THE EGYPTIAN PLANT RED DATA BOOK

Vol. I

TREES AND SHRUBS

Compiled by

M.N. EL-HADIDI **K.H. BATANOUNY**

A.G. FAHMY

Department of Botany - Faculty of Science

University of Cairo

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FACULTY OF SCIENCE
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PREFACE

The history of the use and exploitation of plants is as old as the presence of human kind on the earth. Tracing this history and the human impact as well as the fate of innumerable plant species is not an easy task; however it is indispenable.

Egypt, with its long history depicated on the walls of temples, obelisks and papyri, offers a suitable land for the history of plant use. Hundreds of species used by the Pharaons are still in use by their descendants. Some species are extinct while many others are threatened.

The Department of Botany, Faculty of Science, University of Cairo; being the oldest department in the Middle East with a herbarium having thousands of specimens would be the proper place for investigating the extinct and threatened plants in Egypt. Through its long history of plant collection from the different terrains in Egypt, floristic and ecological studies, the department is prepared for the present investigation.

A fund from UNEP helped the excution of the first part of the study. I grasp this occasion to thank UNEP for this fund and hope that the co-operation between our department and UNEP is furthered.

It is my pleasure to introduce the draft of the first volume of "The Egyptian Plant Red Data Book" compiled by M.N. El-Hadidi, K.H. Batanouny and A.G. Fahmy. I hope that this volume can contribute to the increasing International offort in preserving the endengered plants.

K.H. Batanouny, Ph.D., D.Sc.
Head, Department of Botany,
Faculty of Science,
Cairo University,
Giza, Egypt.

INTRODUCTION

During the last decade, there has been growing awareness of the dangers to which the native flora of Egypt is exposed; and that arised from uncontrolled development.

A preliminary list of 120 species was compiled by El-Hadidi (1979) while Abdallah and Saad (1980) prepared another list of 50 species with special reference to their rarity and distribution in Egypt.

Later in 1987, a list of 425 of flowering plants and vascular cryptogams was compiled by M.N. El-Hadidi, M. Abd El Ghani and A.G. Fahmy in collboration with the threatened plant unit of the IUCN, Kew (Unite Kingdom).
Among these, 190 species are woody perennials (trees, shrubs and undershrubs). The rest of species are annuals, biennials or perennial herbs.

A major part of the perennial species (150 species) were the subject of an M.Sc. thesis which was carried out by Mr. Ahmed Gamal Fahmy (Beni-Suef Branch of Cairo University) under the supervision of Prof. M.N. El-Hadidi, Prof. M. Kassas and Dr. M. Abd El-Ghani. The thesis was submitted for the award of the degree in July 1990.

This work is based on the data extracted from the A.G. Fahmy's thesis; additional maps and illustrations are obtained from different sources.

Further issues of an Egyptian Plant Red Data Book include the following phases:

I. Volume 1,2 would include about 90 species of the endanangered woody perennials. Some taxa are critical and require thorough systematic revision.

II. Volume 2, would include some 220 annual, biennial or perennial species. A major part of these taxa are the subject of current systematic revision.

III. A final version of volumes 1 (1,2) and 2 is to be prepared, including revised information from all available sources.
Also, the completion of the drawings and/or illustration and photographs will be undertaken.

The invaluable encouragement and advice of Professor Dr. M. Kassas are highly appreciated. Without his help, this work would not have been undertaken. We are deeply gateful to him.

We wish to express our gratitude to Dr. A.M. El-Fiky for his continuous help and assistance during the preparation of this volume.

Giza, February 1991 **The authors**

CLASSIFICATION OF DEGREE OF THREAT

The matter of classifying rareness or degree of threat to survival was made less controversial by deciding to follow the categories published by the Threatened Plants Committee Secretariat of IUCN in 1980 (slightly abbreviated and with the word "taxa" replaced by "species" throughout):

"The Red Data Book Categories are used by IUCN to indicate the degree of threat to individual species in their wild habitats. Below are given formal definitions of the categories.

Extinct: (Ex) This category is used only for species which are no longer known to exist in the wild after repeated searches of the type localities and other known likely places. As interpreted by IUCN, this includes species that are extinct in the wild but surviving in cultivation.

Endangered (E): Species in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included are species whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction. This is interpreted to mean including species with populations so critically low that a breeding collapse due to lack of genetic diversity becomes a possibility, whether or not they are threatened by man.

Vulnerable (V): Species believed likely to move into the Endangered category in the near future if the causal factors continue operating. Included are species of which most or all of the populations are decreasing because of over-exploitation, extensive destruction of habitat or other environmental disturbance; species with populations that have been seriously depleted and whose ultimate security is not yet assured; and species with populations that are still abundant but are under threat from serious adverse factors throughout their range.

Rare (R): Species with small world populations that are not at present Endangered or Vulnerable but are at risk. These species are usually localized within restricted geographical areas or habitats or are thinly scattered over a more extensive range.

The categories 'Rare' and 'Vulnerable' have often been confused in the past or thought to be simply stages on a linear scale of increasing degrees of threat to species in danger. This is not the case because they represent the state of organisms in fundamentally different situations, both of which can lead to the 'Endangered' category.

The 'Rare' species has a small world population but is under no known or immediate threat. It is not endangered but is simply at risk because of the size of its population. It may have a very restricted distribution, for example it may be endemic to a single mountain. Alternatively it may have a wider distribution but may be severely restricted by its habitat.

As given the Red Data Book of New Zealand, the critical difference between a 'Rare' species and a 'Vulnerable' one is that the former has a relatively stable population while the latter is on the decline.

Indeterminate (I): Species known to be Extinct, Endangered, Vulnerable or Rare but where there is not enough information to say which of the four categories is appropriate. This category is used for species reported as "?Extinct" or "possibly Extinct" or "probably Extinct" on the assumption that they are either 'Extinct' or 'Endangered'.

LIST OF THE INVESTIGATED SPECIES

GYMMOSPERMAE

CUPRESSACEAE

1. *Juniperus phoenicea* L.

EPHEDRACEAE

2. *Ephedra ciliata* C.A. Meyer
3. *Ephedra foeminea* Forssk.
4. *Ephedra sinaica* Riedl.

ANGIOSPERMAE

DICOTYLEDONEAE

SALICACEAE

5. *Populus euphratica* Oliv.

MORACEAE

6. *Ficus carica* L.
7. *Ficus salicifolie* Vahl.

LORANTHACEAE

8. *Pilicosepalus curiflorus* (Benth. ex Hook.) Tieghem.
9. *Pilicosepalus acaciae* (Zucc.) Wiens & Polhill.

POLYGONACEAE

10. *Atraphaxis spinosa* L.
11. *Calligonum polygonoides* L. subsp. *polygonoides* Soskov.

NYCTAGINACEAE

12. *Boerhavia africana* Lour.
13. *Boerhavia sinnata* (Meikle) Greuter & Burdet
14. *Boerhavia elegans* Choisy

CARYOPHYLLACEAE

15. *Silene schimperiana* Boiss.
16. *Silene fruticose* L. subsp. *cyrenaica* Beguinot et Vaccari
17. *Bufonia multiceps* Decne

CHENOPODIACEAE

18. *Suaeda volkensii* C.B. Clarke
19. *Salsola tetragona* Del. Desc.

20. *Salsota Schweinfurthii* Solms-Laub.
21. *Seidletzia rosmarinus* Bge ex Boiss
22. *Anabasis syriaca* I ljin.
23. *Cornulaca ehrenbergii* Asch.
24. *Haloxylon persicum* Bunge

AMARANTHACEAE

25. *Aerva lanata* (L.) Juss. ex. J.A. Schultes

CAPPARACEAE

26. *Capparis ovata* Desf.
27. *Cadaba rotundifolia* Forssk.
28. *Cadaba glandula* Forssk.
29. *Cadaba farinosa* Forssk.
30. *Boscia* senegalensis (Pers) Lam. ex Poir.
31. *Boscia angustifolia* A. Rich.
32. *Maerua crassifolia* Forssk.
33. *Maerua* oblongifolia (Forssk.) A. Rich.

CRUCIFERAE

34. *Matthiola elliptica* R. Br. ex DC.
35. *Matthiola arabica* Boiss.
36. *Zilla spinosa* (L.) Prontl subsp. biparmata (O.E. Schntz) Maire & Weiller

RESEDACEAE

37. *Randonia africana* Coss.

MORINGACEAE

38. *Moringa peregrina* (Forssk.) Fiori.

ROSACEAE

39. *Rosa arabica* Crep.
40. *Crataegus sinaica* Boiss.
41. *Cotoneaster orbicularis* Schlecht

LEGUMINOSAE

42. *Anagyris foetida* L.
43. *Indigofera arabica* Jaub. & Sp.
44. *Indigofera lotononoides* Baker fil.

45. *Colutea istria* Miller
46. *Astrachantha echinus* (DC.) Podl.
47. *Taverniera lappacea* (Forssk.) DC.
48. *Ebenus armitagei* Schweinf. et Taub.
49. *Delonix elata* (L.) Gamble.
50. *Mimosa pigra* (L.)
51. *Acacia mellifera* (Vahl.) Benth
52. *Acacia asak* (Forssik) Willd
53. *Acacia iraqensis* Rech.
54. *Acacia nubica* Benth.
55. *Acacia seyal* Del.
56. *Acacia etbaica* Schweinf.
57. *Dichrostachys cinerea* (L.) Wight et Arn.

ZYGOPHYLLACEAE

58. *Fagonia taeckholmiana* Hadidi
59. *Fagonia tenuifolia* Steud. & Hochst. ex Boiss.
60. *Fagonia isotricha* Murbeck
61. *Zygophyllum propinquum* Decne
62. *Zygophyllum dumosum* Boiss.
63. *Zygophyllum fabago* L.

EUPHORBIACEAE

64. *Chrozophora brocchiana* Vis.
65. *Jatropha glauca* Vahl.
66. *Securinega virosa* (Roxb. ex Willd.) Baill.
67. *Phyllanthus reticulatus* Poir
68. *Euphorbia nubica* N.E Br.
69. *Euphorbice caneata* Vahl.
70. *Euphorbia dendroides* L.
71. *Euphorbia bivonae* Steud.
72. *Euphorbia erinacea* Boiss & Kotschy in Boiss.
73. *Euphorbia obovata* Decne

BURSERACEAE

74. *Commiphora* Gileadensis (L.) C. Christ.
75. *Commiphora quadricineta*

POLYGALACEAE

76. *Polygala sinaica* Botsch.

ANACARDIACEAE

77. *Rhus coriaria* L.
78. *Rhus abyssinica* Hochst. ex Oliv.
79. *Rhus tripartia* (Ueria) Grande

PISTACIACEAE

80. *Pistacia khinjuk* Stocks in Hook var. *glabra* Schweinf. ex Engl.
81. *Pistacia atlantica* Desf.

SAPINDACEAE

82. *Dodonaea viscosa* Jacq.

CELASTRACEAE

83. *Maytenus senegalensis* (Lab.) Exell.

RHAMNACEAE

84. *Rhamnus lycioides* L. subsp. *oleoides* (L.) Jahandiez et Maire.
85. *Rhamnus disperma* Ehrenb. ex Boiss.
86. *Sageretia thea* (Osbeck) M.C. Johnst.
87. *Ziziphus lotus* (L.) Lam.

TILIACEAE

88. *Triumfetta flavescens* Hochst. ex A. Rich
89. *Grewia villosa*

MALVACEAE

90. *Abutilon figarianum* Webb.
91. *Pavonia kotschyii* Hochst. ex Webb.
92. *Pavonia arabica* Hochst. ex Steud.
93. *Gossypium arboreum* L.

STERCULIACEAE

94. *Melhania denhamii* R. Br.

VIOLACEAE

95. *Viola scorpiuroides* Coss.

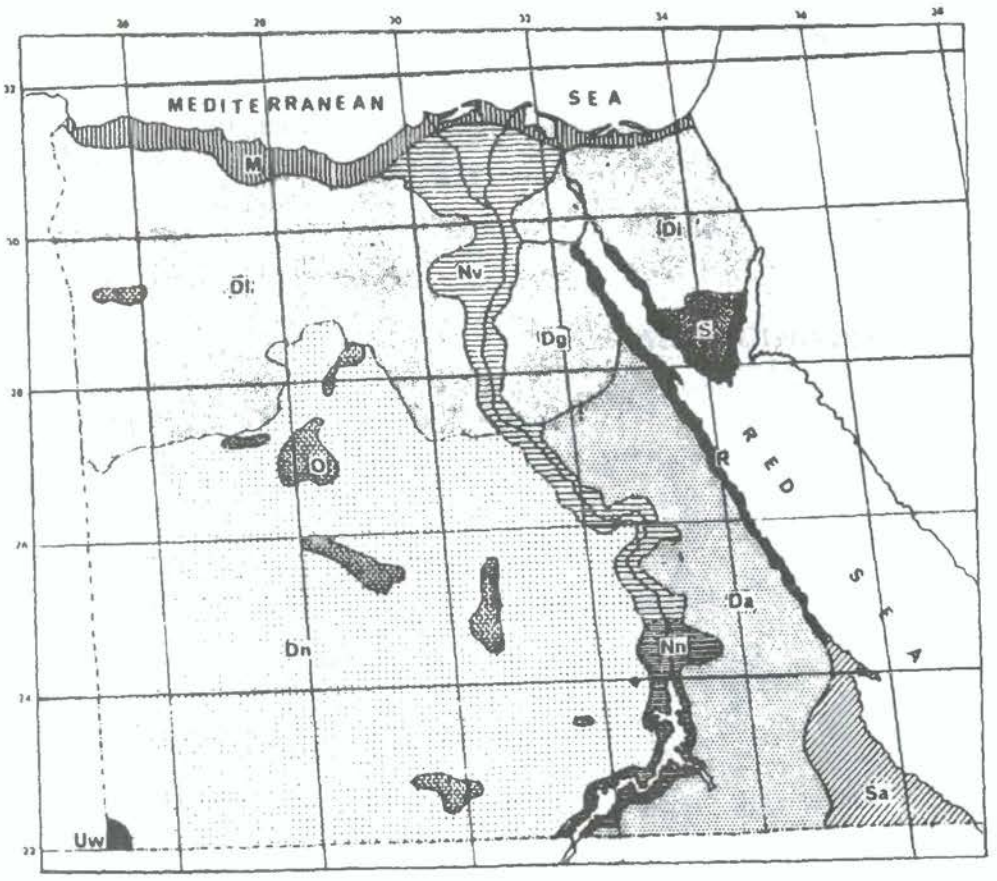
CISTACEAE

96. *Helianthemum ventosum* Boiss.
97. *Helianthemum sancti-antonii* Schweinf.
98. *Helianthemum sehweinfurthii* Grosser in Engler
99. *Helianthemum crassifolium* Pers. subsp. *sphaerocalyx* (Gauba et Janchen)
100. *Fumana arabica* (L.) Spach.

