

RESULTS

PART I
SYSTEMATIC TREATMENT

Synopsis of the studied taxa

Taxa are arranged according to Melchior "Syllabus der Pflanzenfamilien", 12th edition (1964).

- | | |
|-----------------|------------------------|
| Family: | <i>Chenopodiaceae</i> |
| I- Sub-family: | <i>Cycloloboideae</i> |
| A- Tribe: | <i>Salicornieae</i> |
| a- Sub-tribe: | <i>Salicorninae</i> |
| | 1- <i>Halocnemum</i> |
| | 2- <i>Arthrocnemum</i> |
| | 3- <i>Salicornia</i> |
| II- Sub-family: | <i>Spiroloboideae</i> |
| A- Tribe : | <i>Salsoleae</i> |
| a- Sub-tribe: | <i>Anabasiniae</i> |
| | 1- <i>Noaea</i> |
| | 2- <i>Anabasis</i> |

key to genera

I - Embryo cyclic or conduplicate; fruit-perianth wingless:

A-Leaves small, forming opposite decussate bud-like tubercles
along the not jointed branches; bracts free, early deciduous
.....**Halocnemum**.

B-Leaves rudimented, branches not tuberculated, jointed, bracts
connate, persistent:

a-Internodes short (3-5mm); vegetative branches are bluish-green;
fruiting branches become mealy white at drying stage; flowers in
groups, free; seeds black**Arthrocnemum**.

b-Internodes longer than the preceding genus (6-9mm); vegetative
branches light green; fruiting branches become yellow or dark
brown at drying stage; flowers in groups, connate; seeds
brownish**Salicornia**.

II- Embryo spirally coiled; fruit-perianth winged :

A-Stem not jointed; twigs apices are spiny**Noaea**.

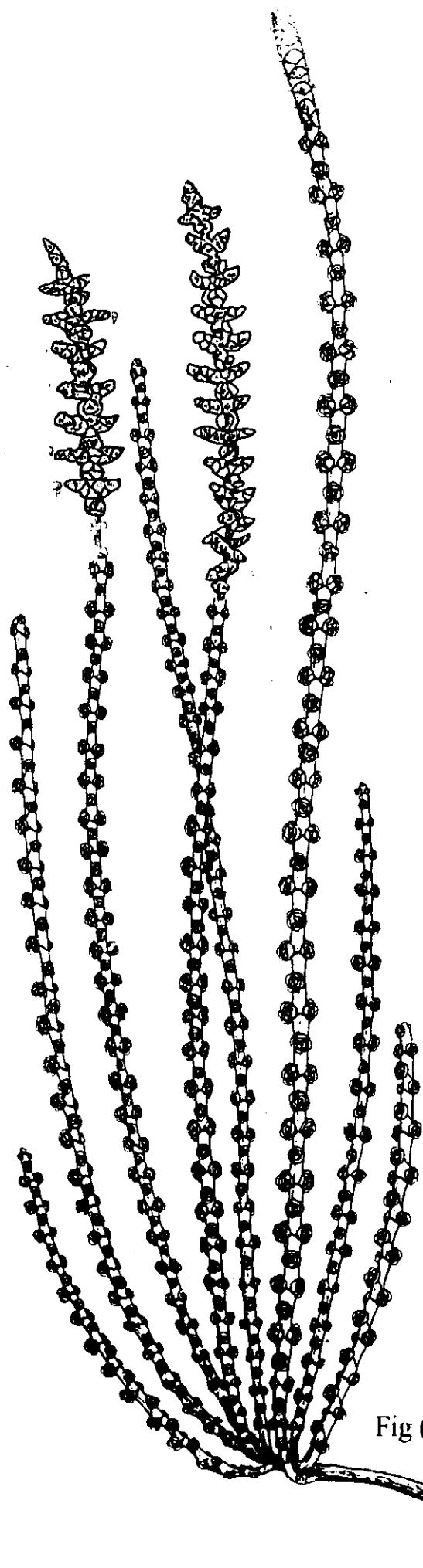
B-Stem jointed; twigs apices not spiny.....**Anabasis**.

1-Halocnemum strobilaceum (Pallas) M.Bieb., Fl. Taur. Cauc. 3:3 (1819); Boiss., Fl. Orient. IV: 936 (1879); Aschers. & Schweinf., Ill. Fl. Egypte II : 127 (1887); Muschl., Man. Fl. Egypt I:285 (1912); Thiselton, Fl. Trop. Afr.VI sec.1:85 (1913); Ramis, Best. Fl. Aegypten, 71 (1929); Dinsmore, in Post & Dins., Fl. Syr. Palest. & Sinai II, ed. 2 : 441 (1933); Parsa, Fl. Iran, IV:1027 (1949); Maire, Fl. Afr. Nor., VIII : 95 (1962); Quezel et Santa, Nouv. Fl. Alger., Tom I : 293 (1962); Reching., Fl. Lowland Iraq, 191 (1964); Zohary, Fl. Palest. I : 155 (1966); Aellen in Davis, Fl. Turk. II : 320 (1967); Migahid and Hammouda, Fl. Saud. Arab., 140 (1974); Tackholm, Stud. Fl. Egypt ed. 2:118 (1974); Jafri & Rateeb, Fl. Libya 58 : 49 (1978); Al-Rawii in Daoud, Fl. Kuwait, I : 141 (1985); Meikle, Fl. Cypr. II: 1384 (1985); Migahid, Fl. Saud. Arab. I:214 (1988); Freitag, Cont. Chenop. Fl. Egypt 183:152 (1989).

Salicornia strobilacea Pall., Reise I:412 (1771).

Type: Described from Trans-Caspian region.

Perennial, fleshy, glabrous, yellowish-green shrub. It ranges in tall from 30 to 70cm., rarely, it reaches 100cm., in tall. Stems prostrate to sub-erect, much branched. Branches are succulent, with short, thick cylindrical to club-shaped internodes ending with two obtuse cupule of leaves. These leaves enclosing globular sterile buds with 4 rows of small sessile leaves, broader than its length. Bracts, the two opposite leaves-of flower clusters, semicircular, opposite, free along its length, shed after flowering. Spikes oblong to cylindrical, lateral and terminal. Flowers



Part of flowering branch.



Cyme of three flowers



Seed



L. S. of the seed showing
the surface and embryo

Fig (1) : *Halocnemum strobilaceum* (Pallas) M. Bieb.



Photo (1) Close view for *Halocnemum strobilaceum* (Pall.)

M.B., flowering stage (28-8-1990) Salhiya.



bisexual, usually in clusters of 3, each two clusters are opposite, flowers not connate, and slightly immersed in the axis of the lax spicate inflorescence. Perianth herbaceous, 3 unequal segments keeled and slightly exceeding the third. Stamen single, anterior; stigma 2 subulate; ovary ovoid; seed vertical, brown, compressed, ovoid, papillose; embryo conduplicate; fig.(1) and photo (1 & 2).

Flowering time : August-October

Habitat : Salt marshes.

Specimens seen :-

M: 6 miles S. of Sollum 28-10-1965 *J.Osborn & I. Helmy* (CAI); East Sollum 16-4-1934 *Shabetai* (CAIM); Matruh 11-1-1940 *Shabetai* (CAIM); Mersa Matruh 15-7-1959 *Samir Ghabbour* (CAI); Matruh city, Monuments zone 30-12-1989 *El-Galaly* (CAI); Ras el Hekma, in salt marshes 26-5-1963 *V.Tackholm* (CAI); Ras el Hekma, in salt marshes 27-9-1965 *D.Osborn & al* (CAI); Ras el Hekma, in salt marshes 28-12-1989 *El-Galaly* (CAI); Alamein 16-3-1953 *F.Saad* (CAIM); Alamein 24-3-1961 *V.Tackholm* (CAI); East Alamein near sea shore 28-12-1989 *El-Galaly* (CAI); Burg el Arab-Alamein 16-3-1958 *F.Saad* (CAIM) Along the road of Burg el Arab Alamein 16-2-1965 *V.Tackholm* (CAI); Burg el Arab 20-3-1953 *Waheeb Kamel* (CAI); Burg el Arab Spring 1961 *Riad Halwag* (CAI); Burg el Arab 27-12-1989 *El-Galaly* (CAI) Kilo 55 W.Alex. On the east side of highway 28-12-1989 *El-Galaly* (CAI); Alexandrin, Damm, durch., den mareotis see 7-12-1879 *P.Ascherson*

(CAIM); Mariut Reg. 20-9-1921 *Behera inspectorate (CAIM)*; Mariut, Masraf Khorshid :Rice fields 28-8-1928 *Mustafa & Sabet (CAI)*;Mariut 5-3-1930 *J.W.Oliver (CAI)*; Moharram Bey, Alex . 29-8-1960 *Khattab (CAIM)*; Amriya,salt marsh 8-2-1966 *J.Osborn & I.Helmy (CAI)* ; Cairo-Alex. agric. road: Abees region 28-11-1989 *El-Galaly (CAI)*;Maadia, at lake Edku 30-8-1928 *Mustafa & Sabet (CAI)*; Maadia, 30kms. E. Alex. 28-11-1989 *El-Galaly (CAI)*; Edku 19-9-1977 *El-Fikky (CAI)*; Kom Abu-kashaba, near Rosetta 28-8-1952 *Boulos (CAI)*; Marsh area near sea, Rosetta 26-8-1952 *Hadidi (CAI)*;El-Busseili, area before sand dunes, Rosetta 26-8-1952 *Hadidi (CAI)* El-Busseili 12-6-1960 *A.Khattab (CAIM)*; Rosetta, August 1954 *Abd Alla El-Dalgamoni (CAI)*; El-Makati Island, lake Borollos 19-8-1961 *V.Tackholm & al (CAI)*; Along 20 kms of the road entering Borollos; W.Side 12-1-1990 *El-Galaly (CAI)*; Along the road entering Ras el Barr 3-9-1961 *V.Tackholm & M.Kassas (CAI)*; Sidi Shata, Damietta 30-8-1922 *Simpson (CAIM)*;Ezbet El-Borg : Damietta 8-1-1929 *Shabetai (CAIM)*; Kafr abu Saad-El-Manzala 17-10-1930 *Shabetai (CAIM)*; Lake Manzala : Rikk Islet 20-9-1927 *Sabet (CAI)*; Port Said Birket el Shagara Island 14-10-1939 *Shabetai (CAIM)* Port Said 16-7-1952 *Amal Amin (CAI)*; Bir Mazar, North Sinai 15-8--8-9-1951 *V.Tackholm & al (CAI)*; Northern Sinai : Sebika, 30 km W.El-Arish,salt marsh 10-11-1985 *M.Gebali (CAI)*.

DI: Qattara in a salt place,Sebkha 25-11-1976 *J.Osborn (CAI)*.

Nv:Shakshuk, shore of Birket Qarun,Faiyum 25-3-1959 *Khattab* (CAIM); Faiyum 11-1-1972 *Ibrahim El-Sayed* (CAI); Salt wastes between Damanhour-Housh Isa 13-12-1926 *Simpson* (CAIM); San El-Hagar from Sharkiya 22-7-1965 *Khattab*(CAIM), Salhiya from Sharkiya 28-8-1990 *El-Galaly* (CAI).

Di: Port Said desert, from Kantarah Gharbia-Ismailia 16-7-1952 *Amal Amin* (CAI); El-Ballah,Suez canal shore 20-11-1979 *M.Costantin & al.* (CAIM); East of Kantarah 26-4-1979 *H.Nabawy & al.* (CAIM);Near Gebel Mariam, Ismailia 29-12-1923 *Simpson* (CAIM); Gebel Mariam, S.of Timsah lake 26-12-1960 *El-Bakry* (CAI);Ismailia-Suez canal road 14-3-1979 *Abd El Aty & M.Mokhtar* (CAIM).

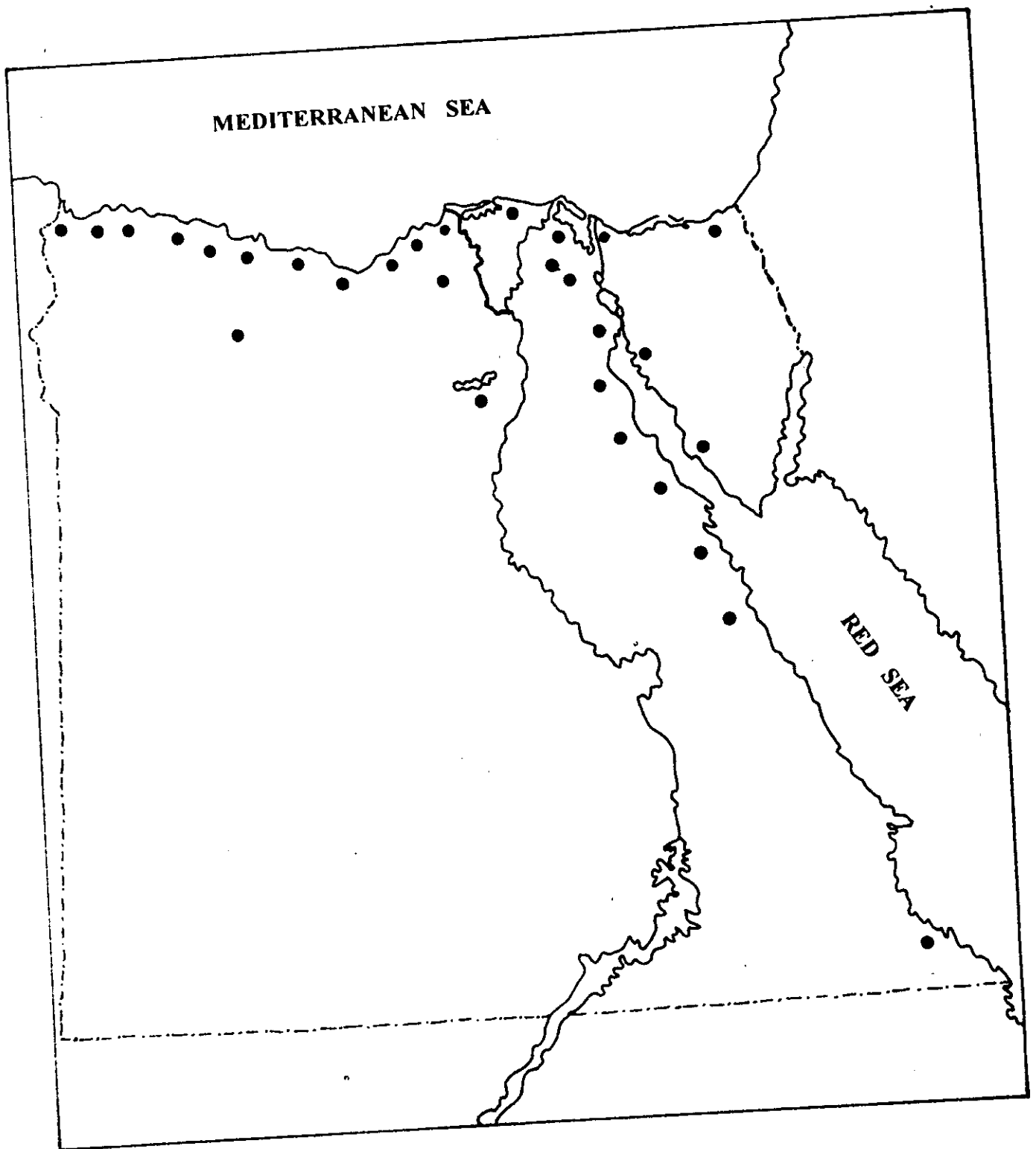
R: 27kms., S. of Suez along the coast 15-4-1960 *Kassas* (CAI);Red Sea region 4km., from Ain Sokhna 25-12-1959 *V.Tackholm & al.* (CAI);Ras Sudr 3-9-1990 *El-Galaly* (CAI); N.Abu Zenima 13-4-1962 *M.Abdallah* (CAIM);Ras Ghareb 11-3-1954 *El-Hadidi* (CAI);6km., N. of Hurghada at the Red Sea coast 12-2-1961 *V.Tackholm & al.* (CAI); Red Sea coast:Ghardaga July 1933 *A.Nayal et Y.Sabet* (CAI);Abu-Mingar Island at Hurghada 7-9-1960 *V.Tackholm & al.*(CAI).

