect dichasium (1-3 times) below, passing on to a monochasial cyme above.Bracts unequal,lower ones

foliaceous,like the upper cauline leaves;upper ones membranaceous, often purplish,ovate-lanceolate, lanceolate,acute,3-nerved,ciliate, sparingly puberulent.Pedicels 1.0-4.0 mm.long,spreading at anthesis,becoming erect,more or less stout after anthesis.Flowers hermaphrodite.Calyx 1.0-1.5 cm.long,2.3-3.5 mm.diam.,cylindrical usually from a truncate base,with 10 prominent greenish nerves, commissural nerves bifurcating & sparingly anastomosed with the median ones,nerves stiffly hirsute with bristly papillae,in fruit oblong or ovate-oblong with narrow base and contracted apex;teeth 1.0-3.0 X 1.0-2.0 mm.,ovate-lanceolate,lanceolate, obtuse or acute,with hyaline ciliate margin.Petal white,sometimes pink,1.3-2.3 cm.long;claw 0.8-1.3 cm.long,equaling calyx,exauriculate, smooth;limb 5.0-10.0 X 1.8-2.8 mm.,obovate-cuneate,bipartite beyond middle into oblong-obovate,oblong-linear lobes;ligules two,0.3-0.5 mm.long,obtuse,often represented by small thickened outgrowths.Filaments exserted,smooth.Styles 3,exserted,hairy. Anthophore 1.5-2.0 mm.long,smooth.Capsule 6.0-8.3 X 5.0-6.0 mm., ovoid-oblong,3-5 times as long as anthophore,included.Seed dark brown with silvery tinge,1.0-1.5 mm.long,with flat face & slightly grooved back,granulate.Th. or Hp.

Type- "Hungary?"

TURKEY- Prov.Erzurum:Erzurum,Zohrab 151,155 &162 ;at the foot of Tech dag above Erzurum,June 1853,Huet .Prov.Gumusane:Bayburt, 1-7-1862,Bourg.47. Prov.Gumusane/ Trabzon:Zigana dag,1500m., 27-7-1934,Balls 1695; Lazistan ,sine loco.,27-6-1866,Bal.1418; sine loco.,Calv.& Zohrab ;ibid.,Calv.& Zohrab 654.Prov.Ankara: Kecioren,18-5-1936,Kranse 4999;Ankar (Galatia),yr.1892,Bornm. 3141. Prov.Kastamonu:nr. Seko,25-5-1892,Sint.3942.Prov.Kayseri: nr. Bunyan,17-6-1954,Davis 21794. Prov.Orfa:Birecik,nr.Tschiflik, 21-4-1888,Sint.425.Prov.Maras:Maras,960m.,30-4-1934,Balls 910. Prov.Gaziantep:Gaziantep,May1889,Post ;ibid.,June190&,Harad. 1309. Prov.Seyhan:Adana,April 1834,Month.1472.Prov.Mersin:Ovacik,July

1949,Atilla;Bouloukli,9-5-1855,Bal.
Cilician Taurus,Kergiraki,yr.1896,Siehe 99,Sine loco,a1836, Ky.80.Prov.Antalya,dt.Kemer:Take dag,nr.Orencik,11-1200m.,12-7-1947, Davis 15764;Antalya,14-7-1860,Bourg.46;Melas between Antalya & Alanya,May 1845,Heldr.;between Lara & Eski,Roma Hardebeleri,23-5-1950, Heilb. & Atilla .Martana,150M.,5-4-1936,Tengwall 273.Prov.Burdur: Ekinova,21-5-1950,Heilb.& Atilla .Prov.Izmir:Izmir,6-5-1854,Bal.99; ibid., May 1842,Boiss. Caria, sine loco.,yr.1843,Pinard .Prov.Izmit: Yalova,June 1943,Basar. Kutul -Karakol yalu,16-7-1947,Heilb.& Basar. Kin Koei,24-5-1883,Sint.136 .Prov.Istanbul:Istanbul,Feldrainen,May 1844,Noe 200;nr.Buyukdere ,June 1874,Pichler.

CYPRUS- Koeletria(nr.Kelokedhara)at Kryonero,14-5-1941,Davis 3427.

SAMOS Is.- Mt.Ambeleo at Arwaniai,600m.,10-4-1934,Rechinger3924.

RHODES - Mt.Attairo,800-1000m.,16-5-1935,Rechinger 7381.

SYRIA- Homs ,600m.,May 1910,Harad.3329;Aleppo,19-4-1841,Ky.117; ibid.,300m.,20-3-1865,Hausskn.;Dara Assyria ,April 1867,Hausskn.; Hermon,1863-4,Lowne

PALESTINE- Nazareth,1863-4,Lowne ;Megiddo,16-5-1934,Field & Lazar 334326;Jerusalem,22-5-1912,AC.2601;ibid.,April 1877,Post 231 & 193; ibid.,AC.976;E. of Jordon,a1873,Paine;El Ruina (Nazareth),27-3-1942, Davis 4378;Ramleh,AC. B4601; Mt.Gilbosa,nr. Beit Alfa,18-3-1942, Davis 4118;Tiberias ,(-)200m.,27-21911,AC.976b;Hesban,800m.,26-4-1911, AC. m976; Plain of Sharon,20-4-1886 Post ;N.E. of Suf,830m.,4-5-1911, AC.G976;Mt. Carmel,AC. 7247;nr. Es Salt,30-4-1886,Post ;Jerash, yr.1928,Crowfoot19.

LEBANON- Sidon & Nabetiyyah,30-3-1877,Post 230.

IRAQ- Sheikh,nr. Ain Sifni,13-6-1934,Field & Lazar 699; sine loco., Aucher 475; Arbil,3750m.,,2-4-1931,Guest 2135;Qost Fafa,nr.Arbil, 405m.,2-4-1931,Guest 1480;Jebel Avroman,N.of Biyara,1700m., 7-6-1948,Gillett 11804.

IRAN-12 m. E.of Urumia,1500m.,16-5-1929,Cow.& Darl.935; 8m. S. of Urumia,1350m.,17-5-1929,Cow.& Darl.992;between Tehran & Tabriz, June 1859,Bunge ; nr.Tabriz,May1920,Gilliat-Smith 1495;Atropatamia (North Iran),2100m.,20-6-1924,Grossheim 280 ; Mt.Elwend,yr.1882, Polak; Hills nr. Bans,1500m.,14-5-1929,Cow.& Darl.2072;Sefin dag, above Shaqlawa,1350m.,9-5-1947,Gillett 8163;Shaqlawa,1000m.,8-5-1947, Gillett 8056.

Geogr.Hungary,Rumania,France,Greece,Turkey, Trans-Caucasus, Cyprus, Syria,Lebanon,Palestine,Iraq & Iran.

Habitat- Fields & rocky places;alt.- (-)200m.-2100m.

Fl.- March -June.

S.dichotoma was described by Ehrhart in his Beitr. 7.144 (1792) with "Hungary? " mentioned as the country of collection .S.racemosa Otth was published in DC.,Prodr.,i, 384 (1824),and was based on S.divaricata Sibth. & Sm.,Prodr. Fl.Graec.,i,293 (1806) & Fl.Graec.,t.414 (1825) with the type collected " in agro Cariensi." S.Sibthorpiana Reichb.,Fl.Germ. Exc.,815 (1832) was based on S.dichotoma of the Fl.Graec.,t.413 (1825).

Boissier kept S.dichotoma and S.racemosa (with its var.Sibthorpiana) as distinct & separate species. Williams also supported Boissier and says of S.racemosa "species a S.dichotoma racemis longis laxis divaricatis,calyce 8-10 mm. tantum longo,petalis profundius bipartitis,capsula ovata, differre videtur." Post and Schischkin also retain both species.Rohrbach reduced S.racemosa to a variety of S.dichotoma ,and did not recognise the var.Sibthorpiana(Reichb.)Boiss.

The characters used by those authors who distinguish these two plants have been investigated,and it has become clear that they have no value for differentiation.The degree of dichotomous branching,which is considered as the chief difference , varies from place to place & appears to depend on environmental conditions.Other characters,viz.,quantity of indumentum,size & to some extent the shape of leaf,nature of calyx teeth & presence or absence of a corona on the petal,appears to be of a fluctuating nature.The quantity of indumentum on the stem & leaves,& size of the leaves depend largely on climatic as well as edaphic conditions.The width of the calyx teeth,as

well as its shape depend on the degree to which the white membraneous margin develops.The presence or absence of a corona,though it may have some taxonomic importance is not restricted to any particular population with isolated distribution, plants having petals with a prominent ligule grow with plants with ecoronate petals or with minute ligule.

Hence there being no morphological differences of a constant nature which can be correlated with geographical distribution, S.racemosa & S.Sibthorpiana have been treated synonymous with S.dichotoma

125. S.oxyodonta Barbey, Herbor. au Levant,121,t.11 (1882);Boiss.,Fl. Or.,Suppl.,92(1888);Williams in Journ.Linn.Soc., xxxii,66 (1896);Post,Fl.Syr.Pal.& Sinai,ed.2,i,175 (1932)

Annual,17.0-43.0 cm.tall .Root slender,deepseated, abruptly expanded into a leafy caudex.Stem erect,terete,leafy, greenish,sometimes faintly purplish from the base upwards, sparsely puberulent with long crisp hairs,simple or branched; branches ascending;middle internodes 2.1-5.3 cm.long.Caudical & lower cauline leaves rosulate,petiolate,5.0-8.5 cm.long,1.0-1.8 mm.wide,oblong-spathulate,attenuated into petiole,base with hyaline margin,glabrescent or sparsely puberulent with crisp hairs;other cauline leaves sessile,3.5-6.0 cm.long,0.7-1.7 cm. wide,lanceolate,oblong-linear,tapering towards the base,glabrous; all leaves acute,with ciliate or villose margin.Inflorescence usually a perfect dichasium below,branches passing into a monochasial cyme above.Bracts subequal,oblong-linear,with

hyaline maegin towards the base,3-nerved,villose at the margin. Pedicels 1.0-4.0 mm.long,spreading at anthesis,becoming erect after anthesis.Flowers hermaphrodite.Calyx 1.7-2.2 cm.long,3.5-4.5 mm.diam.,oblong or oblong-cylindrical,from a truncate base,with 10 greenish nerves;nerves prominent, commissural ones bifurcating & then anastomosed with the median nerves,with crisp hairs,in fruit oblong-ovate with a narrow base and contracted apex;teeth 4.0-5.5 X 1.5-2.0 mm.,lanceolate,acuminate,with hyaline ciliate margin,ending in a recurved tip.Petal pink,2.1-2.4 cm.long; claw 7.0-8.5 mm.long,exserted,smooth,exauriculate;limb 4.0-5.5 X 2.8-3.3 mm.,obovate or obovate-cuneate,bipartite 1/3 its length into obovate obtuse lobes;ligules two,0.5-1.0 mm.long,ovate. Filaments exserted,smooth. Styles 3,included.Anthophore 3.0-4.5 mm.long,smooth.Capsule 6.0-8.5 X 4.5-5.5 mm.,ovoid,twice as long as anthophore,included.Seed dark brown,1.3-1.5 mm.long, with flat face & concave back,granulate.Th.

Type- In planitie Esdraelonis in Palestina ad meridiem Nazareth, Barbey.

PALESTINE- Gaza to Mejdel,4-4-1911,Meyers B5262;Jericho hills, (-)10m.,19-4-1911,AC.4559;Ascent to Ayn Musa,100-300m.,22-4-1911, AC. m559;Wadi Kelt,below St.George monastry,4-3-1942,Davis 4022.

Geogr. Endemic to Palestine.

Habitat- Plains,especially rocky places;alt.-(-)10m-300m.

Fl.- March & April.

S.oxyodonta shows most resemblance to S.dichotoma Ehrh. in its tendency to have inflorescence dichotomous below, & to have cauline leaves large & conspicuous,but in S.oxyodonta the leaves are usually 1-nerved and nearly smooth on both the

surfaces.It is also distinguished from S.dichotoma by the oblong calyx with broad green,crisp-pubescent nerves,calyx teeth ending in recurved tips,pink petals & by the obovate or obovate-cuneate limb which is incised to 1/3 of its length.

126. S.lagenocalyx Fenzl in Ky.,Pl.Pers.Austr.(1845);Boiss.,Fl.Or.,i, 587(1867);Rohrb.,Monogr.Sil.,93(1868).

Syn. S.lagenocalyx var. purpurea Boiss.,Fl.Or.,i,588(1867)

Annual,15.0-33.0 cm.tall.Stem erect,ascending,terete, leafy,usually purplish from the base upwards,puberulent with crisp hairs,sometimes more or less hirtellous;middle internodes 2.3-5.6 cm.long.Caudical & lower cauline leaves rosulate,petiolate, oblong-spathulate,attenuated into petiole,base with hyaline ciliate margin,obtuse;other cauline leaves sessile,1.9-4.8 cm. long,4.5-8.5 mm.wide,lanceolate or linear-lanceolate,acute;all leaves ciliate especially towards the base,puberulent or more or less hirtellous.Inflorescence usually a perfect dichasium (1-3-times) below,ultimate branches passing intoaraceme-like one-sided monochasial cyme. Bracts unequal,linear or linear-lanceolate,with narrow hyaline ciliate margin.Pedicels 3.0-8.5 mm.long,slender & spreading at anthesis,becoming stout & erect after anthesis.Flowers hermaphrodite,upper ones subsessile.Calyx 1.45-1.7 cm.long,3.0-3.5 mm.diam.,cylindrical from a truncate base,with 10 greenish sparingly anastomosed nerves,hirsute & puberulent,in fruit clavate or ovate-clavate with a narrow base & contracted apex;teeth 3.0-3.8 X 1.5-2.0 mm.,lanceolate,acute, with hyaline ciliate margin.Petal white or purplish,1.6-1.85 cm.

long;claw 6.0-7.5 X 4.0-4.5 mm.,cuneate,bipartite;lobes oblong, obtuse;ligules two,0.5-0.9 mm.long,ovate,obtuse.Filaments exserted,smooth.Styles3,exserted,hairy.Anthophore 4.0-5.5 mm.long, smooth.Capsule 6.5-7.5 X 4.0-4.5 mm.,ovoid-conical,1½-2 times as long as anthophore,included.Seed dark brown,1.0-1.3 mm.long, with flat face & concave back,granulate.Th.

Type- In rupestribus Persiae australis ad Gere,Dalechi,Persepolin, Ky.98 & 274 [holo.G.,iso.K!,BM!]

IRAN- Locuss classicus,March 1842,Ky.119; 2m.S.W. of Khirramabad, 1500m.,8-4-1929,Cow.& Darl.459;Tangi Dschis,nr.Khonar Takhts, 3-5-1885,Stapf ;Kurdistan,sine loco.,Bell; sine loco.,Noe

Geogr. Endemic to Iran.

Habitat- Rocky places;alt.- 1500m. Fl.- March- May.

127. S.remotiflora Vis.,Fl.Dalm.,iii,166,t.53 (1852);Rohrb.,Monogr. Sil.,101(1868);Hayek,Prodr.Fl.pen.Balc.,i,26 (1927).

Annual,45.0-80.0 cm.tall.Root slender,tapering, expanded into a leafy caudex.Stem erect,terete,leafy,greenish,usually simple below,branched from the middle upwards,pubescent with more or less long spreading hairs,sometimes hirsute;branches divaricating;middle internodes 2.1-4.0 cm.long.Caudical & lower cauline leaves rosulate,petiolate,3.5-8.3 cm.long,0.6-1.7 cm. wide,obovate-lanceolate,lanceolate or oblanceolate to oblong-linear,obtuse or round at the apex,base with hyaline ciliate margin;other cauline leaves sessile,4.9-7.5 cm.long,6.0-14.0 mm. wide,oblanceolate to oblong-linear,acute;all leaves 3-nerved, puberulent or more or less hirtellous.Inflorescence a one-sided raceme-like cyme,with remote flowers.Bracts equal,exceeding

calyx,linear,acuminate,3-nerved at the base,with hyaline ciliate margin.Pedicels 1.0-4.0 mm.long,slender,spreading at anthesis, becoming erect & stout after anthesis.Flowers hermaphrodite. Calyx 1.35-1.5 cm.long,2.3-3.5 mm.diam.,oblong from a truncate base,with 10 green,prominent nerves which emit only a few branches, hirtellous,glabrous or scabrous between the nerves,in fruit ovoid with a constricted base and contracted apex;teeth 2.3-3.0 X 1.3-1.8 mm.,lanceolate,triangular,acute,with hyaline ciliate margin.Petal pink,1.4-1.6 cm.long;claw 1.0-1.05 cm.long,smooth, equaling calyx,exauriculate;limb 4.0-5.5 X 2.8-3.5 mm.,cuneate, bipartite into oblong lobes;ligules two,0.9-1.5 mm.long,oblong or ovate,obtuse.Filaments exserted,often included,smooth.Styles 3, exserted,hairy.Anthophore 2.5-3.3 mm.long,thick,smooth.Capsule 9.0-10.5 X 6.0-7.5 mm.,ovoid-conical,3 times as long as anthophore, included.Seed dark brown,with flat face & obtusely grooved back, granulate.Th.

Type- Dalmatia- ad vineas circa Gelsa Astalio,Vis.

TURKEY- Prov.Izmir:Izmir,May 1827,Fleischer .Prov.Canakkale: Dardenalles,31-5-1879,Sint. 879.

Geogr. Greece & Turkey.

Habitat- Vineyards .Fl.-May.

S.remotiflora Vis.,when compared with other species in this section,it is found to resemble them in many characters, especially in the shape & nervation of calyx.It shows more resemblance to S.dichotoma Ehrh. than to others in its general habit,seed shape and the 3-nerved leaves,but differs from the latter by its one-sided raceme-like inflorescence with the axis

simple or branched but without alar flowers,bracts herbaceous, linear,and exceeding calyx,shape of the petal lamina & degree of its incision,and lastly the nature of the indumentum.

128. S.Heldreichii Boiss.,Diagn.Pl.Nov.Or.,Ser.1,viii,81(1849);Boiss., Fl.Or.,i,589(1867);Rohrb.,Monogr.Sil.,106(1868).

Annual, 10.0-25.0 cm.tall,from a slender,deepseated taproot. Stem erect,often arcuate,terete,purplish from the base upwards, crisp puberulent,usually branched towards the base;branches ascending or arcuately erect;middle internodes 2.0-3.7 cm.long. Caudical and lower cauline leaves rosulate,petiolate,1.6-5.0 cm. long,4.5-8.0 mm.wide,oblong-spathulate,attenuated into petiole, base with hyaline ciliate margin,obtuse or mucronate;other cauline leaves sessile,1.4-3.6 cm.long,4.5-10.0 mm.wide,lanceolate, acute;all leaves pubescent and hirsute. Inflorescence a raceme-like monochasial cyme.Bracts unequal,herbaceous,linear-lanceolate, or oblong-linear,3-nerved at the base,with hyaline ciliate margin. Pedicels 2.0-3.5 mm.long,spreading at anthesis,becoming erect in fruit.Flowers hermaphrodite.Calyx 1.2-1.5 cm.long,2.5-3.0 mm. diam.,cylindrical from a truncate base,with 10 greenish,more or less anastomosed nerves,puberulent & hirsute at the nerves,in fruit oblong (more or less swollen in the middle) or ovate-oblong with a narrow base & contracted apex;teeth 2.3-3.0 X 1.3-1.5 mm.,lanceolate,acute,with hyaline ciliate margin.Petal white or pink,1.45-1.7 cm.long;claw 9.5-10.5 mm.long,exserted,smooth, exauriculate;limb 4.5-6.5 X 2.0-2.5 mm.,cuneate,bipartite into oblong obtuse lobes;ligules two,0.5-0.9 mm.long,ovate.Filaments exserted,smooth.Styles 3,exserted,hairy.Anthophore 2.8-3.5 mm.

long,smooth.Capsule 6.0-7.0 X 4.3-4.5 mm.,ovoid-conical,twice as long as anthophore,included.Seed dark brown,1.0-1.3 mm.long, with flat face & slightly grooved back,granulate.Th.

Type- Turkey-in saxosis apricis prope Alaya Pamphyliae,in colle Kourmalu non procul ab Adalia,Heldr.[holo.G.]

TURKEY-Prov.Mersin:Anamur,May1872,Peronin 7 .Prov.Antalya:Sahili Atbuku,26-5-1950,Heilb.& Atilla ;Yenikaj,Yesilbayir,22-5-1950, Heilb.& Atilla ;Cubuk Kovanliyol,21-5-1950,Heilb.& Atilla;Serih Alanya,2-6-1950,Atilla .

RHODES- sine loco.,2-6-1870,Bourg.

Geogr. Endemic to the Mediterranean coast of S.Turkey & islands near the Turkish coast.

Habitat- Dry sandy & rocky places near sea coast.Fl.-May.

S.Heldreichii is obviously most closely related to & probably derived from S.dichotoma Ehrh. as demonstrated by the similar movement of pedicels,leaf shape,shape of the calyx at and after anthesis,shape & colour of petal,and to some extent by the shape of the capsule.S.Heldreichii is distinguished from the latter species by its low stature,slender stem with the inflorescence not dichotomously branched,the calyx teeth which are long & lanceolate,acute,herbaceous bracts & bracteoles,& by the relative length of capsule and anthophore.

SECTION 39 SCORPIOIDEAE

The 24 species in this section are all annual or monocarpic plants. S.nicaeensis All. is the only one that behaves either as an annual, biennial or short-lived perennial. In all these species, the plant is always more or less densely pubescent, erect & branched. The inflorescence is generally a raceme-like monochasial cyme with usually a simple axis, but in S.nicaeensis All. the inflorescence is a dichasial cyme below, passing into a monochasium above, the branches of the dichasium are unequal. The petal is almost always bipartite, ligulate.

The species of this section fall into 3 subsections on the basis of calyx shape at and after anthesis and the relative length of capsule & anthophore. The shape of the capsule is also an important subsectional character. These characters distinguishing the subsections will be apparent from the key that is given below.

Key to the subsections & the Oriental species.