RHIZOPHORACEAE

101. *Rhizophora mucronata* Lam.

The Phytogeographical Subdivisions of Egypt



(1) **M**: Mediterranean coastal belt

(2) **D**: the deserts including:
   a. **Dl**; Libyan Desert
   b. **Dn**; Nubian Desert
   c. **Di**; Isthmic Desert
   d. **Dg**; Galalah Desert

   e. **Da**; Arabian Desert

(3) **N**: Nile land including:
   a. **Nv**; Nile Valley

   b. **Nn**; Nubian Nile

(4) **O**: Oases of **Dl** & **Dn**, including the Kisseiba-Shabb area of the latter

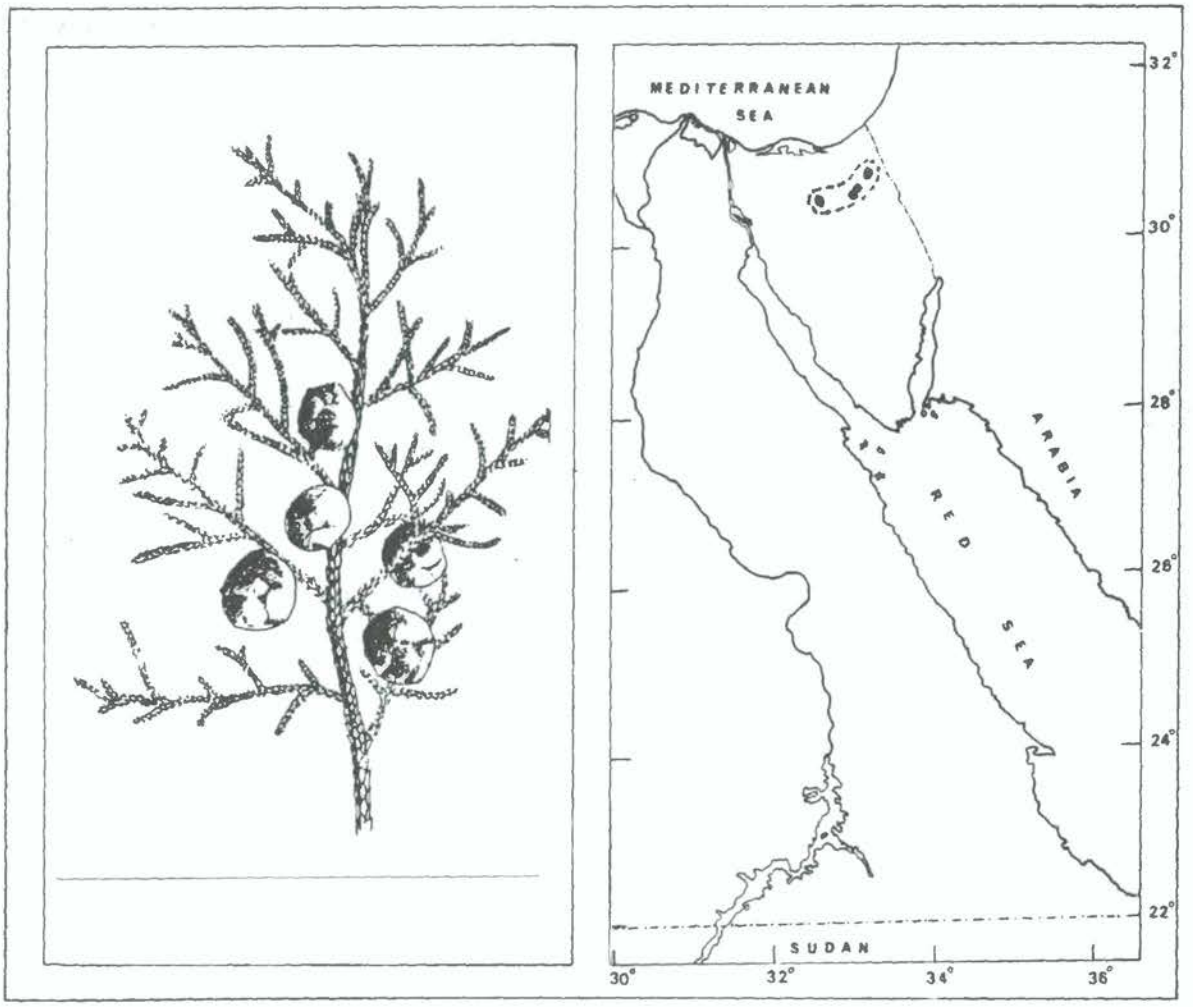
(5) **S**: Sinai mountainous region between the Suez and Aqaba Gulfs

(6) **R**: Red Sea coastal plains including those of **Dg**, **Da** as well as those along the Gulfs of Suez and Aqaba

(7) **Sa**: Sahelian scrub in Gebel Elba mountainous block, its coastal plains along the Red Sea and their extension westwards through **Da**

(8) **Uw**: Massif of Gebel Uweinat and the intersecting wadis

(1) Juniperus phoenicea L., Sp. Pl. ed. 1: 1040 (1953); Boiss. , Fl. Orient. 5: 710 (1884); Range, Fl. Isthmuswüste 10 (1921); Zohary, Fl. Palaest. 1: 20, pl. 19 (1966); Täckholm, Stud. Fl. Egypt ed. 2, 50 (1974); Greuter et al. in Med-Check. 1: 27 (1984); Danin et al. in Willdenowia 15: 261 (1985).



Monoecious shrubs or trees up to 8 m. high. Trunk erect, covered with brown bark; branches erect or ascending, terete when young. Leaves scale-like, ternately whorled or opposite and imbricated; blade ovate-rhombic, margin entire, apex somewhat obtuse. Male cones terminal, sessile, ovoid-oblong, with rounded scale. Female cones nearly sessile, fleshy subglobular or ovoid, brownish-red, glossy. Fruit globose, dark reddish brown.

Flowering and fruiting: M a r c h - A p r i l

Vernacular name (Arabic): 'Ar'ar عرعر

Habitat and ecology: Meso- or nanophanerophyte which grows in crevices of smooth faced limestone and dolomite outcrops and cliffs.

Distribution: It is a Mediterranean tree that has a wide range of tolerance as it grows in Arabia under tropical conditions. Its distribution pattern may be explained in terms of differing combinations of rainfall and topography (Kerfoot & Lavranos, 1984).

Floristic category : Mediterranean region with extensions in Middle Saharo-Sindian subregion.

Status: Endangered

Juniperus phoenicea is only known from Gebel Yelleg (1087 m.), Gebel Halal (892 m.) and Gebel El Maghara (735 m.) of the Isthmic Desert.

Conservation measures taken: N o n e

Conservation measures proposed: The populations traced by Boulos (1960) be wildlife sanctuaries.

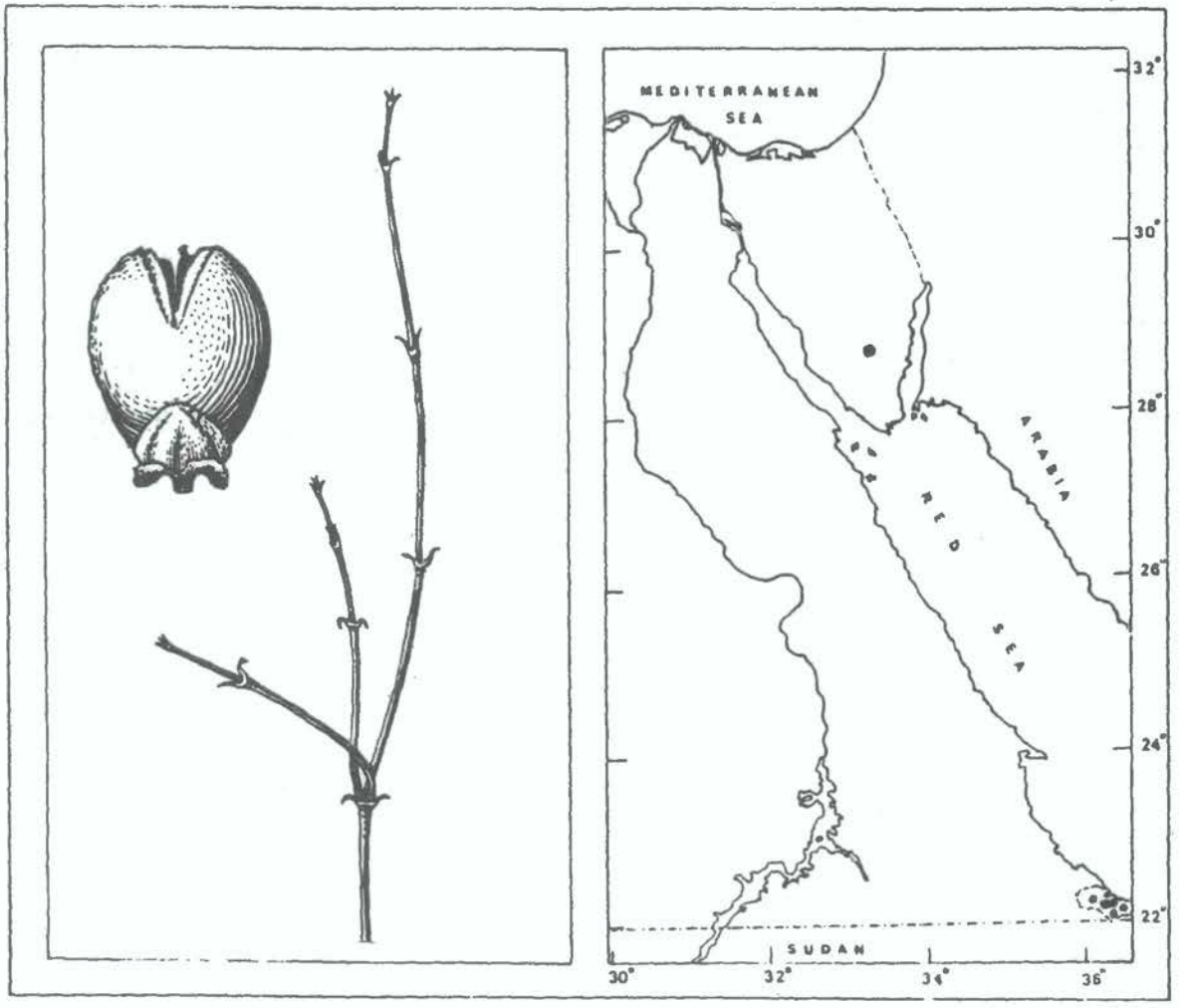
Biology and potential value: The existence of disjunct populations of Juniperus phoenicea in Northern Sinai is of scientific significance to studies of plant geography, and the history of vegetation in this area. It is believed to be relict patches of the Mediterranean territory in the Saharo-Sindian region.

Specimens examined

Di Gebel El Maghara, Wadi El Arousia (on high altitudes), 28. IV. 1959, Boulos s.n. (CAI); El Daiqa (on top of mountains, 15. VIII/8.IX.1951, Täckholm et al. s.n. (CAI); Gebel El Maghara, VIII. 1988, El Hadidi et al. s.n. (CAI). The first record was of Range (1921) in Halal and Yelleg (8-100 m.) No. 1972, 2.8.1916.

2. **Ephedra ciliata** C.A. Meyer, Monog. Eph. in Mem. Acad. Imp. Sc. Petersbourg 4: 100 (1846); Greuter et al. in Med-Check 1. 28 (1984).

Ephedra foliata Boissier, Diagn. Pl. Orient. Nov. ser. 1, 7: 101 (1846); Fl. Orient. 5: 716 (1884); Freitag & Maier-Stolt, Taxon 38 (4): 549 (1989).



Shrubs up to 2 m. tall. Stems glabrous and ascending, sometimes climbing on trees, branches narrow and flexible, sterile ones with clustered filiform leaves.

Leaves opposite, with expanded sheathing base, glabrous on both surfaces; blade linear, 10-20 mm. long, margin entire, apex acute to acuminate. Male cones at the tips of slender branches, either single or in groups of ovoid, each with 4-6 pairs of flowers. Female cones at the tips of slender branches,

ovoid, flowers in groups of two or three, hardly exceeding the bracts.

Flowering and fruiting: January - March

Vernacular name (Arabic): Balatibeib

Habitat and ecology: Nano-phanerophyte growing in wadis and slopes of metamorphic rocks; often climbing on shrubs and trees.

Distribution: Recorded from Saudi Arabia, Qatar, Jordan and Iraq, then extends eastward to Iran, Afghanistan, U.S.S.R. and India. In Egypt. it is recorded from the Red Sea hills, wadis of Gebel Elba and Sinai.

Floristic category: East and Middle Saharo-Sindian subregions, with extensions in the Irano-Anatolian province of the Irano-Turanian region.

Status: Vulnerable

The natural rarity of *Ephedra ciliata* in Egypt is probably related to its geographical range. Egypt seems to be the southwestern limit of its distribution.

Excessive use as firewood for bedouins and overgrazing by domestic livestock are causatives for the species decline.

Conservation measures taken: The populations of *Ephedra ciliata* at Gebel Elba area are to be protected.

Conservation measures proposed: Two or more populations in Wadi Akwamtra (Gebel Elba) and Wadi El Arabian (St. Catherine, S. Sinai) be wildlife sanctuaries. Also cultivation in botanic gardens will be helpful in saving the plant.