S: Sinai : Tor 19-11-1929 *A.Nayal* (CAI); Wadi Thal S.Sinai 15-4-1962 *M.Abdallah & S.Shalaby* (CAIM);Sinai mountain region April 1940 *M.Hassib* (CAI).

Sa: At the Red Sea coast 3 km., N.Mersa Halaib 21-1-1929 *G. Tackholm*
(CAI).

Geographical Distribution : a halophytic plant common in plains of Mediterranean and Red Sea coastal lands (Map 1).

Known from Southern Europe through Asia to Mongolia;
N.Africa.



Map (1) : Distribution of *Halocnemum strobilaceum* in Egypt.

2-Arthrocnemum macrostachyum (Moric.) Moris et Delponte, Ind. Sem. Hort. Taur. 2 : 35 (1854); Thiselton, Fl. Trop. Afr., VI, sec. 1: 86 (1913); Zohary, Fl. Palest., I: 156 (1966); Jafri & Rateeb, Fl. Lib., 58: 53 (1978); Meikle, Fl. Cyp., II: 1385 (1985); Freitag, Cont. Chenop. Fl. Egypt, 183: 152 (1989).

Salicornia macrostachya Moric., Fl. Venet. I: 2 (1820)

Type : Described from Europe (Venice).

Arthrocnemum glaucum (Del.) Ung-Stemb., Atti Congr. Bot. Firenze, 283 (1876); Boiss., Fl. Orient. IV 932 (1879); Aschers. & Schweinf., Ill. Fl. Egypte II : 127 (1887); Post, Fl. Syr. Palest. & Sinai, 686 (1896); Muschl., Man. Fl. Egypt, I : 285 (1912); Ramis, Best. Fl. Aegypt., 71 (1929); Dinsmore, in Post & Dins., Fl. Syr. Palest. & Sinai, I, ed. 2 : 440 (1933); Montasir & Hassib, Ill. Man. Fl. Egypt. I : 72 (1956); Rechinger, Fl. Lowland Iraq, 192 (1964); Aellen & al. in Davis, Fl. Turk., II: 320 (1967); Migahid & Hammouda, Fl. Saud. Arab., 143 (1974); Tackholm, Stud. Fl. Egypt, ed. 2: 119 (1974).

Salicornia glauca Del., Fl. Aeg. III. 69 (1813).

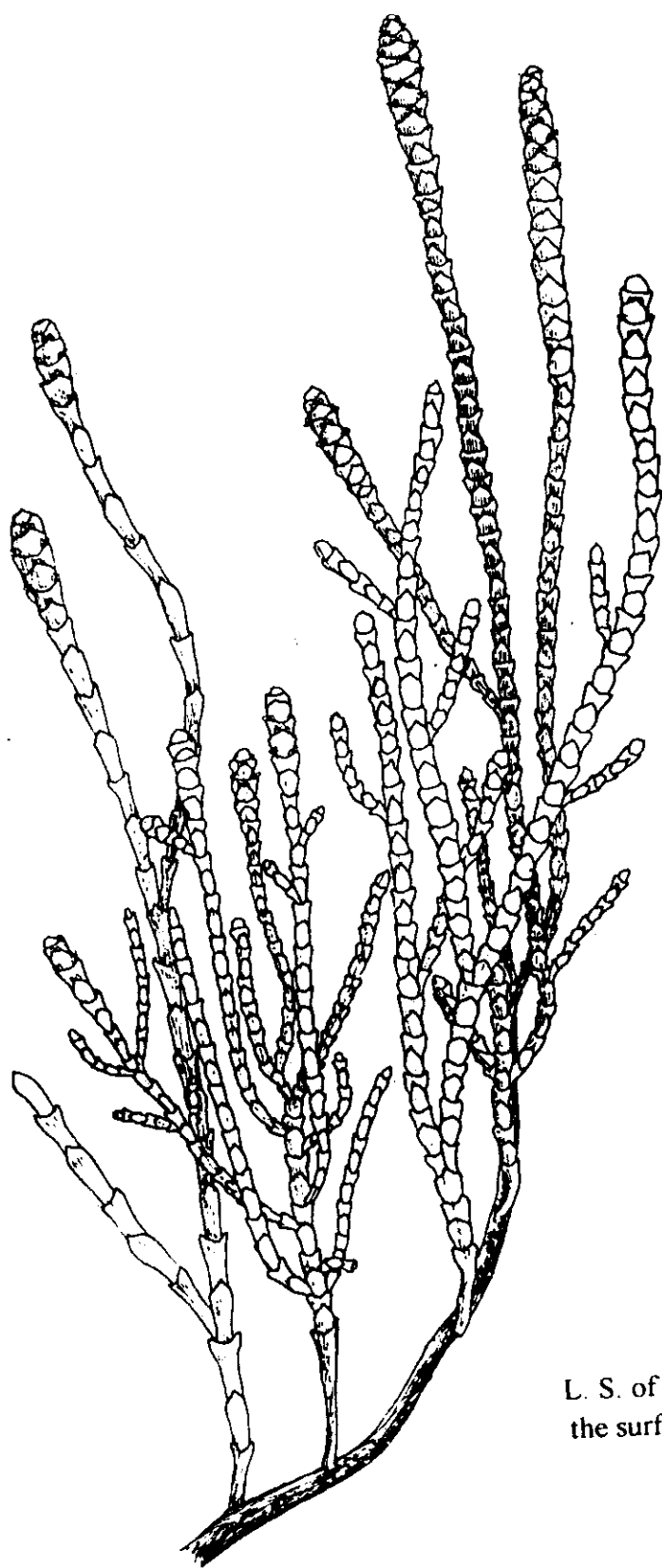
Arthrocnemum indicum (Willd.) Moq., Tand., Chenop. monogr. enum. 112 (1840); Maire, Fl. Afr. Nor., VIII: 97 (1962); Quezel et Santa, Nouv. Fl. Alger., I : 293 (1962).

Salicornia indica Willd., Nov. Act. H. Nat. V : 111 (1799).

Perennial, succulent, glabrous, glaucous, changes into mealy white colour in drying fruiting stage, much branched, 50-100 cm., tall. Branches erect or procumbent, succulent, cylindrical; the procumbent or prostrate ones rooting at base. Branches are jointed (the internodes are articulated in each other), the joints are cylindrical or club-shaped, ending with two opposite, connate below and small leaves with rudimentary lamina and they forming the acute cupules. Bracts entire, opposite, connate, persistent, each subtending a group of flowers. Spikes, erect, thick, cylindrical, obtuse, terminal, and lateral, 3-6cm long, and 3-4mm broad. Flowers are present in a cyme of 3 hermaphrodite, free or connate at base and exerted from undivided cavity to up to one third the length of joint. Perianth 2-4mm. long, usually 3-dentate, obtusely pyramidal. Stamens 2; stigma 2; ovary ovoid, somewhat compressed; seeds vertical, black, compressed, ovoid to sub spherical, covered with short papillae, 1mm in size; embryo arcuate to semicircular; Fig(2) and photo (3 & 4).

Flowering time : July-September .

Habitat: Lodged salines, banks of saline water bodies.



Part of the flowering branch.



Cyme of three flowers



L. S. of the seed showing the surface and embryo



Seed

Fig (2): *Arthrocnemum macrostachyum* (Moric.) Moris et Delponte.



Photo (3) General view showing *Arthrocnemum macrostachyum* (Moric) Moris, bearing both vegetative and fruiting branches. (28-8-1990) Salhiya .



Photo (4) Close view showing the articulated branches of *Arthrocnemum macrostachyum*.

Specimens seen:

M : Matruh, Mediterranean coast 9-6-1959 *T.Hilali* (CAIM); Matruh
14-4-1963 *H.Abd el Megid* (CAIM); Matruh, Monuments zone 30-
12-1989 *El-Galaly* (CAI); Ras el Hekma , in salt marshes 28-12-1989
El-Galaly (CAI) Alamein 16-3-1958 *F.Saad* (CAIM); Burg el Arab
30-3-1953 *Waheeb Kamel* (CAI); Burg el Arab in salt marshes 27-12-
1989 *El-Galaly* (CAI); Mariut, Qabbary 22-11-1926 *Simpson*
(CAIM); El-Max; Alex. 27-10-1961 *A.Khattab* (CAIM); Alex.
Moharram Bey 29-8-1960 *Khattab* (CAIM); Maadia, at lake Edku 30-
8-1928 *Mustafa & Sabet* (CAI); Idku, east of Alex. 20-5-1974
B.Hanna & M.Mokhtar (CAIM); 30 kilo east Alex. between Idku and
Maadia 28-11-1989 *El-Galaly* (CAI); El-Busseili 12-6-1960
A.Khattab (CAIM); Rosetta near sea (Marsh area) 26-8-1952 *Hadidi*
(CAI); Borollos 6-10-1922 *Drar* (CAIM); Baltim 28-6-1927 *Simpson*
(CAIM); El-Makati Island; lake Borollos 19-8-1961 *V.Tackholm &*
al. (CAI); Baltim; sandy hills 29-8-1968 *Hadidi* (CAI); El-Hamoul-
Baltim road 12-1-1990 *El-Galaly* (CAI); Sidi Shata; Damietta 2-5-1922
Simpson (CAIM); Ezbet el Burg; Damietta 8-1-1929 *Shabetai*
(CAIM); Lake Manzala; Masraf Hadoth 12-8-1928 *Mustafa & Sabet*
(CAI); Port Said : El-Kab; lake Manzala bank 15-10-1939 *Shabetai*
(CAIM); Port Said 13-11-1963 *H.A.El-Magid & M. Hediny* (CAIM).

DI: Moghra, Libyan desert 27-11-1976 *Dale Osborn* (CAI).

O: Bahariya Oasis 13-10-1927 *Simpson* (CAIM); Al-Harra, Bir El-Sharq, Salinized land, Bahariya Oasis 7-5-1979 *Abd El-Ghani* (CAI).

Nv: On the way from Gianaclis Farm to Abu-Matamir Western Delta 6-10-1968 *Zahran & Girgis* (CAI); Between Damanhour and Hosh Isa 13-12-1926 *Simpson* (CAIM); Qarun : Faiyum 26-5-1922 *Simpson* (CAIM); El-Gharaq: Faiyum 6-11-1928 *Drar* (CAIM); Salhiya, Sharkiya 28-8-1990 *El-Galaly* (CAI).

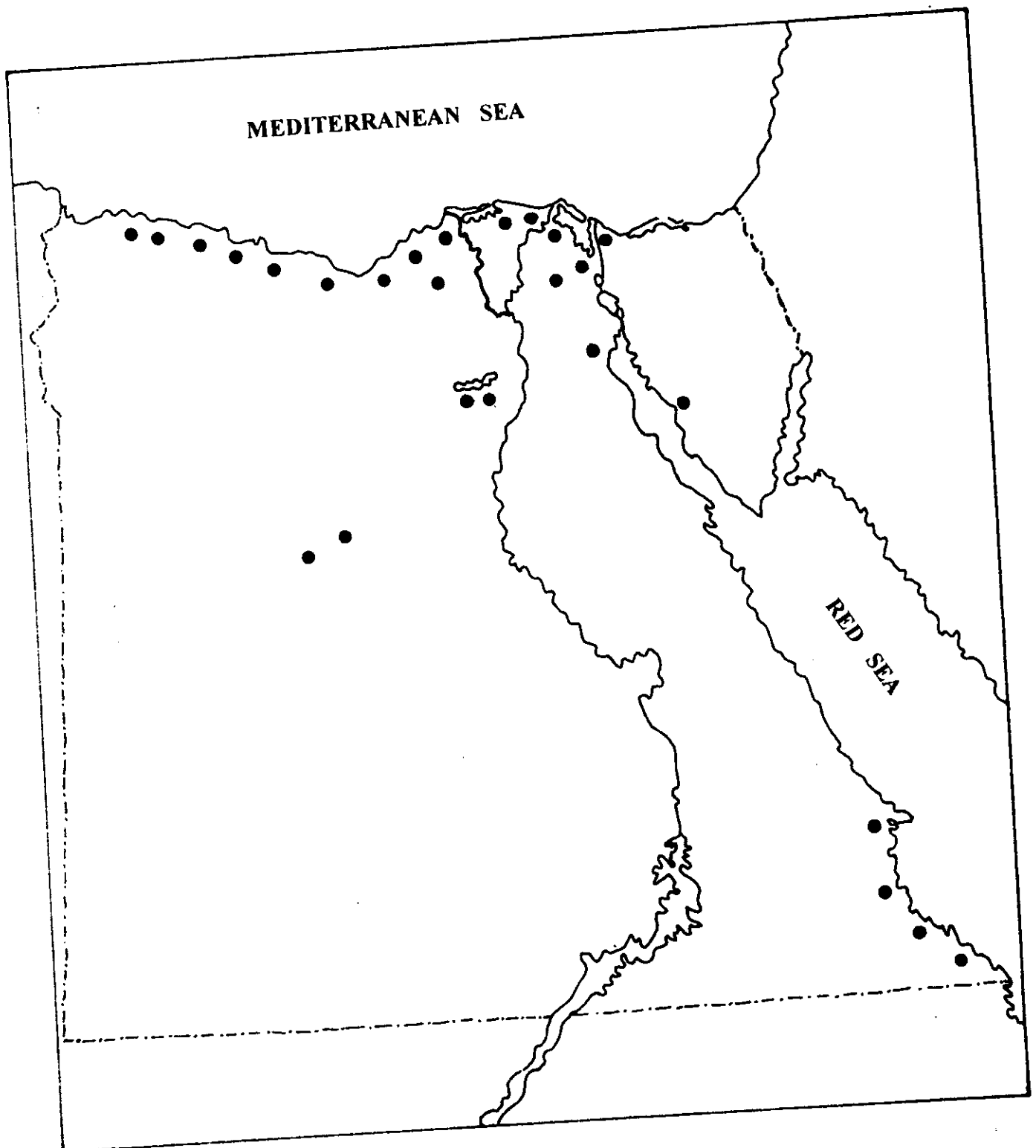
Di: Port Said desert from Kantara Gharbia-Ismailia 16-7-1952 *Amal Amin* (CAI); Ismailia at Timsah lake S.of the town 18-3-1927 *G.Tackholm* (CAI).

R: Kilo 62 S.of Suez 7-10-1960 *V.Tackholm & al* (CAI); Abu-Zeneima, Sinai 14-5-1956 *V.Tackholm* (CAI); Mersa Allam at the Red Sea 1-3-1977 *Adel Gazzar* (CAI); Littoral salt marsh at Mersa Abu-Naam 25-1-1962 *V.Tackholm & al.* (CAI).