1a. Calyx cylindrical, in fruit oblong; capsule oblong, subsessile ..... 39C. Subsect. Nocturnae

1b. Calyx usually cylindrical-clavate or obconical-cylindrical, in fruit clavate; capsule ovoid, ovoid-oblong, sometimes oblong, with a long anthophore :

2a. Calyx cylindrical-clavate, rarely cylindrical, glandular-puberulent or puberulent; plants densely & variously puberulent ..... 39A. Subsect. Pubicalycinae

3a. Inflorescence a dichasial cyme,branches of the dichasium unequal,often passing into a monochasial cyme above;calyx teeth acute;capsule ovoid-oblong,as long as anthophore. Seed with flat face & grooved back 129.S.nicaeensis

3b. Inflorescence a monochasial cyme;calyx teeth obtuse;capsule either ovoid or oblong,usually 2-3 times as long as anthophore :

4a. Seed with flat face & grooved back;leaves more or less thick & fleshy 130.S.discolor

4b. Seed with an ear-shaped depression on the face & obtusely grooved back;leaves neither thick nor fleshy:

5a. Petal pink,obcordate,with cuneate base;anthophore smooth;capsule oblong 132.S.palaestina

5b. Petal white or pink,cuneate;anthophore hairy,if smooth then the capsule ovoid & petal white:

6a. Capsule oblong:

7a. Calyx 1.5-1.8 cm.long,with truncate base;petal white,sometimes slightly pinkish 133.S.damascena

7b. Calyx 2.5-3.3 cm.long,with a truncate-umbilicate base;petal pink 134.S.hirsuta

6b. Capsule ovoid :

8a. Plant not viscid;anthophore smooth;capsule 2-3 times as long as anthophore 131.S.pompeiopolitana

8b. Plant viscid,especially above;anthophore hairy;capsule as long as anthophore 135.S.affinis

2b. Calyx obconical-cylindrical,adpressed puberulent,usually not glandular;plants sparsely puberulent or glabrescent,sometimes puberulent 39B.Subsect.Cinereae

SUBSECTION 39A. PUBICALYCINAE

129. S.nicaeensis All.,Misc.Taurin.,v,88(1774);Fl.Pedem.,ii,81, t.44,fig.2(1785);Boiss.,Fl.Or.,i,591(1767);Rohrb., Monogr.Sil.,152(1868)-Reichb.,Ic.Fl.Germ.Helv.,vi, t.278,fig.5065(1844);Sibth.& Sm.,Fl.Graec.,v,t.424 (1825).

Syn. S.nicaeensis All.,Fl.Pedem.,ii,81(1785);non Cham.& Schldl.(1826)

S.littoralis Pourr.in Mem.Acad.Toul.,iii,329(1788);non Jord.(1848);non Plan (1852).

S.villosa Moench,Method.,708(1794);non Forsk.(1775);non Boiss.(1845);non Schimper(1835);non Cambess.;non Holl.;non Welwitsch

S.arenaria Desf.,Fl.Atl.,i,354(1798)

S.leucophaea Sibth.& Sm.,Fl.Graec.Prodr.,i,297(1806)

S.viscosissima Ten.,Prodr.Fl.Nap.,26(1811);non Rochel,Pl. Exs. ex Rohrb.,Monogr.Sil.,220(1868)

S.arenicola Persl,Fl.Sic.,153(1826)

S.vallesiaca Link.,Handb.,ii,244(1831)

S.subvinosa Delile ,Ind.Sem.Hort.Monsp.,12(1838)

S.nicaeensis var.arenicola Bertol.,Fl.It.,iv,624(1839)

S.nicaeensis var.latifolia Boiss.,Fl.Or.,i,592(1867)

Annual or biennial,10.0 -24.0 cm.tall.Root slender,deepseated

expanded above into a leafy caudex. Stem erect, ascending or arcuately erect, terete, leafy, branched from the middle upwards, sometimes branched throughout, seldom simple, papillose & viscid throughout, becoming glandular above; middle internodes 1.5-5.3 cm. long. Caudical & lower cauline leaves rosulate, petiolate, 2.2-3.8 cm. long, 6.0-11.0 mm. wide, oblong-spathulate, attenuated into petiole, obtuse or round at the apex, base with hyaline ciliate margin; othe cauline leaves sessile, 1.0-3.5 cm. long, 2.0-9.0 mm. wide, oblong-lanceolate, lanceolate or linear-lanceolate, obtuse or acute; all leaves 1-nerved, more or less thick, papillose-viscid. Inflorescence a dichasium; branches unequal, often passing into a monochasial cyme above. Bracts unequal, small, linear-lanceolate. Pedicels 3.0-10.0 mm. long, erect. Flowers hermaphrodite. Calyx 1.3-1.5 cm. long, 3.0-4.0 mm. diam., cylindrical, umbilicate, with 10 pinkish anastomosed nerves, glandular-puberulent, papillose-viscid, in fruit clavate with a constriction below the capsule; teeth 1.3-2.0 X 1.0-1.3 mm., lanceolate, obtuse, with hyaline ciliate margin. Petal white with greenish purple tinge below, 1.2-1.7 cm. long; claw 7.0-10.0 mm. long, exserted, smooth, exauriculate; limb 5.0-6.5 X 1.5-2.3 mm., cuneate, bipartite into linear lobes; ligules two, 0.7-1.0 mm. long, oblong, laciniate. Filaments exserted, smooth. Styles 3, exserted, hairy. Anthophore 5.0-7.5 mm. long, hairy. Capsule 5.0-8.0 X 3.5-4.5 mm., oblong-ovoid, as long as anthophore, included. Seed dark brown, 0.8-1.3 mm. long, with flat striate face & obtusely grooved granulate back. Th.

Type- France-in agro Nicaeesi seens le Var frequens est Annua.

TURKEY-Prov. Mersin: Anamur, May 1872, Peronin 8.

RHODES- sine loco. 11-5-1870, Bourg. 13.

CYPRUS- Ayia Irini (Morphon),13-3-1941,Davis 2605;between Agios Epiktitos & Agios Amvrosios,23-5-1941,Davis 3622; Epiktitos,26-5-1880, Sint.& Rigo 247; Carpass Meerstrand,nr. Davlu,20-4-1880,Sint.& Rigo 247;Syrianshori,6m.,30-3-1935,Syngr.796.

Geogr.Algeria,Spain,Portugal,France,Corsica,Sardinia,Sicily,Italy, Greece,Turkey,Rhodes & Cyprus.

Habitat- Maritime sands .Fl.- March-May.

S.nicaeensis is related to & has probably given rise to S.discolor Sibth.& Sm.,as the latter species exhibits a close similarity in general habit,leaf shape & fleshiness, shape of calyx at and after anthesis,& in the shape of seed. But S.nicaeensis differs from S.discolor by its inflorescence, colour of petal,calyx teeth,and by the relative length of capsule & anthophore.

130. S.discolor Sibth.et Sm.,Prodr.Fl.Graec.,i,292 (1806);v,t.410 (1825);Boiss.,Fl.Or.,i,592(1867);Rohrb.,Monogr.Sil., 110(1868).

Syn. S.discolor Sibth.& Sm.,Prodr.Fl.Gr.,i,292(1806);non Ritz
S.ciliata Urv.in Mem.Soc.Linn.Paris,1.403(1822);non Pourr.(1788);non Willd.(1799).
S.setacea Otth in DC.,Prodr.,i,372(1824);non Viv.(1824)
S.psammica Boiss.in Bourg.Pl.Lyc.,no.55(1860)ms.

Annual,10.0-23.0 cm.tall.Root deepseated,slender,expanded into a leafy caudex.Stem erect,arcuately erect,terete,leafy, usually branched from the base upwards,sometimes simple,puberulent & hirsute with long spreading hairs,glandular & viscid above; middle internodes 0.8-2.1 cm.long.Caudical & lower cauline leaves

rosulate,petiolate,2.0-4.0 cm.long,5.0-12.0 mm.wide,oblong-lanceolate or oblong-spathulate,base with hyaline ciliate margin;other cauline leaves sessile,1.4-2.8 cm.long,3.0-7.0 mm. wide,oblong-lanceolate or lanceolate;all leaves obtuse, more or less thick & fleshy,puberulent & hirsute,upper ones sparingly glandular.Inflorescence a raceme-like monochasial cyme;axis simple or forked without any alar flowers.Bracts unequal,oblong-linear, fertile one smaller, with glandular-ciliate margin.Pedicels of lower flowers 5.0-16.0 mm.long,& those of upper ones 1.0-2.5 mm.long,spreading or erect.Flowers hermaphrodite,erect.Calyx 1.0-1.25 cm.long,3.0-3.5 mm.diam.,cylindrical,umbilicate,with 10 greenish or pinkish anastomosed nerves,glandular-puberulent & hirsute,in fruit clavate with a constriction below the capsule; teeth 1.0-1.5 X 1.0-1.3 mm.,ovate,obtuse,with hyaline ciliate margin.Petal pink,yellowish green on the reverse,1.15-1.35 cm. long;claw 6.5-7.0 mm.long,smooth,exserted,exauriculate;limb 5.0-6.5 X 2.5-3.0 mm.,cuneate,bipartite 2/3 its length into obovate & more or less cuneate lobes;ligules two,oblong, denticulate.Filaments exserted,smooth.Styles 3,exserted,hairy. Anthophore 3.0-4.0 mm.long,hairy.Capsule 6.0-7.5 X 3.5-4.5 mm., ovoid, twice as long as anthophore,included,Seed dark brown, with flat face & grooved back,granulate.Th.

Type- In insula Cypro, Sibth. [holo.Oxford]

TURKEY- Prov.Antalya:Antalya,2-5-1860,Bourg.55;Lara (Eskiharebeleri) 23-5-1950,Heilb.& Atilla ;Tekirova,25-5-1950,Heilb.& Atilla ; Göklimani,29-5-1950,Heilb.& Atilla; Kemer Sahilve,Kayaliklar, 25-5-1950,Heilb.& Atilla ;Sarisu,Kayaliklar,24-5-1950,Heilb.& Atilla .

Geogr. Turkey,Cyprus & Milos Is.

Habitat- Maritime sands . Fl.-March- May.

S.discolor Sibth.& Sm. is obviously closely related to S.pompeiopolitana J.Gay ,but it differs from the latter in its viscid habit,more or less fleshy & thick leaves,shorter pedicels,cylindrical calyx with umbilicate base,pink petal,& the relative length of capsule and anthophore.These differences have been shown in the synoptical comparison [Tab.8]

S.discolor grows freely & occupies a wider area in the S.W. part of Turkey & in the islands of Cyprus & Milos than S.pompeiopolitana J.Gay which is known only from the Cilician type collection.

TABLE 8.

Synoptical comparison of the characters distinguishing S.discolor from S.pompeiopolitana

Character	S .discolor	S.pompeiopolitana
Indumentum	puberulent & hirsute throughout,becoming glandular & viscid above;hairs long, spreading	puberulent & hirsute throughout, becoming glandular above,not viscid;hairs adpressed.
Leaves	fleshy & thick	not thick.
Pedicels	5.0-16.0 mm.long,lower ones shorter than or equaling calyx	5.0-30.0 mm.long,lower ones longer than calyx
Calyx	cylindrical,umbilicate, becoming clavate in	cylindrical-clavate,truncate-umbilicate,becoming clavate in

diac. pomp

	fruit	fruit
Petal	pink;limb cuneate, bipartite into obovate & more or less cuneate lobes	white,limb cuneate,bipartite into oblong-obovate lobes.
Anthophore	3.0-4.0 mm.long,hairy	3.0-5.0 mm.long,smooth
Capsule	twice as long as anthophore	2-3 times as long as anthophore
Seed	with flat face & obtusely grooved back,granulate	with an ear-shaped depression on the face & obtusely grooved back, tuberculate.

131. S.pompeiopolitana J.Gay ex Boiss.,Fl.Or.,i,495(1867);Rohrb., Monogr.Sil.,103 (1868).

Annual,10.0-13.5 cm.tall.Root deepseated,slender expanded intoaleafy caudex.Stem erect,often arcuate,terete, leafy,branched from the base upwards,appressed puberulent & hirtellous throughout,becoming glandular above;middle internodes 7.0-15.0 mm.long.Caudical & lower cauline leaves rosulate,petiolate, 1.5-3.7 cm.long,4.0-7.3 mm.wide,oblong-lanceolate or lanceolate, base with hyaline ciliate margin;other cauline leaves sessile, 1.8-3.0 cm.long,3.5-5.0 mm.wide,lanceolate;all leaves obtuse, puberulent,hirtellous.Inflorescence a raceme-like monochasial cyme.Bracts unequal,sterile ones linear-lanceolate,fertile ones setaceous,both types with ciliate margin.Pedicels 5.0-30.0 mm. long,erect or arcuately erect.Flowers hermaphrodite,erect,upper ones subsessile.Calyx 1.0-1.1 cm.long,3.0-3.5 mm.diam.,cylindrical-

clavate,with 10 greenish sparingly anastomosed nerves, apressed puberulent,somewhat glandular & hirsute,base truncate, in fruit clavate with a constriction below the capsule;teeth 1.0-1.3 X 1.3-1.5 mm.,ovate,obtuse,with hyaline ciliate margin. Petal white,1.3-1.5 cm.long;claw 7.5-8.0 mm.long,exserted,smooth, exauriculate;limb 5.5-7.0 X 2.3-3.0 mm.,cuneate,bipartite beyond middle into oblong-obovate lobes;ligules two,1.0-1.3 mm. long,oblong,denticulate.Filaments exserted,smooth.Styles 3, exserted,hairy.Anthophore 3.0-5.0 mm.long,smooth.Capsule 7.0-9.0 X 3.5-5.0 mm.,ovoid,2-3 times as long as anthophore,included. Seed dark brown,0.5-0.9 mm.long,with an ear-shaped depression on the face & obtusely grooved tuberculate back.Th.

Type-Turkey-in arenosis maritimis ad Pompeiopolim Ciliciae, Bal.810 [holo.G.;iso.K!,E!,BM!]

Geogr. Only from the type gathering.
Habitat- Sandy places by the sea.Fl.-April.

132. S.palaestina Boiss.,Diagn.Pl.Nov.Or.,Ser.1,viii,80(1849);Boiss., Fl,Or.,i,595(1867);Rohrb.,Monogr.Sil.,103(1868).

Syn. S.fulgida Ky.in It.Syr.,no.421(1855)ms.

Annual, 10.0-70.0 cm.tall,from a deepseated taproot. Stem erect,terete,leafy,usually purplish from the base upwards, usually branched from the base,seldom simple,sparingly hispid throughout,becoming viscidly glandular above;middle internodes 1.4-5.0 cm.long.Caudical & lower cauline leaves rosulate,petiolate, 3.0-5.6 cm.long,4.0-10.0 mm.wide,lanceolate to oblong-linear, attenuated into petiole,base with hyaline ciliate margin,apex

obtuse;other cauline leaves sessile,2.0-4.6 cm.long,4.0-11.0 mm. wide,lanceolate or linear-lanceolate,obtuse or acute,ciliate at the base;all leaves puberulent & hispidulous.Inflorescence a raceme-like monochasial cyme,axis simple or branched,without an alar flower.Bracts unequal,sterile ones big,ovate-lanceolate, acute,fertile ones setaceous;both ciliate.Pedicels 0.5-1.3 cm. long,erect.Flowers hermaphrodite,lower ones alternate,upper ones one-sided,subsessile.Calyx 1.2-1.5 cm.long,2.3-3.0 mm.diam., cylindrical with tapering base,truncate,with 10 pinkish sparingly anastomosed nerves,glandular-puberulent & hirsute,in fruit clavate with a constriction below the capsule;teeth 1.3-1.8 X 1.3-1.5 mm.,oblong or ovate,obtuse,with hyaline ciliate margin. Petal pink,1.5-1.9 cm.long;claw 9.0-10.0 mm.long,exserted, smooth,exauriculate;limb 6.0-9.0 X 1.5-2.3 mm.,obcordate-cuneate, bipartite beyond middle into obovate lobes;ligules two,0.8-1.3 mm. long,oblong,crenulate.Filaments exserted,smooth.Styles 3,exserted, hairy.Anthophore 4.0-6.0 mm.long,smooth.Capsule 8.0-11.0 X 3.5-4.3 mm.,oblong,2-3 times as long as anthophore,included. Seed dark brown,0.8-1.0 mm.long,with an ear-shaped depression on the face & obtusely grooved tuberculate back.Th.

Type- Prope Gaza Palaestinae, Boiss.[holo.G.]

PALESTINE-Plain of Sharon,April,Post ;Jaffa,7-4-1897,Bornm. 179; Ramlah,1-20m.,15-5-1908,Dinsm.1262;Gaza to Mejdel,30m.,25-3-1910, Dinsm.5262;Sarada,3-4-1877,Post 233;East of Jordon,yr.1873,Paine; Nachr Rubin between Gaza & Ramlah,29-4-1855,Ky.421.

Geogr. Endemic Lebanon & Palestine.

Habitat- Sandy places .Fl.- March -May

133. S.damascena Boiss.et Gaill.,Diagn.Pl.Nov.Or.,Ser.ll,vi,34 (1859);Boiss.,Fl.Or.,i,594(1867);Post,Fl.Syr.Pal. & Sinai, ed.2,i,177 (1932).

Syn. S.siderophila Boiss.& Gaill. in Boiss.,Fl.Or.,i,594(1867). S.palaestina var.damascena (Boiss.& Gaill.)Rohrb.,Monogr. Sil.,103(1868).

Annual, 7.5-30.0 cm.tall.Root slender,deepseated,expanded into a leafy caudex.Stem erect,often arcuate at the base,terete, leafy,purplish from the base upwards,usually simple below,branched above,sometimes branched throughout,viscid-pubescent & sparingly hirsute;middle internodes 1.3-5.5 cm.long.Caudical & lower cauline leaves rosulate,petiolate,1.7-3.9 cm.long,5.0-8.5 mm. wide,oblong-obovate or oblong-oblanceolate,obtuse,attenuated into petiole,base with hyaline ciliate margin;other cauline leaves sessile, 1.5-2.3 cm.long,5.0-7.0 mm.wide,oblong-lanceolate, lanceolate,or linear-lanceolate,obtuse or acute,ciliate at the base;all leaves 1-nerved,pubescent & hirtellous.Inflorescence a raceme-like monochasial cyme,axis simple or branched without an alar flower.Bracts unequal,sterile ones big,ovate,acuminate or lanceolate,acute,fertile ones setaceous.Pedicels of lower flowers 0.8-2.7 cm.long,erect or ascending.Flowers hermaphrodite. Calyx 1.5-1.8 cm.long,2.5-3.3 mm.diam.,cylindrical,truncate, pinkish,glandular-puberulent,with 10 pinkish anastomosed nerves, in fruit clavate with a constriction below the capsule;teeth 1.3-1.8 X 1.5-2.0 mm.,oblong or ovate,obtuse,with hyaline ciliate margin.Petal white,cream coloured,seldom pinkish,1.1-1.85 cm.long;claw 6.5-12.5 mm.long,more or less exserted,smooth,

exauriculate;limb 4.5-6.0 X 1.8-2.5 mm.,cuneate,bipartite to the middle into oblong-linear lobes;ligules two,0.5-1.0 mm. long,oblong,obtuse.Filaments exserted,smooth.Styles 3,exserted, hairy.Anthophore 3.5-7.0 mm.long,hairy.Capsule 8.5-11.0 X 3.5-4.3 mm.,oblong,1-2 times as long as anthophore,included.Seed brown, 0.8-1.3 mm.long,with an ear-shaped depression on the face & obtusely grooved tuberculate back.Th.

Type- Syria- in ruinis El Keneise Antilibani inter Jantha et Rascheya, Gaillardot [holo.G.]

LEBANON- Khan-Madayrij,16-5-1861,Gaill.1646;Nebal Assal,1575m., Mooney 4394;Weis el Beida,1410m.,15-4-1943,Davis.6007A.

PALESTINE- Es-Salt,830m.,1-5-1911,Dinsm.m1420;E. of Es-Salt, 830m.,1-5-1911,Dinsm.G1420;Nr. Jericho,(-)50m.,10-3-1913, Dinam.2423d;Gamala,(-)200m.,3-4-1911,Dinsm.B3420;Majdal,yr.1863-4, Lowne 4; Jericho,1883,Hart ;Wadi Kilt,4-3-1942,Davis 4021; S. of Sonamayn,700m.,9-5-1935,AC.13420;Hierosolymam,April 1850,Roth; Hebron,780m.,10-4-1855,Ky.488;Zerka Main to Jebel Attaris, 26-4-1945,Davis 9372.

Geogr. Endemic to the countries cited above.

Habitat- Fields ;alt.-(-)200m.-1575m. Fl.- March-May.

S.damascena is obviously most closely related to S.palaestina Boiss ;but it differs from the latter by the nature of indumentum,colour & shape of the petal,and by the relative length of the capsule & anthophore.In S.damascena the petal limb is cuneate with oblong-linear lobes,the pedicels of the lower flowers are generally long & the anthophore is hairy.

134. S.hirsuta Lag.in Varied.de Cienc.,ii,iv,212 (1805);Willk., Ic.Descr.Pl.Nov.Hisp.,i,43,t.29(1852);Rohrb.,Monogr. Sil.,102 (1868).

Syn. S.hirsuta Lag.in Vaied.de Cienc.,212(1805);non Poir.(1789); non Persl (1831);non Schomb.(1877).

S.laxiflora Brot.,Fl.Lusit.,ii,188(1804)

S.latiflora Link in Schrad.,Neues Journ.,11,i,99(1807) [nomen nud.]

S.hirsutissima Otth in DC.,Prodr.,i,372(1824)

S.tenerrima Persl,Delic.Prag.,217(1822)

S.sabuletorum Link in Spreng.Nov.Prov.,39(1819);non Duby (1828).

S.littoralis Plan,Ens.Pl.Gallega,123(1852);non Pourr. (1788);non Jord.(1848).

S.hirsuta var.sabuletorum Aschers.in Bot.Ztg.,xvii,293 (1859).

S.hirsuta var.hirsutissima Aschers. ibid.

S.hispida Salzm.ex Ball,in Journ.Linn.Soc.,xvi,358(1877); non Desf.(1789-1800).