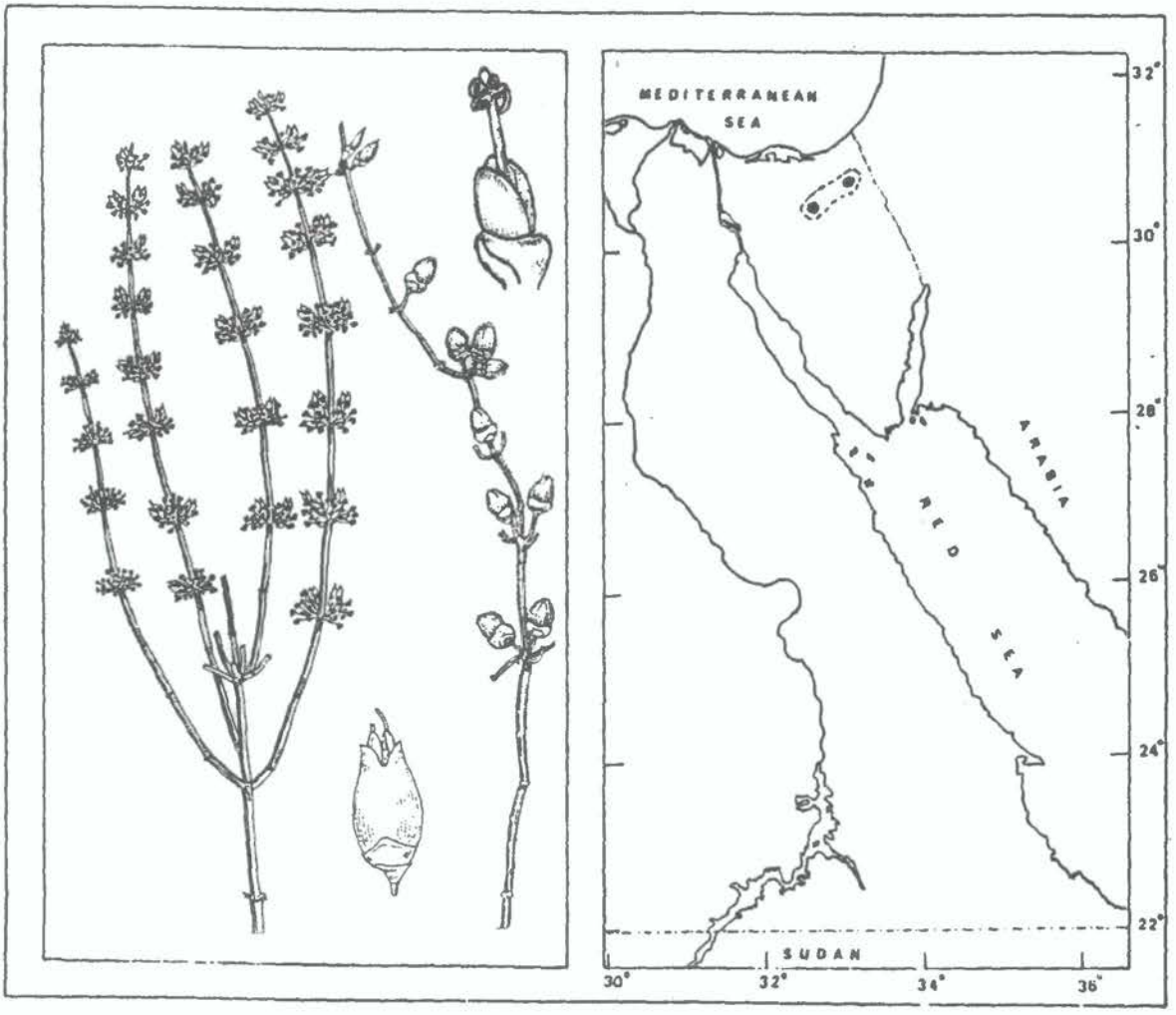
Specimens examined

S. Sinai, 25.XI.1931, *Alfred Kaiser* (Arbon) 805 (K); Sinai, along the stepway on Gebel Musa, 22.IV.1961, Täckholm *et al. s.n.* (CAI).

Sa. Gebel Elba, Khor Wadi Siamtit, 23.I.1962, Täckholm *et al.* 357 (CAI); Wadi Akwamtra, 2711. 1967. Osborn & Helmy s.n. (CAI); Gebel Elba, Wadi Kansisrob, 24.X.1956, Boulos s.n. (CAI); Gebel Elba, Wadi Rabdiet, 22.I.1933, J.R. Shabeiai 1750 (H); Gebel Elba, Wadi Mera Kwam, 10.II. 1962, Täckholm *et al.* 2070 (CAI).

3. **Ephedra foeminea** Forssk. , Fl. Aegypt.-Arab.: 219 (1775); Freitag & Maier-Stolt, Texon 38(4): 550-555 (1989).

Ephedra campylopoda C.A. Meyer, Mem. Imp. Sc. Petersbourg ser, 6, Sc. Math., sconde Pt. Sc. Nat. 7(2): 263 (1846); Täckholm, Stud. Fl. Egypt ed. 2, 51 (1974); Greuter et al. in Med-Check. 1: 299 (1984).



Prostrate shrubs with slender stems; branches opposite or whorled, longtudinally striate; old branches covered with rough fissured brown bark. Leaf scales at first deltoid, connate at base, soon reduced to brownish nodal zone. Male cones clustered at nodes, mostly sessile, ovoid with 4-6 flowers. Female cones in clusters of 2-6 at nodes, on reflexed or recurved peduncles generally longer than cones, 2-flowered.

Vernacular name (Arabic): *Alanda* علندة

Habitat and ecology: Nano-phanerophyte growing in crevices of smooth-faced limestone.

Distribution: Known from Balkan Peninsula, Syria, Lebanon; Palestine and Sinai.

Floristic category: East Mediterranean subregion with extensions to the Middle Saharo-Sindian subregion.

Status: Endangered.

The populations of *Ephedra foeminea* are confined to and sporadically occur among the limestone hills of Gebel Halal and Gebel Yelleg in Northern Sinai (Danin et al., 1985). Sinai seems to be the southwestern limit of the taxon distribution in Asia. Severe grazing by domestic livestock depletes the small populations of this taxon.

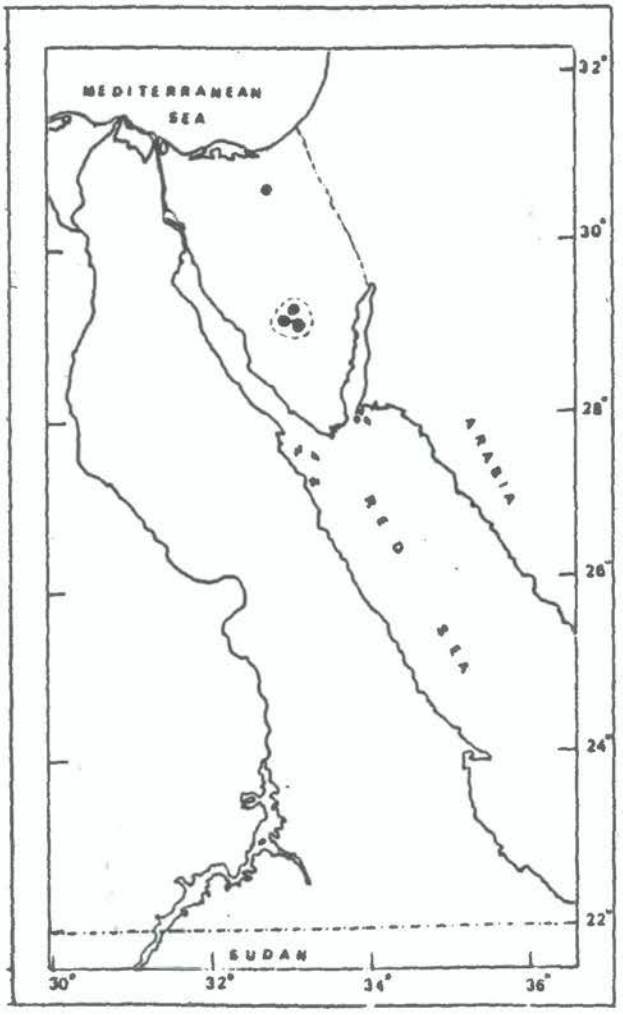
Conservation measures taken: N o n e

Conservation measures proposed: Two or more sites of *Ephedra foeminea* be wild life sanctuaries within the proposed nature reserve at Gebel Halal (34^{o} 33' N, 30^{o} 38' E) and Gebel Yelleg (33^{o} 33' N, 30^{o} 23' E).

Biology and potential value: The occurrence of *E. foeminea* on the limestone hills of Northern Sinai is of great significance. It is believed that this area was rich in the past with Mediterranean elements; and hence, the species is of scientific interest on account of its present geographical range. This may provide a better understanding of the evolutionary history of the genus in relation to the geological and environmental history of the region.

No specimens were seen.

4. **Ephedra sinaica** Riedl, Notes Roy. Bot. Gard. Edinburgh 38(2): 291 (1980); Greuter et al. in Med-Check. 1: 30 (1984); Danin et al. in Willdenowia 15: 262 (1985).



Shrub, up to 1 m. high. Stems erect or prostrate from woody base; branches whorled, the surface parted into ridges composed of tiny wart-like papilae. Leaves opposite, scalelike, cartilagenous, minute, acute, green to the middle, becoming scarious white or brownish to the end. Male cones dense, in heads, nearly sessile, each contain 4-flowers, rarely 6. Bracts broadly ovate, entirely scarious, obtuse. Female cones 2-5 in whorls, on shorter, slender peduncles; lower bracts broadly triangular-ovate, obtuse.

Flowering and fruiting: F e b r u a r y - M a r c h

Vernacular name (Arabic): *Alanda* عُلَنْدَه

Habitat and ecology: Nano-phanerophyte which grows in wadis and crevices of smooth faced limestone outcrops.

A single population was traced at Gebel Halal, Northern Sinai (550 m.). Associated species include: *Agathophora postii and Haplophyllum tuberculatum.*

Distribution: According to Danin et al. (1985) this species is common in S. Sinai rather than in N. Sinai. Also recorded from Saudi Arabia.

Floristic category: Middle Saharo-Sindian subregion.

Status: Endangered.

The extreme rarity of the species can be related to its limited geographical distribution. It is confined in Egypt to Sinai. Collecting and overgrazing are another causatives which may lead to the species decline. Deterioration of habitats supporting this species is a major factor causing the species to be endangered.

Conservation measures taken: N o n e

Conservation measures proposed: The single population traced could be included within the wildlife sanctuary proposed at Gebel Halal (N. Sinai). Other sites are to be selected and protected in S. Sinai.

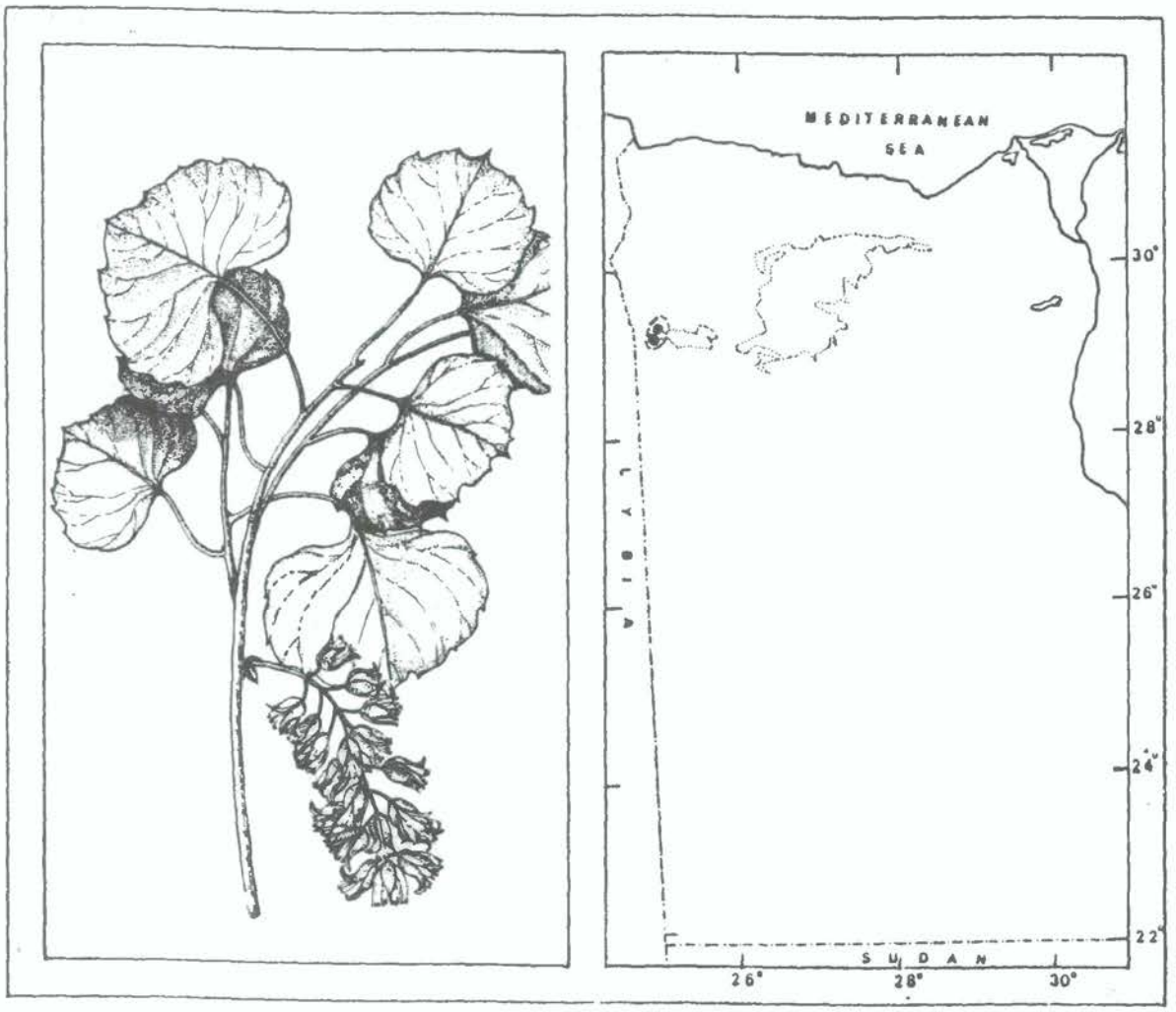
Biology and potential value: The genus *Ephedra* is biologically interesting as being dioecious, and hence the minimum population size, to give a reasonable chance of survival is likely to be higher than with hermaphrodite species.

Specimens examined

Di Northern Sinai,. Gebel Halal, 11.XI.1988, *A.G. Fahmy* 1296 (CAI).

S. Sinai, Gebel Musa, 16.III.1939, *Nayal s.n.* (CAI); Sinai, on the stepway to gebel musa, 11.7.1956, Täckholm et al. s.n. (CAI); Sinai on the stepway to Gebel Musa, 22.IV.1961. Täckholm et al. s.n. (CAI).

5. **Populus euphratica** Oliv., Voy Emp. Oth. 6: 319, pls. 45 & 46 (1807); Muschler, Man. Fl. Egypt 1: 243 (1912); Täckholm, Stud. Fl. Egypt ed. 2, 54 (1974).



Tree up to 8 m. high with erect trunk, old branches covered with smooth or lightly fissured brown bark. Leaves polymorphic, petioled, uniformly glaucous on both surfaces; blade broadly ovate or triangular, sometimes, deltoid-rhombic or suborbicular, margin almost entire, irregularly acute-dentate towards apex. Flowers in cylinderical catkins.

Male flowers on short, hairy pedicels; perianth segments membranous, laciniate. Female flowers on slender, hairy or subglabrous pedicels, perianth segments membranous, oblong, acute or obtuse, pale brown. Capsule ovoid, glabrescent or villose.

Flowering and fruiting: January - March

Vernacular name (Arabic): Erkabkaab Täkholm, 1974, p. 871).