Sa: Old water reservoir of Suakin el Qadim 31-1-1962 *V.Tackholm & al.* (CAI); Mersa Tonbash 1-2-1962 *V.Tackholm & al.* (CAI); Mersa Eikwan 1-2-1962 *V.Tackholm & al* (CAI); Coastal shore of Wadi Hateib 3-2-1962 *V.Tackholm & al* (CAI); Mersa Kolies, Red Sea 4-2-1962 *V.Tackholm & al.* (CAI); Mouth of Wadi Laseitit, Expedition to GE district 5-2-1962 *V.Tackholm & al.* (CAI).

Geographical Distribution: Common along the littoral salines of Mediterranean and Red Seas, the coastal plains of Elba district (Map 2).

Known from Southern Europe Eastwards to W. Syria, Cyprus; also from N. Africa.



Map (2) : Distribution of *Arthrocnemum macrostachyum* in Egypt.

Salicornia L. (1753)

Annual herbs or perennial shrubs. Stem glabrous, glaucous, much branched. Branches are jointed, erect or procumbent or prostrate, leaves are very small or rudimented, opposite connate in pairs, bracts opposite, connate, persistent, cuplike. Flowers bisexual, usually 3 in cyme forming the spicate inflorescence. Fruit-spikes narrow, slender, yellowish or dark brown at drying; seeds vertical, usually ovoid, covered with short curved or hooked hairs; embryo conduplicate.

Key to the species

- A- Annual herb, lateral flowers of the cyme meeting below the central flower; seed covered with long, coiled apex hairs
.....3-**S.europaea.**
- B- Perennial shrub; lateral flowers of the cyme completely separated by the middle one, seed covered with short, pointed apex hairs:
- a- Stem erect, rooting from the base; fruiting branches become yellow at drying stage.....4-**S. fruticosa.**
- b- Stem prostrate, mat-shaped not rooting from the base; fruiting branches become dark brown at drying stage
.....5-**S.lignosa.**

3-Salicornia europaea Linn., Sp. Pl. ed. 1:3 (1753); Butcher, Anew Ill. Brit. Fl. 1:500 (1961); Maire. Fl. Afrique, Nord, VIII: 100 (1962); Quezel et Santa, Nouv. Fl. Algerie, I : 293 (1962); Zohary, Fl. Palest., 1:157 (1966); Ball in Davis, Fl. Turkey. II:321 (1967); Jafri & Rateeb, Fl. Libya, 58: 57 (1978); Meikle, Fl. Cyprus II:1387 (1985); Freitag, Contrib. Chenop. Fl. Egypt, 183:152 (1989).

Type : Described from Gotland. Herb. Linn. 10/1 (LINN)

Salicornia herbacea Linn., Sp. Pl. ed. 2:5 (1762); Boiss., Fl. Orient. IV: 933(1879); Aschers. et Schweinf., Ill. Fl. Egypte II:127 (1887); Post, Fl. Syria, Palestine & Sinai, 686 (1896); Mushler, Man. Fl. Egypt 1:287 (1912); Thiselton Fl. Trop. Africa VI, sec. 1:86 (1913); Ramis, Bestimm. Fl. Aegypten 71 (1929); Dinsmore in Post & Dins., Fl. Syria, Palestine & Sinai ed. 2, II : 440 (1933); Parsa, Fl. Iran, IV : 1022 (1949); Montasir & Hassib, Ill. Man. Fl. Egypt I : 73 (1956); Rechinger, Fl. Lowland Iraq, 192 (1964); Tackholm, Stud. Fl. Egypt ed. 2:119(1974); Al-Rawii in Daoud, Fl. Kuwait I : 142 (1985).

Annual, succulent, glabrous, glaucous herb. 20-50cm., height. Stems erect, woody at base, jointed, not rooting at base, decussately branched. Branches erect, green often turning into purplish in fruiting stage and in the habitats of higher salinity. Leaves are rudimented, opposite, connate in pairs forming the cups at joint ends. Spikes slender, cylindrical, slightly tapering at top, about 4-10 cm., long. Each spike

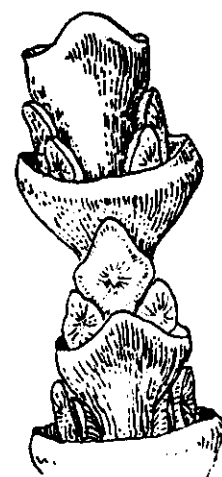
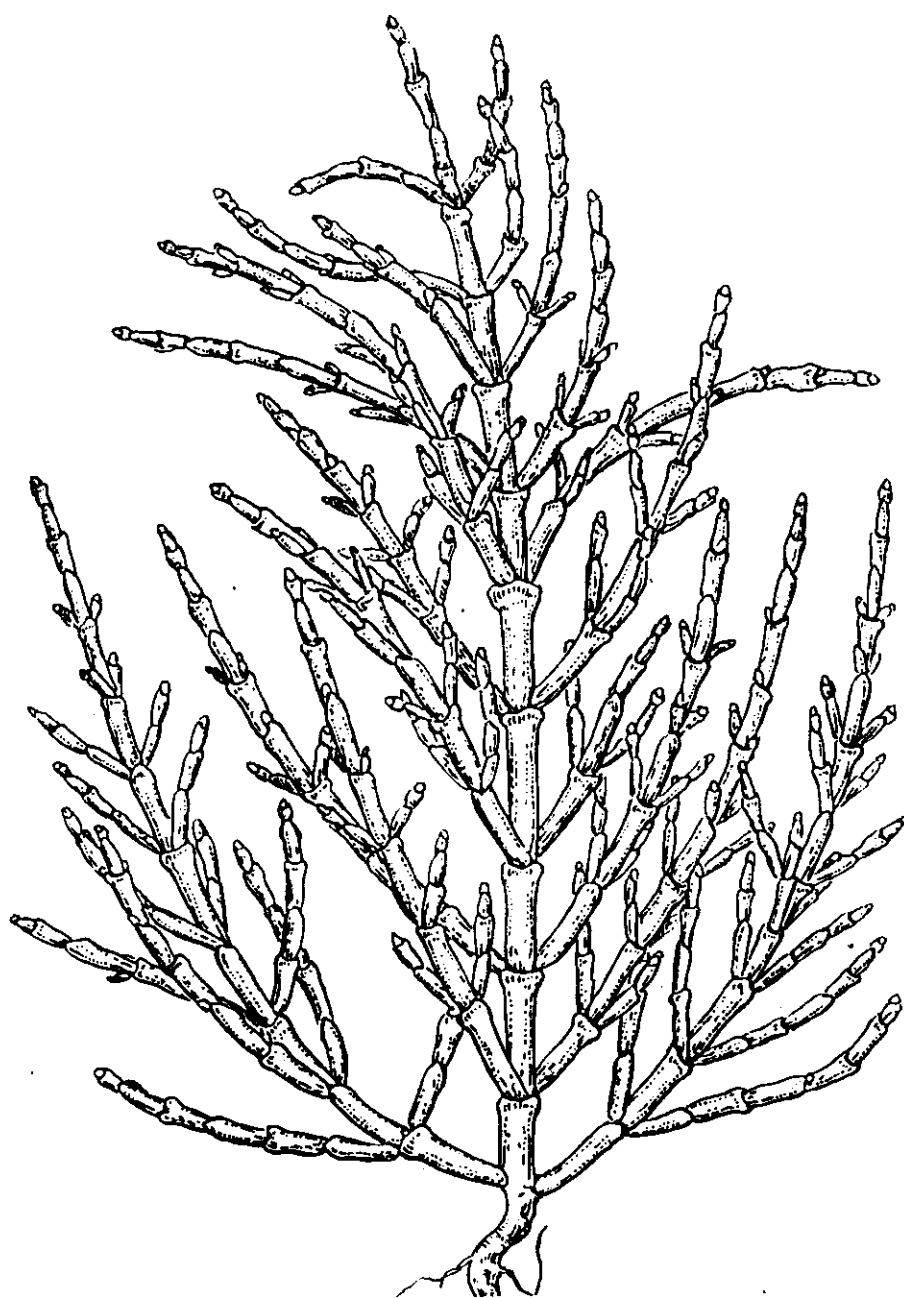
consists of 3-flowered cyme. These cyme imbedded in the cup. The middle flower projecting above the lateral ones and nearly twice as large as them. After shedding the mature flowers, they leave a cavity of three segments. Perianth oval and rhomboidal. Stamen 1, ovary ovate, slightly compressed, style one ending with two subulate stigmas; embryo arcuate. Seed vertical almost oblong-ovoid covered with long coiled apex hairs; Fig (3) & photo (5 & 6).

Flowering time: August-November.

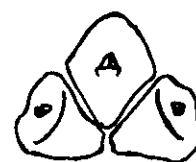
Habitat: Salt marshes.

Specimens seen :

M: Ras el Hekma 15-3-1958 *V. Tackholm* (CAI); Burg el Arab, salt marshes 27-12-1989 *El-Galaly* (CAI); Abees; Alex. 8-10-1989 *El-Galaly* (CAI); Mamourah; Alex. 18-12-1927 *Simpson* (CAIM); Maadia, lake Idku 28-11-1989 *El-Galaly* (CAI); Lake Borollos, El-Makati Island 19-8-1961 *V. Tackholm & al.* (CAI); Balteem 26-6-1927 *Simpson* (CAIM); Ezbet Salem S. Balteem 12-1-1990 *El-Galaly* (CAI); Burg el Borollos 12-1-1990 *El-Galaly* (CAI); Between Ras el Bar and Damietta 13-9-1929 *Hefnawy* (CAI); Sidi Shata near Damietta 30-8-1922 *Simpson* (CAIM); Lake Manzala: Sidi El-Boghdadi 27-8-1931 *Sabet* (CAI); Port Said 14-10-1939 *Khattab* (CAIM).



Part of the flowering branch



Arrangement of the three flowers in the cyme



L. S. of seed showing surface and embryo

Fig (3) : *Salicornia europaea* L.



Photo (5) General view of a community of *Salicornia europaea* L. (12-1-1990) Balteem .

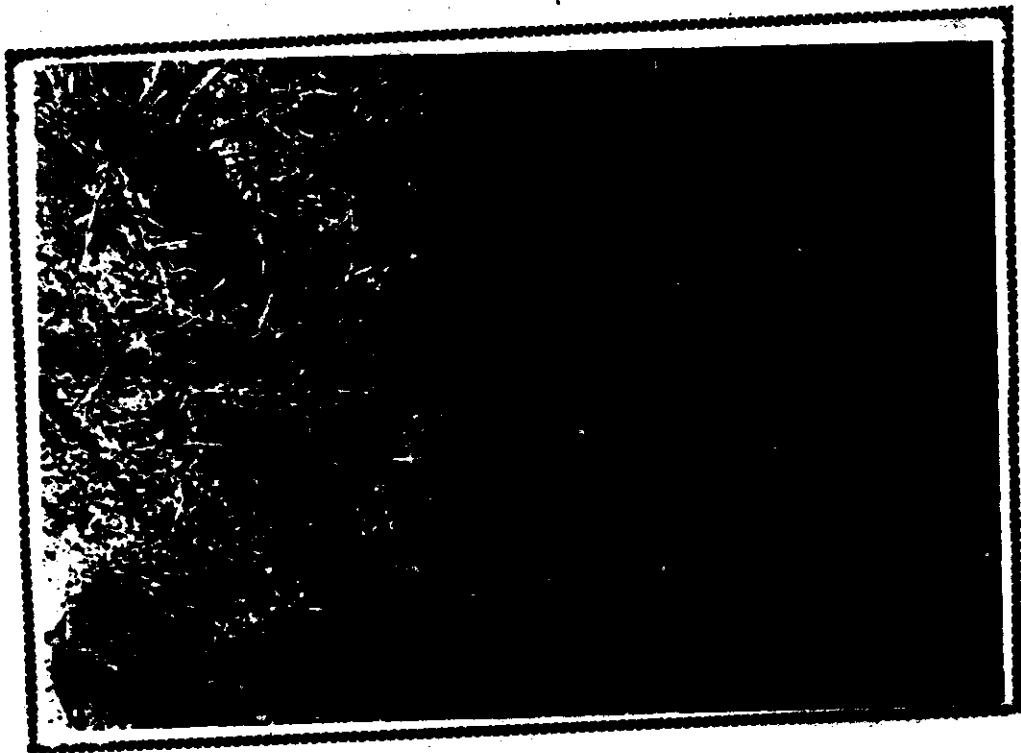
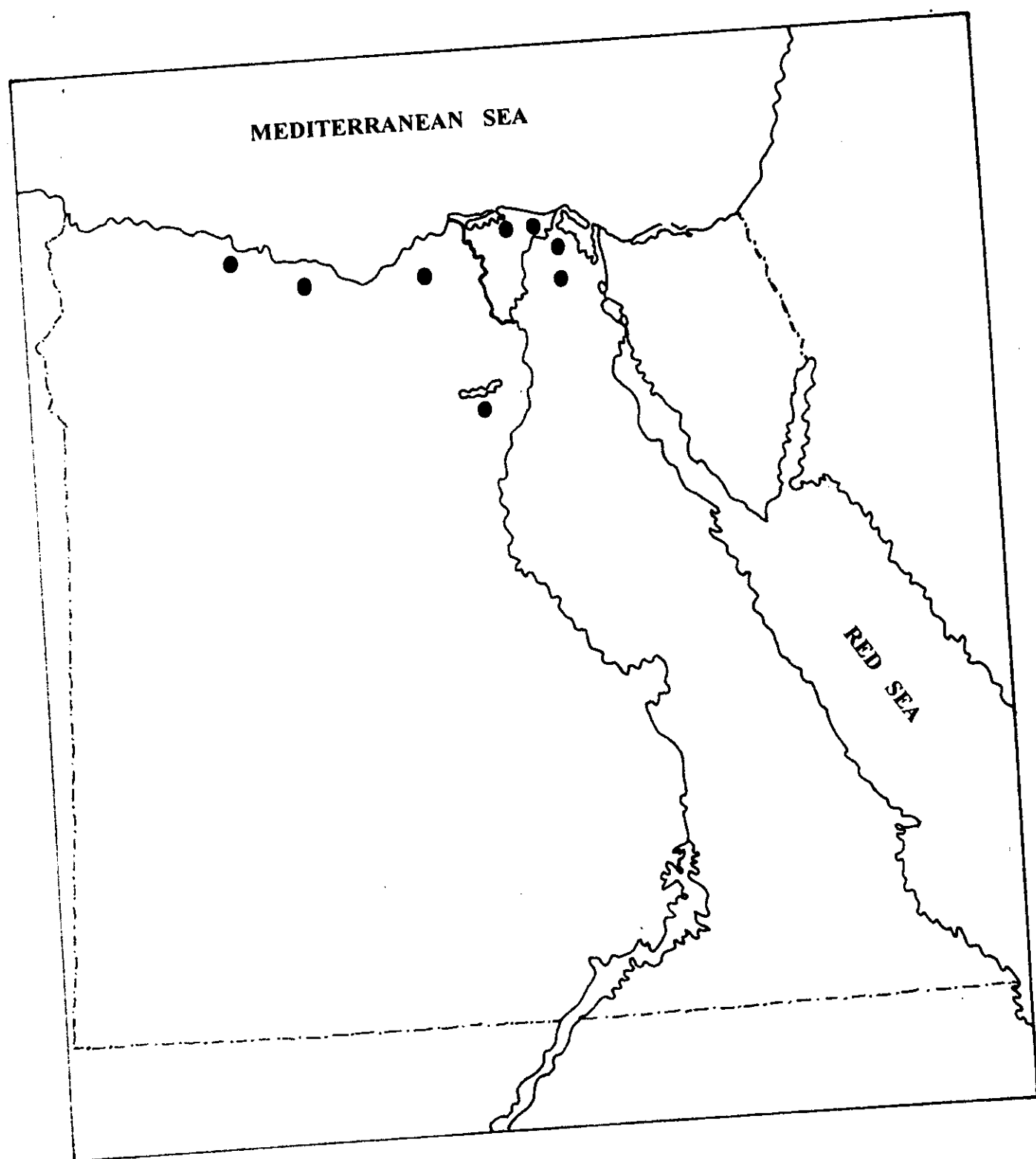


Photo (6) Close view showing *S. europaea* L. in the fruiting stage, appearing dark brown.