Annual, 15.0-40.0 cm.tall,from a deepseated,slender taproot. Stem erect,ascending,often arcuate,terete,leafy,greenish or purplish from the base upwards,usually branched from the base upwards,seldom simple,hirsute & viscid throughout,often glandular & puberulent especially above;hairs white or yellowish, 2.0-5.0 mm.long,septate,straight or wavy;middle internodes 1.3-5.0 cm.long.Caudical & lower cauline leaves rosulate,petiolate, 3.0-5.8 cm.long,4.0-10.0 mm.wide,oblong-spathulate,attenuated into petiole,base with hyaline ciliate margin,apex obtuse or round;other cauline leaves sessile,3.5-6.0 cm.long,3.4-9.0 mm.

wide,oblong- or linear-lanceolate,ciliate at the base,obtuse or acute;all leaves 1-nerved,hirsute,often sparingly glandular. Inflorescence a raceme-like monochasial cyme,axis simple or branched without an alar flower.Bracts unequal,linear-lanceolate, or linear,with hyaline ciliate margin.Pedicels 4.0-30.0 mm. long,erect at anthesis,becoming arcuate after anthesis.Flowers hermaphrodite.Calyx 1.25-1.45 cm.long,2.5-3.3 mm.diam., cylindrical with truncate-umbilicate base,with 10 greenish or pinkish anastomosed nerves,densely hirsute & sparingly glandular-puberulent,sometimes sparsely hirsure & eglandular, in fruit clavate with a constriction below the capsule;teeth 1.3-3.0 X 1.0-1.5 mm.,ovate,obtuse,with hyaline ciliate margin. Petal pink,1.25-1.6 cm.long;claw 7.5-9.0 mm.long,exserted, smooth,exauriculate;limb 5.0-7.0 X 2.0-3.0 mm.,cuneate,bipartite beyond middle into linear lobes;ligules two,0.9-1.3 mm.long, ovate,obtuse.Filaments exserted,smooth.Styles 3,exserted,or included,hairy.Anthophore 4.0-7.3 mm.long,minutely hairy. Capsule 5.0-8.0 X 3.5-4.5 mm.,oblong,as long as or 1½-2 times as long as anthophore,included.Seed dark brown,0.9-1.3 mm.long, with concave face & obtusely grooved tuberculate back.Th.

Type- In Lusitania Lagasca [holo.Madrid]

PALESTINE- Above Jabbock river,300m.,2-5-1911,AC.G1729;Elishas fountain,(-)230m.,26-4-1912,AC. 1729;N.W. of Dead Sea,(-)394m., 24-3-1908,AC.4490;Petra,1050m.,10-4-1935,AC. 11703;between Petra & foot of Mt.Hot,17-4-1945,Davis 9791;ibid.,Dinsm.9073; Wadi Ram,900m.,15-4-1945,Davis 9008;ibid.,Davis 9031;ibid.,15-4-1945, Davis 9097;mouth of Wadi Ith'm,14-4-1945,Davis 8905.

Geogr. Spain&Palestine .

Habitat- Rocky places;alt.-(-)394m.- 1050m. Fl.-March-May.

The distribution of S.hirsuta is highly disjunct,occurring in Spain on one hand, in Palestine and in the adjacent areas on the other.Though it grows wide apart,there seems to be no significant variant.The plants from Palestine vary to some extent in the nature & density of indumentum,leaf size and in the height of the plant.These variations seems to be correlated with ecological conditions.

135 .S.affinis Boiss.,Diagn.Pl.Nov.Or.,Ser.11,i,72(1853);Rohrb., Monogr.Sil.,104(1868);Post,Fl.Syr.Pal.& Sinai,ed.2, i,176 (1932) [Plate 17]

Syn. S.villosa Del.ap Schimper un. it.no.411(1835)ms.;non Forsk.(1775);non Boiss.(1845);non Moench(1794).
S.affinis Boiss.,Diagn.,11,i,72(1853);non Godr.(1853).
S.arabica Boiss.,Fl.Or.,i,593(1867);non Williams(1896).
S.eremophila Bienert in Bunge Pl.Pers.exs.
S.setacea var.viscida Boiss.,Fl.Or.,i,594(1867).
S.eremophila var.viscida Bornm.,Pl.It.Pers.Taur.,no.(1893)ms.

Annual,3.0-20.0 cm.tall.Root slender,deepseated,expanded into a leafy caudex.Stem erect or arcuately erect,terete,leafy, simple or branched,loose hairy,viscidly glandular,sometimes hirtellous;middle internodes 7.0-24.0 mm.long.Caudical & lower cauline leaves rosulate,petiolate,1.2-3.5 cm.long,1.0-2.5 mm. wide,linear-lanceolate or oblong-linear,attenuated into petiole, base with hyaline ciliate margin;other cauline leaves sessile, 0.8-3.7 cm.long,1.3-2.5 mm.wide,oblong-linear or linear,ciliate at the base;all leaves 1-nerved,acute,puberulent & viscidly

glandular.Inflorescence a raceme-like monochasial cyme.Bracts unequal,linear,acute.Pedicels of lower flowers 8.0-15.0 mm.long, spreading at anthesis,becoming arcuately erect in fruit.Flowers hermaphrodite,erect,upper ones subsessile.Calyx 1.0-1.5 cm.long, 3.5-4.3 mm.diam.,oblong-cylindrical,with truncate-umbilicate base,with 10 greenish anastomosed nerves,glandular-puberulent & viscid,glabrous or nearly so between the nerves;in fruit clavate & more or less inflated;teeth 2.5-3.0 X 1.3-2.0 mm., triangular or lanceolate,obtuse,with hyaline ciliate margin. Petal white,1.3-1.6 cm.long;claw 7.5-9.0 mm.long,exserted, smooth,exauriculate;limb 5.5-7.0 X 1.8-2.5 mm.,cuneate,bipartite into oblong-cuneate or linear-spathulate lobes;ligules two, 1.0-1.3 mm.long,oblong,obtuse or denticulate.Filaments exserted,smooth.Styles 3,exserted,hairy.Anthophore 3.5-5.5 mm. long,hairy.Capsule 5.0-7.5 X 3.8-4.5 mm.,ovoid,as long as or somewhat longer than anthophore.Seed brown,0.3-0.5 mm.long, with an ear-shaped depression the face & obtusely grooved tuberculate back.Th.

Type-Sinai-in arenosis vallium Sinaticarum,Scimper 411(sub. S.villosa)[holo.G!;iso.K!,E!]

SINAI- Wadi Barak,14-3-1882,Post ;Desert of Sinai,16-4-1835, Schimper 76; Sinai peninsula,sine loco.,yr.1928,Meincrtz ; dt.Sarbal,Sel-el-Maen,Wadi Adani,March ,Kaiser 74.

ARABIA- Arfjan,March 1933,Dickson 34 ;Adaliyeh,7-4-1935, Dickson 212;Failaicha,24-3-1936,Dickson 34B;Masjan Is.,21-3-1938, Dickson 445;Road to Hufuf,S.W.of Abqek oil field,23-3-1947, Dickson 531;Wadi Arar,450m.,18-4-1950,Dickson 666.

IRAQ-sine loco,Aucher 477;Suliman Beg,nr.Tuz,12-4-1933,Eig, Guest & Zohar 5080;Zubir,8-4-1933,Eig,Guest & Zohar 5016;West of Ry.between Ain dibbs & Beiji,250m.,1-4-1947,Gillett & Rawi 7164; 8km.,E.of Shithatha,70m.,11-3-1947,Gillett & Rawi6465;22m.,N.of

Plate 17

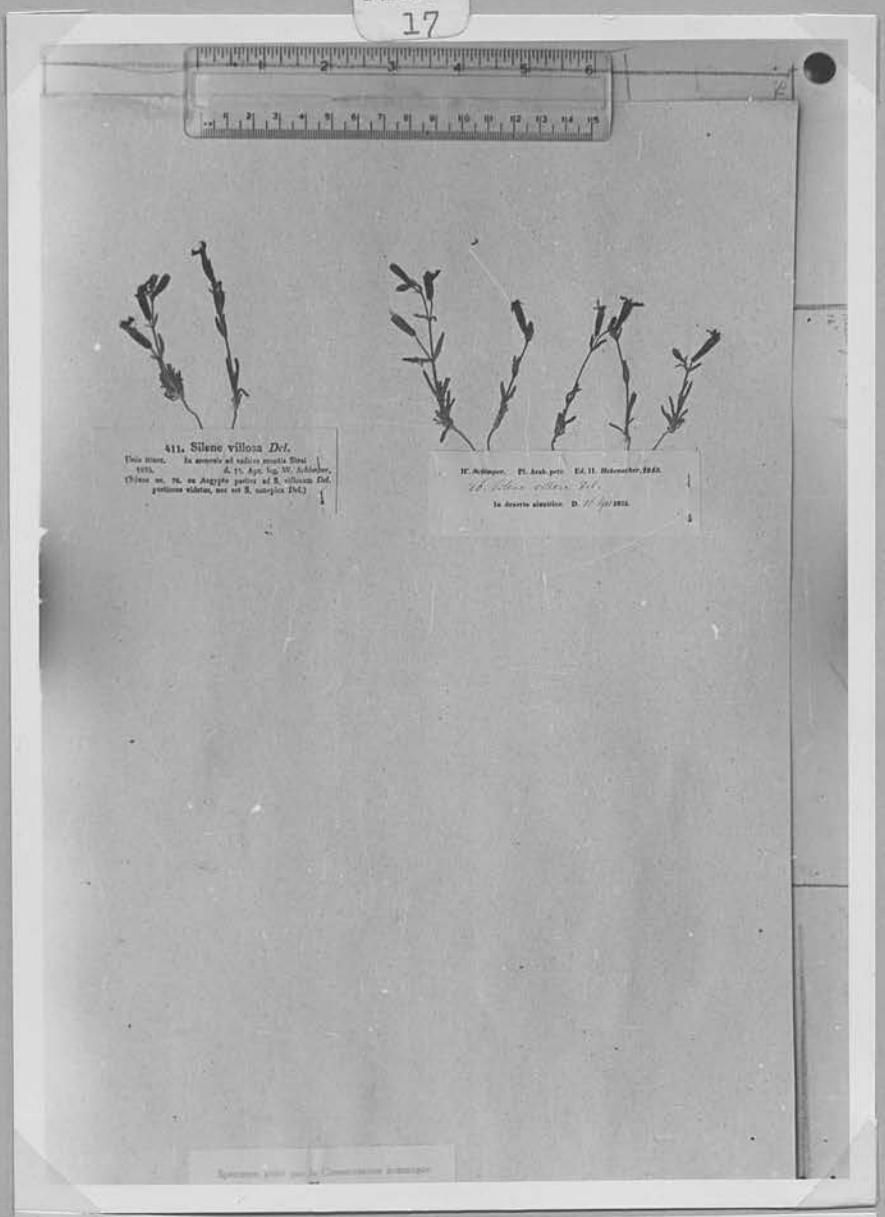


Plate 17-Silene affinis Boiss.

Qum,1050m.,26-4-1929,Cow.& Darl.774.

IRAN- Buschir,13-3-1893,Bornm.95;ibid.,13-4-1885,Stapf;ibid., June 1926,Horner 311 ;desert of Kerman,2100m.,28-4-1892,Bornm.2271.

Geogr.Endemic to the countries cited above.

Habitat- Sandy & gravelly soil of Steppe & desert;alt.-450-2100m. Fl.- March & April.

The anthophore was wrongly described as glabrous by Rohrbach,an error which was repeated by Williams.The correct description occurs above .

S.setacea var.viscida Boiss.(S.eremophila Bienert var. viscida Bornm.,ms.) was reduced to a synonym of S.colorata Poir. subsp.Oliveriana (Otth) by Rohrbach.I am unable to follow the reduction of this variety to a synonym of a species which differs in many respects.Rohrbach probably saw the specimen collected by Aucher from Iraq which was distributed under the number 477.A duplicate of this sheet is at Kew.This sheet contains 3 or 4 plants mounted together;these donot all belong to the same species or variety.The plants belong to S.affinis (S.setacea var.viscida),S.colorata var.(ssp.) Oliveriana, & S.setacea.Rohrbach probably examined the plant which actually belongs to var.Oliveriana and reduced S.setacea var. viscida to a synonym of S.colorata var.Oliveriana.The plant which is actually the var. viscida differs from var.Oliveriana in its viscid stem & leaves,including calyx,oblong-cylindrical calyx which becomes inflated and clavate in fruit,and in the calyx teeth.

Boissier kept this plant as a variety of S.setacea, but the variety differs strikingly from the latter species in

its viscid indumentum,shape of the calyx(somewhat inflated) at & after anthesis and flat leaves.Its relation to S.setacea is therefore somewhat obscure.

Now that more material is available of S.setacea var.viscida Boiss.,I find myself unable to separate it from S.affinis Boiss.,and consider it a synonym of that species.

S.affinis Boiss.does not seem to have an immediate relative among the Oriental species,except for S.villosa Forsk. which belongs to the sect.Succulentae .S.affinis is quite distinct from S.villosa Forsk. in the shape of its calyx,and its teeth,form of lamina & its lobes,shape of capsule,& by the form and size of the seed.

SUBSECTION 39B. CINEREAE

136. S.setacea Viv.,Fl.Lib.,23,t.12,fig.2(1824);Boiss.,Fl.Or.,i,594 (1867);Rohrb.,Monogr.Sil.,105(1868);Post,Fl.Syr.Pal. & Sinai, ed.2,i,176 (1932).

Syn. S.setacea Viv.,Fl.Lib.,23(1824);non Otth (1824).
S.Vivianii Steud.,Nomencl.,ed.2,588(1841)
S.ligulata Viv.,Fl.Lib.,24(1824)
S.asphattica Ky.in It.Syr.,no.1336(1855)ms.
S.brachystachys Webb,Fragm.Fl.Aethiop.-Aegypt.,34(1854).
S.puberula Bertol.,Miscel.Bot.,ex Boiss.,Fl.Or.,i,594(1867)
S.villosa var.glandulosa Ehrbg.ex Rohrb.,Monogr.Sil.,104 (1868).
S.spicata Ehrbg. ex Rohrb.,ibid ;non DC.(1805).

Annual,9.0-20.0 cm.tall,from a deepseated,slender taproot. Caudex short,leafy.Stem erect,or arcuate,sometimes ascending,

rigid,terete,leafy,simple or branched from the base,appressed puberulent,sometimes puberulent with crisp or subretrorse hairs, not viscid;middle internodes 1.5-3.7 cm.long.Leaves monomorphic, 1.5-4.2 cm.long,0.5-2.0 mm.wide,linear-subulate,plicate,acute, sparsely or densely puberulent;lower leaves rosulate,petiolate, attenuated into petiole,base with hyaline ciliate margin;upper leaves sessile,with ciliate base.Inflorescence a raceme-like monochasial cyme.Bracts unequal,ovate-lanceolate or oblong-linear, acute or acuminate,with ciliate margin.Pedicels of lower flowers 2.0-7.0 mm.long,erect or ascending.Flowers hermaphrodite,erect. Calyx 1.5-1.7 cm.long,3.0-3.5 mm.diam., obconical-cylindrical, with 10 greenish sparingly anastomosed nerves,appressed puberulent, usually glabrous between the nerves,base truncate-umbilicate, in fruit clavate with a constriction below the capsule;teeth 2.8-3.3 X 1.3-1.5 mm.,triangular or lanceolate,acute.Petal white or pinkish,1.3-1.5 cm.long;claw 7.5-8.0 mm.long,exserted, smooth,exauriculate;limb 5.5-7.0 X 1.8-2.5 mm.,cuneate,bipartite almost to the base into linear lobes;ligules two,0.8-1.3 mm.long, ovate,obtuse.Filaments exserted,smooth.Styles3, exserted,hairy. Anthophore 6.0-7.5 mm.long,hairy.Capsule 6.0-9.0 X 3.5-4.3 mm., ovoid,as long as or slightly longer than anthophore,included. Seed brown,0.5-0.8 mm.long,with concave face & acutely grooved back.Th.

Type-In littore Magnae Syrteos.

PALESTINE- Shore of Dead sea,(-)394m.,21-4-1908,Dinsm.1187;Negev, Mashabei,25-3-1952,Angelis & Orshan 508;Wadi Ith'm,600m., 14-4-1945,Davis 9266.

Geogr.Morocco,Algeria,Libya,Egypt,Arabia,& Palestine.

Habitat- Sandy & gravelly places;alt.-(-)394-600m.Fl.-Jan.-May.

Although it has the general appearance of S.sericea All. & S.colorata var. Oliveriana ,the clear-cut species S.setacea is distinctly set off from both by its linear,plicate leaves, cuneate limb which is divided into two linear lobes,and by the shape of the seeds.In the shape of the leaf and the greenish nerves of calyx,S.setacea comes very near S.colorata var. Oliveriana.

SUBSECTION 39C. NOCTURNAE

137. S.nocturna Linn.,Sp.Pl.,ed.1.i,416 (1753)

Annual,15.0-30.0 cm.tall,from a deepseated,slender taproot.Stem erect,seldom decumbent or more or less prostrate, terete,leafy,greenish,or purplish from the base upwards,simple, or sparingly branched from the base upwards,scabrous-puberulent, sometimes densely&retrorsely puberulent below,sldom hirtellous, becoming dense & viscid above;middle internodes 1.6-3.7 cm.long. Caudical & lower cauline leaves rosulate,petiolate,1.7-4.2 cm.long, 5.0-15.0 mm.wide,spathulate or oblong,attenuated into petiole, base with hyaline ciliate margin,apex obtuse or mucronate; other cauline leaves sessile,2.5-5.4 cm.long,7.5-18.0 mm.wide, oblong-lanceolate or lanceolate,sometimes oblanceolate;upper ones oblong-linear,obtuse or acute,base ciliate;all leaves usually puberulent.Inflorescence a raceme-like monochasial cyme, axis simple or branched without an alar flower.Bracts unequal, ovate-lanceolate,ciliate,acute.Pedicels of lower flowers 3.0-9.0 mm.long,erect.Flowers hermaphrodite,erect,upper ones subsessile. Calyx 8.0-12.0 mm.long,2.5-3.3 mm.diam.,cylindrical,with 10

usually greenish anastomosed nerves,scabrous or sparsely puberulent, truncate at the base,in fruit oblong;teeth 3.0-4.3 X 1.3-1.8 mm., lanceolate,acute,with hyaline scarious margin.Petal white or livid,1.1-1.35 cm.long;claw 7.0-8.0 mm.long,equaling calyx, smooth,exauriculate;limb 4.0-5.5 X 1.5-2.5 mm.,cuneate,bifid into linear lobes;ligules two,1.0-1.5 mm.long,oblong,denticulate. Filaments equaling claw,smooth.Styles 3,included,hairy.Anthophore 1.5-2.0 mm.long,hairy.Capsule 8.0-11.0 X 3.5-5.0 mm.,oblong, subsessile,included.Seed dark brown,0.8-1.3 mm.long,with an ear-shaped depression on the face & obtusely grooved tuberculate back.Th.

Key to the varieties.

Calyx 1.1-1.25 cm.long;petal exserted,ligulate,bipartite .....a.var.nocturna

Calyx 8.0-10.0 mm.long;petal included,eligulate,emarginate .....b.var.brachypetala

a.var. nocturna . Boiss.,Fl.Or.,i,595 (1867);Rohrb.,Monogr.Sil.,100 (1868)-Sibth.& Sm.,Fl.Graec.,v,t.408(1825);Reichb., Ic.Fl.Germ.Helv.,vi,t.274,fig.5059(1844).

Syn. S.nocturna Linn.,Sp.Pl.,1,416(1753);non Schimper .
S.mutabilis Linn.,Sp.Pl.,ed.11,596(1762).
Cucubalus spicatus Lamk.,Fl.Fr.,iii,34(1778).
Silene carnosa Moench,Method.,Suppl.,306(1802).
S.bicolor Moench,Method.,706(1794);non Thore(1803);non Friv.
S.spicata DC.in Lamk.& DC.,Fl.Fr.,iv,759(1805);non Ehrbg.
S.nyctantha Willd.,Enum.Hort.Berol.,472(1809).

S.inclusa Hornem.,Hort.Hafn.,i,413(1813).

S.neglecta var. Ten.,Syll.,212

S.pinguis Vahl.in Hornem.,Hort.Haf.,Suppl.,49(1819).

S.matutina Persl,Fl.Sic.,i,149(1826).

S.nocturna a.genuina Gren.& Godr.,Fl.Fr.,i,206(1848).

S.Boullui Jord.ex Mars.,Cat.Pl.Cors.,28(1872).

S.decipiens Ball in Journ.Bot.,xi,301(1873);non Barcelo (1879).

S.gallica Groves,Fl.Terr.Otrant.,in Nuovo.Giorn.Bot.Ital., xix,130(1887)

S.nocturna a.typica Fiori & Paol.,Fl.Anal.Ital.i,367(1898)

S.nocturna var.prostrata Post,Fl.Syr.Pal.& Sinai,ed.2,i, 177(1932).

Inflorescence a spike-like cyme;main axis simple or sparingly branched.Lower flowers with 3.0-9.0 mm.long pedicels,upper ones subsessile.Calyx 1.1-1.25 cm.long.Petal white,exserted, ligulate;limb cuneate,bipartite.

Linnaean specimen - In Italia,Pensylvania (sic.)[L!]

TURKEY-Cilicia,sine loco.,April 1834,Montb.

CHIOS Is.- sine loco.,Aucher 478.

CYPRUS-Mt.Troodos,Mesopotamus,21-4-1939,Lindberg; Niophilos, Druce 57;Mt.Pentedactylos,28-3-1880,Sint.& Rigo 245b.

PALESTINE-Jerusalem,800m.,6-4-1903,Dinsm.654;Jerusalem,Mt.Scopus, 6-4-1931,Eig 120.

LEBANON-Hasbani,4-4-1877,Post 234;Saida,7-3-1853,Bl.6.

b. var. brachypetala (Rob.et Cast.)Benth.,Cat.Pyren.,122(1826);Rohrb., Monogr.Sil.,101(1868)-Reichb.,Ic.Fl.Germ.Helv.,v t.274,fig.5058(1844).

Syn. S.brachypetala Rob.et Cast.in DC.& Lamk.,Fl.Fr.,Suppl., v,607(1815);non Hort.ex Fenzl in Del.Sem. Hort.Vindob.(1851).

S.nocturna var.pauciflora Otth in DC.,Prodr.,i,372(1824).

S.nocturna var.brachypetala Benth.,Cat.Pyren.,122(1826).

S.apetala Host,Fl.Austr.,i,532(1827);non Willd.(1800).

S.apetala Groves,Contrib.Fl.Terr.Otrant.,in Nuovo Giorn.Bot.Ital.,ix,54 (1877);non Willd.

S.nocturna var.apetala Badaro ex Reichb.,Fl.Germ Exc., 813 (1832).

Inflorescence raceme-like cyme,axis branched;branches few-flowered.Flowers shortly pedicellate or subsessile.Calyx 8.0-10.0 mm.long,Petal eligulate,included;limb emarginate. Capsule usually smaller.