Habitat and ecology: Micro-phanerophyte which grows on sand dunes. According to Zohary (1973) *Populus euphratica* can tolerate a high degree of soil salinity. A population of 6 trees was recorded in Khamisa Sharkia 60 km. west of Siwa Oasis. Associated species include: *Zygophyllum album*, *Tamarix nilotica*, *Spergularia rubra* and *Zygophyllum simplex*.

Distribution: Recorded from North Africa (Algeria & Libya), eastwards to Siwa Oasis (Egypt), Palestine, Jordan, Syria, Iraq, Iran, Afghanistan and W Pakistan. Also recorded from S.E. Spain and Turkey.

Floristic category: Middle and East Saharo-Sindian subregions, Mesopotamian and Irano-Anatolian provinces of Irano-Turanian region.

Status: Endangered.

Populus euphratica is known from a single locality in Egypt; Siwa Oasis. It is believed to be introduced to this area during the Roman time (331 B.C.). The natives cut the branches or even the whole tree as a firewood or to roof their huts.

Conservation measures taken: Cultivated in El Orman botanic garden.

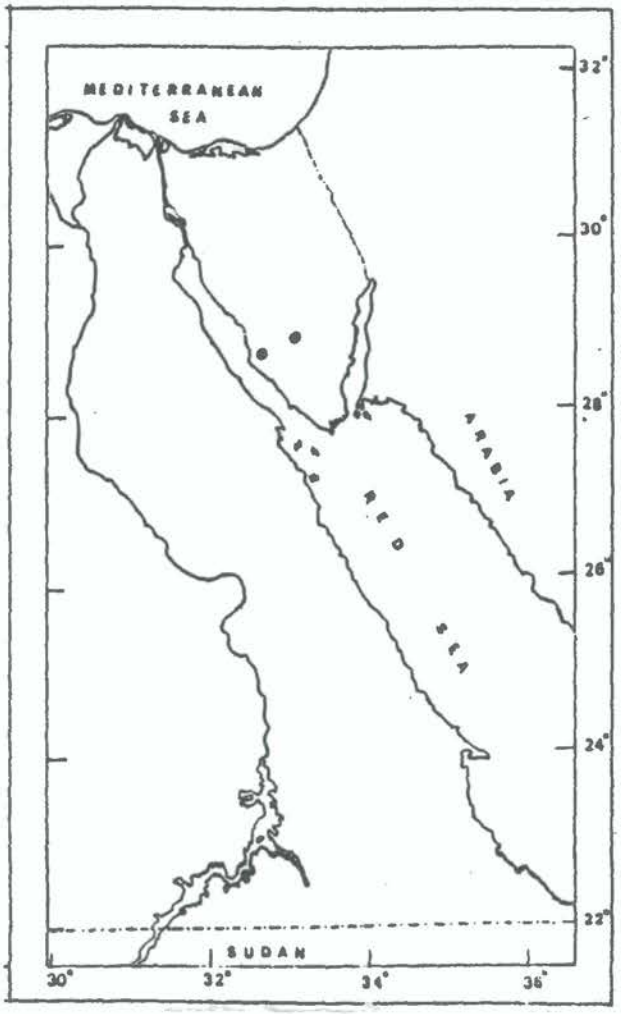
Conservation measures proposed: The population recorded in Khamisa Sharkia (Siwa) to be included in a wildlife sanctuary in the area.

Biology and potential value: Due to the longevity of the tree and the durability of the wood, the older specimens and remaining dead trunks and stumps are likely to be of great value to dendochronological studies. The study of the tree rings elucidates the past climate and provides a standard of dating woods.

Specimens examined

O. Khamisa Sharkia (Siwa Oasis), 18.IV.1986, *El Hadidi et al. s.n.* (CAI); Khamisa sharkia, 60 km. West of Siwa, 6.V.1988, *A. G. Fahmy* 1244 (CAI); Siwa Oasis, 29.XII. 1969, *Zahran s.n.* (CAI).

6. **Ficus carica** L. var. **rupestris** Haussknecht ex Boissier, Fl. Orient. 4: 1154 (1879); Täkholm, Stud. Fl. Egypt ed. 2, 55 (1974).



Deciduous shrub or small tree, with milky juice up to 2 m. tall. Stem erect, terete, branched from the base, with rounded or broadly ovoid crown, covered with grey bark. Leaves simple, petiolate, often velvety pubescent beneath; blade broadly ovate or oblong, margin entire, apex obtuse. Inflorescence a monoecious syconium. Male flowers slender, perianth segments 4-partite, lanceolate. Female flowers on stout, fleshy pedicels, perianth segments 4, lanceolate-oblong. Figs more or less puberulent, pear shaped.

Flowring and fruiting: F e b r u a r y - A p r i l

Vernacular name: *Teen El Barr, Hamat*

Habitat and ecology: Nano-phanerophyte which grows in moist places and slopes of rocky mountains.

Distribution: Recorded from Iran and Iraq westwards to the Syrian Desert and Turkey. Restricted in Egypt to the mountains of S. Sinai.

Floristic category: Mesopotamian province of the Irano-Turanian region with extensions to the Middle Saharo-Sindian subregion.

Status: Endangered.

The extreme rarity of this taxon can be related to its limited geographical distribution; the mountains of S. Sinai harbours our taxon as a relict. The plant is under immediate threat due to severe cutting and lack of suitable conditions for propagation.

Conservation measures taken: Some wild populations are protected in Wadi El Arbain, which is a part of the protected area at Gebel St. Catherine (S. Sinai).

Conservation measures proposed: The wild populations of this taxon in Gebel Serbal (S. Sinai) be protected. Cultivation in botanic gardens is a useful mean to preserve the plant.

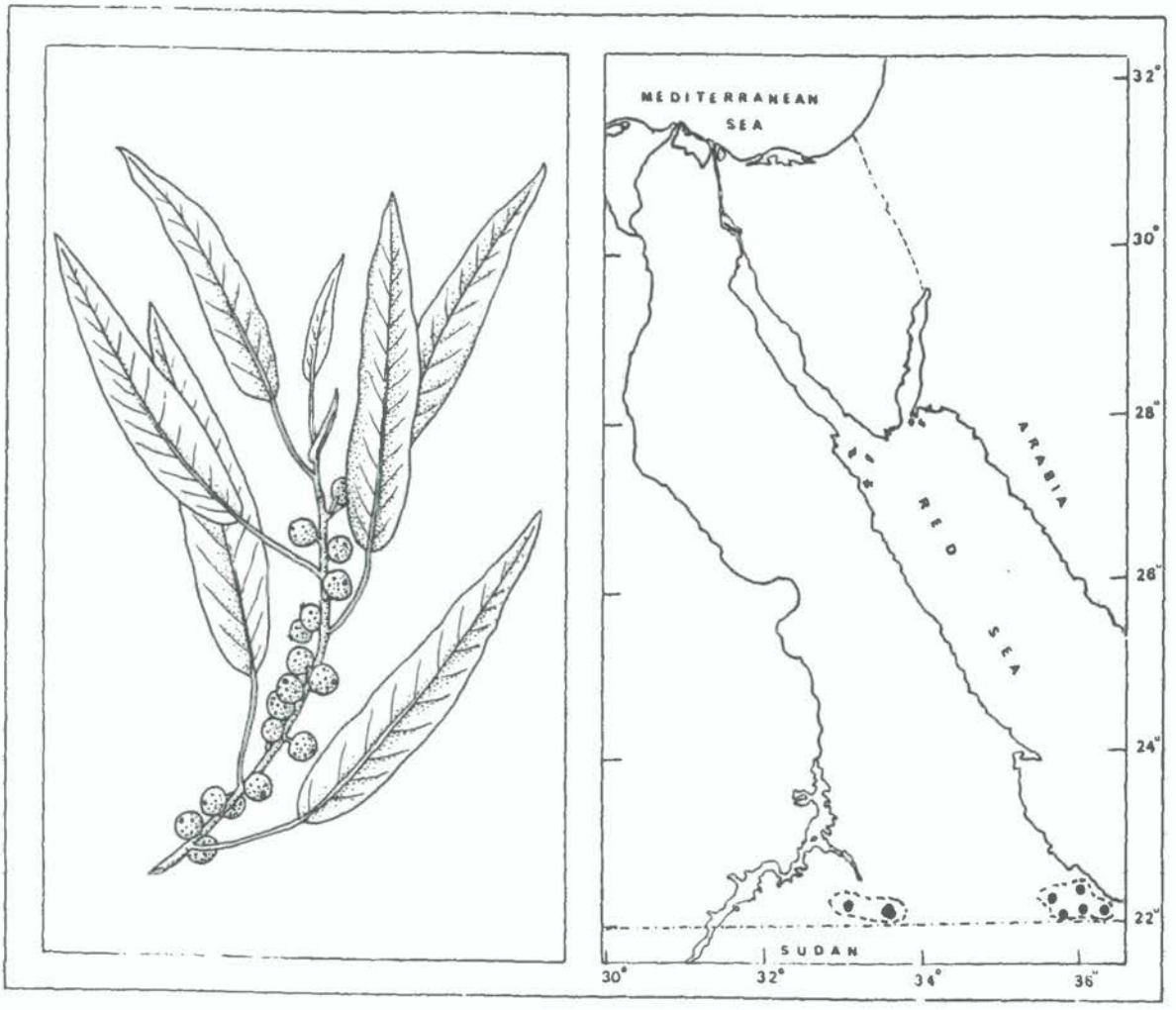
Biology and potential value: This taxon is the only wild variety of *Ficus carica* L. which grows in Egypt. With a genus of such economic value, it is especially vital that the gene pool of its individuals are conserved, so that they will be available for future use in breeding.

Specimens examined

S. Sinai, Wadi Isla, *J.R. Shabetai* 125 (K); Wadi El Arbain, 19. VIII. 1982, *El Hadidi et al. s.n.* (CAI); Sinai, 11, 1870, *Loralie s.n. (K).*

7. Ficus salicifolia Vahl, Symb. Bot. 1: 72, tab. 23 (1790); Täckholm, Stud. Fl. Egypt ed. 2: 54, pl. 6 (1974); Greuter et al. in Med-Check. 4: 242 (1989).

F. teloukat Batt. et Trabut in Bull. Soc. Bot. France 58: 674 (1912)



Trees up to 5 m. high. Stems erect, stout, branched, young branchlets usually puberulous, soon becoming glabrous; older branches covered by a light brown bark. Leaves petiolate, glossy above, conspicuously recticulate-warty beneath; blade lanceolate to oblong-lanceolate, margin entire, apex obtuse or sub-acuminate, rounded or slightly cordate at base. Inflorescence a monoecious syconium. Male flowers sessile, perianth segments elliptic, pubescent. Female flowers sessile perianth segments short ovate-lanceolate, glabrous.

Flowering and fruiting: D e c e m b e r - F e b r u a r y

Vernacular name (Bishari): *Saymook* (Täckholm, 1974).

Habitat and ecology: Nano-phanerophyte growing on rocky slopes. Kassas and Zahran (1971) noted that this species form pure stands on the north and north-eastern slopes of Gebel Elba which can be attributed to its higher water requirements.

Distribution: Recorded from Cameroon, Tschad and extends eastward to Ethiopia, Somalia and the Sudan. In Egypt it is recorded from Gebel Elba and Gebel El Uweinat (Täckholm and Boulos, 1974).

Floristic category: Sahelian, Congo and Afroriental domains of the Sudano-Zambezian region.

Status: Vulnerable.

The trees of *Ficus salicifolia* is restricted to higher altitudes of Gebel Elba mountains (north and north-eastern slopes) where the habitat is more humid due to the orographic precipitation. Geographically, these locations seems to be the northernmost limit of the taxon distribution in northeastern Africa. The fruits are edible and the trunks are a good source of firewood.

Conservation measures taken: Cultivated specimens originating from Gebel Elba grow in the Agricultural Museum and El Orman garden, Giza.

Conservation measures proposed: Populations of this tree in Wadi Ideib, Wadi Rabdeit and Wadi Yahamib be protected within the frame work of the protected area at Gebel Elba.

Biology and potential value: The species is of scientific interest as a member of a critical group relevant to studies of plant geography and taxonomy.

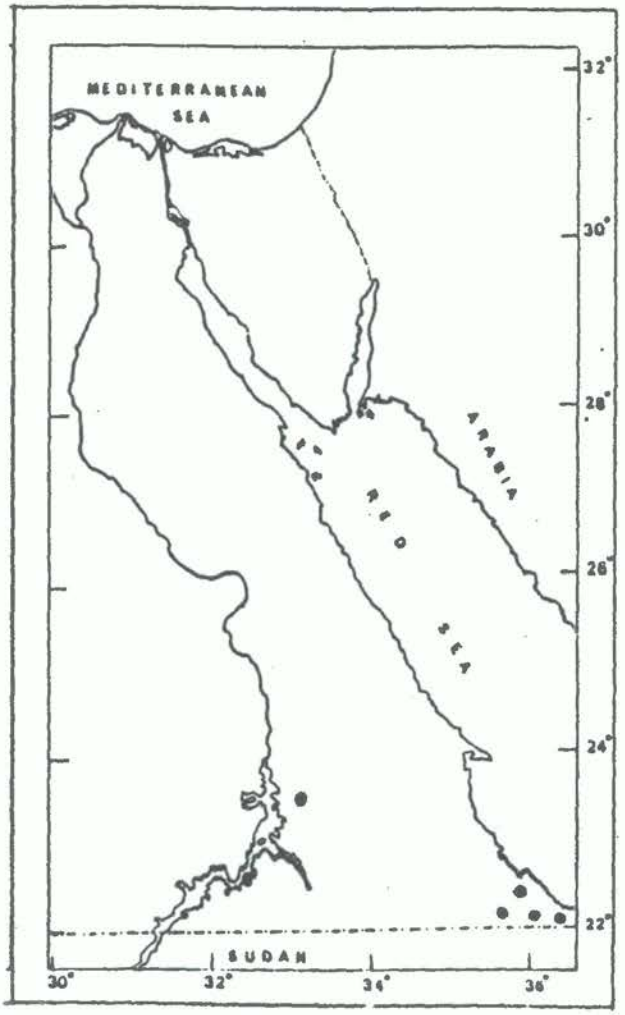
Specimens examined

Sa. Gebel Elba, Wadi Siamtit, 30.I.1933, *J.R. Shabetai s.n.* (K); Khor Wadi Yahamib, 22.I.1962, *Täckholm et al.* 318 (CAI); Wadi Akau, 18.I.1933, *Mrs Palmer s.n.* (K); Gebel Elba, 23-27.I.1929, *G. Täckholm s.n.* (CAI); Gorge across Gebel El Shallal, 24.I.1962, *Täckholm et al.* 478 (CAI)

Da. Wadi Allaqui, 7.III.1963, *M. Abdallah et al.* 1435 (K).