Nv: Near lake Qarun, Faiyum 28-5-1922 *Simpson* (CAIM); Shakshuk, lake Qarun 29-10-1944 *P.H.Davis* (CAIM); Birket Qarun, Faiyum 8-11-1983 *A.Abbas & M.Mokhtar* (CAIM); Lake Qarun, Faiyum 29-11-1991 *El-Galaly* (CAI); San el Hagar, Sharkiya 18-10-1989 *El-Galaly* (CAI); Salhiya, Sharkiya 28-8-1990 *El-Galaly* (CAI).

Geographical Distribution: Common along the Mediterranean coastal land, southwards in inland salt marshes (Map 3).

Known from marshy places of Europe. Asia, N.Africa and N.America.



Map (3) : Distribution of *Salicornia europaea* in Egypt.

4-Salicornia fruticosa (L.) Linn., Sp. Pl.ed. 2:5 (1762); Boiss., Fl. Orient. IV:933 (1879); Aschers.et Schweinf., Ill. Fl. Egypte II:127 (1887); Post, Fl. Syria, Palestine & Sinai 686(1896); Muschler, Man. Fl. Egypt I:286(1912); Ramis, Bestimm. Fl. Aegypten 71 (1929); Dinsmore in Post & Dins., Fl. Syria, Palestine & Sinai ed. 2,II:440 (1933); Parsa, Fl.Iran, IV:1021 (1949); Montasir & Hassib, Ill.Man. Fl. Egypt I:73 (1956); Migahid & Hammouda, Fl. Saudi Arabia I: 143(1974); Tackholm, Stud. Fl. Egypt ed.2:119(1974); Meikle, Fl. Cyprus II: 1386 (1985); Freitag, Contrib.Chenop .Fl. Egypt, 183 : 153 (1989).

Salicornia europaea L. var. *fruticosa* Linn., Sp.Pl. 3(1753).

Type : Habitat in Europae litoribus maritimis.

Arthrocnemum fruticosum (L.) Moq., Chenop. Monogr.Enum. 111(1840) et in DC., Prodr. 13,2:151 (1849); Zohary, Fl. Palest.I: 156 (1966); Aellen & al in Davis, Fl. Turkey. II:320 (1967); Jafri & Rateeb. Fl. Libya, 58 : 54 (1978).

Sarcocornia fruticosa (L.) Scott,Bot.J.Linn., Soc. 75:367 (1977).

Perennial, succulent, glabrous, glaucous shrub; forming patches or tufts up to 1 meter height. Stems erect woody, jointed, more or less decussately branched, rooting at base forming stolons. Leaves are

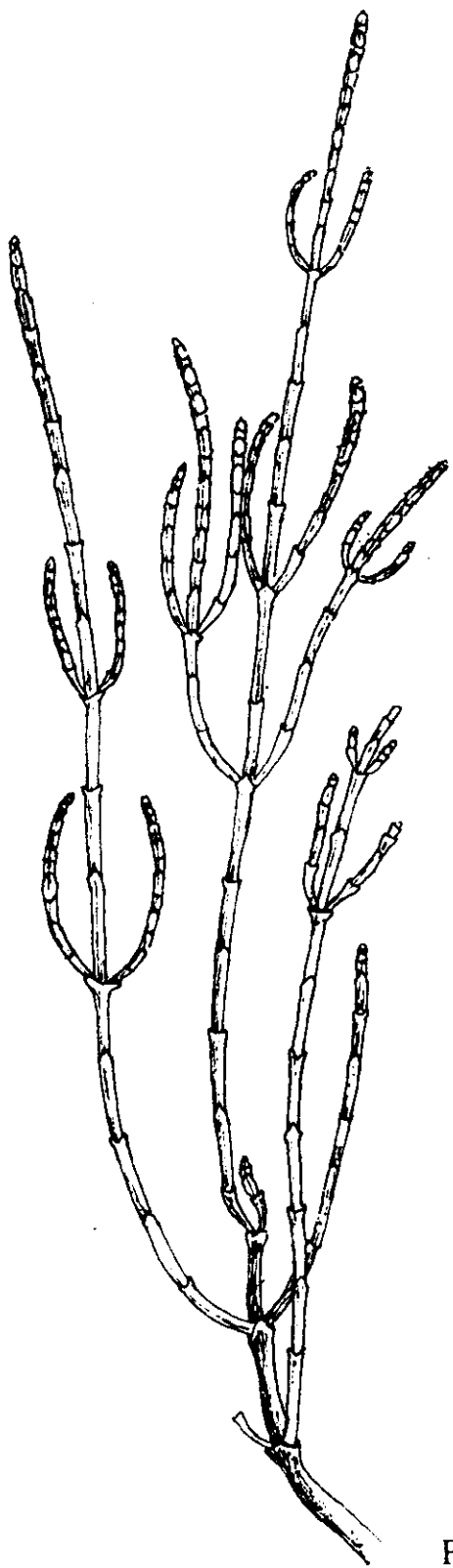
rudimented and represented by the membranous margined cupular sheath at the end of the joint. Spikes cylindrical, obtuse, terminal and lateral, green turned to yellow when drying, about 14cm., long. Spikelet cyme, 3-flowered, immersed in the floral cavities, slightly outcurved above. The middle flower completely separates the lateral ones. Perianth of the middle flower slightly pentagonous or trapezoidal at top. Stamen 2; ovary ovoid, somewhat compressed, stigma 2, projecting out, embryo arcuate to semicircular. Seeds vertical, brownish, testa covered with small, thick conical protrusions; Fig (4) & Photo (7, 8 & 9).

Flowering time : August-September .

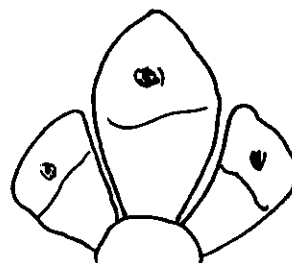
Habitat: Salt marshes.

Specimens seen :-

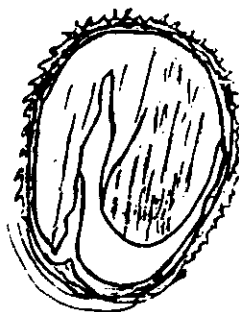
M: Bir Ramla-Sallom, near the sea 7-4-1970 *A.Abbas (CAIM)*; Mersa Matruh, Medit.Coast 8-6-1959 *T.Hilali (CAIM)*; Mersa Matruh Monuments zone 30-12-1989 *El-Galaly (CAI)*; Burg el Arab, in the salt marshes 28-3-1957 *V.Tackholm (CAI)*; Burg el Arab salt marshes 27-12-1989 *El-Galaly (CAI)*; Alexandria, Moharram Bey 29-8-1960 *Kkattab (CAIM)*; Abu Qir 6-5-1976 *S.El-Khanagry & Mokhtar (CAIM)*; Maadia, at lake Edku 30-8-1928 *Sabet (CAI)*; Edku E.Alex. 26-7-1965 *A.Khattab (CAIM)*; Edku 20-5-1974 *H.Helmy & A.El-Heddiny (CAIM)*; 30km., East Alexandria, near Maadia 28-11-1989



Part of the flowering branch.



Arrangement of the three flowers in the cyme.



L. S. of seed showing the surface and embryo

Fig (4) *Silicornia fruticosa* L.



Photo (7) General view of *Salicornia fruticosa* L.
in the flowering stage (28-8-1990) Salhiya .



Photo (8) Close-up view showing the spicate inflorescence of
S. fruticosa .



Photo (9) A view showing *Salicornia fruticosa* forming stolon and the adventitious roots, Borollos (12-1-1990)

El-Galaly (CAI); Rashid N. 15-12-1949 *A.Khattab (CAIM)*; El-Buseili 20-5-1974 *H.Helmy & A.El-Heddiny (CAIM)*; Rosetta 20-4-1973 *Ibrahim & al. (CAI)*; Baltim 28-6-1927 *Simpson (CAIM)*; Lake Borollos 2-4-1940 *J.R.S (CAIM)*; Emad, 3km., W. of Borollos Gulf, Burg el Borollos area 16-8-1961 *V.Tackholm & al. (CAI)* Lake Borollos 12-1-1990 *El-Galaly (CAI)*; Between Hamoul and Baltim 11-9-1929 *Hefnawy (CAI)*; Ezbet Salem W. Baltim 12-1-1990 *El-Galaly (CAI)*; Sidi Shata, Damietta 5-8-1927 *Simpson (CAIM)*; Damietta 8-1-1939 *M.Darar (CAIM)*; Damietta 6-2-1954 *Boulos (CAI)*; Lake Manzala: Meal Islet 21-9-1927 *Sabet (CAI)*; Lake Manzala : Bar El-Hammar 27-8-1931 *Sabet (CAI)*; El-Matariya, Dakahliya 21-5-1967 *Mohamed El-Mahdi (CAI)*; Port Said, El-Kab, lake Manzala bank 15-10-1939 *A.Khattab (CAIM)*; Port Said 11-2-1966 *J.Osborn & I.Helmy (CAI)*.

O: Khanisa, Siwa Oasis 26-3-1940 *Drar (CAIM)*; Bahariya Oasis 4-7-1933 *Drar (CAIM)*; Dakhla Oasis Bir El-Sheikh Waly 8-3-1934 *Shabetai (CAIM)*.

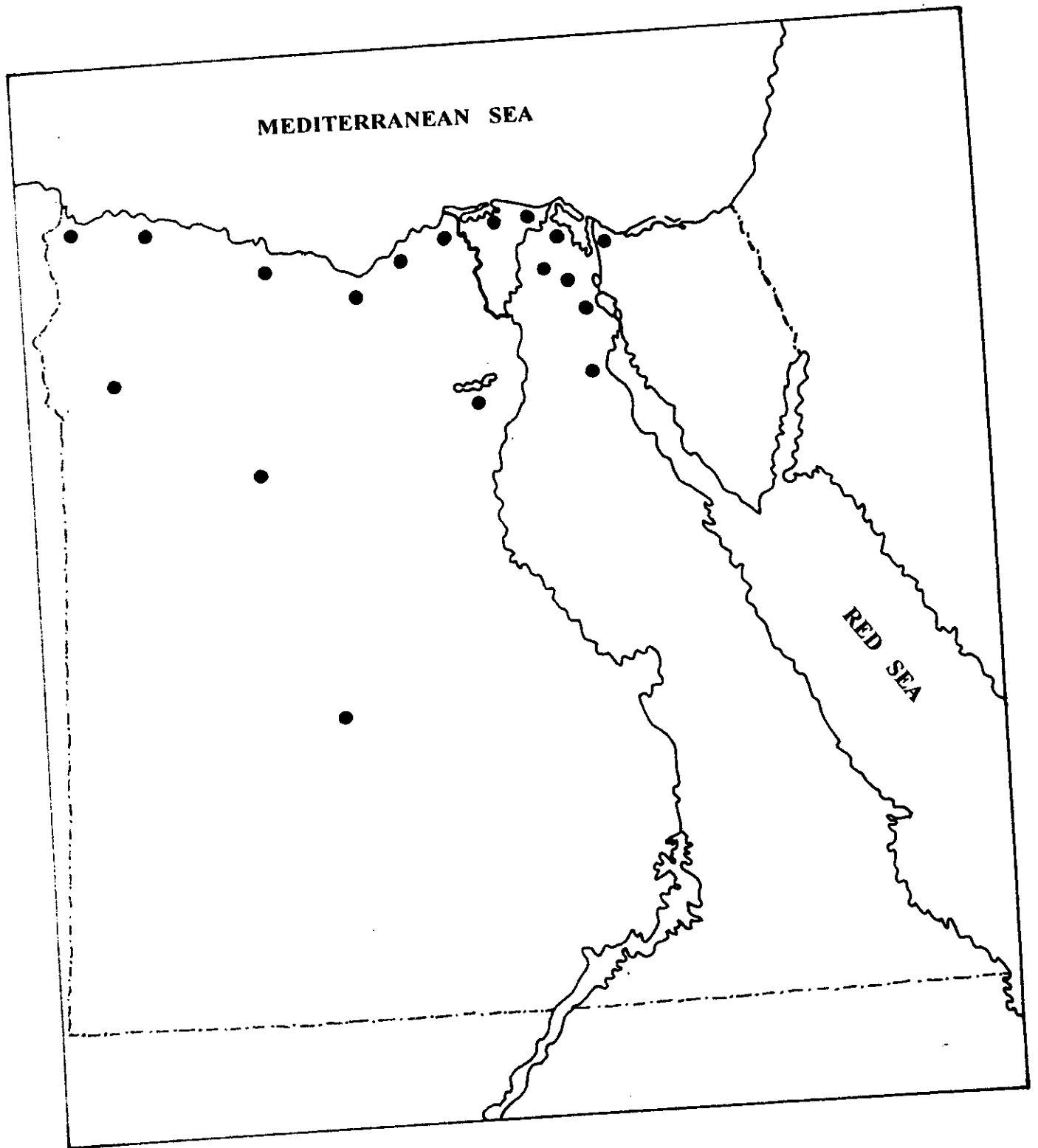
Nv: Faiyum: Ezbet el Uni, S. of Birket Qarun 21-11-1926 *G.Tackholm (CAI)*; Faiyum: Ezbet El-Newishi 22-6-1980 *Abbas & A.El-Heddiny (CAIM)*; Lake Qarun, Faiyum 29-11-1991 *El-Galaly (CAI)*; San el Hagar from Sharkiya 30-1-1928 *Aqrudi (CAIM)*; San el Hagar, Monuments zone 18-10-1989 *El-Galaly (CAI)*; Salhiya in Birket el Bat 28-8-1990 *El-Galaly (CAI)*.

Di : Ismailia, at Timsah lake S.of the town 18-3-1927 *G. Tackholm*
(CAI); Gebel Mariam, S. of Timsah lake 12-6-1981 *El-Bakry* (CAI);
Ain Sokhna 13-3-1953 *H.A. Gohar* (CAI).

Geographical Distribution :

Common plant in salt marshes with moderate salinity along the
Mediterranean coasts and in the inland marshes (Map 4).

Known from Mediterranean coasts of Europe, France, N. Africa,
Arabia, W. Syria, Iran, and N. America.



Map (4) : Distribution of *Salicornia fruticosa* in Egypt.

5-Salicornia lignosa Woods, in Proc. Linn. Soc.2, III : 31 (1851);
Tackholm, Stud. Fl. Egypt ed.2:119 (1974).