Type- France- collected by M.Robillard & Castagne from near Marseille.

LEBANON- Beirut,April 1876,Post.

CYPRUS- Nicosia,165m.,14-5-1950,Chapm.682 ;St.Chrysostoms,May 1889, Pichler; Mt.Pentedactylos,28-3-1880,Sint.& Rigo 245;between Smyez & Akamas.

Geogr.(of sp.)Canary Is.,Morocco,Algeria,Tunisia,Libya,Egypt, Spain,France,Italy,Greece,Turkey,Chios Is.,Cyprus, Syria,Lebanon,Palestine & Arabia.

Habitat- Fields ;alt.-160m-800m. Fl.-March & April.

S.nocturna is closely related to to S.reflexa(Linn.) Ait.,but is very distinct from the latter species in its lanceolate, acute calyx teeth,in the bipartite lamina of the petal(especially

of the var. nocturna),and in its smooth filaments.S.nocturna is further distinguished by the oblong capsule.Considering the small size of the flowers especially of var. brachypetala where the petals are small & emarginate and included,this species must be considered as a specialized species in this section.

S.nocturna also exhibits some similarity to S.apetala Willd. of the section Dipterospermae in the general habit,shape of the fruiting calyx and in the included emarginate petal (var.brachypetala),but it at once sets off from the latter by the shape of the capsule and shape and form of the seed.

SECTION 40 GALLICAE

The 7 species of this section are characterized by a raceme-like monochasial cyme, cylindrical calyx which becomes ovoid in fruit with contracted apex, entire, emarginate or slightly bifid ligulate petal, & subsessile ovoid capsule. So far as the inflorescence is concerned, the species S. ramosissima Desf. is the most primitive among the species. The inflorescence in this species is more or less a dichasial cyme, but the branches of the dichasium are unequal & the inflorescence passes into a monochasium, especially on the upper part. In S. disticha & S. bellidifolia the axis is usually forked once or twice with alar flowers and the branches bear the flowers in a one-sided cyme; while in the rest the inflorescence is a one-sided raceme-like cyme throughout. The species are mostly from the Mediterranean countries.

Key to the Oriental species.

Filaments pilose at the base; limb of the petal entire or emarginate .....140. S. gallica

Filaments smooth; limb of the petal bipartite:

Calyx oblong-elliptical at anthesis with pinkish anastomosed nerves; capsule ovoid-acuminate, 4-5 times as long as anthophore; axis of the inflorescence usually simple, sometimes branched but without alar flowers .....139. S. cerastioides

Calyx cylindrical at anthesis with greenish sparingly anastomosed nerves; capsule ovoid, as long as anthophore; axis of the inflorescence branched with alar flowers...138. S. bellidifolia

138. S.bellidifolia Jacq.,Hort.Vindob.,iii,44,t.81(1776);Graebn.et Aschers.,Syn.Mittl.Eur.Fl.,v.2,93(1929);Boiss., Fl.Or.,i,588(1867)[S.hispida];Rohrb.,Monogr.Sil., 95(1868)[S.vespertina]-Moris,Fl.Sard.,i,t.19(1837).

Syn. S.bellidifolia Jacq.,Hort.Vindob.,iii,44(1776);non Pourr.; non Thumb.

S.vespertina Retz.,Obs.Bot.,iii,31(1783)

S.hirsuta Poir.,Voy.Barb.,11,163(1789);non lag(1805);non Persl (1831);non Schomb.

S.hispida Desf.,Fl.Atl.,i,348(1789-80).

S.lusitanica Sibth.& Sm.,Fl.Graec.,Prodr.,i,290(1806).

S.sabuletorum Duby,Bot.Gall.,1025(1828);non Link.(1819).

Annual,15.0-70.0 cm.tall.Root deepseated,expanded into a leafy caudex.Stem erect,terete,leafy,simple below,branched above, seldom branched throughout,more or less hispid with spreading & wavy hairs;middle internodes 2.5-4.3 cm.long.Caudical & lower cauline leaves rosulate,petiolate,2.5-4.5 cm.long,4.0-8.5 mm. wide,oblong-spathulate,attenuated into petiole,obtuse or mucronate, base with hyaline ciliate margin;other cauline leaves sessile, 1.7-3.3 cm.long,3.0-6.5 mm.wide,lanceolate,acute,ciliate at the base;all leaves 1-nerved,hirsute.Inflorescence a raceme-like monochasial cyme;axis 1-3 times forked with alar flowers.Bracts unequal,linear-lanceolate,acute.Pedicels 0.5-4.0 mm.long,erect. Flowers hermaphrodite,erect,upper ones sessile.Calyx 1.45-1.7 cm. long,3.0-3.5 mm.diam.,cylindrical with truncate base,with 10 greenish,sparingly branched & anastomosed nerves,hispid,glandular-

puberulent,in fruit ovoid with a constricted base & contracted apex;teeth 3.0-3.5 X 1.0-1.5 mm.,lanceolate,acute,with membraneous ciliate margin.Petal pink,1.5-1.7 cm.long;claw 9.0-10.0 mm.long, equaling claw,smooth,exauriculate;limb 6.0-7.0 X 2.8-3.3 mm., cuneate,bipartite to the middle into oblong lobes;ligules two, 1.3-1.8 mm.long,truncate,crenulate.Filaments equaling claw,smooth. Styles 3, hairy.Anthophore 5.0-7.5 mm.long,hairy.Capsule 6.0-9.0 X 4.5-5.5 mm.,ovoid,as long as or somewhat longer than anthophore, included.Seed dark brown,0.5-0.8 mm.long,with an ear-shaped depression on the face & obtusely grooved tuberculate back.Th.

TURKEY- Genova,May 1872,Peronin 9 ?
PALESTINE- Mt. Nebo,Post .

Geogr.Algeria,Portugal,Sicily,Sardinia,Italy,Greece,Crete,Turkey? and Palestine.
Habitat- Fields . Fl.-March -May.

S.bellidifolia is similar to S.disticha Willd. in the general habit,inflorescence,shape of the fruiting calyx,and colour & shape of petal,but differs in its indumentum,shape of capsule & in its length in relation to anthophore.S.bellidifolia is a bridging species between this section & the sect. Scorpioideae since it is obviously related to S.hirsuta Lag. in several morphological features.These characters are the indumentum of plant & calyx,general habit,and shape of the leaves ,and in the relative length of the capsule & anthophore. But the inflorescence,

shape of fruiting calyx with contracted apex & shape of capsule strongly favour its retention in sect.Gallicae

139.S.cerastioides Linn.,Sp.Pl.,ed.1,417 (1753);Boiss.,Fl.Or.,i,591 (1867);Rohrb.,Monogr.Sil.,98(1868)-Sibth.& Sm., Fl.Graec.,v,t.412(1825);Reichb.,Ic.Fl.Germ.Helv., vi,t.273,fig.5057 (1844).

Syn. S.cerastioides Linn.,Sp.Pl.,1.417(1753);non All.(1785).
S.rigidula Linn.,Cent.Pl.,11,16(1756);non Sibth.& Sm.(1806); non Heldr.(1849).
S.micropetala DC.,Cat.Hort.Monsp.,146(1813);non Roem(1824); non Lag.(1816);non Ten.(1835-36).
S.disticha Webb,It.Hisp.,63(1838);non Willd.(1809).
S.Clusii Schott ex Steud.,Nomencl.,ed.2,583(1841).
S.rostrata Duf. in Bull.Soc.Bot.,vii,244(1860).
S.sclerocarpa Duf., ibid. 245 (1860).
S.tridentata Boiss.,Fl.Or.,Suppl.,93(1888);non Desf.(1798); non Ram in Lamk.& DC. (1805).
S.cerastioides var.sclerocarpa Graebn.& Aschers.,Syn.Mittl. Eur.Fl.,v,2,104(1929).

Annual,10.0-25.0 cm.tall,from a deepseated taproot.Caudex short,erect,leafy.Stem erect,terete,greenish or purlish,usually simple below,becoming branched from the middle,sometimes branched throughout,adpressed puberulent throughout,becoming hirtellous above;middle internodes 2.4-6.0 cm.long.Caudical & lower cauline leaves rosulate,petiolate,1.3-3.2 cm.long,3.0-5.0 mm.wide,

spathulate-lanceolate,attenuated into petiole,base with membraneous ciliate margin;other cauline leaves sessile,1.7-2.9 cm. long,2.5-7.0 mm.wide,oblong- or linear-lanceolate,ciliate at the base;all leaves acute,obtuse,puberulent & hirsute.Inflorescence a raceme-like monochasial cyme,axis simple or sparingly branched without alar flowers,Bracts unequal,linear,acute,puberulent & hirsute.Pedicels 1.0-1.5 mm.long,erect.Flowers hermaphrodite, lower flowers alternate,upper one one-sided, erect.Calyx 9.5-11.0 mm.long,2.5-3.0 mm.diam.,oblong-elliptical from a truncate base,with 10 usually pinkish anastomosed nerves,puberulent & hirsute;teeth 3.5-5.0 X 1.0-1.5 mm.,subequal,lanceolate,acute, with hyaline ciliate margin;calyx in fruit ovoid with the constricted base & contracted apex.Petal pink,8.5-10.0 mm.long; claw 6.5-7.0 mm.long,equaling clayx,smooth,exauriculate;limb 2.0-3.0 X 1.3-1.8 mm.,more or less cuneate,bipartite to the middle into oblong lobes;ligules two,0.8-1.3 mm.long,oblong, denticulate.Filaments included,smooth.Styles 3, equaling claw, hairy.Anthophore 2.0-2.5 mm.long,hairy.Capsule 5.0-6.5 X 4.5-6.0 mm., ovoid,acuminate,4-5 times as long as anthophore,included.Seed dark brown,0.5-0.8 mm.long,with an ear-shaped depression on the face & obtusely grooved back,tuberculate.Th.

Linnaean specimen- In Europa australi [L!]

CYPRUS- Ayia Irini (Morphou),11-3-1941,Davis 2555.

PALESTINE- Petra to foot of Mt. Hor(Uago Oroshana),18-4-1945, Davis 8645.

Geogr.Algeria,Spain,Italy,Belearic Is.,Greece,Turkey,Cyprus, Palestine,Egypt,Tunisia,Libya & Morocco.

Habitat- Maritime sands & hillsides.Fl.- March & April.

S.cerastioides is most closely related to S.gallica Linn. It is almost identical with that species in habit,leaf form,pubescence,& in inflorescence,but differs conspicuously in having a more or less cuneate & bipartite limb and smooth filaments.It is further distinguished by its conspicuously reticulate usually pinkish calyx nerves,and ovoid acuminate capsule.The geographical range of S.gallica and S. cerastioides almost exactly concide .

140. S.gallica Linn.,Sp.Pl.,ed.1,417 (1753).

Annual, 10.0-45.0 cm.tall.Root slender,deepseated. Caudex short,leafy,simple.Stem erect,ascending,sometimes arcuate, terete,leafy,simple or freely branched from the base upwards, hirsute to hispidulous throughout,usually upper portion adpressed puberulent & glandular,sometimes more or less viscid;middle internodes 2.7-6.8 cm.long.Caudical & lower cauline leaves rosulate,petiolate,2.6-5.2 cm.long,6.0-14.0 mm.wide,oblong- or lanceolate-spathulate,attenuated into petiole,apex obtuse or mucronate;other cauline leaves sessile,2.5-4.7 cm.long,4.0-8.5 mm. wide,oblanceolate or lanceolate ,sometimes oblong-linear;upper ones seldom linear,obtuse or nearly so;all leaves ciliate at the base,puberulent & hirsute.Inflorescence a raceme-like monochasial cyme;axis simple or sparingly branched without alar flowers. Bracts linear-lanceolate,seldom linear,acute.Pedicels 1.0-12.0 mm. long,erect,in fruit arcuate or spreading. Flowers hermaphrodite,

lower ones with more or less long pedicels,upper flowers subsessile.Calyx 9.0-10.5 mm.long,2.3-3.0 mm.diam.,tubular from a truncate base,with 10 greenish or pinkish,more or less simple nerves,glandular-puberulent & hirsute;infruit ovate with contracted apex;teeth 2.5-3.3 X 0.5-1.0 mm.,linear-lanceolate, acute,with ciliate margin,often recurved in fruit.Petal white to pink,1.0-1.2 cm.long;claw 6.5-7.0 mm.long,equaling calyx, smooth,exauriculate;limb 3.5-5.0 X 1.8-2.5 mm.,obovate, elliptical or rhomboidal-elliptical,entire or slightly emarginate;ligules two,1.0-1.5 mm.long,linear,acute.Filaments equaling claw, hairy.Styles 3, included,hairy.Anthophore 1.0-1.5 mm.long,hairy. Capsule 7.0-9.0 X 4.0-4.5 mm.,ovoid-conical,subsessile,included. Seed dark brown,0.7-1.3 mm.long,usually with flat face & obtusely grooved tuberculate back.Th.

Key to the varieties.

Petal one coloured,white or pink,usually small
.....a.var. gallica

Petal with a conspicuous red disc in the centre with pale margin, usually large .....b.var.quinquevulnera

a. var. gallica . Boiss.,Fl.Or.,i,590(1867);Rohrb.,Monogr.Sil.,96 (1868)-Reichb.,Ic.Fl.Germ.Helv.,vi,t.272,fig.5054 & t.273,fig.5056(1844);Sowerby,Engl.Bot.,11,t.202 (1885);Javorka & Csapody,Ic.Fl.Hung.,144,no.1153 (1930);Moss,Cambr.Br.Fl.,t.75(1920).

Syn. Lychnis cerastioides Scop.,Fl.Carn.,i,309(1772).

Silene villosa Forsk.,Fl.Aeg.Arab.,210(1775);non Forsk., Fl.Aeg.Arab.,88 (1775).

Cucubalus silvestris Lamk.,Fl.Fr.,iii,28(1778).

Silene cerastioides All.,Fl.Pedem.,ii,79(1785);Geners.el scep.,no.236;Reichb.,Fl.Exc.,813(1832); Persl,Fl.Sic.,1,149 ;Host,Fl.Austr.,i, 527;Guss.,Fl.Inarim.,i,45(1845);Willd., Herb.,no.8618 ; non Linn.(1753);non Reichb.,Ic.Fl.Germ.Helv.(1844).

S.lustanica Guss.,Prodr.,i,496(1827);non Linn.(1753);non Sibth.& Sm.(1806).

S.silvestris Schott excl. var in Reichb.Fl.Exc.,812(1832)

S.micropetala Ten.,Fl.Nap.,v,344(1835-36);non DC(1813);non Lag.(1816);non Roem.in Schrank,Syll.,i,212 (1824).

S.Chilensis Cham.& Schldl.,Diar.,136 ex Rohrb.,Monogr.Sil., 97(1868).

S.vernalis Poeppig in herb. Berol ex Rohrb.,ibid.

Oncerum gallicum Dulac ,Fl.Haut.Pyr.,256(1867).

S.glandulosa Bertol.,Fl.Ital.,vi,626(1844).

S.littoralis Jord.,Cat.Pl.Dijon,31(1848) ,in Flora,xxxii, 477(1849);non Pourr.(1788);non Plan (1852).

S.Candollei Jord.in Guss.,Fl.Inarim.,37(1845)

S.gallica var.littoralis Lange in Videnskab.Medd.Nat.Foren. Kjobent.,2,vii,113(1865).

S.articulata Viv.,Pl.Lib.Spec.,23,t.12; non Kunze(1846).

S.gallica forma genuina Rohrb.,Monogr.Sil.,97(1868).

S.gallica var.silvestris Aschers.,Fl.Prov.Brandenb.,i,88 (1860).

S.gallica a.typica Beck,Fl.Nieder-Oesterr.,380(1890).

Fruiting pedicels erect,ascending or spreading.Calyx with adpressed hairs.Petal white or pink;limb with smooth or erose-denticulate margin.

Linnaean specimen- In Gallia [L!]

TURKEY- Prov.Erzurum:Erzurum,Zohrab 150.Lazistan,sine loco.,June 1866,Bal. .Asia Minor,sine loco.,Aucher 474.

AEGEAN Is.=Karpathos Is.-Mt.Lasto,June 1883,Pichler 118.

Ikaria Is.-Hagios Kirykos,24-4-1934,Rechinger 4185.

Samos Is.- between Kalouna & Tigani,12-4-1934,Rechinger 3985.

Lesbos Is.- Kallomi,18-5-1934,Rechinger 5922.

Rhodes - Mt.Prophet,Elian,nr.Salakos,600m.,11-5-1935, Rechinger 7180

LEBANON- Beirut,April 1876,Post ;between Saida & Nabatiyyah,Post 235.

PALESTINE- Jaffa,1-20m.,4-4-1913,AC.9496;between Ramlah & Yibnah 30m.,March,AC.3477.

CYPRUS- Platres,960m.,6-5-1939,Kennedy1503;Kato Platres,870m., 16-5-1939,Kennedy1504;between Platres & Aphamis,22-4-1941,Davis 3189; Naklacees,Druce 59; sine loco, yr.1904,Samson ; ibid . May 1931,Tracey79.

Geogr. (od var.) .Cosmopolitan .

b. var. quinquevulnera (Linn.) Mert.et.Koch,Deutschl.Fl.,iii,230 (1831);Boiss.,Fl.Or.,i,590 (1867);Post, Fl.Syr.Pal.& Sinai,ed.2,i,175(1932)-Reichb., Ic.Fl.Germ.Helv.,vi,t.272,fig.5055(1844);

Sowerby,Engl.Bot.,ii,t.263 (1885).

Syn. S.quinquevulnera Linn.,Sp.Pl.,ed.1.416(1753).

Lychnis vulnerata Scop.,Fl.Carn.,ed.2,i,309(1772).

Cucubalus variegatus Lamk.,Fl.Fr.,iii,28(1778).

Silene Scictica Otth in DC.,Prodr.,i,372(1824).

Corone quinquevulnera Hoffman.ex Steud.,Nomencl.,ed.2.i, 422 (1840).

Silene marginata Schott in Syll.Ratisb.,i,210(1824);non Kit.(1836).

S.Chia Spreng.,Syst.,ii,409(1825).

S.silvestris var.quinquevulnera Reichb.,Fl.Germ.Exc.,812 (1832).

S.gallica forma 6 Rohrb.,Monogr.Sil.,97(1868).

Flowers large.Petal intensely purple or pink with pale margin.

Linnaean specimen- In Hispania,Lusatia ?,Italia,Gallia[Cliff.Herb (BM!)]

TURKEY- Prov.Canakkale: on the coast of Dardenalles,3-6-1883, Sint. 903.Prov.Istanbul:Istanbul,7-5-1945,Basar. ;Belgrat Forest,7-5-1940,Kasap.

Geogr.(of var.)- Spain,Portugal,Italy,Greece & Turkey.

Habitat-(of sp.)- Fields & hillsides. Fl.-March -June.

S.gallica is a cosmopolitan species confined largely to Europe but also found throughout the temperate region of the world.

Linnaeus described in his Species Plantarum,ed.1,416 (1753) four species,viz. S.gallica,S.anglica,S.lusitanica &

S.quinquevulnera. Most of the more reliable authors have regarded S.anglica as differring in no essential way from the Linnaean type of S.gallica,and have used S.gallica as the specific name,reducing S.anglica to a variety or even to a synonym of it; similarly S.lusitanica & S.quinquevulnera have been reduced to varieties.

So far as the Oriental material is concerned there apparently seems to occur 3 varieties (var.gallica,var. lusitanica and var. quinquevulnera),but when their geographical distribution is taken into consideration the variety lusitanica (having plants with elongated lower pedicels) seems to lose its varietal identity;this is probably an ecological variant growing here and there.So I have not retained it as a variety. The quinquevulnera,with large coloured petal is of much more limited distribution than var.gallica.This has been retained as a variety in this work.

SECTION 41 DIPTEROSPERMAE

The 7 species of this section exhibit remarkable uniformity in the shape of the calyx (except for S.apetala Willd.) & in the seed form.All the species are annual with a raceme-like monochasial cyme ,calyx slightly inflated at or after anthesis, petal conspicuous,ligulate & bipartite (except S.apetala Willd.). In general habit and shape of calyx & petal it is very closely allied to the Subsect.Cinereae of Scorpioideae ,but differs mainly in the shape of seed which is deeply & acutely grooved at the back and provided with two wavy wings.The species are adapted to mesophytic & to some extent xerophytic conditions, and are distributed in the countries round the Mediterranean.

Key to the Oriental species.

Calyx obconical-cylindrical with an umbilicate base,in fruit ovate-clavate or clavate;capsule ovoid, 1-2 times as long as anthophore;petal always conspicuous & exserted 141.S.colorata

Calyx oblong-clavate with a truncate base,in fruit campanulate or ovate-oblong;capsule subglobose,subsessile;petal either inconspicuous & included,or conspicuous & exserted 142.S.apetala

141. S.colorata Poir.,Voy.Barb.,ii,163 (1789).

Annual,10.0-50.0 cm.tall,from a slender,deepseated taproot.Stem erect,ascending or decumbent,terete,leafy,greenish, often purplish from the base upwards,simple or branched,appressed

puberulent,sometimes more or less hirtellous.Caudical & lower cauline leaves rosulate,petiolate,1.3-5.2 cm.long, 3.3-11.0 mm.wide,obovate or oblanceolate-spathulate,attenuated into petiole,base with hyaline ciliate margin,obtuse;other cauline leaves sessile,1.1-6.5 cm.long,3.0-10.0 mm.wide, lanceolate or linear-lanceolate,sometimes oblong-linear,ciliate at the base,obtuse or acute;all leaves 1-nerved,puberulent, sometimes glabrous or nearly so. Inflorescence a raceme-like monochasial cyme;axis usually simple,seldom branched with or without alar flowers. Bracts unequal,ovate-lanceolate to linear,acute.Pedicels 3.0-18.0 mm.long,erect.Flowers hermaphrodite, erect,upper ones subsessile.Calyx 1.05-1.85 cm,long,3.0-4.0 mm. diam.,obconical-cylindrical,umbilicate,with 10 usually pinkish sparingly anastomosed nerves,appressed puberulent,often glabrous between the nerves,in fruit ovate-clavate or clavate with somewhat narrowed base,sometimes slightly inflated;teeth 1.5-4.0 X 1.3-2.0 mm.,oblong & obtuse or lanceolate & acute,with hyaline ciliate margin.Petal pink or cream coloured,sometimes white, 1.0-1.8 cm.long;claw 7.0-10.5 mm.long,exserted,exauriculate, margin smooth,usually median nerve on the dorsal surface with a row of papillae;limb 3.0-7.5 X 3.0-5.0 mm.,obovate-cuneate or cuneate,bipartite beyond middle into obovate or oblong-linear lobes;ligules two, 1.0-1.5 mm.long,oblong or ovate,obtuse, seldom acute.Filaments equaling claw or exserted,smooth. Styles 3,exserted,hairy.Anthophore 4.5-8.0 mm.long,hairy. Capsule 6.0-9.0 X 4.5-6.0 mm.,ovoid,as long as,or 1½-2 times as long as or somewhat shorter than anthophore,included.Seed brown,1.5-2.0 mm.long,with flat striate face & deeply & acutely

grooved back,back with two wavy wings.Th.