8. Plicosepalus curviflorus (Benth. ex Hook.) Tieghem, Bull Soc. Bot. Fr. 41: 504 et 540 (1894).

Loranthus curviflorus Benth. ex Hook., Ic. Pl. ser. 3, 14: 3, t. 1304 (1880); Täckholm, stud. Fl. Egypt ed. 2, 58 (1974).



Perennial shrub; stems ascending and climbing, terete, sparsely branched, more or less nodose. Leaves simple, nearly sessile, opposite, sub-opposite, or alternate, glabrous on both surfaces; blade linear to oblanceolate, margin entire, apex obtuse or rounded. Umbels solitary, axillary, 4-6 flowered, pedicellate. Sepals form cylidrical tube. Petals red. Fruit globose viscid berry.

Flowering and fruiting: D e c e m b e r - F e b r u a r y.

Vernacular name (Bishari): *Sihir* (Täckholm, 1974).
Arabic Anam عنم

Habitat and ecology: Semiparasite on the tops of certain *Acacia* trees viz. *A. mellifera* and *A. tortilis* .

Distribution: Recorded from Mozambique, northward to Tanzania, Kenya, Uganda, Ethiopia, Somalia and the Sudan; eastward to S. Saudi Arabia, Y.A.R. and Y.D.R.
In Egypt, it is a rare species.

Floristic category: Zambezian, Afroriental, and S. Arabian domains of Sudano-Zambezian region.

Status: Vulnerable.

The natural rarity of *Pl cosepalus curviflorus* in Egypt can be related to its limited geographical distribution, since Gebel Elba seems to be the northernmost limit of the species distribution in East Africa. Kassas (1966) pointed out that the dependence of the one sided parasite on its host is an intimate form of communal relation. The host destruction will likewise mean the eradication of the parasite. Accordingly, the continuous cutting of *Acacia* trees by the natives is the main causative for the species decline. The seeds of this species are disseminated by birds. The classic arabic name is *Zarq AtTair* (Birds excretion).

Conservation measures taken: Populations of *Acacia* spp. with the parasite are protected within the protected area of Gebel Elba.

Conservation measures proposed: Some populations of this taxon growing on *Acacia* would be preserved within Wadi El Allaqui protected area.

Biology and potential value: The plant is decorative with its scarlet red petals.

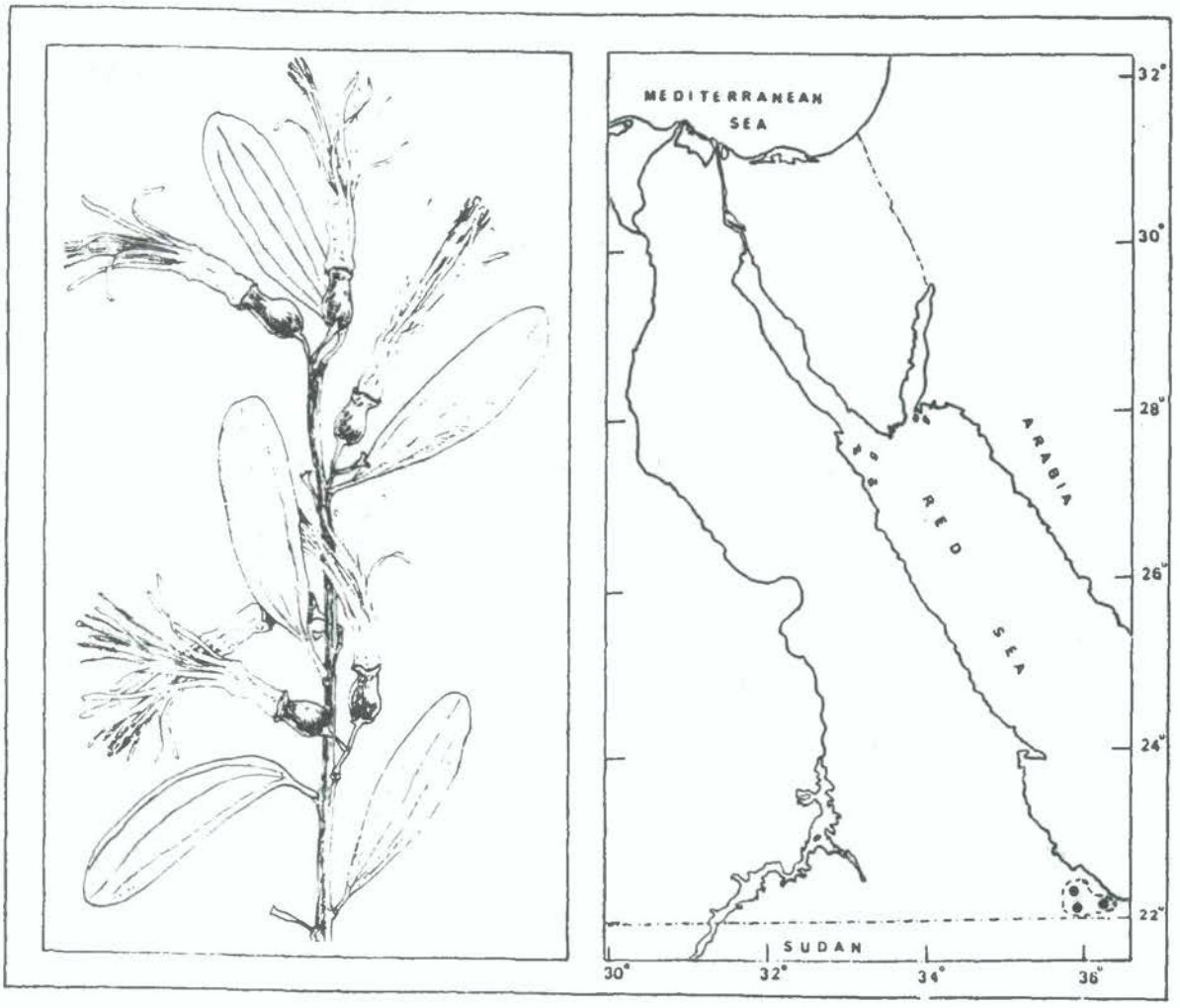
Specimens examined

Da. Wadi El Allaqui, 13.II.1963, *M. Abdallah et al.* 1109 (K).

Sa. Gebel Elba, Wadi Yahameib, 22.I.1962, *Täckholm et al.* 322 (CAI); Gebel Elba, 14.I/6.II.1933, *Fahmy and Hassib s.n.* (CAI); Wadi Aideib, N. of Gebel Elba, 14.IV.1928, *Simpson* 6443 (K); Gebel El Shellal, 1925-1926, *Murray* 3845 (K).

9. Plicosepalus acaciae (Zucc.) Wiens & Polhill, Nordic. J. Bot.: 21 (1985)

Loranthus acaciae Zucc., Abh. Akad. Wiss. (München) 3: 249, t.2, f. 3 (1840); Boissier, Fl. Orient. 4: 1070 (1879); Täckholm Stud. Fl. Egypt ed. 2, 58, pl. 8B. (1974); Danin et al. in Willdenowia 15: 290 (1985).



Perennial semi parasite, stems creeping over the host surface, branches terete, glabrous. Leaves simple, short petioled, nearly opposite, glabrescent on both surfaces; blade ovate to oblong, margin entire, apex obtuse. Umbels solitary or fascicled, axillary, 2-flowered, pedicellate. Sepals form an ovoid tube with dentat limb. Petals crimson red. Fruit baccate, ovoid-oblong.

Flowering and fruiting: D e c e m b e r - F e b r u a r y

Vernacular name (Arabic): *Abu Hamata* (Täckholm, 1974), *Anam*

Habitat and ecology: Semiparasite on *Acacia mellifera, Rhus abyssinica and Pistacia atlantica.*

Distribution: Recorded from Ethiopia, Somalia, the Sudan, eastwards to Saudi Arabia, Yemen and Oman. Also known from Palestine, Jordan and Syria. It is a very rare species in Egypt, recorded from Gebel Elba area and recently from Sinai (*Danin et al.* 1985).

Floristic category: Afro-Oriental and S. Arabian domains of the Sudano-Zambezian region with extensions to the Irano-Turanian region.

Status: Endangered.

The extreme rarity of this species can be related to its communal relations. Small populations of this plant parasitize on rare arboreal plants. The severe cutting of the host trees is highly threatening.

Conservation measures taken: Gebel Elba protected area.

Conservation measures proposed: Populations of the plant growing on host trees of Wadi Yahameib, being a part of the protected area at Gebel Elba.

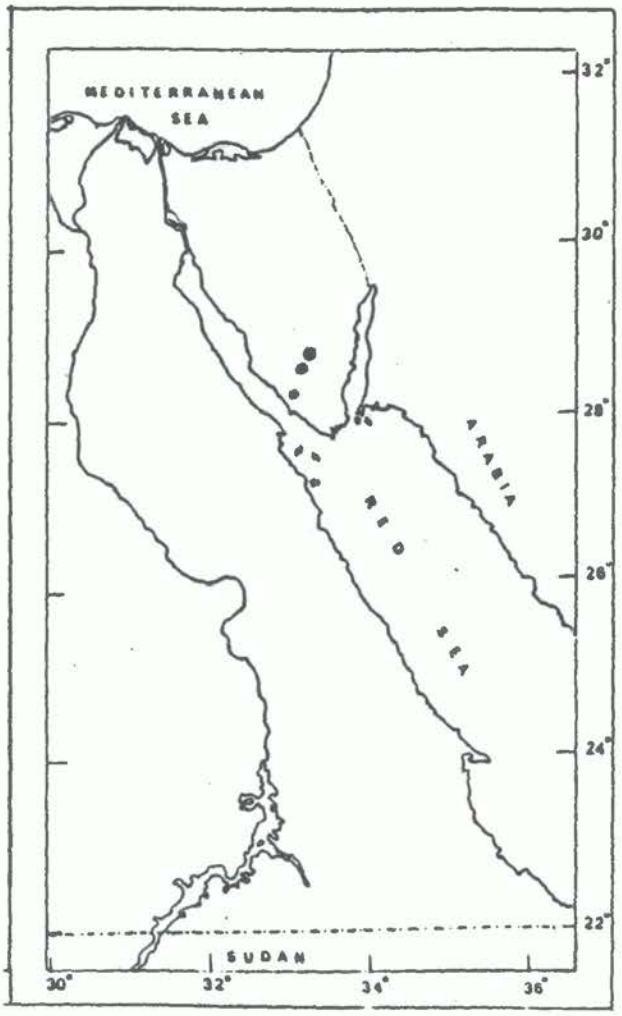
Biology and potential value: The species is of scientific interest as a semiparasite relevant to studies in plant ecology.

Specimens examined

Sa. Gebel Elba, Wadi Yahameib, 22.I.1962, *Täckholm et al.* 322 (CAI); Gebel Elba, 17.I.1933, *Mrs Palmer* 197 (K); Gebel Ekwal, 27.I.1933, *Shabetai* 1562 (K).

10. Atraphaxis spinosa L., Sp. Pl.: 333 (1753); Greuter et al. in Med-Check. 4: 352 (1989).

A. spinosa var. *sinaica* Boiss., Fl. Orient. 4: 1021 (1879): Täckholm, Stud. Fl. Egypt ed. 2, 58 (1974).



Spinescent undershrubs, up to 60 cm high. Stems ascending. terete, much branched with spinescent twigs, covered with greyish bark. Leaves simple, shortly petioled, glabrous on both surfaces; blade orbicular and suborbicular, margin entire, apex broadly obtuse. Flowers in axillary clusters, pedicellate. Perianth persistent, petaloid 4-partit, pink with white margins, the outer segments (2) ovate-orbicular to reniform. Achene sublenticular, broadly ovate to orbicular, light brown, smooth and shiny.

Flowering and fruiting: March - May

Vernacular name (Arabic): *Sawaas* (Täckholm 1974).

Habitat and ecology: Chamaephyte growing in the crevices of granite rocks at high altitudes.

Distribution: Recorded from Jordan, Palestine eastwards to Arabia, Iran and Afghanistan. It is restricted in Egypt to the mountains of S. Sinai.

Floristic category: Middle Saharo-Sindian subregion extending to W. Irano-Turanian subregion.

Status: Vulnerable.

Southern Sinai seems to be the western limit of the taxon distribution. The species can be related to its limited geographical distribution combined with severe grazing by goats. The bedouins collect the fruiting parts of the plant and use it in folk medicine.

Conservation measures taken: Gebel St. Catherine protected area.

Conservation measures proposed: Some populations in St. Catherine area be managed as wildlife sanctuaries within that reserve.

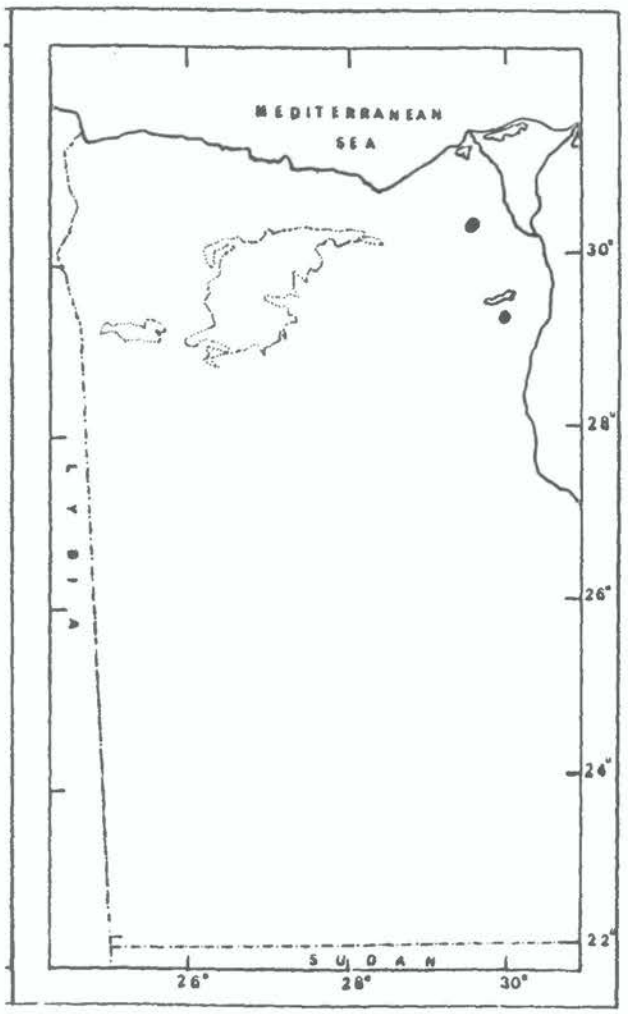
Biology and potential value: The bedouins collect this plant together with *Tanacetum* and *Artemisia,* to be used in folk medicine.

Specimens examined

S. St. Catherine, 16.IV.1937, *Shabetai* 134-316 (K); Montagne Menegad-Mousa, VI. 1832, *N. Bove* 36 (K); on the way to Gebel Musa, 10.V.1956, *El Hadidi* 52 (CAI); Gebel Senaa, 24.IV.1961, *Täckholm et al. s. n.* (CAI).