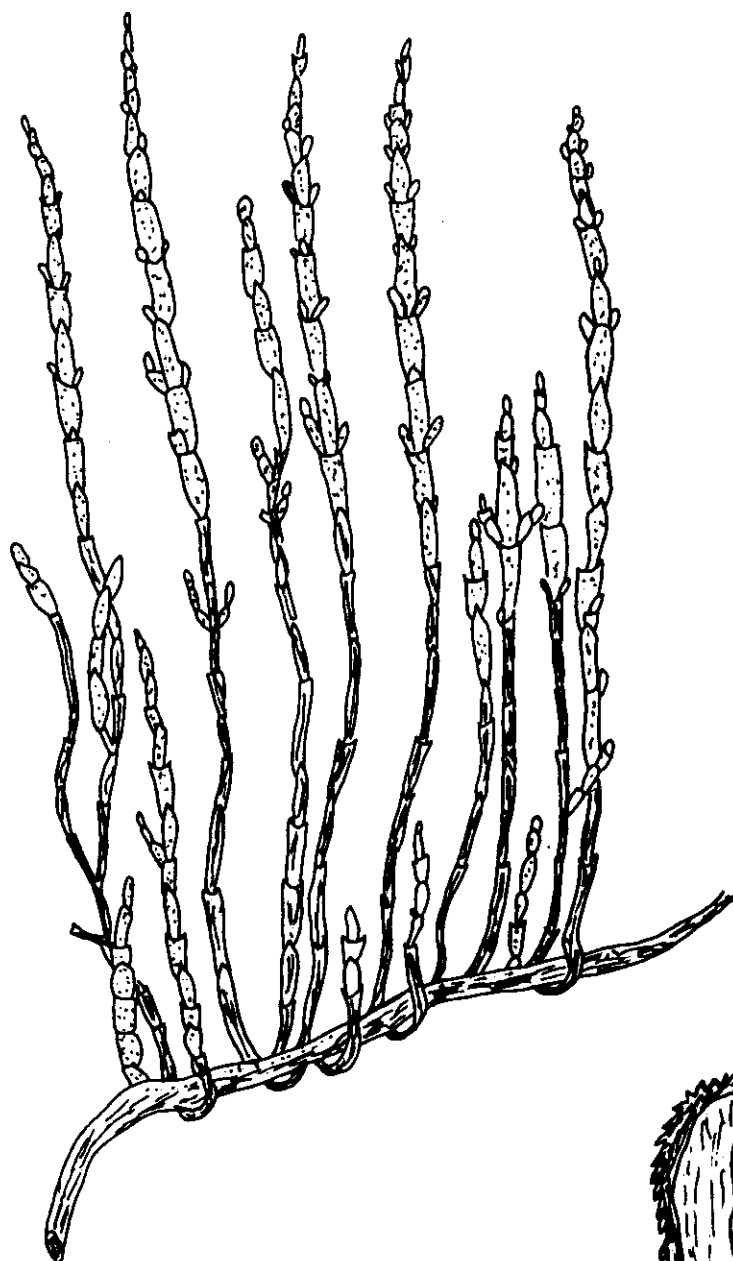
Type: Described from Europe.

Salicornia perennis Mill., Gard. Dicot. ed. 8,no.2 (1768); Butcher,
Anew Ill. Brit. Fl. I:504 (1961); Maire, Fl. Afr. Nord VIII : 102 (1962).

Salicornia radicans Sm., Engl. Bot. 24; t.1691 (1807).

Arthrocnemum perenne (Mill.) Moss, Journ. S.Afr. Bot. 14:40 (1948);
Zohary, Fl. Palest. I : 156 (1966); Jafri & Rateeb Fl. Libya 58:56
(1978).

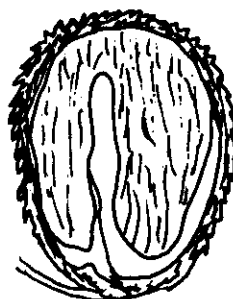
Perennial shrub, succulent, glabrous, glaucous. Stems woody below, 10-22-cm high, numerous, growing erect from creeping and branched woody main stem. Creeping stem not forming adventitious roots from the nodes and forming mat of the plant. Stems articulated and having a reduced leaves which represented by the cupular sheath, about 2mm. Spikes terminal and lateral 2-4cm., long cylindrical, obtuse, become brown in drying. Flowers three, nearly equal, imbedded in the floral cavity. The central flower completely separating the outer ones, almost reaching the top of the joint. Perianth of the central flower obtrapezoidal or rhomboidal at top, but that of the outer ones is triangular. Stamens two; ovary ovoid, somewhat compressed, stigma 2;



Part of the flowering branch



Arrangement of the three flowers in the cyme



L. S. of the seed showing the surface and embryo

Fig (5) : *Salicornia lignosa* Woods

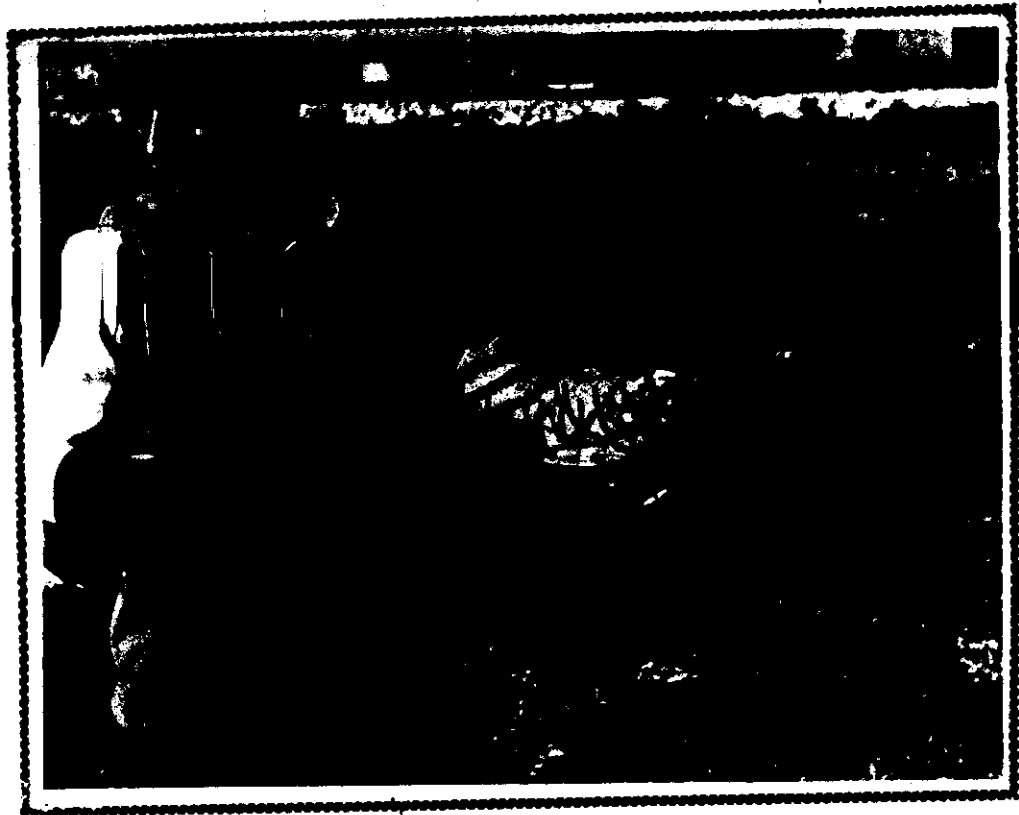


Photo (10) *Salicornia lignosa*. Woods, prostrate stem with main root only, never produces adventitious roots at the nodes. Borollos (12-1 -1990).



Photo (11) Close view showing the creeping stem and bears the ascending and erect vegetative branches. San El-Hagar (18.10-1989).

embryo arcuate. Seeds globular covered with short curved hairs; fig (5) & photo(10 & 11).

Flowering time: August-September

Habitat: Dry salt marshes

Specimens seen:

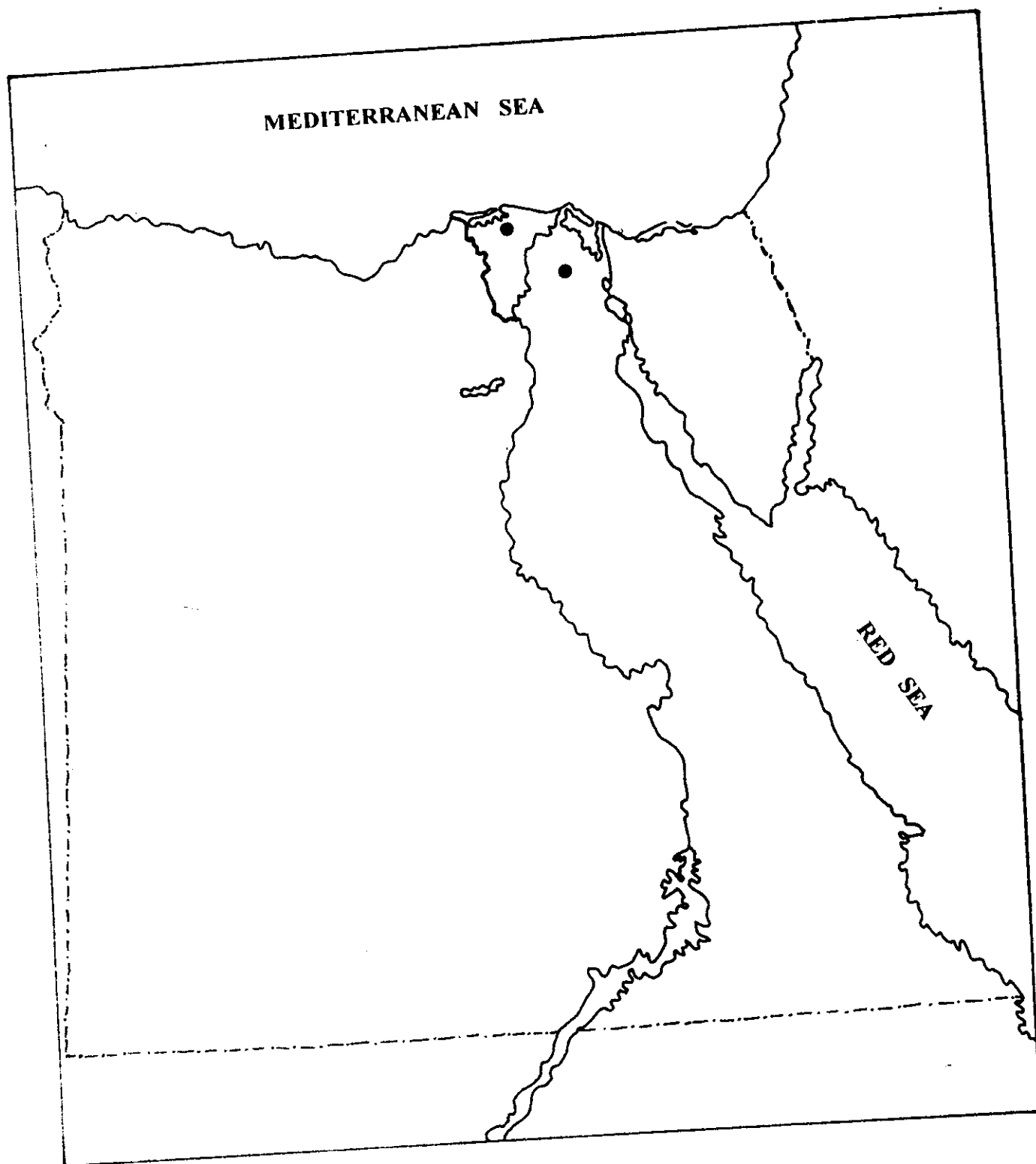
M: El-Borollos Sept.1952 *Kassas* (CAI);Ezbet Salem W.Borollos 12-1-1990 *El-Galaly* (CAI).

Nv: Sharkiya: San el Hagar at Monuments zone 18-10-1989 *El-Galaly* (CAI)

Geographical distribution:

Rarely distributed, in dry soils of salt marshes (Map 5).

Known from Europe, Mediterranean and Euro-Siberian territories.



Map (5) : Distribution of *Salicornia lignosa* in Egypt.

6-Noaea mucronata (Forssk.) Aschers. & Schweinf., Ill. Fl. Egypte 2:131 (1887); Muschler, Man. Fl. Egypt 1:300 (1912); Ramis, Bestimm. Fl. Aegypten 68 (1929); Dinsmore in Post & Dins., Fl. Syr. Palest. Sinai, vol. II, ed. 2 : 451 (1933); Parsa. Fl. Iran, IV : 1074 (1949); Maire, Fl. Afr. Nord, VIII : 167 (1962); Quezel et Santa, Nouv. Fl. Alg. 1:297 (1962); Rechinger, Fl. Low. Iraq, 206 (1964); Zohary, Fl. Palest. 1:175 (1966); Davis, Fl. Turk., II:336 (1967); Tackholm, Stud. Fl. Egypt, ed. 2:127 (1974); Jafri & Rateeb, Fl. Libya 58:101 (1978); Meikle, Fl. Cyprus II:1393 (1985); Migahid. Fl. Saud. Arab. I : 202 (1988); Freitag, Cont. Chenop. Fl. Egypt 183:167 (1989).

Salsola mucronata Forssk., Fl. Aeg. Arab. 56 (1775).

Type: (Egypt) Alexandria, ad Catacombas, Forsskal 182 ; (C, lecto.)

Anabasis spinosissima L. fil., Suppl. Plant. 173 (1781).

Noaea spinosissima (L.) Moq., in DC., Prodr. 13,2:209 (1849); Boiss., Fl. Orient., IV. 2:965 (1879); Post, Fl. Syr. Palest. Sinai 691 (1896); Montasir & Hassib, Ill. Man. Fl. Egypt 1:64 (1956).

Perennial, glabrous shrub, up to 80cm., Stem woody, procumbent to erect, much branched from base. Branches rigid, flexuous, intricate; twigs spreading, bearing flowers from base to middle, spiny at tip.

Leaves alternate, semi-terete, subulate, 8-10 mm long, 1.5 mm wide, scabrous at margin; bracts and bracteoles ovate, subulate. Flowers bisexual, solitary in axils, alternated along the branches, often crowded at base of twigs and forming the racemose inflorescence; perianth segments 5, shortly connate at base, 3-4mm long, all developed into wings in fruit; wings unequal, 5-6mm in diam., imbricated, membranous, white or purplish, obovate to oblong, with sinuate margins. Staminodes 0 ; stamens 5, free, inserted on a fleshy, lobed disk, anthers appendaged, lanceolate about 2.5mm long. Ovary ovoid; style elongate with two subulate stigmas. Embryo spiral coiled, green. Fruit winged. Seeds vertical, compressed, orbicular, fig (6) & photo (12 & 13) .

Flowering time: August-October.

Habitat : Semi-desert habitats.