Key to the varieties.

Leaves obovate- or lanceolate-spathulate,seldom linear-lanceolate; plant erect,ascending or decumbent;calyx usually red-nerved .....a.var. colorata

Leaves linear-lanceolate or linear,sometimes oblong;plant erect or ascending;calyx red-or green-nerved:

Calyx usually red-nerved;petal pink;capsule shorter than anthophore .....b.var.longipes

Calyx usually green-nerved;petal white;capsule as long as or longer than anthophore .....c.var.Oliveriana

a. var. colorata . Rohrb.,Monogr.Sil.,114(1868);Hayek,Prodr.Fl.pen. Balc.,i,263(1927);Post,Fl.Syr.Pal.& Sinai,ed.2,i, 178(1932)-Bot.Mag., xviii,t.677(1803);Desf.,Fl. Atl.,t.100(1798);Sibth.& Sm.,Fl.Graec.,v,t.409 (1825);Reichb.,Ic.Fl.Germ.Helv.,vi,t.279,fig. 5068 (1844).

Syn. S.colorata Poir.,Voy.Barb.,ii,163(1789);non Friv.(1835); non Hornem (1813);non Schousb.;non Willd.; non Fenzl.

S.amoena Ucria,Hort.Panorm.,185(1789);non Linn.(1763);non Huds (1762).

S.bipartita Desf.,Fl.Atl.,i,352(1798).

S.bifida Retz.in Haffm. Phytogr.Blatt.,i,37(1803).

S.hispanica Jacq.,Fragm.,47 (1809);non Otth (1824).

S.decumbens Biv.,Cent.Sic.Pl.,i,75(1806-7);non Salzm.;non Schreb.

S.canescens Ten.,Fl.Nap.,i,236 (1811-15).

S.diffusa Otth in DC.,Prode.,i,373(1824);non Forsk.

S.secundiflora Otth ibid. 375(1824).

S.pernoctans Link.in Spreng.,Syst.,ii,408(1825).

S.vespertina Sibth.& Sm.,Fl.Graec.,v,7(1825).

S.sicula Ker-Gawl.,Bot.Ref., (1815-24).

S.vespertina Reichb.,Fl.Exc.,814(1832);non Retz.(1783);non Boiss.(1839);non Webb;non Salzm.

S.exaltata N.v.Esenb.in Reichb.,Fl.Exc.,814(1832).

S.sericea ,a.,b.,& c. Guss.,Syn.,i,483 & 484(1842);non All.(1785).

S.bipartita var.prostrata Welwitsch,It.Lusit.,no.496(1841)

S.bipartita var.canescens Soy-W.& Godr.,Monogr.Sil.Alg., 27(1851).

S.bipartita var.spathulifolia Soy-W.& Godr.,ibid.

S.vespertina var.pubicalycina Fenzl,Advers.,(1850).

S.bipartita var. a. vulgaris & angustifolia Willk.,Ic.& Descr.,i,45 (1851).

S.tubiflora Duf.,Pl.Hisp.Exs.;Turcz in Bull.Soc.Nat.Mosc., xxvii,2,370(1854).

S.bipartita var.eriocaulon Boiss.,Fl.Or.,i,597(1867).

S.bipartita var.stenophylla Boiss.,ibid.

S.pyrenaica Pourr. ex Rohrb.,Monogr.Sil.,115(1868).

S.bellidifolia Pourr.,Herb. Salvad.,no.108;non Jacq.(1776). non Thunbg.

S.bipartita var. maritima Tod.,Fl.Sic.Exs.no.494(1870).

S.colorata var. angustifolia & canescens Willk.& Lange, Prodr.Fl.Hisp.,iii,652(1878).

S.colorata var.vulgaris Rohrb.,Monogr.Sil.,115(1868).

S.Boissier Tineo ex Rohrb.,ibid.; non J.Gay.

S.saxicola Roy in Bull.Soc.Bot. Fr.,xxix,43(1882);non Lag.

S.sericea ssp.colorata Williams in Journ.Linn.Soc.,xxxii, 71(1896).

S.sericea ssp.colorata grex.a.pubicalycina Williams ibid. 72(1896).

Plant usually branched from the base upwards,rarely simple; branches ascending or decumbent.Leaves obovate- or lanceolate-spathulate,sometimes linear-lanceolate,appressed-puberulent, sometimes greyish.Calyx with pinkish nerves,puberulent with dense appressed hairs,glabrous or nearly so between the nerves. Petal pink. Capsule as long as or 1½-2 times longer than anthophore.

TURKEY- Trojanum,Thymbra,in valle Scamandri,3-4-1883,Sint.954. Prov.Izmir:Izmir,20-4-1854,Bal.97;ibid.,Fleischer .Prov.Bursa: Ulu dag,Forbes 147.Antiphellous,Forbes 146.Caria,yr.1843,Pinard; ibid.,Aucher 434.Prov.Antalya:Antalya,March 1845,Heldr.;E .of Antalya,40m.,6-3-1936,Tengwall 101;Lara,23-5-1950,Atilla& Heilb.; Yenikoy,22-5-1950,Heilb.& Atilla ;Antalya,Gleis. 59;ibid.,April, Bourg.;Felsen,1-4-1938,Gassner897 .Prov.Mersin: Mersin,17-4-1855, Bal. Cilicia,sine loco.,Aucher 435;ibid.,yr.1896,Siehe 151; Mt.Taurus,yr.1836,Ky.84.Prov.Seyhan:Adana,26-3-1935,Gassner 111; Adana ,nr.Brakand,6-3-1935,Kranse 4657.Prov.Gaziantep:Fevzi Pasha to Gaziantep,540m.,15-4-1935,Balls 2133.

CYPRUS - Salamis,20-4-1949,Casey550,Kyrenia,hills above Kyrenia, May 1931,Tracey14;Kyrenia,April 1938,Wyatt 57;Kyrenia,15M.,31-3-1949, Casey 444;Houstous Kyrenia,March 1902,Lascelles ; Larnaca,13-2-1936, Syngr. 1042; dt. Larnaca,Peroolia village,15-30m.,25-2-1938, Syngr. 1753; Famagusta,27-3-1933,Syngr. 47;nr. Famagusta,May1946, Mavrom.;Paphos,Druce 61; Andre,25-4-1880,Sint.& Rigo 252c;

St.Andre,26-4-1880,Sint.& Rigo 248;Ayios Philon,nr.Rizocarpos,30m., 19-2-1941,Davis 2257;Agios Memnon,1-5-1948,Mavrom.;Cape Apostolos Andreas,3-5-1948,Mavrom.;Redgelia,8-3-1880,Sint.& Rigo 248 ; N.of Amathus,25-2-1947,Mavrom. ;Peristeros,45m.,30-3-1935,Syngr. 777; Malounda,300m.,10-4-1950,Chap.319

AEGEAN = Samos Is.-Tigani,2-4-1934,Rechinger 3654.

Ikaria Is.-Hag Kyrikos,500m.,18-4-1934,Rechinger 4395.

SYRIA- Aleppo,19-3-1841,Ky.;ibid.,Aucher 476.

LEBANON- Beirut,11-4-1877,Post 1088;ibid.,April 1876,Post ;ibid., 2-1-1933,Meinertz; coast below Chondifat,26-2-1943,Davis 5279; Tripoli,Bl.; ibid., Bal.;Saida ,10-3-1853,Gaill. ;ibid.,22-1-1853, Bl.64 ;ibid.,10-3-1853,Bl.923;ibid.,22-1-1853,Bl. 7.

PALESTINE- Jerusalem,Campbell;Jericho,a1863-4,Lowne ;ibid.,a1883, Hart; Haifa,1-3-1912,AC. 2423c;ibid.,1-20m.,6-5-1909,AC.1420; Gaza ,50m.,31-3-1911,AC. 9420; Even Yehuda ,13-3-1942,Davis 4076; Wadi Fallah,Carmel,16-2-1942,Davis 3932; Carmel, a1863-4,Lowne 5; Beit Alfa,18-3-1942,Davis 4149;Ramalh,N.of Tel Aviv,13-3-1928, Eig 45;Kalliroho,March1872,Hayne ;sine loco,Post 236;Jaffa ,7-4-1897, Bornm.178.

SINAI- Rajah,N. Sinai,June,Davis 10423.

Geogr.(of var.).Spain,Sicily,Sardinia,Morocco,Algeria,Libya,Egypt, Arabia,Palestine,Lebanon,Syria,Turkey,Greece,Crete, Cyprus,Iraq,Iran,Abyssinia & Canary Is.

b. var. logipes(Post)Dinsm.in Post,Fl.Syr.Pal.& Sinai,ed.2,i,178(1932)

Plants branched from the base upwards,appressed-puberulent. Leaves oblong-linear or linear-lanceolate,sometimes oblong,acute. Calyx usually pink-nerved,appressed-puberulent.Petal pink.Capsule shorter than anthophore.

Type - No locality given.

SYRIA- S.E.of Qaryatien,13-4-1943,Davis 5063.

PALESTINE- Madaba,770m.,24-4-1911,Dinsm.m423;E.of Jerusalem,200-800m.

27-2-1903,Dinsm.423;Gaza,50m.,April,Dinsm.B8423;Sarona,1-20m., 28-1-1910,Dinsm.8423;Jericho ,(-)230m.,24-2-1911,AC.B423ef;Jaffa, 22-4-1897,Bornm.177;Irbid,530m.,7-5-1911,AC. G423.

Geogr.(of var.) Syria & Palestine.

c. var. Oliveriana (Otth) Chowdhuri,comb.nov. ←Bouloumoy,Fl.Lib. Syr.,t.47,fig.2 (1930).—

Syn. S.Oliveriana Otth in DC.,Prodr.,i,373(1824);non Samarit ;
S.colorata ssp.Oliveriana(Otth)Rohrb.,Monogr.Sil.,116(1868)
S.sericea ssp.Oliveriana(Otth)Williams in Journ.Linn.Soc., xxxii,72(1896).
S.bipartita var.Oliveriana(Otth)Post,Fl.Syr.Pal.& Sinai,ed. 1,i,139(1896).

Stem ascending or erect,appressed-puberulent;Leaves monomorphic, linear-lanceolate or narrowly lanceolate,acute,finely pubescent, often more or less glabrous.Calyx with 10 usually greenish ,seldom pinkish nerves;teeth lanceolate,acute.Petal white to cream-coloured, rarely pinkish;claw exserted;limb oblong-cuneate,bipartite into linear-spathulate lobes.Capsule somewhat longer than anthophore.

Type- Iraq-circa Alep et Mossul.

SYRIA- Aleppo,19-3-1841,Ky.17;ibid.,600m.,29-3-1865,Hausskn.;N.of Raqqah,300m.,14-4-1939,AC.10423.

PALESTINE- Jericho ,a1863-4,Lowne 3;ibid., Hart ;Nazareth,yr.1863-4, Lowne 2;ibid.,Bl.925;Tell Fara,3-3-1930,Harding211;ibid.,19-2-1930, Harding166;ibid.,2-41930,Harding267;Jaffa ,25-4-1912,AC.8423;ibid., 1-20m.,May,AC.3258;Acre ,12-4-1926,Jolles 120; Heirosolyma,April,Rath; W.of Iatiani,700m.,19-3-1937,AC.21258; S.W. of Maan,1000m.,16-4-1937, AC.19258; Arabia Petraea,March & April 1846,Boiss.

IRAQ-sine loco,Chesney 123; Wadi Hauran,140m.,25-3-1947,Gillett & Rawi 6888;Badra,100m.,18-3-1947,Gillett 6625; 5km. E.of As Salman,200m., 24-2-1927,Gillett & Rawi 6199; Shabicha,250m.,25-2-1947,Gillett & Rawi 6255; W.of Ry.line,between Ain Dibs & Beiji,200m.,1-4-1947,

Gillett & Ravi 7163;Hawija,250m.,3-4-1948,Gillett 10701; Qdiyarah,Mosul,192m.,17-3-1937,Bayliss 35 ;Qosh Tafa (nr.Arbil) 405m.,2-4-1931,Guest 1474;Jabal Hamrin ,nr.Table mountain,150m., 28-3-1932,Guest 1782;ibid.,30-3-1932,Guest 1906;Kani Dolruan hills, Kirkuk,390m.,3-4-1933,Guest 4320;Rutba wells,April 1933,Dickson 11; Mts. of Kurdistan,Layard 85.

Geogr.(of var.) Syria,Palestine ,Arabia,Iraq & Iran.

Habitat- (of sp.)- Fields & also in sandy places;alt.-(-)230- 1000m.

Fl.- Feb.- April.

S.colorata Poir. is often confused with S.sericea All. Indeed,the habit of the two plants is so similar that resort to the seed character is necessary for identification.Whereas S.colorata has flat reniform seeds that are deeply & acutely grooved at the back and provided with two wavy wings,in S.sericea All. the seed is widely reniform with concave face & obtusely grooved back, without wings.Other floral characters- shape of calyx,petal & capsule are similar in the two.The var.Oliveriana,with its linear or linear-lanceolate & green-nerved calyx ,is very similar to S.setacea Viv.,but differs from the latter by its seed,shape of petal & of calyx in flower.

This species extends from Spain to Iran & from Algeria to Egypt & Palestine.It is highly polymorphic species and has developed only 3 varieties,which have circumscribed geographical areas which overlap with widespread typical form of the species. Of these,var.Oliveriana is confined to Syria,Palestine,Iraq & Iran,and var.logipes to Syria & Palestine.

142. S.apetala Willd.,Sp.Pl.,ii,703 (1800),et Herb.,no.8656 (1799).

Annual,5.0-45.0 cm.tall.Root deep-seated,slender, expanded into a leafy caudex.Stem erect or arcuately erect,terete, leafy,greenish,usually simple below & branched from the middle upwards,sometimes branched from the base upwards,appressed-puberulent with short & retrorse hairs;middle internodes 2.0-5.3 cm. long.Caudical & lower cauline leaves rosulate,petiolate,1.5-3.5 cm. long,2.0-5.0 mm.wide,lanceolate to oblong-linear,attenuated into petiloe,base with membraneous ciliate maegin, obtuse or acute; other cauline leaves sessile,2.4-4.3 cm.long,2.5-5.0 mm.wide,linear-lanceolate to oblong-linear,ciliate at the base,acute;all leaves 1-nerved,puberulent.Inflorescence a raceme-like monochasial cyme,seldom lower part is a dichasium,branches of the dichasium unequal,sometimes flowers are more or less crowded at the apices of the branches.Bracts unequal,ovate-lanceolate,acute to acuminate,ciliate.Pedicels 8.0-31.0 mm.long,erect.Flowers hermaphrodite,erect.Calyx 5.5-9.0 mm.long,3.0-4.5 mm.diam., oblong-clavate from a truncate base,appressed-puberulent,with 10 greenish sparingly anastomosed nerves,in fruit campanulate or oblong-ovate;teeth 1.5-3.3 X 1.0-1.5 mm.,lanceolate or triangular, acute,with hyaline scarious margin.Petal white to pink,included, sometimes conspicuously exserted;when included,minute,emarginate, eligulate;when exserted large,bipartite,ligulate,claw with a row of papillae on the median nerve on the dorsal surface.Filaments exserted,or equaling claw,smooth.Styles 3,equaling claw,hairy. Anthophore 2.0-3.5 mm.long,smooth.Capsule 6.0-7.5 X 4.0-5.0 mm., subglobose,subsessile,or 3-4 times as long as anthophore,included. Seed dark brown,1.0-1.5 mm.long,with flat face & acutely & deeply

grooved back.Th.

Key to the varieties.

Petal minute,included,eligulate
.....a.var.apetala

Petal large & conspicuous,exserted,ligulate:

Calyx green-nerved,appressed-puberulent;petal white or greenish .....b.var.grandiflora

Calyx usually pink-nerved,nerves densely hirsute;petal pink .....c.var. alexandrina

a. var. apetala . Boiss.,Fl.Or.,i,596(1867);Rohrb.,Monogr.Sil.,118 (1868)-Reichb.,Ic.Fl.Germ.Helv.,vi,t.275,fig.5060 (1844);Willk.,Ic.Descr.Pl.Hisp.,i,t.38B (1852).

Syn. S.apetala Willd.,Sp.Pl.,ii,703(1800);non Host(1827).
S.aspera,S.praecox,S.glauca Hort.Par. ex Rohrb.,Monogr.Sil. 118(1868).
S.anomola Duf.,Pl.Hisp.Exs.,ex Rohrb.,ibid.
S.vilis Fenzl ex Boiss.,Fl.Or.,i,596(1867).
S.apetala var.glomerata Godr.,Fl.Juven.,i,9(1854).
S.apetala var.congesta Fiori.in Fiori.& Pao.,Fl.Anal.Ital. App.,75(1907).

Calyx with greenish nerves,appressed-puberulent.Petal minute,included,eligulate,emarginate.

Type- No locality given [Berlin?]

CYPRUS- Chelones nr.Rizokarpos,22-4-1941,Davis 2304;Nicosia,150m., 18-4-1950,Chapm.498.

PALESTINE- Wadi El-Ghor,27-3-1929,Gabreileth 36; Weit Perra, 16-5-1945,Davis 8973.

IRAQ- Khanaquin,210m.,29-3-1932,Guest 1868.

IRAN- Dalechi,between Abuschir & Schiraz,March 1842,Ky.192;northern Iran,sine loco, Aucher 4265;Richer,13-4-1885,Stapf 933; Hadschiabad,yr.1884,Stapf ;Bunhir,April 1868,Hausskn.;between Buschir & Schiraz,March 1842,Ky.; Hormus Is. 5-2-1893,Bornm.93.

AFGHANISTAN-sine loco,yr.1863,Griff.1636.

b. var. grandiflora Boiss.,Fl.Or.,i,597 (1867);Post,Fl.Syr.Pal.& Sinai,ed.2,i,178 (1932).

Syn. S.Lagascae Boiss. in Welw.,It.Lusit.,490(1841).

S.pallidiflora Link.in Herb.Berol.ex Rohrb.,Monogr.Sil., 118(1868).

S.apetala var.macropetala Willk.in Willk.& Lange,Prodr.Fl. Hisp.,Suppl.,280(1893).

S.apetala var.orientalis Boiss.ex Post,Fl.Syr.Pal.& Sinai, ed.1,139(1896).

S.apetala var.Lagascae (Boiss.) Graebn.& Aschers.,Syn.Mittl. Eur.Fl.,v.2,120(1929).

Calyx usually with greenish nerves,appressed-puberulent. Petal conspicuous,exserted,greenish or white;claw equaling calyx, exauriculate,margin smooth,median nerve on the dorsal surface with a row of papillae;limb cuneate,bipartite into oblong-linear lobes; ligules two,ovate,obtuse.

Type- Greece-in Attica cum typo,Sprmner [holo.G.]

CYPRUS- Rizokarpos,120m.,22-2-1941,Davis 2298;Syrianoclori,15-4-1936, Syngr.966.

PALESTINE- Jerusalem,21-4-1886,Post ;Yutta Judea desert,S.of Hebron,23-3-1929,Gabreileth 75;Jericho,(-)230m.,21-2-1911,Dinsm. 4400;Jerusalem,Khan Khadrur,200m.,10-3-1913,AC.B400,between Petra & foot of Mt.Hor,17-4-1945,Davis 9080.

IRAQ-Shaiba,Watson ;Karradah,Graham ;nr.Zubeir,30m.,19-2-1927, Gillett & Rawi 6061.

IRAN- Musjid-i-Suliman,March 1927,Macmillan 59,60 & 61;Buschir, 7-3-1893,Bornm.92;Kargo Is. Ky.24 .

c. var. alexandrina Aschers.,Ill.Fl.d'Egypte,in Mem.Inst.Egypte,ii, 46 (1889);Williams in Journ.Linn.Soc.,xxxii,74 (1896).

Syn.S.Rigoi Boiss.in Sint.& Rigo,It.Cypr.,no.244(1880)ms.

Plants dwarf.Calyx usually with pink nerves,densely hirsute along the nerves.Petal conspicuous,exserted,ligulate; limb bipartite.

CYPRUS- 3 miles from Nicosia,F'gusta road,150m.,12-4-1950,Chapm. 395; Buffavento,870m.,20-2-1953,Casey 1284;ibid.750m.,23-3-1941, Davis 2812;in Mt.Pentadactylos,29-3-1880,Sint.& Rigo 244.

Geogr.(of sp.) Spain,Morocco,Algeria,Tunisia,Libya,Egypt,Canary Is., Greece,Cyprus,Syria,Palestine,Iraq,Iran,Afghanistan and India.

Habitat-(of sp.)-Sandy places & in fields;alt.-(-)230m-750m.

Fl.-Feb.- May.

SECTION 42 CONOSILENE

The species in this section are all annual or monocarpic,& are centred in the Mediterranean countries.S.conoidea Linn. is the only one which completely circumboreal,whereas S.multinervia Wats. is found only in North America.

The inflorescence is a lax or more or less congested dichasial cyme,rarely with the branches of the dichasium unequal.Calyx cylindrical or cylindrical-conical with 15-30 or 60 more or less parallel nerves,in fruit usually inflated towards the base.Claw of the petal is usually auriculate, smooth or ciliate.Filaments generally pilose at the base.

Key to the Oriental species.