11. Calligonum polygonoides L. subsp. **polygonoides** Soskov, Novo. Sist. Vyss. Rast. 12: 153 (1975); Greuter et al. in Med-Check. 4: 352 (1989).

C. polygonoides L., Sp. Pl.: 530 (1753); Boiss. , Fl. Orient. 4: 1000 (1879); Täckholm, Stud. Fl. Egypt ed. 2, 61 (1974).



Shrubs up to 90 cm. high. Stems ascending to erect, slender, much branched with pale brownish-whitish bark, young branches fasciculate, green. Leaves minute, deciduous, free from the ochrea, glabrous on both surfaces; blade filiform, margin entire, apex almost acute. Flowrs in axillary clusters, pedicellate. Perianth segments 5, white. Fruit oblong, covered with stiff bristles, which arises from tuberculate bases.

Flowering and fruiting: M a r c h - J u n e

Habitat and ecology: Nanophanerophyte which grows on sandy plains.

Distribution: Recorded from Palestine, Jordan, eastwards to Arabia, Iran, Afghanistan and India. It is confined in Egypt to the Galalas of the Eastern Desert and El Tih Desert (N. Sinai).

Floristic category: Mesopotamian and Medio-Asiatic provinces of the Irano-Turanian region with extensions to the Middle Saharo-Sindian subregion.

Status: Vulnerable.

This taxon was probably widespread in the northern deserts of Egypt but completely disappeared due to the establishment of new settlements.
It was recently recorded by Hassan (1987) in Wadi El Assiuti (31° 22' N., 27° 17' E.), Wadi Mishagig (30° 52' N., 27° 58' E. to 31° 07' N, 27° 50' E) and Wadi Ibada (30° 53' N, 27° 47' E, to 31° 01' N, 27° 52' E.).
Overgrazing and severe collection by bedouins leads to its decline.

Conservation measures taken: N o n e

Conservation measures proposed: The populations traced by Hassan (1987) in Wadi El Assiuti area be wildlife sanctuaries.

Biology and potential value: The plant can be propagated as a good sand binder.

Specimens examined

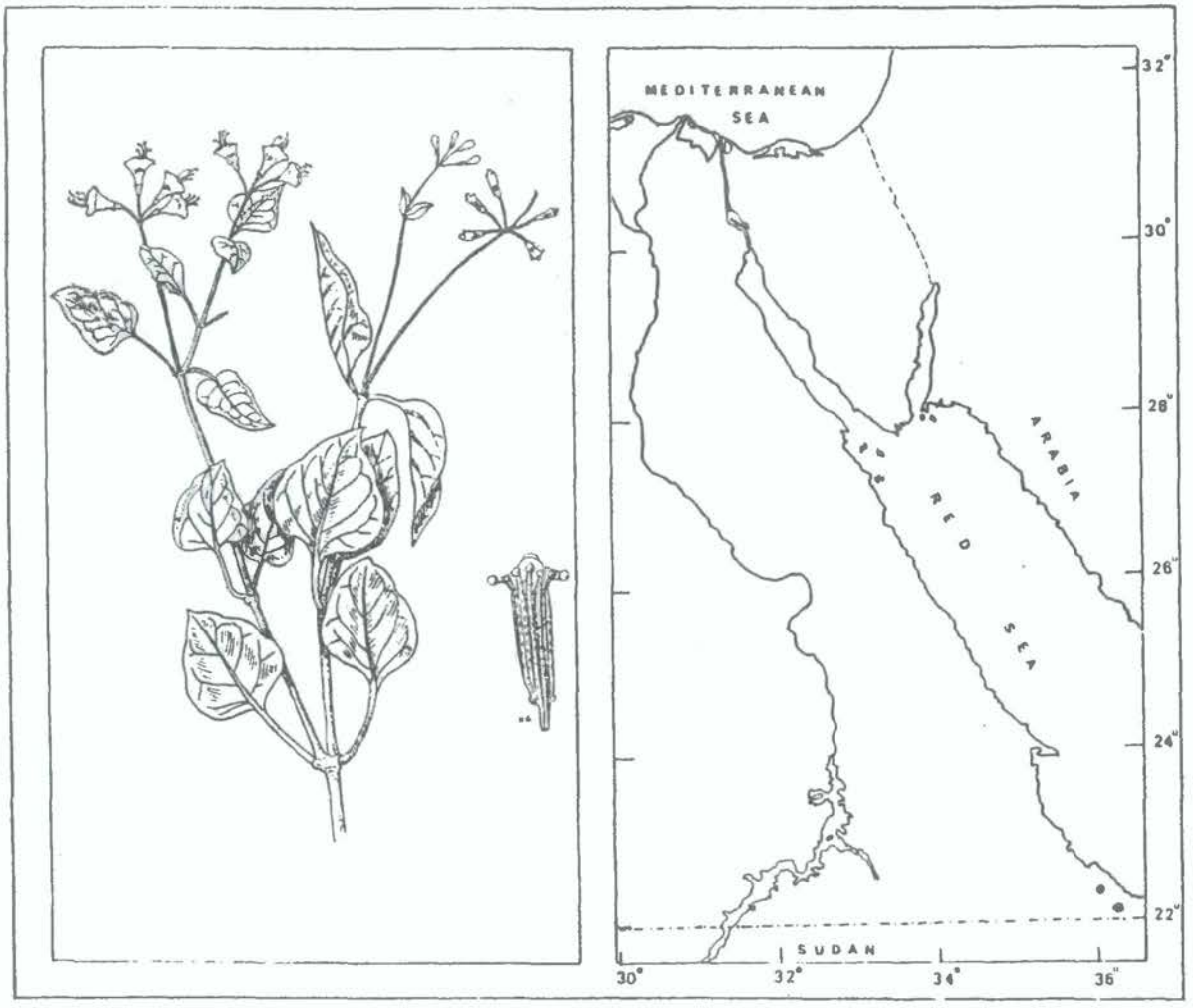
Dl. Homich rajan (S.W. Fayum), 27.III.1876, *Ascherson* 450 (K); Kboase, bei Ain Um El Lifah, 22.IV.1876, *Ascherson* 452 (K), Cairo-Alex. desert road, 11.IV.1949, *N.D. Simpson s.n.* (K).

Dg. Kairo (Abbasiaeh, IV.1904, *Keller* 179 (K); Wadi Mishagig (Minya area), 22.III.1984, *L. Hassan* 3199 (CAI); Wadi Ibada (Mallawi, Minya), 23.III.1984, *L. Hassan* 3214 (CAI); Wadi El Assiuti, 4.IV.1964, *Zahran* and *Girgis s.n.* (K); Wadi El-Assiuti, 19.III.1984, *L. Hassan* 3133 (CAI).

Di Tel El Kebir, III.1906, *Muschler s.n.* (K).

12. Boerhavia africana Lour., Fl. Coch. 1: 16 (1790); Greuter et al. in Med-Check. 4: 244 (1989).

Commicarpus africana (Lour.) Dandy in Andrews, Fl. Pl. Ang.-Egypt. Sudan 1: 152, Fig. 91 (1950); Täckholm, Stud. Fl. Egypt ed 2: 68 (1974).



Woody herb, up to 60 cm. high. Stems erect or scrambling, more or less woody below, slender, branched, pubescent. Leaves opposite, petiolate, adpressed pubescent on both surfaces; blade broadly ovate to ovate-lanceolate, margin entire to deeply sinuate, apex obtuse to acute. Flowers in terminal, leafy panicles, pedicellate. Perianth funnel-shaped, white or lilac above, tubular and greensih below, short-pubescent. Fruit an anthocarp, with stalked or sessile tubercles at apex.

Flowering and fruiting: D e c e m b e r - F e b r u a r y

Vernacular name (Arabic): *Dowinaat El Far* (Täckholm, 1974).

Habitat and ecology: Chamaephyte growing on rocky beds of wadis, especially in shady places.

Distribution: Widely distributed in Tropical and Southern Africa, northwards to N. Africa, S.W. Europe; also known from Arabia and Madagascar It is confined in Egypt to Gebel Elba area.

Floristic category: Sudano-Zambezian, Madagascan and Mediterranean regions.

Status: Vulnerable.

Small populations of *Boerhavia africana* are scattered in the wadis of Gebel Elba. These are greatly depleted due to the exploitation of the plant tops for camels fodder. Overgrazing by goats causes the species decline.

Conservation measures taken: Some populations are preserved in Gebel Elba protected area.

Conservation measures proposed: Two or more populations in Wadi Akwamtra and Gebel Shallal (Elba area) to be propagated in wildlife sanctuaries.

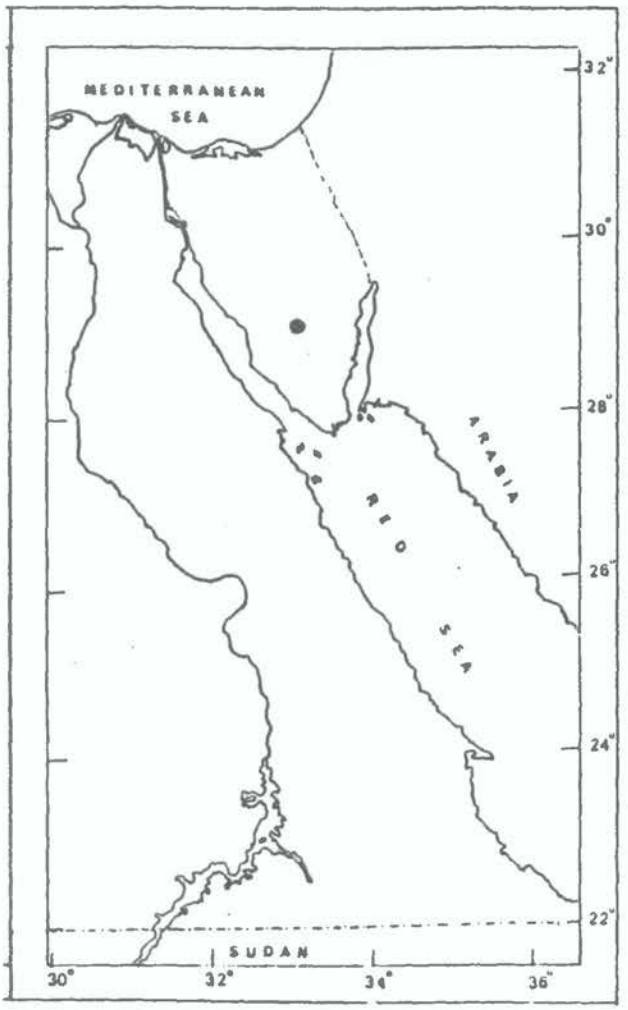
Biology and potential value: The plant is of horticultural value becaus of its scrambling habit and decorative inflorescene.

Specimens examined

Sa. Gebel Elba, Wadi Akwantra, mountain tributary, 27.II.1967, *Osborn* and *Helmy s.n.* (CAI); Khor across Gebel Shallal, 24.I.1962, *Täckholm et al.* 429 (CAI).

13. Boerhavia sinuata (Meikle) Greuter & Burdet in Willdenowia 16: 448 (1987); Greuter et al. in Med-Check. 4: 245 (1989).
Commicarpus sinuatus Meikle in Kew Bull. 29: 83 (1974).

C. ehrenbergii Täckholm et Boulos, Publ. Cairo Univ. Herb. 5: 58 (1974); Täckholm, Stud. Fl. Egypt ed 2, 68 (1974).



Woody herb, up to 30 cm. high. Stems scrambling, slender, branched, densely glandular-pubescent. Leaves opposite, petiolate, glabrescent on both surfaces; blade broadly ovate, margin sinuate, apex acute. Flowers in terminal umbels, pedicellate. Perianth funnel-shaped, rosy lilac. Anthocarp cylindrical, nearly sessile, tubercled at apex.

Flowering and fruiting: F e b r u a r y - A p r i l

Habitat and ecology: Chamaephyte scrambling through bushes on sandy plains.

Distribution: Recorded from Ethiopia, Somalia eastwards to Saudi Arabia and S. Yemen. Very rare in Egypt, confined only to the lower massive of Sinai.

Floristic category: Afro-Oriental and S. Arabian domains of the Sudano-Zambezian region, and Middle Saharo-Sindian subregion.

Status: Endangered.

The natural rarity of this species can be related to its limited geographical distribution. Small populations are subjected to severe grazing by domestic livestock which highly endanger this taxon.

Conservation measures taken: N o n e .

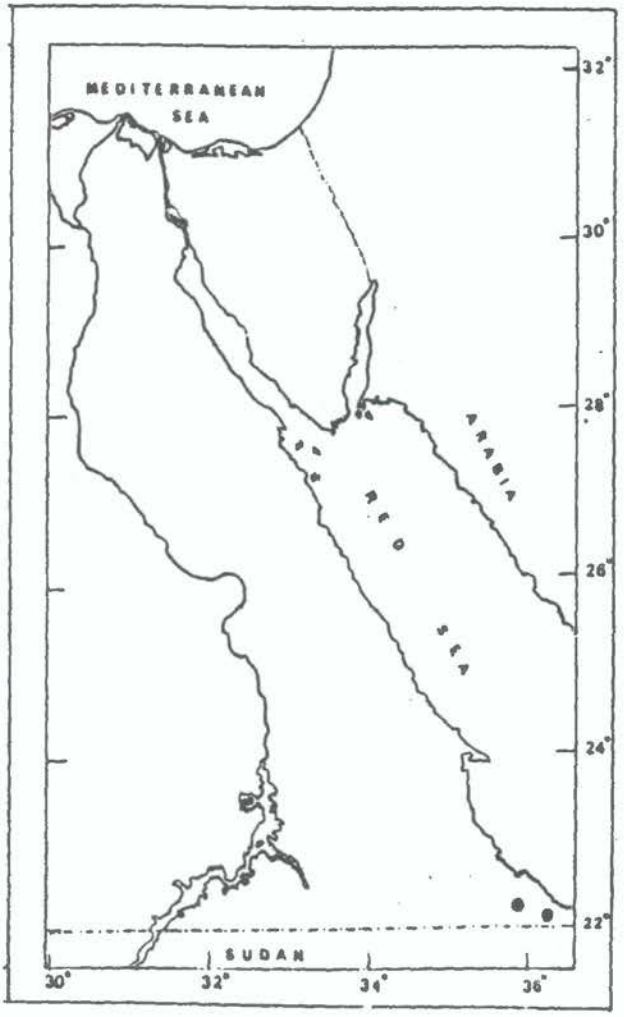
Conservation measures proposed: The lowr Sinai massive nature reserve; also cultivation of the plant in botanical gardens can help to preserve our taxon.