Specimens seen:

M: Sallum plateau near the boundary 28-9-1963 *Boulos* (CAI); Sallum plateau near the boundary 29-12-1989 *El-Galaly* (CAI); Cliffs Norht of Sallum 23-10-1965 *Osborn & Helmy* (CAI); Kilo 61 East of Sallum 29-12-1989 *El-Galaly* (CAI); 120km West of Mersa Matruh 28-9-1963 *Boulos* (CAI); 24km East Mersa Matruh 28-12-1989 *El-Galaly* (CAI); Ras el Hekma 20-7-1959 *Ghabbour* (CAI); Alamein 17-4-1959 *F.Saad* (CAIM); Alamein 30-3-1969 *A.Abbas* (CAIM);

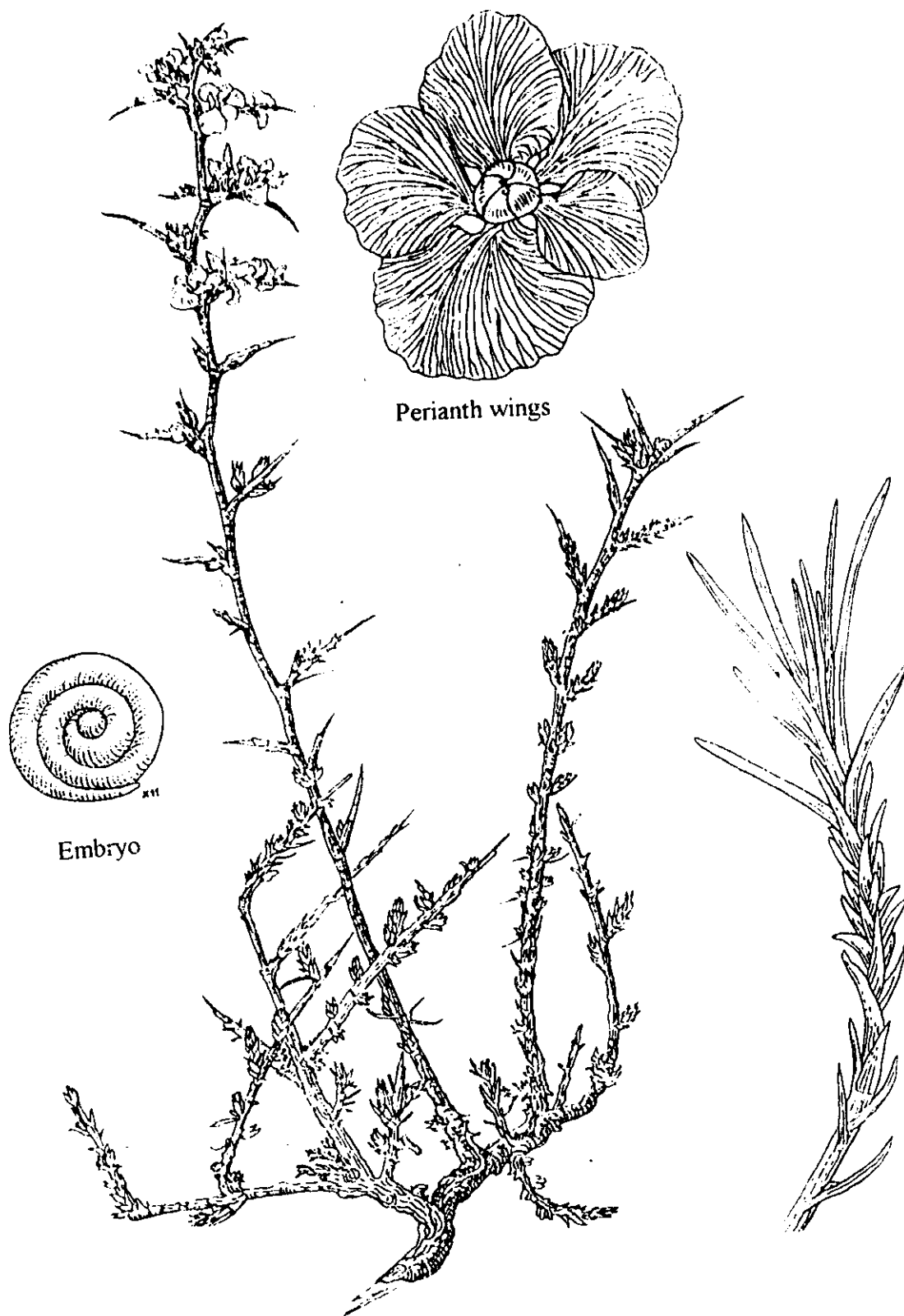


Fig. (6) *Noaea mucronata* (Forssk.) Aschers. & Schweinf.

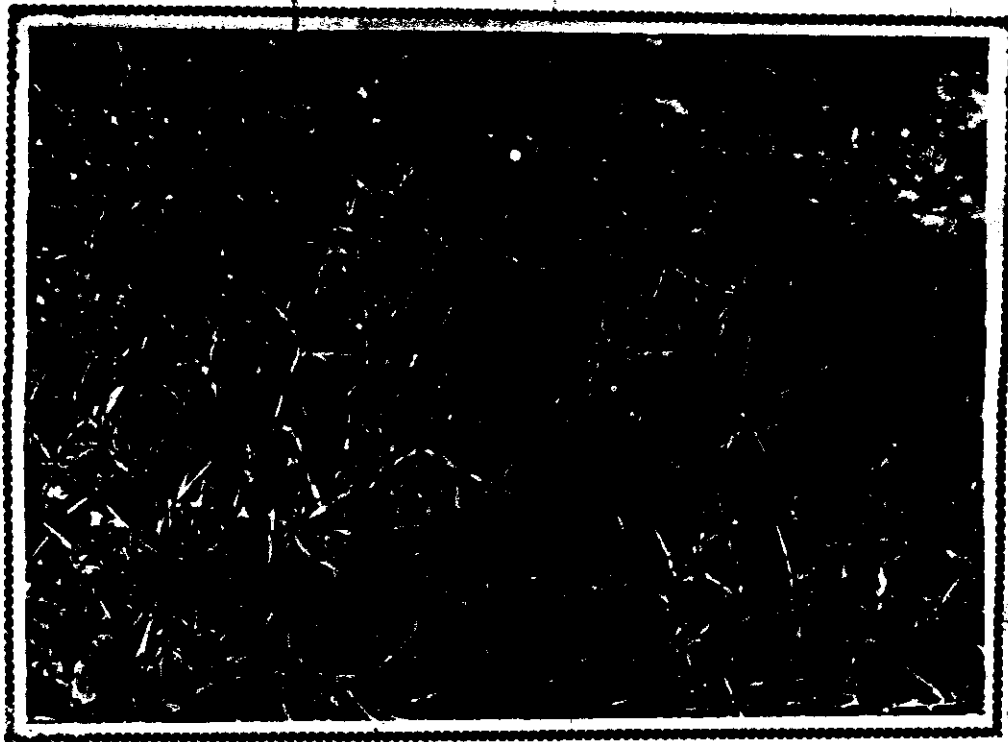


Photo (12) General view showing the habit of *Noaea mucronata*
(Forssk.) Ascherson & Schweinfurth (28-11-1989)
Cairo- Alexandria desert road at kilo 169.

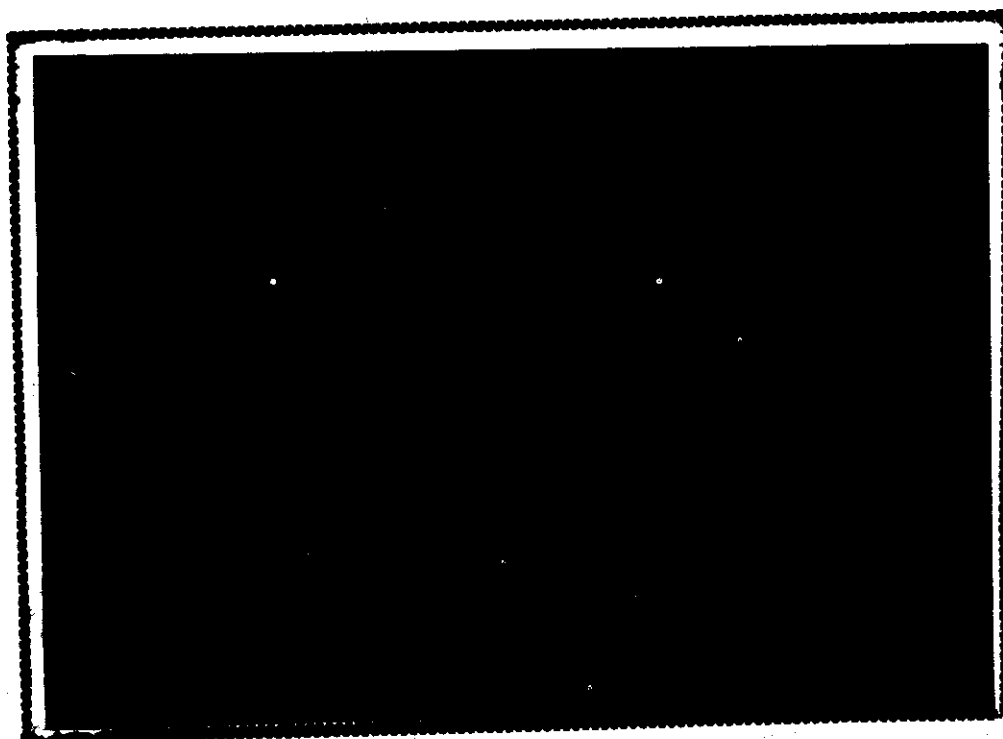


Photo (13) Close-up view showing a branch of *N. mucronata*
bearing flowers and fruits

Alamein 3-5-1976 *S.El-Khanagry & M.Mokhtar (CAIM)*; Alamein 28-12-1989 *El-Galaly (CAI)*; Burg el Arab March 1953 *Fawzi (CAI)*; Burg el Arab 4-4-1956 *Batanoupy (CAI)*; Burg el Arab 27-3-1969 *A.Abbas (CAIM)*; Mariut: In the calcareous field N. of Amria station 25-3-1927 *G.Tackholm (CAI)*; Amria N. 16-4-1932 *Shabetai (CAIM)*; Dekhela 15-11-1926 *Drar (CAIM)*; Dekhela, Alex. 24-8-1952 *Boulos (CAI)*; Ikingi Mariut 22-1-1928 *G.Tackholm (CAI)*; Sidi Bishr W. Alex. 9-10-1923 *Simpson (CAIM)*; Alexandria: Ramleh 21-1-1928 *G.Tackholm (CAI)*; Migdaba N.El-Arish 16-9-1928 *Drar (CAIM)*.

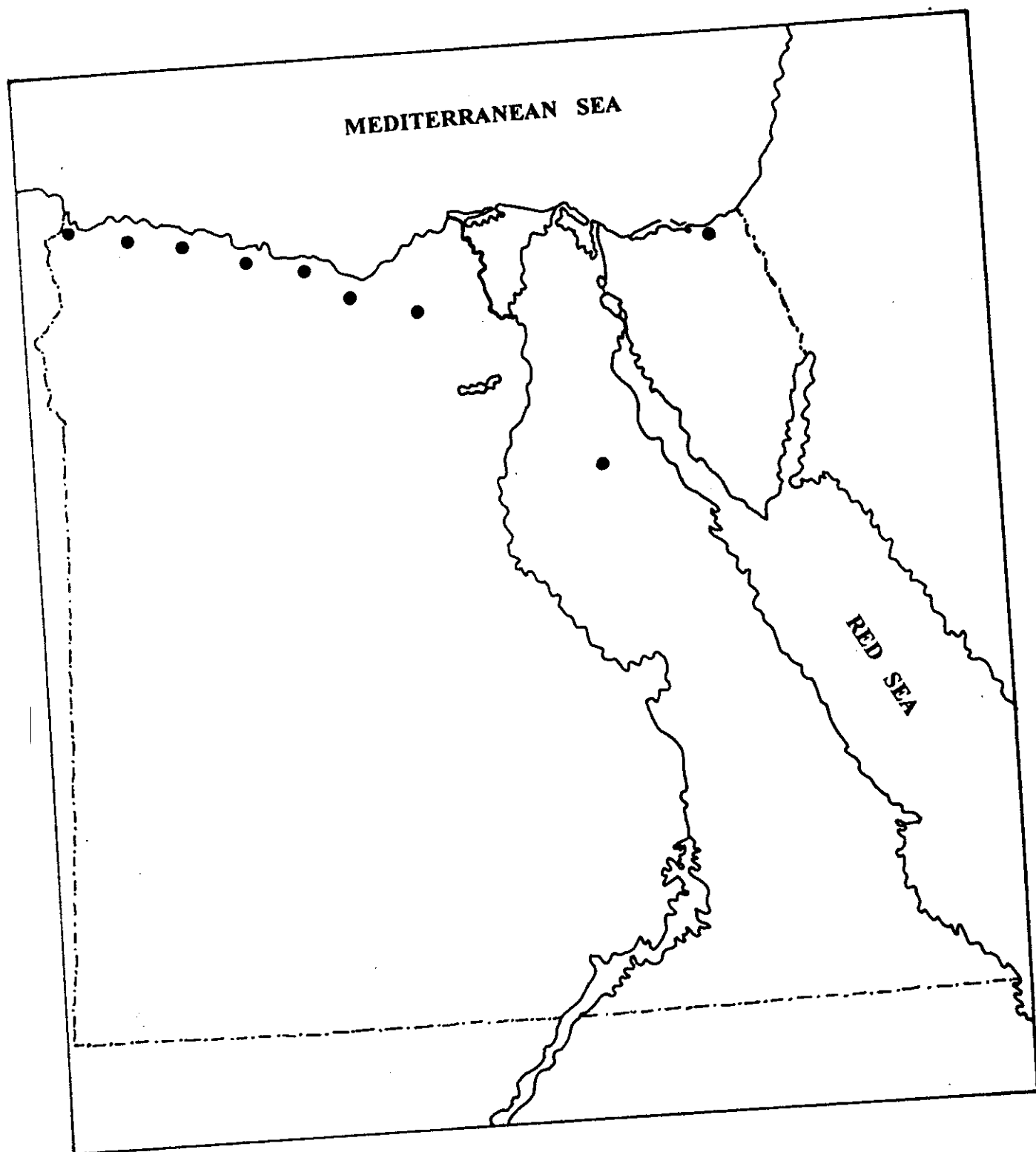
Nv: Cairo-Alexandria desert road at kilo 169 from Cairo 28-11-1989 *El-Galaly (CAI)*.

Dg: Wadi Askhar S.Galala 13-3-1937 *Shabetai (CAIM)*; Wadi El-Zim S.Galala 7-12-1944 *Shabetai (CAIM)*; Gebel Um Hamoul, S.Galala 9-12-1944 *Shabetai (CAIM)*.

Geographical distribution:

Rare species as separate individuals not forming a community along the Mediterranean coast and the Galalah desert (Map 6).

Known from Irano-Turanian and Mediterranean region, also from N. Africa and Greece.



Map (6) : Distribution of *Noaea mucronata* in Egypt.

Anabasis L. (1753)

Perennial shrubs with jointed and branched stem. Leaves opposite decussate, or reduced to scales. Flowers solitary or clustered, perfect hermaphrodite, subtended by two pubescent bracteoles. Perianth 5-parted, free to base, all the 5 or the 3 outer ones furnished with a wing in fruit. Stamens 5, alternating with the 5 staminodal lobes; anthers cylindrical-elliptic or obovate-cordate, not appendiculate. Ovary smooth or papillose having a style which divided into two short stigmas. Seeds vertical, compressed; embryo spiral.

key to the species

- I-Leafy plant7- **Anabasis setifera.**
II-Leaves absent or reduced8-**Anabasis articulata.**

7- **Anabasis setifera** Moq., Chenop. Monogr. Enum. 164 (1840); Boiss., Fl. Orient. IV:970 (1879); Aschers. et Schweinf. III. Fl. d' Eg., II : 131 (1887); Post, Fl. Syr. Palest. & Sinai, 692 (1896); Muschler, Man. Fl. Egypt I:301 (1912); Ramis, Bestimm. Fl. Aeg. 70 (1929); Dinsmore in Post & Dins., Fl. Syr. Palest. & Sinai II, ed. 2 : 453 (1933); Parsa, Fl. L'Iran IV : 1079 (1949); Montasir & Hassib, III. Manu. Fl. Egypt I:71 (1956); Rechinger, Fl. Lowland Iraq 208 (1964); Zohary, Fl. Pal. I : 178 (1966); Migahid & Hammouda, Fl. Saud. Arab., 141 (1974); Tackholm, Stud. Fl. Egypt, ed. 2 : 128 (1974); Al-Rawi in Daoud, Fl. Kuwait, I : 151 (1985); Migahid, Fl. Saud. Arab. I, ed. 3:217 (1988); Freitag, Cont. Chenop. Fl. Egypt, 183 : 168 (1989).