1a. Calyx 15-20-nerved:

2a. Caudical leaves oblong-spathulate;calyx less than 10.0 mm. in length;filaments smooth;capsule 5.0-7.0 mm.long,ovoid, 3-4 times as long as anthophore;plants more or less prostrate .....143.S.ammophila ssp.carpathae

2b. Caudical leaves linear-lanceolate;calyx more than 10.0 mm. in length;filaments pilose at the base;capsule 7.5-12.0 mm. long,subsessile;plants erect or arcuately erect. 144.S.coniflora

1b. Calyx 25-60-nerved:

3a. Calyx 25-30-nerved:

4a. Capsule subsessile: or stalked

5a. Bracts ovate-lanceolate,5-7-nerved at the base;

calyx less than 16.0 mm.in length;claw & filaments pilose;capsule ovoid 145.S.subconica

5b. Bracts lanceolate,3-5-nerved at the base;calyx more than 16.0 mm.in length;claw & filaments usually smooth;capsule conical-ovoid with a long neck(flask-shaped) 148.S.conoidea

4b. Capsule sessile:

6a. Bracts ovate-acuminate,5-7-nerved;calyx conical-cylindrical,with long spreading hairs,and a truncate base,in fruit ovate;limb obovate or oblong;seed with flat back 147.S.lydia

6b. Bracts linear,3-5-nerved;calyx oblong,without long hairs, umbilicate,in fruit ovoid-conical;limb cuneate;seed with grooved back 146.S.conica

3b. Calyx 60-nerved 149.S.macrodonta

143. S.ammophila Boiss.et Heldr. subsp. carpathae Chowdhuri,subsp.nov. Plate 18;fig.21.

Affinis S.ammophilae Boiss.et Heldr. sed habitu majore, calycibus 7.0-9.5 mm.longis superne paulo constrictis,lamina petalorum 3.0-4.0 mm.longa obovato-cuneata,ungue exserto,capsula longiore differt.

Herba annua,10.0-15.0 cm.alta,laxa,puberula,inferne sparsim et superne dense glandulosa,viscosa.Radix tenuis.Caules teretes,foliosi,ramosi,ramis divaricatis prostratis vel ascendenti-erectis;nodis infimis plus minus incrassatis,

Plate
18

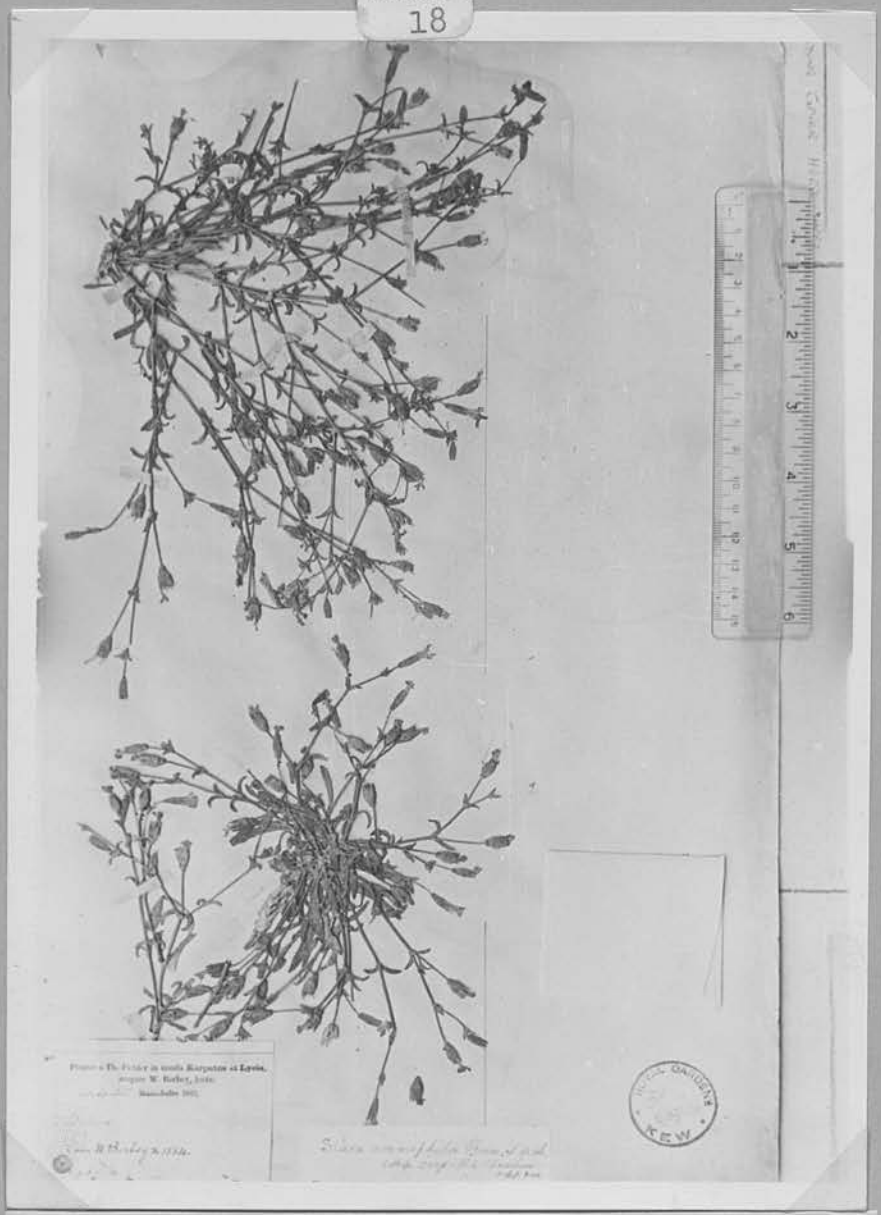


Plate 18. Silene ammophila Boiss.& Heldr.
subsp.carpathae Chowdhuri

Fig.21

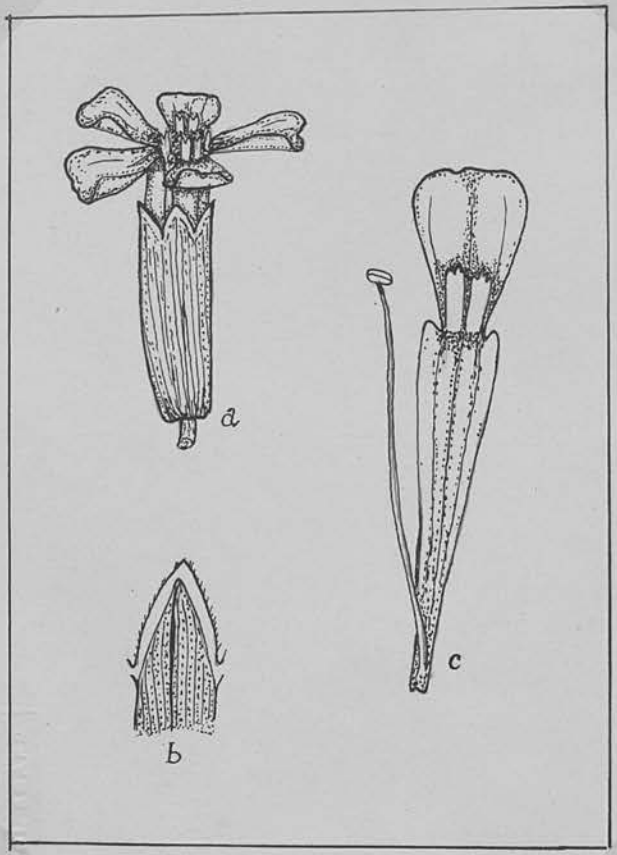


Fig.21.Silene ammophila subsp. carpathae: a.flower;b-calyx tooth;c- petal.

internodiis mediis 1.0-2.5 cm.longis .Folia caudicalia rosularia 2.3-4.7 cm.longa,3.5-4.3 mm.lata,oblongo-lanceolata vel spathulata,in petiolum brevem attenuata basi vaginato-connata ibique membranaceo-marginata ciliata,ad apicem obtusa;folia caulinia reducta sessilia,paullum recurva,obtusiuscula.Flores hermaphroditi,pedicellati,in dichasia laxa dispositi.Bracteae aequales ovato-lanceolatae,acutae,basi 3-nerviae,anguste membranaceo-marginatae ciliolatae.Pedicelli 7.0-18.0 mm.longi, stricti,erecti vel ascendenti-erecti.Calyx 7.0-9.5 mm.longus, 2.5-3.0 mm.diametro,cylindricus,glanduloso-puberulus,viscosus, leviter umbilicatus,nervis 15-20,purpurescentibus haud anastomosantibus,in fructu clavatus supra subconstrictus infra capsulam sensim leviter constrictus;dentes 2.5-3.5 X 1.0-1.3 mm., ovato-lanceolati,albo-marginati,ciliolati.Petala 1.2-1.45 cm. longa,in sicco purpurescentia;unguis 9.0-10.5 mm.longus, glaber,obtuso-auriculatus;lamina 3.0-4.0 X 2.5-3.3 mm.,obovato-cuneata,integra;ligulae binae,1.3-1.5 X 0.5-0.8 mm.,oblongae, denticulatae.Filamenta 1.2-1.35 cm.longa,exserta,glabra.Styli tres,5.0-6.5 mm.longi,exserti,pubescentes.Anthophorus 1.5-2.3 mm.longus,puberulus.Capsula 5.0-7.0 X 3.0-3.5 mm.,ovoidea, anthophoro 3-4 plo longior,calyce inclusa.Semina brunea,0.9-1.3 mm. longa,dorso leviter canaliculata, faciebus plana.

Carpathos- Pigadia,20-4-1883,Pichler 115 [holo.K]

144. S.coniflora Nees in DC.,Prodr.,i,371 (1824);Boiss.,Fl.Or.,i, 578(1867);Rohrb.,Monogr.Sil.,89(1868).

Syn. S.Molopica Fenzl in Ky. Pl.Alepp.(1841)ms.

S.Molopica var.purpurea Fenzl in Ky.Pl.Alepp.(1841) ms.
S.acrocarpa Griseb.,Spicil.,i,172(1843).

Annual,(2.6) 3.5-23.0 (30.5) cm.tall.Root slender,tapering, expanded into a leafy caudex.Caudex short,2.5-4.3 mm.wide,simple, often branched,leafy.Stem erect,terete,branched,lower branches arcuately erect or decumbent at the base,upper ones ascending, greenish,often purplish below,uniformly & retrorsely pubescent below,becoming glandular-puberulent & viscid above;lower nodes more or less swollen;middle internodes 1.1-5.3 cm.long.Caudical leaves rosulate,1.5-4.5 cm.long,1.7-2.5 mm.wide,linear-lanceolate to linear,more or less attenuated into a short petiole,base with membraneous ciliate margin;membraneous margins of opposite bases united into a sheath; cauline leaves 1.7-5.5 cm.long,2.0-6.5 mm. wide,lanceolate or linear-lanceolate,rarely linear,sessile, base connate,ciliate;all leaves pubescent,acute or acuminate. Inflorescence a many-flowered dichasial cyme;cymules 3-7-flowered. Bracts equal,linear or linear-lanceolate,glandular-puberulent, rarely pubescent,ciliate.Pedicels erect or ascending,glandular-puberulent,viscid,those of terminal flowers 3.0-11.0 mm.long, & those of lateral flowers 1.3-2.5 cm.long.Flowers hermaphrodite, erect.Calyx 1.0-1.5 cm.long,2.5-3.3 mm.diam.,conical-cylindrical with base usually umbilicate,with 20 more or less prominent, parallel,greenish,glandular-puberulent & viscid nerves,hyaline & glabrous between the nerves,in fruit ovate-campanulate with apex attenuated;teeth 3.0-4.5 X 1.0-1.3 mm.,1/3 as long as the tube,unequal in length,lanceolate,acuminate,with narrow hyaline ciliate margin.Petal white or pink,1.1-1.55 cm.long;claw 8.0-11.0 mm.long,equaling calyx tube,expanded above,smooth;auricles 1.0 mm.

long,triangular,obtuse,acute or round;limb 3.0-4.5 X 1.3-2.5 mm., oblong-cuneate or obovate-cuneate,entire or emarginate,with two minute lateral outgrowths at the base;ligules two,1.5-2.0 mm. long,oblong-lanceolate,obtuse or nearly so.Filaments equaling claw,pilose at the base.Styles 3,slightly exserted,hairy. Anthophore 0.5-1.0 mm.long,stout,hairy.Capsule 7.0-12.0 X 4.0-6.0 mm., ovoid-conical,subsessile,included.Seed greyish brown,1.0-1.5 mm. long,with flat face & obtusely grooved back,papillose.Th.

Type- In Mesopotamia (Herb.Olivier,DH).

TURKEY- Prov.Urfa:Birecik,Djebel Taken,7-4-1888,Sint.321.

SYRIA- Kharran,300m.,6-5-1865,Hausskn.;Aleppo,31-3-1841,Ky.65; ibid.,yr.1841,Ky.95;ibid.,a1834,Montb.1808;ibid.,Aucher 463; from Aleppo to Khandir,8-4-1900,Post;Damascus,3-4-1856,Gaill. 15501;ibid.,27-4-1878,Post ;Ruins of Palmyra,10-4-1890,Post ; North of Raqqa,300m.,16-4-1939,AC. B6438;near Quaryetin,5-4-1890, Post ;Quaryetin,April 1943,Davis ;Rat Tush,Davis 5621;ibid, 13-4-1943,Davis 5662;Palmyra ,Bit Slem,19-4-1943,Davis 5748

PALESTINE- South of Itrani,800m.,9-4-1935,AC.6438;E.of Jordon, a1873,Paine ;Mashita,750m.,25-4-1911,AC.m438;Bir Zuweira,Judean desert,25-3-1929,Grabr.18; S.of Ziza,18-3-1937,AC. 8438;Wadi Musa,1200m.,19-4-1945,Davis 8676.

IRAQ-Mosul,Qdirydrah,192m.,Bay 68; 4km. W.of Haditha,140m., Gillett & Rawi 6922;sine loco, Chesney122;W.of Ry.line between Ain Dibbs & Beiji,200m.,Gillett & Rawi 7029;Tazirah desert, 20-4-1933,Edwards 3820;sine loco,5-9-1919,Watson ;nr.desert Hatra,270m.,5-3-1934,Low 61.

IRAN-44m. S.W.of Qum,1200m.,24-4-1929,Cow.& Darl.815;22m.N. of Qum,1050m.,24-6-1929,Cow.& Darl.2572;16m. S.of Dilijan,1350m., 19-4-1929,Cow.& Darl.630;nr.Teheran,April 1843,Ky.317(37);Prov. Ser-Tschah (middle Iran),March 1859,Bunge

AFGHANISTAN- Hari-rud-valley,13/19-4-1885,Aitch. 214/279;Kulme 24-6-1935,Hay 293;Khyber pass,1080m.,John.31.

Geogr. Endemic to the countries cited above.

Habitat-In dry gravelly fields or semidesert places;alt.-1--1300m.

Fl.- April & May.

S.coniflora shows some resemblance to S.ammophila Boiss.& Heldr. and its subsp.carpathae Chowdhuri in the shape of petal,number of nerves in the calyx and the shape of seed,but differs by its erect habit,shape & size of calyx & capsule,and by the hairy filaments.The colour of the petals varies from white to pink throughout the range of the species. The species is more or less uniform throughout its range,but in Palestine there is a minor variant: the base of the calyx is truncate instead of umbilicate.However,plants with umbilicate or truncate bases are found in the same area,so that this has not been treated as a significant variant.

145. S.subconica Friv.in Flora,xviii,334 (1835);Rohrb.,Monogr.Sil., 90 (1868);Hayek,Prodr.Fl.pen.Balc.,i,259(1927).

Syn. S.juvenalis Del.,Ind.Sem.Hort.Monsp.,28(1836).
S.cylindriflora Griseb.,Spicil.Fl.Rum.Bithyn.,i,171(1843); Ky.,It.Cil.Kur.Exs.,no.186(1841);non Otth (1824)).
S.subconica b.juvenalis (Del.) Hayek,Prodr.Fl.pen.Balc.,i, 259(1927).

Annual,5.3-38.5 cm.tall.Root slender,expanded into a leafy caudex.Caudex more or less swollen,1.0-3.3mm.long,and upto 9.0 mm. wide,1-several-stemmed,leafy.Stem erect or ascending,often lateral branches semidecumbent at the base,simple or more or less branched from the middle upwards,terete,often purplish from the base upwards,puberulent below,becoming glandular-puberulent & viscid above:middle internodes 2.5-6.3 cm.long;lower nodes

more or less swollen.Caudical & lower cauline leaves rosulate, petiolate,2.5-8.6 cm.long,4.0-8.0 mm.wide,oblong- to linear-lanceolate,puberulent;other cauline leaves in a few to many pairs,sessile,1.5-5.3 cm.long,3.0-5.0 mm.wide,lanceolate to linear-lanceolate,puberulent or sparingly glandular & puberulent;all leaves acute.Inflorescence a many-flowered dichasial cyme;often branches of the dichasium unequal.Bracts equal,5.5-8.5 X 2.0-2.5 mm.,ovate-lanceolate,acuminate,5-7-nerved,with hyaline ciliate margin,ventral surface more or less glabrous or sparingly puberulent,dorsal surface glandular-puberulent.Pedicels 5.0-22.0 mm.long,erect.Flowers hermaphrodite.Calyx 1.4-1.55 cm.long, 4.0-6.0 mm.diam.,oblong-cylindrical or cylindrical from umbilicate base,with 30 more or less prominent,parallel,purplish or greenish viscidly glandular nerves,hyaline & glabrous between the nerves, in fruit ovate-conical;teeth 5.0-7.0 X 1.5-2.5 mm.,triangular or lanceolate,acuminate,with narrow hyaline ciliate margin. Petal pink,1.7-2.2 cm.long;claw 1.1-1.3 cm.long,equaling calyx tube,or slightly exserted,ciliate at the base;auricles obtuse or round;limb 6.0-8.5 X 6.0-7.0 mm.,obcordate with constricted base,emarginate or shallowly bifid,with two minute lateral outgrowths at the base;ligules two,sometimes one,0.6-1.5 X 0.6-1.3 mm.,oblong,obtuse,when one retuse.Filaments exserted,pilose at the base.Styles 3,exserted,smooth.Anthophore 1.5-3.5 mm. long,hairy.Capsule 8.0-12.0 X 4.0-6.0 mm.,ovoid,acuminate, 4-6 times as long as anthophore,included.Seed brown,0.9-1.5 mm. long,with flat face & obtusely grooved back,granulate,Th.

Type- In Rumelia,Friv.

TURKEY- Prov.Elazig:Harput,nr.Morenik,23-5-1889,Sint.411.

Prov.Ankara:Bergsteppe,10-6-1932,Kotte ;ibid.,2-6-1933,Kotte; Ankara,a1892,Bornm.3009;Ankara,Cubuk dere,10-5-1935,Kranse 4748; ibid.,900m.,26-4-1936,Kranse 4975;Cankaya,24-5-1936,Gassner 382; Kecioren,Bergsteppe,2-6-1936,Kranse 4253;Yenizehiir steppe,25-5-1933, Kotte ;Golbasi,23-5-1936,Kranse 5036;Bis Evedik,18-5-1954,Kranse 4515.Prov. Kayseri:Ova,30-4-1944,Bagda .Cappadocica,Karakoi,1350m., 29-4-1859,Ky.186; Tschomakli,1350m.,29-5-1859,Ky.199;Chesme Koupri, 21-5-1933,Tufnell 52; between Kaisaryeh & Kir Shehir,21-5-1933, Tufnell 52;between Kaisaryeh & Ankara,20-5-1933,Tufnell 78; Kartamini,Manisad.494. Caria,sine loco.,a1843,Pinard . Lydia, sine loco.,June 1842,Boiss; at Emir Alem,8-5-1906,Bornm.9149. Lycia,Sadelur,Forbes 150. Phrygia,nr. Uschak,910m.,16-6-1856,Bal.1311.

SAMOS Is. Mt. Kerki,1000-1200m.,15-4-1936,Rechinger 4092 .

Geogr. Rumelia,Greece,Aegean Is. and Turkey.

Habitat- Sandy & rocky places,fields & mountains;alt.-1-1200 m.

Fl.- April - June.

Two specimens collected by Davis from Turkey show an intermediate character.They have got the petal (obcordate) of S.subconica but the shape of calyx (both flowering & fruiting) is like that of S.conica Linn.

Turkey= Prov.Konya:Yavsan Memlehasi,nr.Tuz Golu- in Stipa steppe, 8-6-1952,Davis 18688.Prov.Nigde: between Taspinar & foot of Hasan dag,1000-1100m.,15-6-1952,Davis 18859.

The specimens of this species vary in the indumentum of stem & leaves,and the width of calyx teeth and degree to which the white membraneous margin develops.These differences are not correlated with geographical or ecological isolation,so S.subconica has been considered as monomorphic so far the Oriental countries are concerned.

There has been a difference of opinion as to whether S.juvenalis is a distinct species or not.I have examined the isotypes of both S.juvenalis & S.subconica at Kew. Turrill has

pointed out that S.juvenalis differs in no way from S.subconica & has reported that these species are conspecific.I have seen that the slight morphological difference in both S.juvenalis & S.subconica can not be correlated with geographical isolation. So,following Turrill,I have reduced S.Juvenalis Del.to a synonym of S.subconica,the latter being an earlier name.

146. S.conica Linn.,Sp.Pl.,ed.1.418 (1753);Ledeb.,Fl.Ross.,i,314(1842) Boiss.,Fl.Or.,i,578(1867);Rohrb.,Monogr.Sil.,91(1868)-Sibth.& Sm.,Fl.Graec.,v,t.423(1825);Reichb.,Ic.Fl.Germ. Helv.,vi,t.276,fig.5062(1844);Moss,Cambr.Br.Fl.,t.72 (1920).

Syn. S.conica Linn.,Sp.Pl.,1.418(1753);non Hampe (1837);non Hochst.

Lychnis conica Scop.,Fl.Carn.,2.i,308(1772).

S.oppositifolia Gmel.,Reise,iii,307(1774).

Cucubalus conicus Lamk.,Fl.Fr.,iii,33(1778).

S.conoidea Huds.,Fl.Angel.,ed.2.189(1778);Reichb.,Ic.Fl. Germ.Helv.,vi.t.276,fig.5062 (1844);non Linn.(1753).

S.conoidea b. conica Fiori et Paol.,Fl.anal.Ital.,i,365 (1898).