Biology and potential value: The occurrence of *Boerhavia sinuata* in disjunct populations in S. Sinai is of interest to phytogeographers and plant ecologists. It could also be of horticultural interest because of its scrambling habit and decorative flowers.

No specimens seen; its occurrence in Sinai is reported by *Danin et al.*(1985).

14. Boerhavia elegans Choisy in De Candolle, Prodr. 13(2): 453 (1849); Boissier, fl. Orient. 4: 1045 (1879); Täckholm, Stud. Fl. Egypt ed 2, 69 (1974).

B. repens L. var. *elegans* Ascherson et Schweinfurth *sensu* Täckholm, Stud. Fl. Egypt ed. 2, 69 (1974).



Perennial reddish-flushed herb, up to 30 cm. high. Stems ascending, sometimes prostrate, slender, much branched, adpressed pubescent, later becoming glabrous. Leaves whorled, petiolate, glabrous, whitish beneath; blade broadly ovate, lanceolate and elliptic, margin sinuate, apex obtuse or subacute. Flowers in a large naked panicle, pedicellate.
Perianth small, campanulate, pentagonal, viscid. Anthocarp longitudinally ribbed without warty glands.

Floering and fruiting: D e c e m b e r - F e b r u a r y

Habitat and ecology: Chamaephyte growing on wadi beds.

Distribution: Recorded from Ethiopia, Somalia, the Sudan, eastwards to Arabia and Iran. Very rare in Egypt, confined to Gebel Elba area.

Floristic category: Afro-Oriental and S. Arabian domains of the Sudano-Zambezian region with slight extension to W. Irano-Turanian subregion.

Status: Vulnerable.

The populations of *Boerhavia elegans* in Gebel Elba area represents the northern limits of its distribution in Africa. The species vulnerability may be related to its severe browse by camels and goats.

Conservation measures taken: Some populations of this species are under protection within Gebel Elba protecred area.

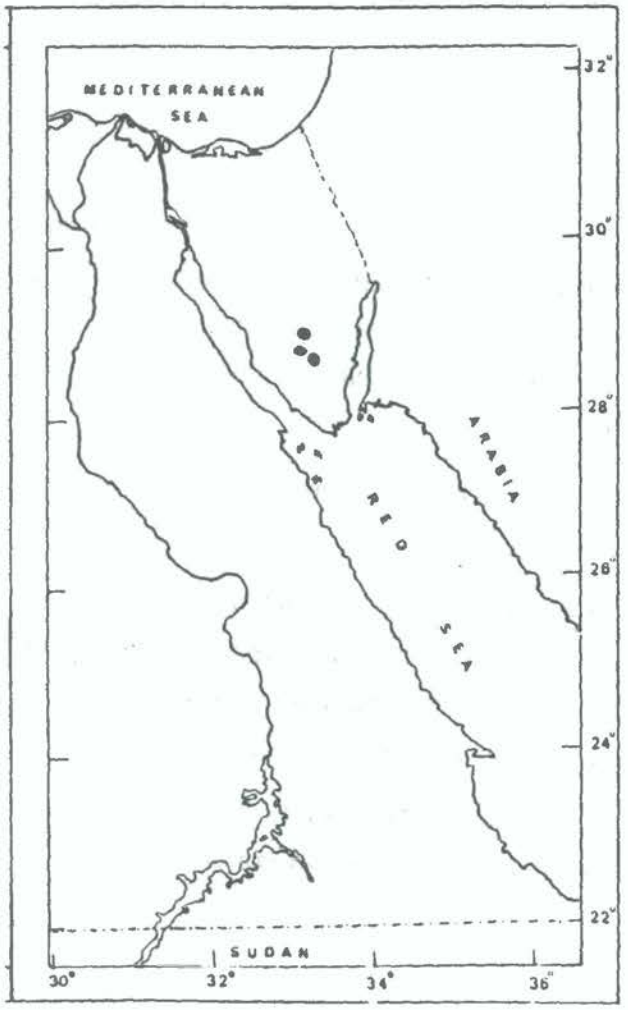
Conservation measures proposed: Two or more populations in Wadi Serimtai may serve as wildlife sanctuaries within the reserve of Gebel Elba area.

Biology and potential value: It is of considerable scientific interest as a member of critical group relevant to studies of plant geography and taxonomy.

Specimens examined

Sa. Gebel Elba, Wadi Serimtai, 23.I.1962, *Täckholm et al.* 362 (CAI); Gebel Elba, upstream part of Wadi Serimtai, 27.I.1962, *Täckholm et al.* 665 (CAI).

15. Silene schimperiana Boiss. Diagn. Pl. Orient. Nov. ser. 1, 1: 31 (1843); Täckholm, Stud. Fl. Egypt ed. 2, 86 (1974); Greuter et al. in Med-Check 1: 274 (1984); Danin et al. in Willdenowia 15: 269 (1985).



Perennial woody herb, up to 40 cm. high. Stems ascending, slender, simple and forked, viscid in upper parts and glabrous below. Leaves simple, sessile and petiolate, glabrous on both surfaces; blade linear-lanceolate, margin entire, apex acute. Flowers in terminal, solitary, pedicellate. Calyx cyclindrical with triangular, glabrous, acute teeth. Corolla white. Capsule oblong, glabrous.

Flowering and fruiting: June - August

Vernacular name (Arabic): *Wesbi* (Täckholm, 1974). وِسْبِي

Habitat and ecology: Hemicryptophyte growing on rocky wadi beds.

Distribution: Recorded from the table mountains, Gebel El Igma, lower and higher massif of Sinai.

Floristic category: Endemic.

Status: Vulnerable.

The species vulnerability can be related to its limited geographical distribution combined with overgrazing especially by goats. The bedouins of S. Sinai collect the plant and mix it by sticky substance, for catching insects and even small birds (Abdallah *et al.*, 1984). This is perhaps another reason leading to the species decline.

Conservation measures taken: Some populations are protected in Gebel St. Catherine protected area.

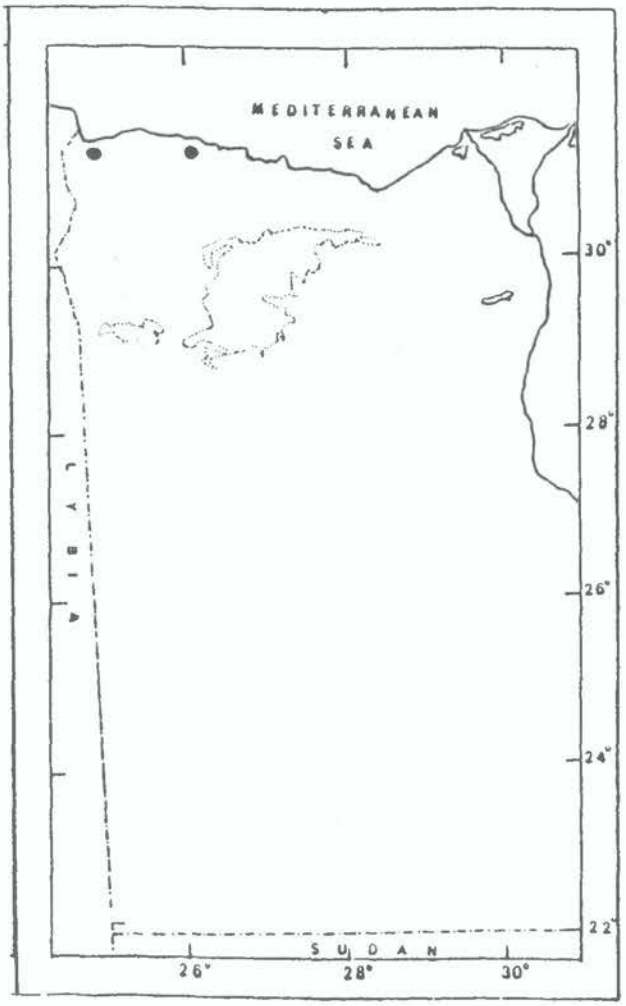
Conservation measures proposed: Another populations in Wadi Talah and Wadi El Arbain (St. Catherine) can be propagated as wildlife sanctuaries. The propagation of this plant in botanical gardens as an ornamental is another valuable means to preserve the species.

Biology and potential value: This plant deserves protection as a rare endemic species. It is potentially an ornamental plant with attractive white flowrs.

Specimens examined

S. Gebel St. Catherine, in the garden of Deir El Arbain, 23.IV.1961, *Täckholm et al. s.n.* (CAI); Catherine, Wadi Talah, 8.X.1983, *El Hadidi et al. s.n.* (CAI); on the stepway to Gebel Musa, 11.V.1956 *Täckholm* 38 (CAI).

16. Silene fruticose L. subsp. cyrenaica Beguinot et Vaccari, Nouve Fl. Libya: 2 (1912); Täckholm, Stud. Fl. Egypt ed. 2, 86 (1974); Greuter et al. in Med-Check. 1: 258 (1984).



A loosley tufted suffruticose perennial with stout woody base, up to 60 cm. high. Stems erect, slender, with almost simple branches, thinly crisped, pubescent below, glabrescent above. Leaves simple petiolate, glabrous except at margin; blade obovate-spathulate, maring entire, apex acute, sometimes apiculate. Flowers in densely corymbose-panicles at the tip of the branches, pedicellate. Calyx 10 nerved, with ovate triangular, subacute teeth, densely glandular-pilose. Corolla rose. Capsule ovoid-urceolate with slightly reflexed teeth.

Flowering and fruiting: M a r c h - A p r i l

Habitat and ecology: Hemicryptophyte growing on limestone slopes.

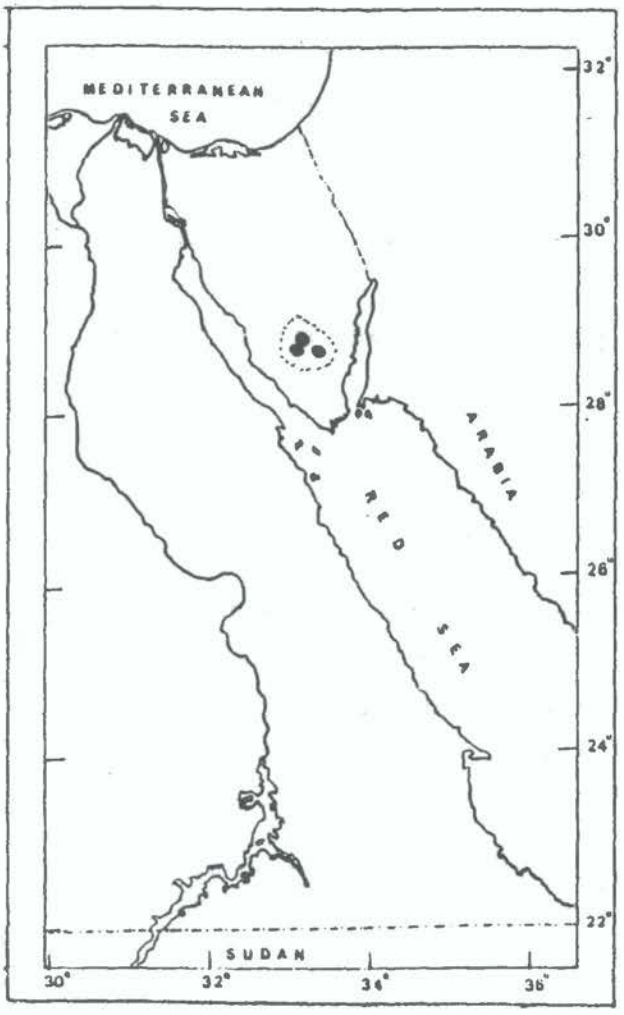
Distribution: Recorded from Libya and the westernmost part of the Mediterranean coast of Egypt.

Floristic category: S. Mediterranean subregion.

Status: Indeterminate.

Täckholm (1974) reported its occurrence near the Egyptian-Libyan frontier, while no collections were seen by the writer from this area. Field studies are required in its past sites to determine its present status.

17. Bufonia multiceps Decne. Ann. Sci. Nat. Bot. ser. 2, 3: 259 (1835); Täckholm, Stud. Fl. Egypt ed. 2, 89 (1974); Greuter et al. in Med-Check. 1: 172 (1984); Danin et al. in Willdenowia 15: 267 (1985).



Undershrub, up to 30 cm. high. Stems ascending, slender, simple and branched, glandular hairy. Leaves simple, sessile and appressed to stem, glabrous on both surfaces, but ciliated near the base; blade filiform, margin entire, apex narrowly acute. Flowers small, grouped in cymose spikes or panicles. sepals lanceolate, glabrous, acute. Petals white.
Capsule compressed-lenticular, glabrous.

Flowering and fruiting: F e b r u a r y - A p r i l

Vernacular name (Arabic): *Adama* (Täckholm, 1974).

Habitat and ecology: Hemicryptophyte growing on stony and rocky slopes as well as crevices of rocky outcrops.

Distribution: Endemic to Mountainuous Sinai.

Floristic category: Middle Saharo-Sindian subregion.

Status: Endangered.

Small populations are traced in Gebel St. Catherine, Gebel Musa and the surrounding wadis.
It was listed by El Hadidi (1979) among the threatened and endangered species of Egypt.
Overgrazing threatens this taxon.

Conservation measures taken: Some populations are protected in Gebel St. Catherine protected area.

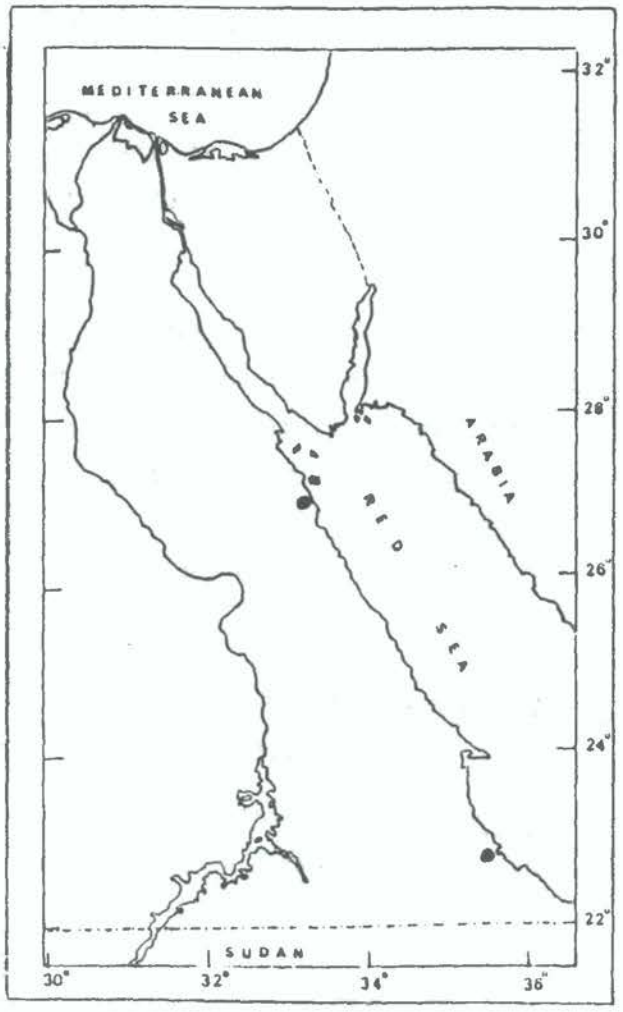
Conservation measures proposed: The populations of *Bufonia multiceps* in Wadi El Arbain (Gebel St. Catherine area) and along the stepway to Gebel Musa be protected in wildlife sanctuaries.
Propagation and seed banks are possible means to protect this taxon from extinction.