Type: Persia, Belanger; (P,holo.).

Anabasis lutea Moq. in DC. Prod. XIII, ed. 2:215 (1848).

Perennial, shrubby, glabrous, deep green. Stems numerous branched, ascending and erect forming a patches. Branches elongated, fleshy and decussated. Leaves fleshy, cylindrical, club-shaped, horizontal , opposite decussate, connate at base, obtuse, ending in a deciduous bristle, 8-10mm long, 4-6mm wide. Flowers in clusters of 3-7; perianth segments 5, free to base all of them developing wings in fruiting; stamens 5, alternated with 5 staminodal lobes; stigma 2 on a very short or obscure style. Seed vertical, compressed, brown. Embryo spiral coiled. Fruiting wings 5, unequal , orbicular, nearly entire, pale yellow; Fig. (7) & photo (14 & 15) .

Flowering time: October-November.

Habitat : Arid deserts and wadi beds.

Specimens seen :

Di : Wadi El-Mizerie , N. Sinai 24- 4-1959 *L. Boulos (CAIM)*; A branch of wadi El-Mizerie, near G.El-Maghara, Sinai 25-4-1959 *Boulos (CAI)*; Gebel Halal ,N. Sinai 11-11-1988 *Hadidi & El-Garf (CAI)*; El-Hassana-El-Qusiema road, N. Sinai 10-11-1988 *El-Hadidi & El-Garf(CAI)*; Sadr El-Hetan, N. Sinai 3-9-1990 *El-Galaly (CAI)*.

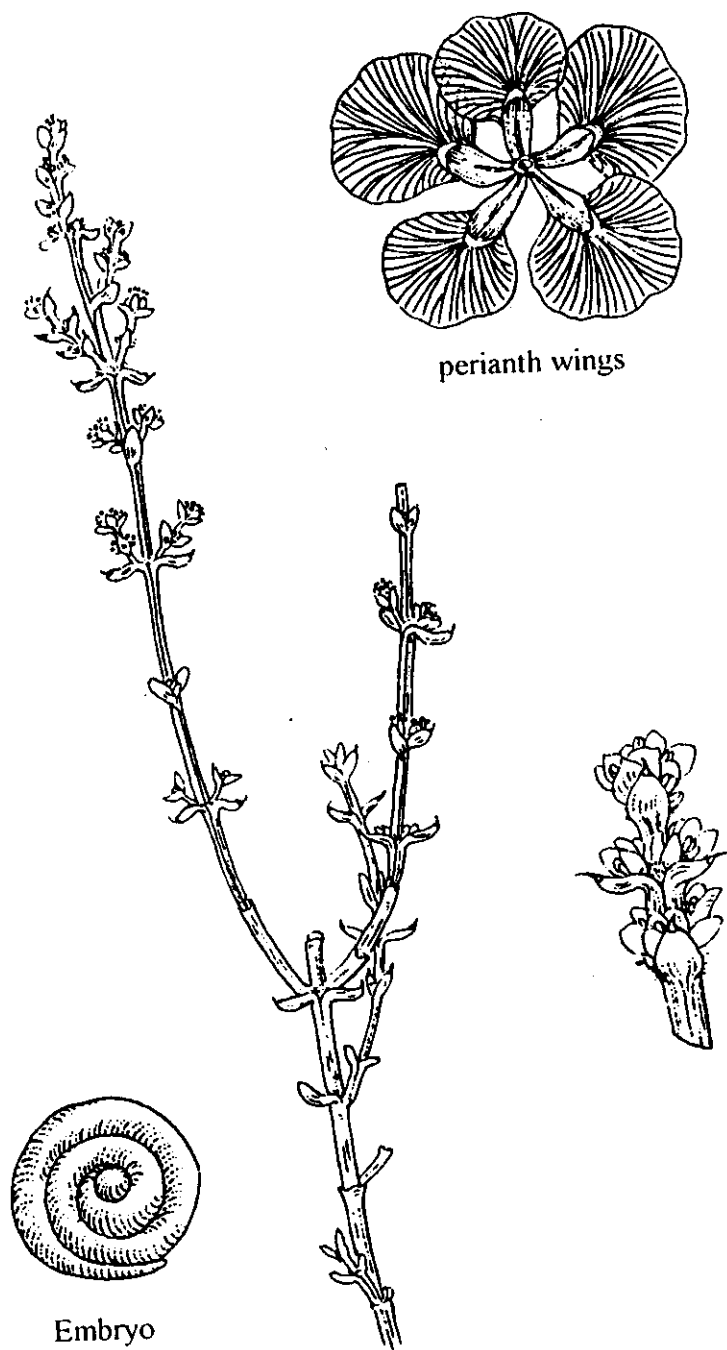


Fig. (7) *Anabasis setifera* Moq.



Photo (14) Close view showing the habit of *Anabasis setifera*
Moq. (12-9-1990) Cairo - Suez road.



Photo (15) Close-up view showing a vegetative branch of
Anabasis setifera bearing the decussate and fleshy
leaves.

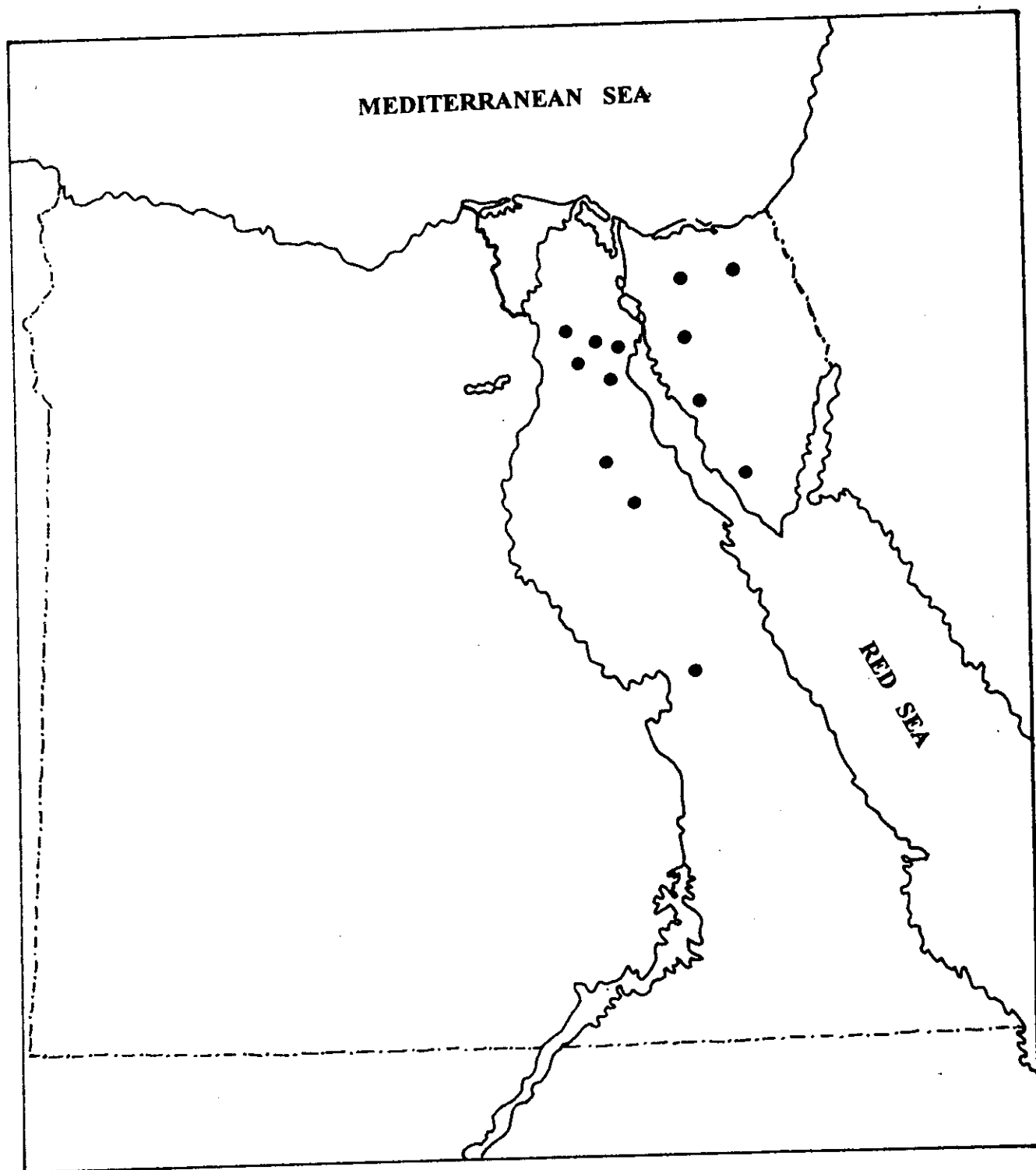
Dg: Cairo-Suez desert road km 24-10-1945 *Shabetai* (CAIM); Wadi El-Nassuri-Wadi Anqabia along Cairo-Suez road 7-3-1956 *Hadidi* (CAI); ALong the sides of Cairo-Suez road 12-9-1990 *El-Galaly* (CAI); Wadi Liblab 1-3-1952 *V. Tackholm* (CAI); G.Ahmar 21-11-1952 *Fikry Ibrahim Francis* (CAI); W. East of Maadi 30-12-1921 *Simpson* (CAIM); W. Digla above the well 17-11-1922 *Simpson* (CAIM); Lower W.Digla 8-10-1944 *Shabetai* (CAIM); Wadi Digla 15-10-1953 *V. Tackholm* (CAI); Wadi Digla of the Helwan desert 12-1-1960 *V. Tackholm et al* (CAI); W.Hof of Helwan 12-12-1929 *Shabetai* (CAIM); W.Hof 28-12-1952 *Boulos* (CAI); W.Hof 24-3-1953 *Hilali, H. Ibrahim & Khattab* (CAIM) W. Hof 30-12-1977 *A.Soliman* (CAI); W.Hof 30-3-1987 *Ahmed Gamal Fahmy* (CAI); Tourah mountains 7-11-1958 *Kassas* (CAI); W.Gibbu 26-5-1953 *V. Tackholm* (CAI); Wadi Gerawi 8-5-1953 *V. Tackholm* (CAI); W. Rishrash 13-11-1959 *William & Sami* (CAI); Helwan desert, eastern side 19-8-1952 *Hadidi* (CAI); Suez: Between Gebel Ataq and Aboud's Factory 8-3-1954 *Mohammed Naguib* (CAI) Gebel Ataq, Suez 11-6-1955 *Bot. Dept . Exc.* (CAI); Wadi Abar, Gebel Ataq, Suez 15-2-1956 *Amal Amin* (CAI); Kilo 32 S. of Suez 7-6-1960 *V. Tackholm et al* (CAI); Wadi Hodein 6-2-1932 *Drar* (CAIM); W. El-Nahiya between North and South Galala Eastern Desert 30-1-1937 *Shabetai* (CAIM); Wadi Um El-Zanatir S.Galala 7-12-1944 *Shabetai* (CAIM) Wadi Qoseib 9-12-1944 *Shabetai* (CAIM); Wadi El-

Assiuty 31-12-1931 *Shabetai* (CAIM); Wadi El-Assiuty 4-4-1964
Zahran & Girgis (CAI).

S: North Abu zenima South Sinai 9-6-1969 *S.Shalaby & A.Khattab*
(CAIM); Wadi Tayiba South Sinai 6-5-1980 *A.Abbas* (CAIM).

Geographical distribution : Commonly distributed especially in
Ithmic desert, Galala desert and southern Sinai (Map 7) .

Known from E.Saharo-Sindian, slightly extending into Irano-
Turanian and Sudanian territories.



Map (7) : Distribution of *Anabasis setifera* in Egypt.

8- *Anabasis articulata* (Forssk.) Moq., in DC., Prodr., 13, 2 : 212 (1849); Boiss., Fl. Orient., IV:970 (1879); Aschers, et Schweinf., Ill. Fl. Eg. 2 : 131 (1887); Post, Fl. Syr. Palest. & Sinai, 692 (1896); Musch., Man. Fl. Eg. I : 300 (1912); Ramis, Bestimm. Fl. Aeg., 71 (1929); Dinsmore in Post & Dins., Fl. Syr. Palest. & Sinai, II, ed. 2:452 (1939); Montasir & Hassib, Ill. Man. Fl. Eg. I : 72 (1956); Maire, Fl. L'Afr. Nord VIII : 173 (1962); Quezel et Santa, Nou. Fl. L'Alg., I:296 (1962); Rechinger, Fl. Low. Iraq. 207 (1964); Zohary, Fl. Palest. I : 177 (1966); Migahid & Hammouda, Fl. Saud. Arab. 141 (1974); Tackholm, Stud. Fl. Eg. ed. 2:128 (1974); Jafri & Rateeb, Fl. Lib. 58 : 97 (1978); Migahid, Fl. Saud. Arab. I, ed. 3:217 (1988); Freitag, Cont. Chenop. Fl. Egypt 183 : 167 (1989).

Salsola articulata Forssk., Fl. Aeg. Arab. 55, t. 8a (1775).

Type: Ca.Cairo, affinitatis ad pyramidas, Forsskal. (C, lecto.).

Perennial dwarf shrub, pale green, 40-50cm high with tortuous or erect brittle branches. Stem woody, much divaricately branching. Branches opposite with more or less equal internodes, greenish-glaucous, yellowish or whitish when dried, older with whitish peeling bark below. Leaves reduced to a short, bilobed cupule. Flowers solitary, opposite, or sometimes more than one in an axil, the upper arranged in spikes, crowded at tip of branches. Perianth 5 membranous segments. Stamens 5 long-exserted, alternated with 5 thick staminodal

lobes. Stigma 2, thick, papillose. Ovary ovoid, subglobular, dorsally compressed, papillose. Embryo spiral coiled. Seed vertical, brown with membranous testa. Fruiting wings 5, unequal, orbicular, subreniforms white and pink or purple, wings margin entire to sinuate; Fig (8) & Photo (16 & 17) .

Flowering time: October-December.

Habitat: Dry and sandy plains.