Annual,(2.5) 4.0-35.0 cm.tall.Root slender,deepseated, abruptly expanded into a leafy caudex.Caudex more or less swollen, 1-many-stemmed.Stem simple or branched from the base upwards, erect,or ascending,greenish or purplish towards the base terete,retrorsely and coarsely puberulent throughout,becoming

sparingly glandular upwards especialy in the region of inflorescence;branches arcuately erect or ascending;middle internodes 1.0-4.5 cm.long.Caudical & lower cauline leaves rosulate,petiolate,1.3-4.5 cm.long,2.5-7.0 mm.wide,oblong-lanceolate to lanceolate,attenuated into the petile,base with membraneous ciliate margin;other cauline leaves sessile,1.1-4.5 cm.long,1.5-3.5 mm.wide,lanceolate to linear-lanceolate,3-nerved at the base;all leaves coarsely & uniformly puberulent. Inflorescence a dichasial cyme,seldom symetrical,often alternate branches short and thus passing into a monochasial cyme.Bracts equal,1.2-2.3 cm.long,ovate-lanceolate or lanceolate,acuminate, 3-5-nerved,with hyaline ciliate margin,pubescent,often sparingly glandular.Pedicels 9.0-27.0 mm.long,erect or ascending.Flowers hermaphrodite,erect.Calyx 1.4-1.7 cm.long,3.0-5.0 mm.diam., oblong,umbilicate,in fruit ovoid-conical with more or less narrowed base & apex,with 30 prominent,parallel,greenish,puberulent, often sparingly glandular nerves,hyaline & glabrous or minutely and sparsely puberulent between the nerves;teeth 5.0-7.5 X 1.3-1.5 mm.,triangular,acuminate or subulate,with membraneous ciliate margin.Petal white to pink,1.1-1.43 cm.long;vlaw 8.4-9.3 mm.long, equaling calyx tube,ciliate at the base;auricles acute,obtuse or round;limb 2.7-5.0 X 1.3-2.5 mm.,obovate-cuneate or cuneate, slightly bifid,rarely entire,with two minute lateral outgrowths at the base;ligules two,0.8-1.3 mm.long,oblong,obtuse.Filaments equaling claw,pilose at the base. Styles 3, exserted,hairy. Anthophore 0.5-1.0 mm.long,hairy.Capsule 8.0-10.5 X 5.0-6.5 mm., ovoid-conical,sessile,included.Seed grey brown,0.5-1.0 mm.long, with flat face & obtusely grooved back,granulate.Th.

Linnaean specimen- In Hispania, Gallo provincia [Hort.Cliff-BM!].

TURKEY-Prov. Izmir:Izmir,12-5-1854,Bal. Prov.Amasya/ Tokat: between Amasya & Tokat,27-4-1912,Bornm.70.Prov.Ankara:Kecioren, Hauhadin,14-6-1944,Kasap.

SYRIA- Damascus,3-4-1856,Gaill.915.

ARABIA- Bestan at the base of Mt.Sinai,yr.1835,Schimper 131.

IRAN- Enseli(north Iran),22-4-1902,Bornm.6359; north Iran,sine loco,yr.1882,Polak ;nr. Gulmek,1500m,,May/June 1934,Trott 191.

Geogr.Tunisia,Morocco,Algeria,France,Italy,Sicily,Switzerland, Bavaria,Greece,Caucasus,Siberia,Turkey,Syria, Arabia, Iran.

Habitat- In sandy or rocky places;alt.-1-1500m. Fl.-May-July.

It is remarkable that such a widespread species has developed no appreciable variants,atleast in the Oriental countries. S.conica Linn. is similar in habit & appearance to S.subconica Friv.,but can be distinguished in the manner pointed out in the tabular comparison. [Tab.9.].

TABLE 9.
Synoptical comparison of the characters distinguishing S.conica from S.subconica.

Characters	S.subconica	S.conica
Indument-um	pubescent below,becoming densely glandular above particularly in the region of inflorescence	coarsely & retrorsely puberulent, often becoming sparingly glandular above.
Bracts	5-7-nerved at the base,	3-5-nerved at the base,
Calyx	cylindrical,nerves with more glandular hairs,in	oblong,usually wider at the base, nerves coarsely puberulent,

	fruit ovoid-conical	sometimes sparsely glandular,in fruit usually ovoid-conical with more or less constricted base and apex -
Petal	limb large,obcordate with cuneate base,bifid; ligule usually one.	limb somewhat small,obovate-cuneate or cuneate,entire or shortly bifid;ligules two.
Anthopho--re	1.5-3.5 mm.long	0.5-1.0 mm.long.

147. S.lydia Boiss.,Diagn.Pl.Nov.Or.,Ser.1,i,37(1842);Boiss.,Fl.Or., i,579(1867);Rohrb.,Monogr.Sil.,91(1868).

Syn. S.Harrissii Turrill in Kew Bull.,267(1918).

Annual,6.7-27.0 cm.tall.Root slender,deepseated. Caudex erect or arcuately erect,short,leafy,usually simple. Stem erect or arcuate,terete,leafy,greenish,rarely slightly purplish at the base,simple below,branched in the region of inflorescence,sometimes branched from the base upwards,hispidulous throughout,becoming glandular-puberulent & viscid above;nodes more or less swollen;middle internodes 1.5-5.5 cm.long.Caudical leaves rosulate,petiolate,1.7-2.5 cm.long,2.0-3.0 mm.wide, linear-spathulate or lanceolate,rarely ovate-spathulate,attenuated into petiole,base with hyaline ciliate margin;cauline leaves sessile,gradually reduced upwards,1.3-3.0 cm.long,1.5-3.0 mm. wide,linear-lanceolate;upper ones bract-like,5-nerved;all leaves acute,puberulent & hirsute.Inflorescence a dichasial cyme,3-7-flowered;branches of the dichasium often divaricate,sometimes

short,rarely suppressed.Bracts equal,ovate-lanceolate or lanceolate,acuminate,7-nerved,ventral surface glabrous or sparingly puberulent,dorsal surface hirsute & pubescent and sparingly glandular,margin with a narrow hyaline margin,towards the base villose.Pedicels 4.0-12.0 mm.long,strict,erect or ascending.Flowers hermaphrodite,erect.Calyx 1.35-1.5 cm.long, 2.8-3.5 mm.diam.,cylindrical-conical with a truncate base,in fruit ovate-conical,with 30 parallel,greenish nerves,nerves with long, spreading,stiff hairs (2.0-3.0 mm.long) & sparingly glandular-puberulent;teeth 5.5-7.0 X 1.5-2.5 mm.,triangular,acuminate or subulate,spreading especially in fruit,with hyaline ciliate margin. Petal pink,1.7-1.95 cm.long;claw 1.2-1.35 cm.long,slightly exceeding calyx tube,smooth,acutely auriculate;limb 5.0-6.0 X 2.5-3.5 mm., oblong-obovate,emarginate or slightly bifid,with two lateral outgrowths at the base;ligules two,1.3-1.7 mm.long,lanceolate, acute.Filaments included,pilose at the base.Styles 3,included, hairy.Anthophore 0.5-1.0 mm.long,hairy.Capsule 8.0-11.0 X 4.0-6.0 mm. ovoid,with a short neck,sessile,included.Seed dark brown,1.0-1.3 mm.long,with flat or slightly concave face & flat or slightly convex back,granulate.Th.

Type- Turkey-in parte superior omnium montium Lydiae,Aucher 465 [holo.G.;iso.K!]

TURKEY- Prov.Kayseri:Ercies dag,Tschomkli,1350m.,29-5-1859,Ky.199; Saksakle dere,1941,Basar. ;Kocatepe,21-5-1938,Heilb..Katara pass, Forbes 149. Lydia,Yamanlar dag,22-5-1906,Bornm.9146;ibid.,Bornm. 9146b.Prob.Izmir: loc.class.,June 1833,Montb.;Boz dag in Tmolo, 18-7-1854,Bal.94

Geogr. Endemic to Turkey & Greece.

Habitat- In fields & mountains;alt.- 1-1350m.Fl.-April -July.

S.lydia is intermediate between S.subconica Friv. & S.macrodonta Boiss. From S.subconica it is distinguished by the indumentum, by truncate calyx which is adpressed to capsule; by oblong-obovate limb, and by the seed form. From S.macrodonta it is set off by the number of calyx nerves, absence of long spreading hairs on the calyx and by the shape of the fruiting calyx.

S.Harrissii Turrill, described from Greece cannot be separated from S.lydia .

148. S.conoidea Linn., Sp.Pl., ed.1, 418 (1753); Boiss., Fl.Or., i, 580 (1867); Rohrb., Monogr.Sil., 92(1868)-Reichb., Ic.Fl. Germ.Helv., vi, t.275, fig.5062(1844)[S.conica]; Moss, Cambr.Br.Fl., iii, t.71(1920).

Syn. S.conoidea Linn., Sp.Pl., 1, 418(1753); non Huds (1778); non Reich.(1844); non Pallas .

Cucubalus conoideus Lamk., Fl.Fr., iii, 27(1778).

Silene cylindriflora Otth in DC., Prodr., i, 371(1824); non

S.dioica Fisch.& Mey., Ind.Sem.Hort.Petrop., vii, 6(1830).

S.conica Hochst.in Schedae, 1835: Reichb., Ic.Fl.Germ.Helv., vi, 49(1844); non Linn.(1753); non Hampe(1837).

S.conoidea var.obcordata Boiss., Fl.Or., i, 580(1867).

S.conoidea var.glabrescens Boiss., ibid.

S.conoidea var.cylindriflora O.Ktz.in Act.Hort.Petrop., x, 1. 174(1887).

S.conica var.conoidea Saint-Lager in Cariot Etude des

Fleurs,8.ed.11,112(1889).

S.conoidea a.typica Fiori in Fiori & Paol.,Fl.anal.Ital., i,365(1898).

Annual,(5.5) 7.0-40.0 cm.tall.Root slender,deepseated. Caudex simple or branched,leafy.Stem erect or ascending,terete, leafy,often purplish from the base upwards,simple below,branched above,sometimes branched throughout,generally uniformly & retrorsely pubescent,becoming conspicuously glandular & viscid above,rarely entire plant more or less glabrescent;nodes more or less swollen;middle internodes 1.3-7.0 cm.long.Caudical & lower cauline leaves resulate,petiolate,2.5-9.0 cm.long,5.0-10.0 mm. wide,oblong-lanceolate,attenuated into petiole,base with hyaline ciliate margin,sheath of the opposite petioles connate into a tube;other cauline leaves sessile,3.5-9.0 cm.long,4.0-12.0 mm. wide,oblong- to linear-lanceolate,sometimes oblanceolate;all leaves acute,rarely obtuse ,pubescent or sparingly glandular & puberulent.Inflorescence an open compound dichasial cyme; branches of the dichasium usually equal,sometimes unequal, rarely branches are conspicuously unequal simulating a monochasium, axis of the inflorescence forked with the flowers on an umbellate cyme.Bracts equal,ovate-lanceolate or lanceolate, 3-5-nerved,ciliolate.Pedicels erect or ascending,those of lateral flowers 1.5-3.0 cm.long,& those of terminal flowers 5.0-10.0 mm. long.Flowers hermaphrodite,erect.Calyx 1.6-3.0 cm.long,2.5-4.5 mm. diam.,cylindrical-conical,with strongly umbilicate base,in fruit ovoid-conical with much inflated base,with 30 parallel,prominent, greenish,glandular-puberulent & viscid nerves,hyaline & glabrous

or rarely sparingly puberulent between the nerves;teeth 4.0-12.0 X 1.5-2.5 mm.,1/3 as long as the tube,lanceolate,acuminate,with narrow hyaline ciliate margin.Petal white to pink or purplish, 1.7-4.6 cm.long;claw 1.2-3.2 cm.long,equaling or exceeding calyx tube,smooth or ciliate at the base;auricles obtuse or round;limb 5.0-14.0 X 2.5-13.0 mm.,obovate-cuneate,entire or eroded-denticulate,or obcordate-cuneate,bifid,with two minute lateral outgrowths at the base;ligules two,1.5-2.0 mm.long,oblong, retuse or irregularly lobed.Filaments included,or equaling claw,smooth or hairy.Styles 3, exserted,hairy.Anthophore 1.5-2.0 mm.long,hairy.Capsule 1.5-1.9 X 0.8-0.9 cm.,ovoid-conical, tapering abruptly into a long conical apex,included.Seed grey brown,1.0-1.5 mm.long,with flat face & shallowly grooved back.Th.

Linnaean specimen -In segetes Hispaniae [L!].

TURKEY- Prov.Erzurum:Tortum,4-5000m.,June 1853,Huet .Armenia, sine loco,Zohrab 164;ibid., Calv.& Zohrab .Prov.Urfa:Birecik, 21-4-1888,Sint.322.Prov.Gaziantep:nr.Gaziantep,900m.,1-5-1935, Balls 2210.Prov. Nigde:between Taspinar & foot of Hasan dag, 15-6-1952,Davis 18861.Prov.Kayseri:nr.Develi,27-6-1952,Davis 19201. Insuyu,June 1942,Basar. Hatuniye Koyenstitusu,14-4-1951, Duzici.

SYRIA- Aleppo,May 1843,Montb.1835;ibid.,Ky.85;ibid.,450m.,19-5-1865 Hausskn.; nr.Aleppo,Aucher 467;Damascus,3/27-4-1856,Gaill.914: Qalat Siman,800m.,14-4-1939,AC.20411;Qaryatein,11-4-1943,Davis 5544; S.of Hums,10-4-1943,Davis 5594.

PALESTINE- Jerash,530m.,3-5-1911,AC.G562;N.of Ayn Musa,1200m., 16-4-1937,AC.8562;Jerusalem,Mt.Scopus,20-3-1931,Eig 119;Jerusalem, 800m.,2-4-1912,AC.2562; sine loco,Hayne;Ayn Musa,460m.,22-4-1911, AC.m562; above Ayn Musa,1350m.,19-4-1945,Davis 8899;Shabek, 21-4-1945,Davis 8804;between Petra & foot of Mt.Hor,17-4-1945, Davis 9066;between Hasbeya & Rasherya,9-4-1877,Post 3951.

ARABIA- Petraea,yr.1849,M'Donald;Adaleyeh,Kuwait,7-4-1935,Dickson 193;ibid,1-3-1937,Dickson 325.

SINAI- Mt.Sinai,Bestan,a1835,Schimper 131.

CYPRUS-Platres,990m.,22-4-1937,Kennedy344,ibid.,1040m.,18-5-1941,

Davis 3476;Kato Platres,945m.,7-5-1937,Kennedy358;Trimikliene, 600m.,11-4-1911,Davis 3128;Malounda, 300m.,10-4-1950,Chapm.316; Silikow,May 1930;C.B.M.96;

IRAQ- Arbil,375m.,2-4-1931,Guest 1451;Kirkuk,210m.,4-4-1931, Guest 1379;ibid,14-6-1932,Guest 2636;Mosul,270m.,2-4-1931,Guest 1492;Mosul,Ain Ghazal,360m.,28-4-1933,Guest 4078;nr.Mosul,270m., April 1931,Hewitt 1552;Qaraghan,April 1929,Rogers 0129;Shaiba, 23-8-1919,Watson ;Dobuk,450m.,21-4-1930,Daly2157;Bagdad,Karradah, 12-3-1920,Parunjfre 134;Karradah,12-3-1920,Reo; ibid.,13-1-1920, Reo ;Bagdad,May 1868,Hausskn.;Kerman,1900m.,22-4-1892,Bornm.2269; Tigris plain,210-300m.,22-3-1936,Low 111; East Iraq,sine lloco, May 1936,Daly;

IRAN-Ispahan,Aucher 4214;Poul,May 1930,D.Bowrke Borrowers 46; Buschire,7-5-1926,Horner 138 & 33;nr. Buschire Kazarum plain, 25-3-1928,Horner 179;S.of Tabriz,Tabriz hills,2-5-1926,Gilliat-Smith 1447;ibid 29-4-1926,Gilliat-Smith 145;ibid.,May 1926, Gilliat-Smith 1625; nr.Schahrud,May 1858,Bunge ;Adgah Trarubi, 180-375m.,10-4-1912,Lamin.;12m. W.of Ardabil,1500m.,14-6-1929, Cow.& Darl. 1565;36m.N.of Urumia,1650m.,15-5-1929,Cow.& Darl.1317; Prov.Yesd,at Agda,1300m.,28-3-1892,Bornm.2270m.,Teheran,22-4-1843, Ky.57;Ispili Tehlah,June 1937,Landsay1217;Musjid-i-Sulemain (W.Iran),March 1923,Macmillan 58;Keredj,Mt.Elbrus,18-5-1937, Rechinger 187;Aschabad,above Nephton,4-5-1900,Sint.208; Ecbatanensi,yr.1882,Polak ;Isphahan,1500m.,April 1937,Jliff 21; East Iran,sine loco,1350m.,15-11-1912,Macgregor H1836/22;E.of Kermain,yr.1933,Biggs 13061; Yehlah,yr.1936,Lindsay;Sultanbad, nr.Kastin,1500m.,May1935,Lindsay173;Bakhtiari,Watt13197.

AFGHANISTAN- Kabul,1619m.,1-5-1935,May 91;base of Chilleru,Griff. 391;Harirud valley,25-4-1885,Aitch.1022;Kurrum valley,25-4-1879, Aitch.144;Kabul,May1870,Collett 60.

BELUCHISTAN-Quetta,27-3-1889,Lace ;ibid.,1680m.,24-4-1888,Lace 3718;ibid.,1680m.,13-4-1888,Lace 3550;nr.Chamba,900m.,30-3-1899, Lace; Fort Sandeman,5-5-1897,Harsukh 30479.

Geogr. Circumboreal in its distribution.

Habitat- In fallow& cultivated fields,rocky places,limestone hills & ridges;alt.-1-1650m. Fl.-March-June.

S.conoidea is a highly polymorphic species so far the Oriental countries are concerned.Despite its extreme variablity, 4 varieties were proposed by Boissier,Post and Bornmüller. Boissier recognized twp varieties- obcordata & glabrescens.The

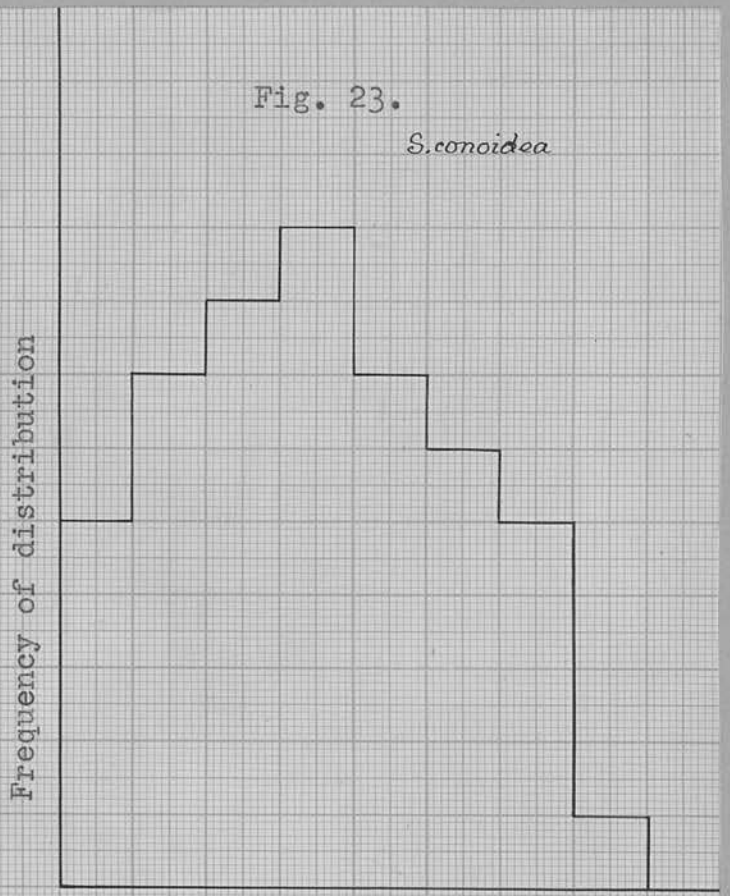
var.obcordata,with the character "Lamina majora obcordata" was described from material collected from Aleppo in Syria, and the other var.glabrescens,has the character " Tota etiam ad calyce glabra.Rostrum capsule abbreviatum".Both these varieties were not recognized by Rohrbach who sunk them in the species.Later on Post & F.N.Williams revived them.Post, in addition to these,proposed one new variety, grandiflora, with a large ovate-cuneate & eroded-denticulate limb.From the study of the herbarium material collected from different countries and the statistical data obtained,I am convinced that there is no natural group or variety within the species which is distinguishable by the characters mentioned above to warrant taxonomic recognition.

In the accompanying fig 22,a scatter diagram is given in which lamina length of 41 specimens from different localities is plotted against breadth.The ringed points indicate two gatherings. It will be seen that a positive correlation is shown & that the variation is continuous.In fig 23 ,a histogram is given showing the frequency distribution of 40 specimens on the length/ breadth ratio of the lamina of the petal.The histogram shows a normal curve.It is evident from these two figs.that all the specimens belong to one natural group.

The variety obcordata cannot be recognized as a natural group,as this form is connected to the other form with entire petals by intermediates.Thus,these apparently distinct forms or varieties are all connected by intergrading forms.The type & quantity of pubescence shows considerable variation- a character that seems to vary in response to ecological

Fig. 23.

S. conoidea

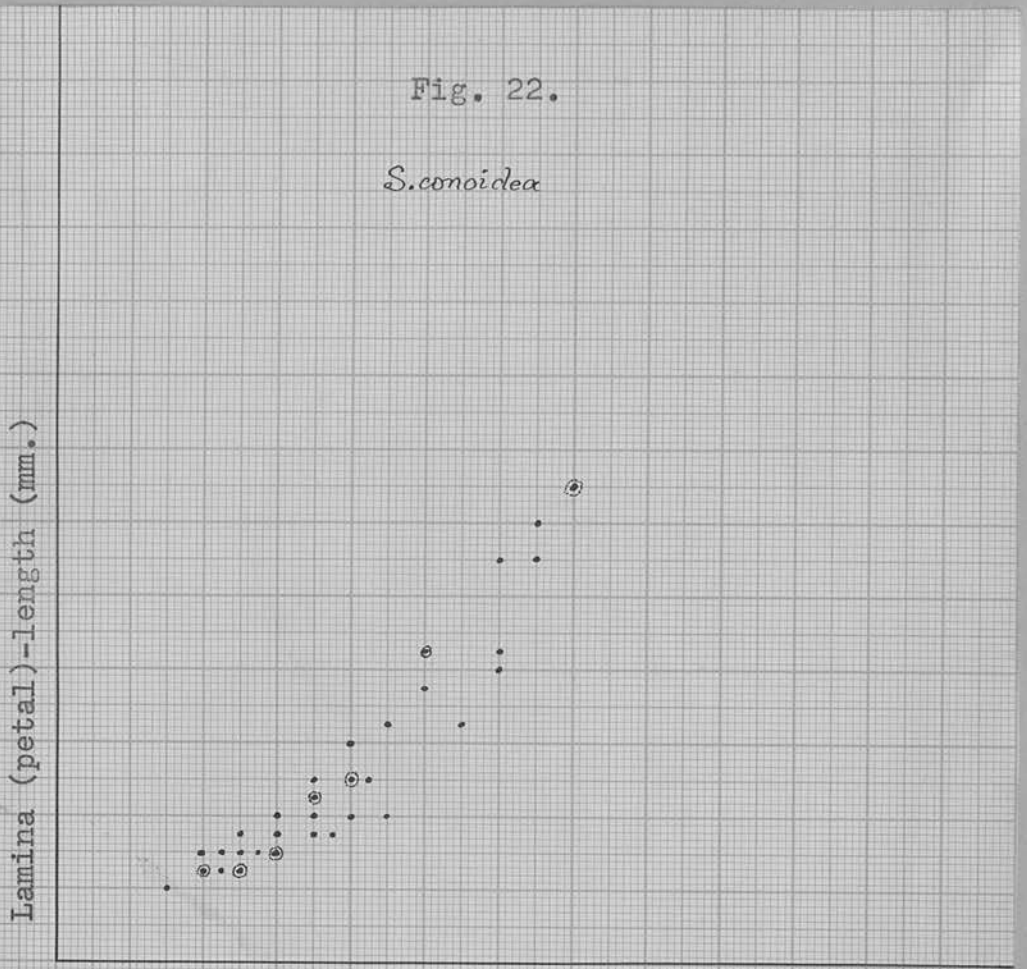


Scale - 1 cm.= 1.5 mm.

Fig.23. Histogram showing frequency of distribution of specimens on the length/breadth ratio of lamina.

Fig. 22.

S. conoidea



Scale - 5mm.= 1 mm.

Fig.22. Scatter diagram showing correlation of lamina length & breadth.

conditions.Generally the plants are densely & retrorsely pubescent with glandular hairs above,but plants from the Provinces of Kayseri & Maras,tend to be less hairy (or more or less glabrous) than plants from the other parts.But this does not mean that less puberulent or glabrous plants are not found elsewhere.Another character of variation that I have observed is the hairy filaments.Specimens with hairy filaments and smooth filaments occur throughout the entire specific range in the Orient.Hence there seems to be no satisfactory basis in morphological discontinuity or in geographical distribution for recognizing such varieties.

I have not seen any specimen of var.eglandulosa Bornm.,so its validity as a variety has not been ascertained

149. S.macrodonta Boiss.,Diagn.Pl.Nov.Or.,Ser.1,i,37(1842);Boiss., Fl.Or.,i,580(1867);Rohrb.,Monogr.Sil.,92(1868).

Syn. S.grammatocalyx Fenzl in Ky.Pl.Aleppo,1843,ms.
S.pamphylica Boiss.& Heldr.,Diagn.,1,viii,81(1849)
S.macrodonta var.pamphylica Boiss.,Fl.Or.,i,581(1867).

Annual,(2.6)5.0-40.0 cm.tall.Root slender,deepseated. Stem erect,or arcuately erect,sometimes semidecumbent at the base,simple or branched throughout,leafy,terete,valvety-canescent with short retrorse hairs,becoming glandular & viscid above,often purplish from the base upwards;middle internodes 1.0-6.3 cm.long. Caudical leaves rosulate,petiolate,1.3-3.8 cm.long,2.5-8.0 mm. wide,oblong-lanceolate to lanceolate,gradually attenuated into

short petiole,puberulent,base with hyaline ciliate margin;cauline leaves sessile,0.7-7.2 cm.long,1.0-9.0 mm.wide,lanceolate to linear-lanceolate,acute,puberulent,upper ones bract-like and glandular-puberulent.Inflorescence a dichasial cyme,often alternate branches of the dichasium short,1-3- or 5-flowered. Bracts equal,6.0-13.5 mm.long,ovate,acuminate,usually 3-5-nerved at the base,base with hyaline ciliate margin,glandular-puberulent. Pedicels 3.0-15.5 mm.long,strict,erect or ascending.Flowers hermaphrodite,erect.Calyx 1.0-1.6 cm.long,2.0-3.5 mm.diam., cylindrical with a truncate base,in fruit ovoid-conical with spreading teeth,with 60 parallel,greenish,glandular-puberulent & viscid nerves;teeth 5.0-7.0 X 1.0-1.5 mm.,triangular or lanceolate,acuminate,½ as long as the tube,with hyaline ciliate margin Petal pink,1.3-1.75 cm.long;claw 9.0-11.0 mm.long, equaling or somewhat shorter than calyx,smooth;auricles acute; limb 4.0-6.5 X 2.5-4.0 mm.,obcordate-cuneate or oblong-cuneate, emarginate or shortly lobed,with two minute lateral outgrowths at the base;ligules two,1.3-2.0 mm.long,oblong,round at the apex,sometimes denticulate.Filaments exserted,pilose at the base. Styles 3,exserted,hairy.Anthophore 1.0-2.5 mm.long,hairy. Capsule 9.0-11.0 X 4.0-5.0 mm.,oblong-conical,subsessile, included.Seed dark brown,1.0-1.5 mm.long,with flat or more or less convex face & flat or more or less concave back,granulate, Th.

Type- Turkey-in cultis planitiei Cariensis ad meridiem montis Cadmi sitae,Boiss. [holo.G.].

TURKEY- Prov. Bilecik:Karasu,300-400m.,17-5-1929,Bornm.13878 . Prov.Antalya:sine loco.,May 1845,Heldr. ;ibid.,Forbes 148;at the foot Elmu dag,10/28-5-1860,Bourg.54;Cubuk bogazi,22-5-1950, Heilb.& Atilla .Prov.Mersin:Silifke,14-6-1950,Atilla ;in Mt.Taurus,30-6-1855,Bal.809. Cilicia,at Gorumse (Kassan Oghlu) 1260m.,12-5-1859,Ky.79.

CYPRUS- Ayia Grini,nr.Morphon,11-3-1941,Davis 2556;ibid.,Davis 2554;Malounda,300m.,10-4-1950,Chapm.315;Platres,900m.,Kennedy 1505;Agios Philon,nr.Rizokarpos ,19-2-1941,Davis 2223;before Pyroi,from Nicosia,20-4-1934,Syngras.471;before Pyroi,90m., 17-2-1932,Syngras.1111;Eurythbon,600m.,12-3-1935,Syngras.825; Paratheuri,Dreuce 70;Sandhugel,nr.Yialussa,23-4-1880,Sint.252; Pentedactylos,18-3-1880,Sint.& Rigo 252b.

SYRIA- Aleppo,28-4-1941,Ky156; ibid.,Montb.1770.

PALESTINE-Jerusalem,800m.,10-4-1912,Meyers 3120;ibid.,(garden tomb)200-800m.,28-3-1908,AC. 5037.

Geogr. Endemic to the countries cited above.

Habitat- In fallow fields,mountain slopes,sandy flats;alt.-1-1260m.

Fl.- April- June.

S.macrodonta,although it covers a wide area from Turkey to Palestine,is monomorphic as far as we know at present.In Turkey plants of short stature were treated by Boissier & Heldriech as a variety of this species,but plants from different localities show that it is sporadic & can not be treated as a distinct variety.

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APPENDIX 1

SILENE DIURNA GODR.- THE CORRECT NAME FOR MELANDRIUM DIOICUM (L.) COSS. & GERM. within SILENE.

Silene diurna Godr.,Obs.Sil.,39 (1847).

Syn. Lychnis dioica Linn.,Sp.Pl.,ed.1,437(1753);non Silene dioica Fisch.& Mey.(1830).

Lychnis dioica β rubra Weigel,Fl.Pom.-Rug.,85(1769)

Lychnis sylvestris Schkuhr,Handb.,i,403(1791);non Silene silvestris Schott in Reichb., Fl.exc.,812 (1832)

Saponaria dioica (L.) Moench,Meth.,76(1794)

Lychnis diurna Sibth.,Fl.Oxon.,145(1794);nom.illegit.

Lychnis rosea Salisb.,Prodr.,304(1796);non Silene rosea Fenzl;non S.rosea Vilm.

Silene silvestris Clairv.,Man.,145(1811);non Silene silvestris Schott in Reichb.(1832).

Melandrium silvestre Roehl.,Deutschl.Fl.,ed.2,i,274(1812); non Silene silvestris Schott.

Agrostemma silvestris G.Don,Syst.,i,416(1831);non Silene silvestris Schott.

Saponaria diurna Fenzl in Endl.,Gen.,974(1841).

Melandrium diurnum Fries in Bot.Notiser,170 (1842).

Lychnis dioica α rubriflora De Not.Rep.,68(1844).

Melandrium dioicum (L.) Coss.& Germ.,Fl.Env.Paris,28(1845).

Lychnis rubra Patze,Meyer & Elkan,Fl.Preuss.,384(1850).

Melandrium purpureum Rupr.,Fl.Ingr.,i,163(1860).

Melandrium rubrum Garcke,Fl.N.& M.Deutschl.4.Aufl.,55(1858)
Melandrium dioicum Simonkai,Enum.Fl.Transs.,129(1886).

In this thesis it has been found necessary to transfer Melandrium dioicum (L.) Coss.& Germ.[Syn. Melandrium rubrum Garcke cf. Burtt in Notes Royal Bot.Gard. Edinb.,xxi,163: 1953] to Silene .From the synonymy set out above it will be apparent that Silene diurna Godr.(1847) is the correct name for this species within the genus Silene .Silene diurna Godr. was based on Lychnis diurna Sibth.(1794) -the latter was a new name for Lychnis dioica L. (which Sibthorp cites as a synonym) and is therefore illegitimate because it was redundant when published.However,this does not prevent Silene diurna Godr.(1847) from being accepted as a new name (not new combination) which must still be typified by Lychnis dioica L.

APPENDIX 2

List of Oriental species which were not studied in this thesis.

1. S.affghanica Rohrb.*
2. S.amana Boiss.*
3. S.araxina Trautv.*
4. S.austro-iranica Rech.(Rigidulae).
5. S.avromana Boiss.& Hausskn.
6. S.Balansae Boiss.*
7. S.Behboudiana Rech.(Lasiostemones)
8. S.Bornmulleri Freyn *
9. S.brevipes Paine
10. S.cabulica Bornm. (Rigidulae)
11. S.caesia Sibth.& Sm.*
12. S.candicans Celak *
13. S.capillipes Boiss.& Heldr.*
14. S.caricifolia Bornm.
15. S.cephalantha Boiss.*
16. S.demawendica Bornm. (Auriculatae)
17. S.dictyoneura Rech.(Auriculatae)
18. S.dschuparensis Bornm. (Auriculatae)
19. S.elymaitica Bornm. (Auriculatae)
20. S.eremitica Boiss.* < euxina
21. S.Fenzlii Boiss.& Bal.*
22. S.flammulifolia Steud.*
23. S.Friwaldzkyana Hampe *
24. S.Gaubae Bornm.& Gauba(Sclerocalycinae)

25. S.graeca Boiss.& Sprun.*

26. S.Holzmanni Heldr.*

27. S.Hussoni Boiss.*

28. S.idrisiaca Bornm. (Sclerocalycinae)

29. S.incurvifolia K.& K.*

30. S.infidelium Post*

31. S.insularis Barbey*

32. S.intricata Post (Rigidulae).

33. S.Koelzii Rech.(Lasiostemones)

34. S.nurensis Boiss.& Hausskn.*

35. S.nabathaea Gombault

36. S.papillifolia Williams *

37. S.phrygia Boiss.*

38. S.Pravitziana Rech.(Auriculatae)

39. S.Reinholdi Heldr.*

40. S.Schlumbergeri Boiss.*

41. S.Schmuckeri Wettst.*

42. S.shahrudensis Rech.(Lasiostemones)

43. S.shanbashakensis Rech.(do).

44. S.sipylea O.Schwarz (Sclerocalycinae)

45. S.striata Rohrb.*

46. S.suffrutescens M.B.*

47. S.tenella C.A.Mey *

48. S.trinervia Seb.+Maur.*

49. S.urodonta Bornm.(Sclerocalycinae)

50. S.Vandasii Nabelek *

51. S.xylobasis Freyn *

52. S.yenensis Defl. / Melanolimon persicum?

NB. Species with asterisk have already been mentioned under different sections

TABLE 2

Name of Species (examined)	No. of flowers examined from different gatherings	Calyx inflated	Calyx semi-inflated	Calyx not inflated	No of nerves in the calyx	Nature of nerves	Venation	No. of flowers with 3 styles	No. of flowers with 4 styles	No. of flowers with 5 styles	No. of flowers with 1-celled ovary	No. of flowers with 3-celled ovary	No. of flowers with 5-celled ovary	No. of capsule; examined from different gathering	No. of capsule; with 5 teeth	No. of capsule; with 6 teeth	No. of capsule; with 8 teeth	No. of capsule; with 10 teeth	Nature of seed
							LYCHNIS												
L. cyrilli Reichb.	5	X	X	"	10	Not bifurcating	Slightly anastomosed	X	X	5	5	X	X	6	6	X	X	X	Reniform with wi...
L. sibirica Linn.	5	X	X	"	10	"	"	X	X	5	5	X	X	..... not seen					"
L. coronaria (L.) Desr.	10	X	X	"	10	"	"	X	X	10	10	X	X	12	12	X	X	X	"
L. flos-cuculi L.	10	X	X	"	10	"	"	X	X	10	10	X	X	5	5	X	X	X	"
L. senno Sieb. & Zucc.	2	X	X	"	10	"	"	X	X	2	2	X	X	..... not seen					"
L. coronata Thumb.	1	X	X	"	10	"	"	X	X	1	1	X	X	..... not seen					"
L. Seigeriana Sehkr.	2	X	X	"	10	"	"	X	1	1	2	X	X	..... not seen					"
L. chalcedonica L.	3	X	X	"	10	"	"	X	X	3	3	X	X	..... not seen					"
L. miqueliana Rohrb.	2	X	X	"	10	"	"	X	X	2	2	X	X	..... not seen					"
							VISCARIA												
V. viscosa (Scop.) Aschers.	17	X	X	"	10	Not bifurcating	Anastomosed above	X	X	17	X	X	17	16	13	1	X	X	"
V. alpinia (L.) G.Don.	4	X	X	"	10	"		X	X	4	X	X	4	3	3	X	X	X	"
V. Sartorii Boiss.	1	X	X	"	10	"		X	X	1	1	X	X	10	9	1	X	X	"
V. atropurpurea Griseb.	10	X	X	"	10 (10-12)	"		X	X	10	X	1	9	15	14	X	1	X	"

TABLE 2 (contd.)

Name of Species (examined)	No. of flowers examined from different gatherings	Calyx inflated	Calyx semi-inflated	Calyx not inflated	No. of nerves in the calyx	EUDIANTHE: Nature of nerves	EUDIANTHE: Venation	No. of flowers with 3 styles	No. of flowers with 4 styles	No. of flowers with 5 styles	No. of flowers with 1-celled ovary	No. of flowers with 3-celled ovary	No. of flowers with 5-celled ovary	No. of capsules examined from different gatherings	No. of capsules with 5 teeth	No. of capsules with 6 teeth	No. of capsules with 8 teeth	No. of capsules with 10 teeth	Nature of seed
E. coeli-rosa (L.) A. Br.	6	X	X	"	10	Not bifurcating	Simple	X	1	5	X	X	1+5	15	X	2	1	12	Not winged
E. laeta (Ait.) A. Br.	4	X	X	"	10	"	"	X	X	4	X	X	4	11	X	3	2	6	"
E. nivalis (Kit.) Williams	2	X	X	Slightly inflated	10	"	"	X	X	2	X	X	2	1	1	X	X	X	"
						MELANDRIUM - A													
M. apetalum (L.) Fenzl	15	"	X	X	10-15	Bifurcating	Anastomosed	X	X	15	15	X	X	10	X	2	X	8	Testa inflated into wing
M. affine J. Vahl.	3	"	X	X	10-12	"	"	X	1	2	2	X	X	6	X	1	2	3	"
M. angustiflorum (Rupr.) Walp.	2	"	X	X	10-15	"	"	X	X	2	2	X	X	2	X	X	X	2	"
M. Stewartii Edgew.	1	"	X	X	10	Not bifurcating	"	X	X	1	1	X	X	3	X	1	1	1	"
M. multicaulis Wall.	2	"	X	X	10-12	Bifurcating	"	X	1	1	2	X	X	5	1	X	2	2	"
M. inflata Wall.	3	"	X	X	10-15	"	"	X	1	2	3	X	X	3	X	X	1	2	"
M. himalayensis Edgew.	1	"	X	X	12	"	"	X	X	1	1	X	X	10	1	X	2	7	"
M. nigrescens (Edgew.) Wild.	3	"	X	X	15	"	"	X	X	3	3	X	X	10	X	1	3	6	"
M. atrocastanea Diels.	3	"	X	X	10	Not bifurcating	"	X	1	2	3	X	X	..... not seen					
M. triflorum (Br.) Leibn.	1	"	X	X	10-12	Bifurcating	"	X	X	1	1	X	X	7	X	1	2	4	"
M. atsaensis Marquand	1	"	X	X	10	Not bifurcating	"	X	X	1	1	X	X	..... not seen					

TABLE 2 (contd.)

MELANDRIUM - B

Name of Species (examined)	No. of flowers examined from different gatherings	Calyx inflated	Calyx semi-inflated	Calyx not inflated	No. of nerves in the calyx	Nature of nerves	Venation	No. of flowers with 3 styles	No. of flowers with 4 styles	No. of flowers with 5 styles	No. of flowers with 1-celled ovary	No. of flowers with 3-celled ovary	No. of flowers with 5-celled ovary	No. of capsules examined from different gatherings	No. of capsules with 5 teeth	No. of capsules with 6 teeth	No. of capsules with 8 teeth	No. of capsules with 10 teeth	Nature of seed
M. rubrum (Weigel) Garcke	8	"	X	X	10-15	Bifurcating	anastomosed	1	2	5	4	2	2	7	X	1	1	5	Not winged
M. album (Mill.) Garcke	11	"	X	X	"	"	"	1	3	7	7	1	3	12	X	X	1	11	"
M. macrocarpum Willk.	2	"	X	X	"	"	"	X	1	1	1	X	X	2	X	X	X	2	"
M. eriocalycinum Boiss.	1	"	X	X	"	"	"	X	X	1	1	X	X	4	X	1	1	2	"
M. persicum Boiss.	2	"	X	X	"	"	"	X	1	1	1	X	1	2	X	X	X	2	"
M. fimbriatum Wall.	1	"	X	X	10	Not bifurcating	"	X	1	X	1	X	X	4	X	1	2	1	"
M. viscosum (L.) Celak	3	X	X	"	10	"	"	3	X	X	2	1	X	2	X	2	X	X	"
M. nutans (Benth.)	2	X	"	X	10	"	"	1	1	X	2	X	X	3	X	2	1	X	"
M. cordiopetalum (Franch.) Hand-Mazz.	3	X	X	"	10	"	"	2	1	X	2	1	X	5	X	6	X	1	"
M. Delavayi (Franch.) Hand-Mazz.	4	X	"	X	10	"	"	3	1	X	4	X	X	10	X	8	2	X	"
M. napuligerum (Franch.) Hand-Mazz.	5	X	"	X	10	"	"	4	1	X	4	1	X	5	X	5	X	X	"
M. kermesinum W.W.Sm.	2	X	"	X	10	"	"	2	X	X	2	X	X	..... not seen					"
M. lichiangense W.W.Sm.	3	X	"	X	10	"	"	3	X	X	2	1	X	3	X	2	1	X	"
M. adenanthum (Franch.) Hand-Mazz.	6	X	"	X	10	"	"	4	X	X	4	X	X	6	1	4	1	X	"
M. oblanceolatum W.W.Sm.	5	X	"	X	10	"	"	5	X	X	4	1	X	2	X	2	X	X	"
M. viscidulum (Franch.) Will.	10	X	"	X	10	"	"	10	X	X	8	2	X	7	X	4	2	1	"
M. noctiflorum (L.) Fries	3	X	X	"	10	"	"	3	X	X	3	X	X	3	X	3	X	X	"
M. auriculatum (Sibth. & Sm.) Rohrb.	2	X	"	X	20	bifurcating	"	2	X	X	1	1	X	2	X	2	X	X	"
M. Zawadskii	1	X	"	X	20	"	"	1	X	X	1	X	X	3	X	2	1	X	"
M. Drummondii (Hook.) Hutten	4	X	X	"	10	Not bifurcating	"	1	1	2	3	1	X	2	X	X	1	1	"

TABLE 3

Characters distinguishing Silene from its allied genera

	No. of chromosome (haploid)	Habit of plants	Calyx			Styles		Character of capsule teeth		Seed
			nature	no. of nerves	nature of nerves	usual no.	% of Flowers with different no. of styles	usual no. of teeth	% of capsule with different no. of teeth	
Agrostemma	12	⊙	simple	10	anastomosed	5	5-100%	5	5-100%	Wingless
Lychnis (including Coronaria)	12	♃	simple or inflated	10	"	5	5-100%	5	5-100%	"
Viscaria	12	♃	simple	10	"	5	5-100%	5	5-83% 6-14% 10-3%	"
Petrocoptis	12	♃	simple	10		5	5-100%	5	5-100%	Beardat hilum
Melandrium A	12	♃	much inflated	10-20	median & commissural nerves bifurcating	5	3-5% 4-10% 5-85%	10	5-10% 6-5% 8-10% 10-75%	Winged with inflated testa
Melandrium B	12-96	♃-⊙	inflated or simple	10 or more	anastomosed	3 or 4 (5)	3-67% 4-6% 5-27%	6 or 8 or 10	5-10% 6-50% 8-10% 10-20%	Wingless
Heliosperma	12	♃	simple	10	"	3	3-100%	6	6-100%	Crested at the back
Silene	12 or 24 96	♃-⊙	simple or inflated	10-20	simple or bifurcating	3 or 4 (5)	3-83% 6-5% 5-12%	6 (6-10)	6-85% 8-5% 10-10%	Wingless & Winged
Eudianthe	12	♃ ⊙	simple	10	simple	5	5-95% 4-5%	10 (8-10)	6-8% 10-85%	Wingless & not crested

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