Specimens seen :

M: Sallum 0-2-km from the Libyan . boundary 28-9-1963 *Boulos (CAI)*; Sallum, March-April 1964 *D.Osborn & I.Helmy (CAI)*; Sallum 11 miles south east, sandy area 26-10-1965 *D.Osborn & I.Helmy (CAI)*; Plateau of Sallum 21-4-1973 *Amal Amin (CAI)*; Wadi El-Habs between Mersa Matruh and Agiba 5-3-1976 *V.Tackholm et al (CAI)*; Ras El-Hekma 25-5-1954 *Migahid et Shafey (CAI)*; El-Alamein station, Marmarica 1-8-1953 *Boulos (CAI)*; Alamein 16-3-1958 *F.Saad (CAIM)*; Calcareous sandy soil, El-Alamein 3-5-1976 *S. El Khanagry & M.Mokhatar (CAIM)* ; El-Alamein 28-12-1989 *El-Galaly (CAI)*; Burg el Arab 1-4-1960 *V. Tackholm (CAI)*; Along the inner road, Amria-Burg el Arab 23-3-1961 *V.Tackholm(CAI)*; Ikingi Mariut 25-12- 1922 *Simpson (CAIM)*; Mariut 8-12-1953 *V.Tackholm (CAI)*; South of Amria, Mariut 16-12-1961 *V. Tackholm (CAI)*; 3 miles SE of Abu Mina, Mariut 10-11-1965 *Osborn &I.Helmy (CAI)*;

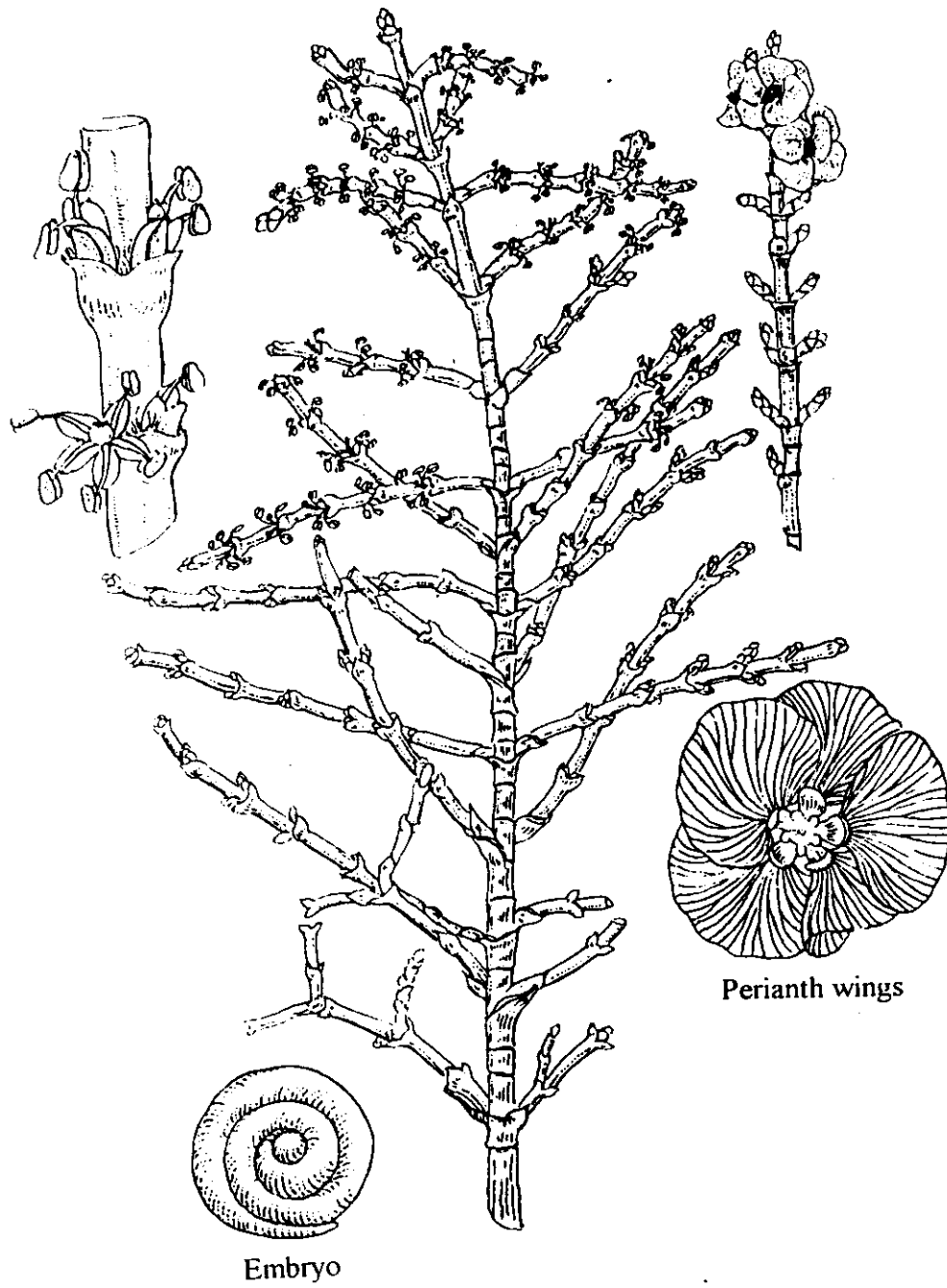


Fig. (8) *Anabasis articulata* (Forssk.) Moq.

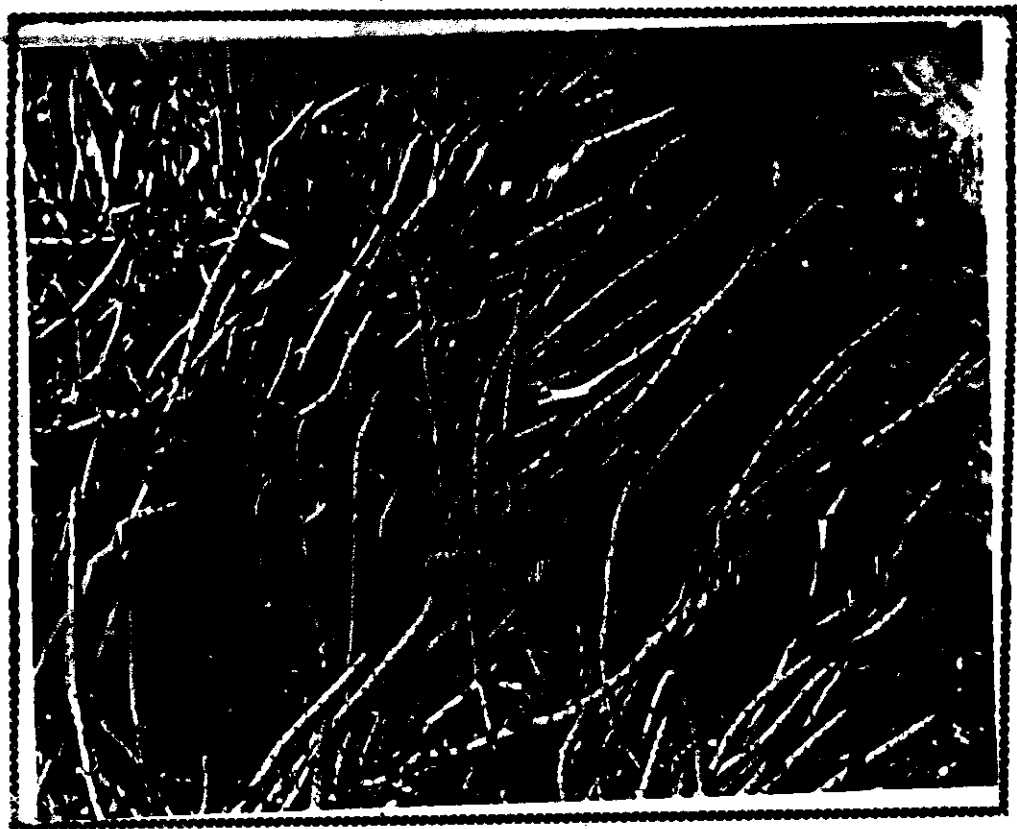


Photo (16) General view showing the leafless, vegetative branches of *Anabasis articulata* (Forsk.) Moq. (28-11-1989). Cairo-Alex. desert road.



Photo (17) Close-up view of *A. articulata* in the fruiting stage (El- Almeen, 28-12-1989).

Ras el Barr 2-7-1976 *Adel Gazzar, Abd el Aziz & S.Sisi (CAI)*;
Northern Sinai : 64 km west of El-Arish at Misfk, next to the main
road, near a salt marsh 5-12-1985 *Mohammed Gibali (CAI)*; El-Midan
S.of El-Arish 2-2-1956 *Boulos (CAI)*; 20km S.of El-Arish 15-6-1960
Sayed Diab (CAI).

Nv : Cairo-Alex, desert road 7-8-1970 *Ibrahim & Mahdi (CAI)*;
Cairo-Alex. desert road 25-1-1978 *S.Abd el Wahab (CAI)*; 166km
from Cairo on the desert road to Alex. 7-7-1976 *Amal Amin & al
(CAI)*; At kilo 169 from Cairo on the desert road to Alex. 28-11-1989
El-Galaly (CAI); Sandy desert soil sides of Cairo-Alex. desert road
between Amria and Rest House 21-4-1950 *Shabetai (CAIM)*; Wadi
Natroun 27-2-1959 *Mustafa Imam (CAI)*; Giza pyramids 27-11-1944
Shabetai (CAIM); Abu Rawash region 5-11-1952 *Hadidi (CAI)*;
Near wadi el Hay, El-Saff desert 21-3-1960 *V.Tackholm & al (CAI)*;
Cairo-Faiyum desert road from kilo 16-kilo 41 sandy soil 3-8-1976 *F.
Saad & al (CAIM)*; Salhiya desert near El-Ballah 11-9-1990 *El-Galaly
(CAI)*.

DL: Wadi Thoma nr. Qattara Depression, waste sandy lands 7-8-1937
Abdel Megid El-Mistikawy (CAIM).

O: 200 miles from Burg el Arab en route for Bahariya Oasis 9-10-1927
Simpson (CAIM).

Di: In the desert N. of wadi Tumilat on the road Belbies-Ismailia 15-4-1960 *V. Tackholm* (CAI); Cairo-Belbies desert road 20km NE of Hikestep 22-2-1981 *A. El-Bakry* (CAI); Cairo-Ismailia desert road, wadi El-Gafra 56km NE of Cairo 11-6-1981 *A. El-Bakry* (CAI); Salty soil, Ismailia- El-Ballah 19-11-1979 *M. Costantin & al* (CAIM); Wadi Mitla 5-6-1969 *A. Khattab* (CAIM); Near Bir El-Lagama, Gebel El-Maghara North Sinai 27-4-1959 *Boulos* (CAI); Sud El-Rawafaa, North Sinai 10-11-1988 *Hadidi & El-Garf* (CAI); Gebel Halal, North Sinai 11-11-1988 *Hadidi & El-Garf* (CAI); Ain Ewaigeela, Wadi El-Arish, North Sinai 12-9-1928 *Drar* (CAIM); Kosseima, North Sinai 3-12-1929 *Drar* (CAIM).

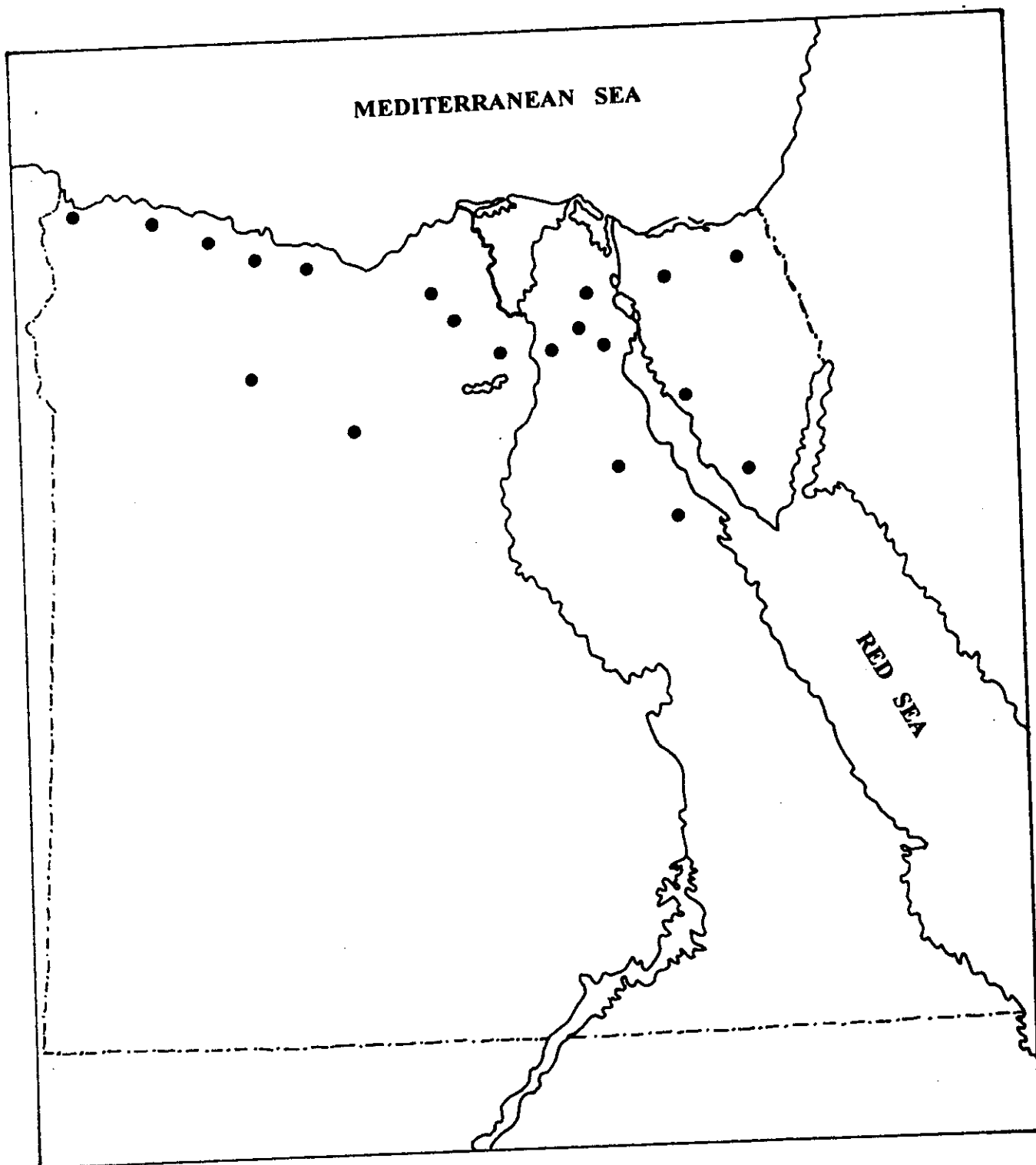
Dg: Suez road 27-12-1959 *Bot. Dept. Exc.* (CAI); Cairo-Suez desert road at kilo 19 28-3-1976 *M. Costantin & al* (CAIM); Cairo-Suez desert road 12-9-1990 *El-Galaly* (CAI); Cairo:Gebel Ahmar 4-3-1927 *G. Tackholm* (CAI); Wadi El-Humara between Maadi and Suez 16-12-1927 *G. Tackholm* (CAI); Wadi El-Nassuri, Suez road 15-12-1953 *Hadidi* (CAI); Wadi Gendali of Suez road 11-12-1959 *V. Tackholm & al* (CAI); Wadi Amlog 60km south of Suez 26-2-1964 *Kassas* (CAI); S. Galala 7-12-1944 *P. H. Davis* (CAI); Rocky calcareous ground, Gebel Um Hammad, S. Galala 7-12-1944 *Shabetai* (CAIM); Cretaceous foothills of S. Galala 6-2-1960 *V. Tackholm & al* (CAI).

R: 1/2km North of Bir Abu Darag, Suez Gulf 14-1-1954 *Boulos* (CAI); 53 Kilo south of Ras Gharib 11-9-1960 *V.Tackholm & al* (CAI).

S: North Abu zenima south Sinai 16-2-1969 *M.Abdallah* (CAIM); Sandy soil, Wadi Tayiba North Abu Zenima South Sinai 6-5-1980 *A.Abbas* (CAIM); Between St. Catherine and Wadi Feiran along the road.S. Sinai 26-4-1961 *V.Tackholm & al* (CAI).

Geographical distribution : a common plant in the desert plains, along Mediterranean and Red sea coasts, the Oases, and southern Sinia (Map 8) .

Known from N.Africa (Algeria to Egypt), Palestine, Syria, Jordan and Spain.



Map (8) : Distribution of *Anabasis articulata* in Egypt.