Biology and potential value: *Bufonia multiceps* is an endemic taxon and firm measures are to be taken to save it from extinction.

Specimens examined

S. Gebel St. Catherine, Wadi El Arbain, V. 1835, *Schimper* 328 (K); Wadi El Arbain, 6.V.1982, *A. Hosny s.n.* (CAI); Sinai Om El Sezat Arab, VI.1832, N. Bove 209 (K); Sinai, along the stepway on Gebel Musa, 22.IV.1961, *Täckholm et al. s.n.* (CAI).

18. Suaeda volkensii C.B. Clarke, F.T.A. 6(1): 92 (1909): Täckholm, Stud. Fl. Egypt ed. 2, 123 (1974); Greuter et al. in Med-Check. 1: 314 (1984).



Succulent undershrub, up to 60 cm. high. Stems erect or ascending, slender to stout, much branched, glabrous. Leaves thick and fleshy, sub-sessile, glabrous; blade oblong-lanceolate, margin entire, apex rounded obtuse. Flowers in clusters forming continuous sessile spikes. Perianth of pentagonal fleshy segments. Fruiting perianth enclosing compressed urticle.

Flowring and fruiting: January - February

Vernacular name (Arabic): Sowweid

Habitat and ecology: Hemicryptophyte growing on salt marshes (terrestrial or partly submerged).

Distribution: Recorded from Somalia, Ethiopia and along the Red Sea coast to the Sudan and eastwards to Arabia. Very rare species in Egypt and confined to the coastal salt marshes along the Red Sea.

Floristic category: Afro-Oriental domain of the Sudano-Zambezian region with extensions to the Middle Saharo-Sindian subregion.

Status: Vulnerable.

The populations of *Suaeda volkensii* around Hurghada (33° 50' N 27° 13' E) represents perhaps the northermost limit of its distribution in Africa. The species vulnerability can be related to its narrow ecological amplitude (Red Sea coastal plains) combined with human impact, the establishment of touristic centres around Hurghada.
Overgrazing by camels is another causative for the species decline.

Conservation measures taken: N o n e

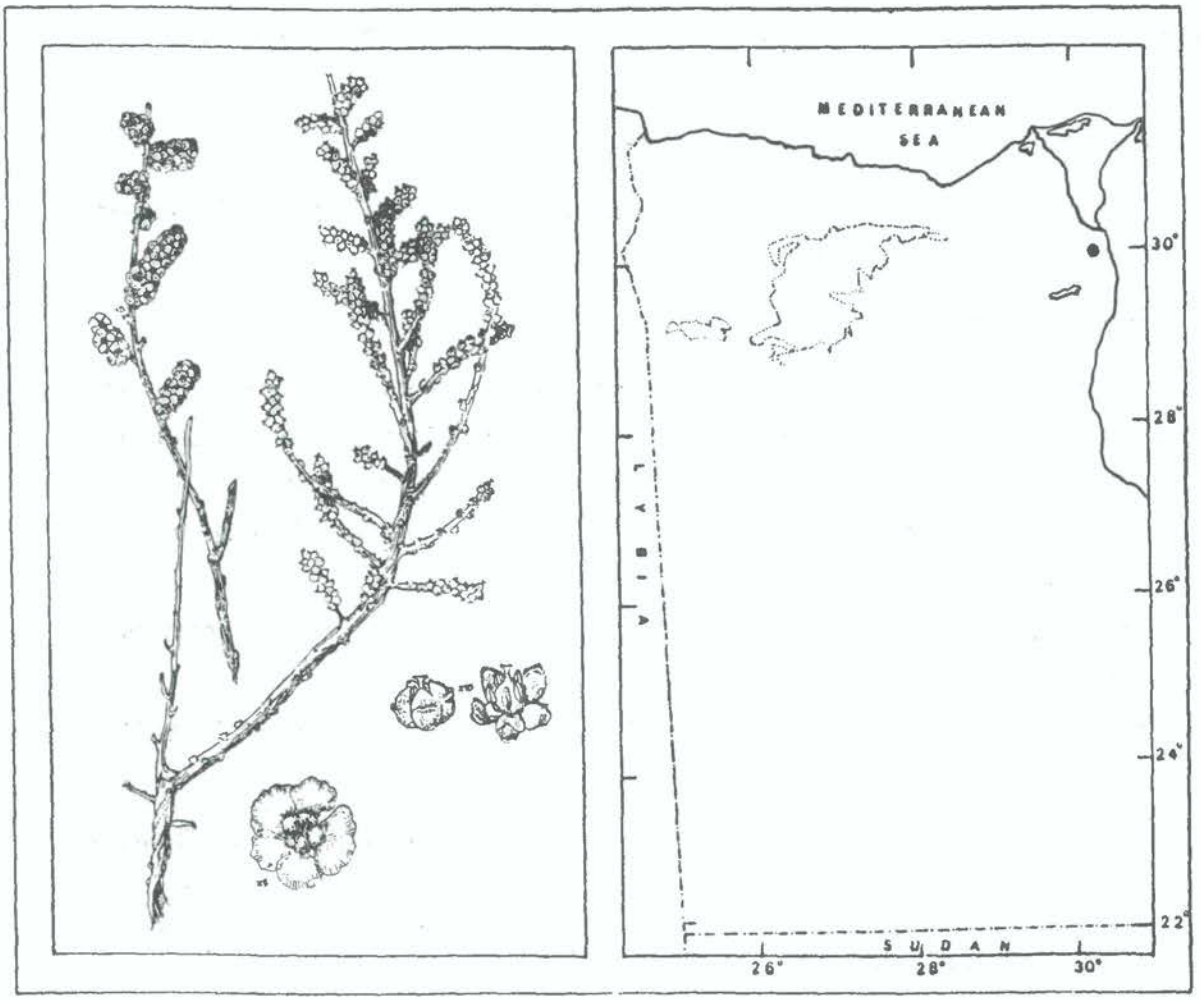
Conservation measures proposed: Shadwan Islands (33° 55' N 27° 30' E to 34° 5' N, 27° 25' E) as a nature reserve.

Biology and potential value: The species is of considerable interest in phytogegraphical studies and the phylogenetic affinities within the genus.

Specimens examined

R. Hurghada, 21.I.1929, *A. Nayal s.n.* (CAI); Ashaweib area, 1.II.1962, *Täckholm et al.* 1160 (CAI); Red Sea coast, Wadi E.side of Hamra Doum, 2.III.1967; *Osborn & Helmy s.n.* (CAI); Shadwan Island, 1.I.1935, *A.H. Nasr s.n.* (CAI).

19. Salsola tetragona Del. Desc. Egypte, Hist. Nat.: 203, Fig. 3 (1813-1814); Boiss., Fl. Orient. 4: 957 (1879); Täckholm, Stud. Fl. Egypt ed. 2, 125 (1974); Greuter et al. in Med.-Check. 1: 310 (1984); Freitag, Flora (1989) 183: 163 (1989).



Dwarf shrublet, up to 30 cm. high. Stems erect, terete, much branched, silky-glossy. Leaves simple, 4-angled decussate, clasping at base, vilous; blade scale-like, ovate-rhombic, margin entire, apex mucronate. Flowers solitary in axils, sessile. Perianth segments triangular, silky villous, subacute. Fruiting perianth with obovate, pink, impricated wings.

Flowering and fruiting: S e p t e m b e r - N o v e m b e r

Vernacular name (Arabic): *Tarteer* (Täckholm, 1974). طرطير

Habitat and ecology: Chamaephyte growing on smooth faced outcrops of limestone hills.

A small population of 50 individuals was traced in Doumet El Hassana (31° 00' N, 30° 00' E to 31° 03' N, 29° 59' E) west of El Giza province. Associate species include: *Anabasis articulata, Traganum nudatum* and *Zygophyllum album*.

Distribution: Recorded from N Africa and Palestine.

Floristic category: Middle Saharo-Sindian subregion with slight extension to the East Saharo-Sindian subregion.

Status: Endangered.

Salsola tetragona was previously recorded from several localities of the Libyan Desert (Cairo-Alexandria desert road, Mersa Matrouh-Siwa road and Wadi El Natroun). At present it is only known from a single locality: Doumet El Hassana, Abou Rawash, Giza. This area belongs Geologically to the Cretaceous.

Quarrying limestone and its processing in the area is severely threatening the plant.

The species is going under immediate threat due to its very limited geographical range with small sized populations.

Conservation measures taken: The small sized population at Doumet El Hassana was recently protected.

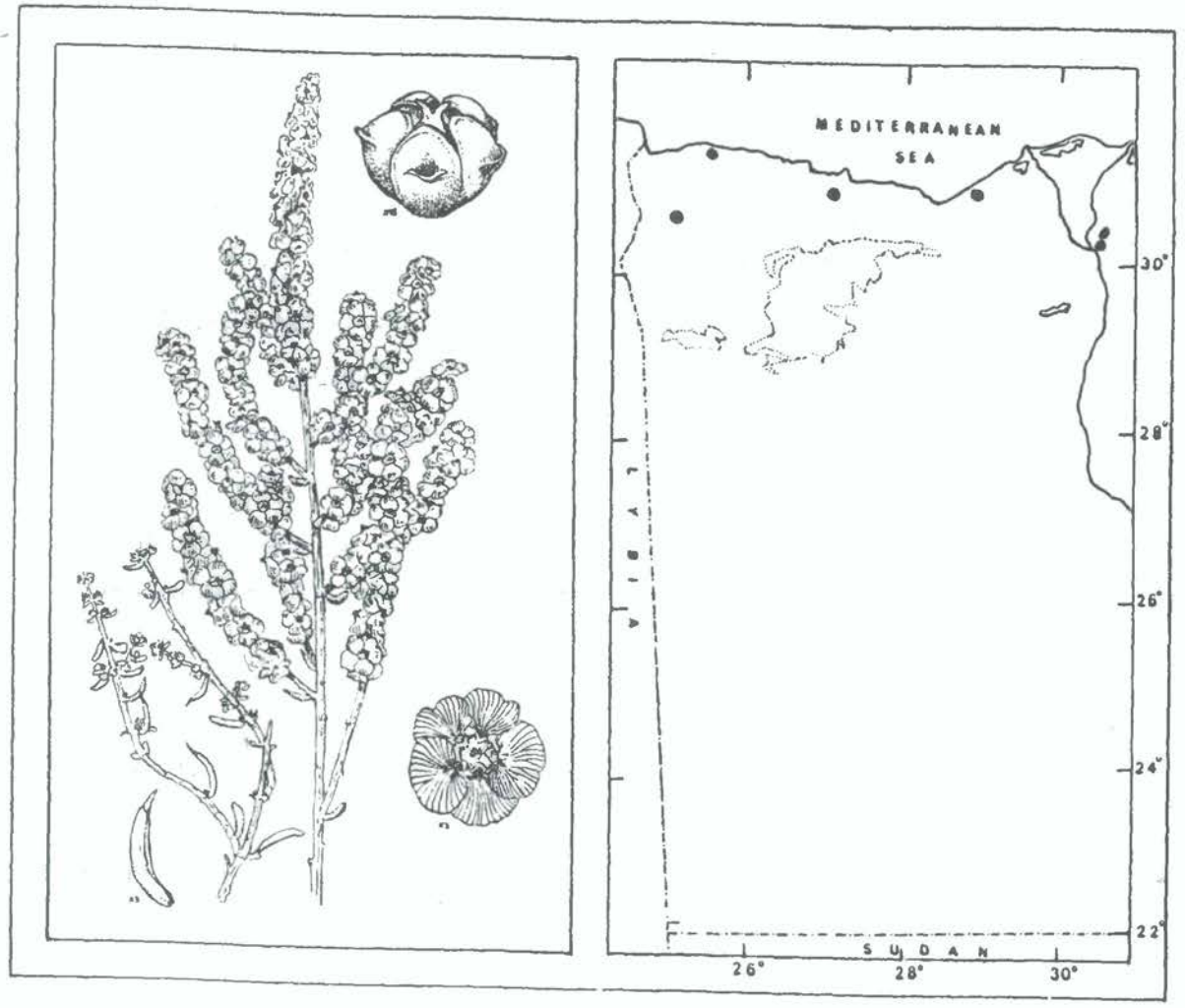
Conservation measures proposed: Propagation and preservation of seeds in gene banks is recommended.

Biology and potential value: The species is of scientific interest being a relict dating back to the Cretaceous. It is of considerable significance to studies of plant geography and evolution.

Specimens examined

DI. 50 Km. S Mersa Matrouh to Siwa Oasis. 8.VIII.1953, *L. Boulos s.n.* (CAI); Wadi El Natroun, 27.II.1959, *M. Imam s.n.* (CAI); Abou Rawash, 17.IV. 1885, *Volkens s.n.* (K); Abou Rawash Desert, 5.XII.1952, *Täckholm s.n.* (CAI); Doumet El Hassana, Abou Rawash, 19.XI.1986, *A.G. Fahmy (CAI).*

20. Salsola schweinfurthii Solms-Laub., Bot. Zeit. (Berlin) 59(1): 173 (1901); Täckholm, Stud. Fl. Egypt ed. 2, 125 (1974); Greuter et al. in Med-Check. 1: 310 (1984); Freitag, Flora (1989) 183: 162 (1989).



Shrubs up to 60 cm. high. Stems erect and ascending, slender to terete, branched especially at base, white-glossy. Leaves simple, fleshy, subsessile or sessile, glabrous; blade linear-subterete, margin entire, apex arcuate with caducous bristle at tip. Flowers sessile, 1-2 in each axil, forming loose or dense spikes. Perianth segments ovate-orbicular, glabrous with white margin. Fruiting perianth with suborbicular, greenish white wings.

Flowering and fruiting: A u g u s t - N o v e m b e r

Vernacular name (Arabic): Khreit خريط

Habitat and ecology: Chamaephyte growing on sandy plains and chalky slopes.

Two populations of this taxon were traced along Siwa-Mersa Matrouh road (25° 30' N, 30° 00' E). Associates include: *Atriplex inamoena, Salsola vermiculata, Telephium sphaerospermum, Zygophyllum simplex, Fagonia brugieri and Paronychia arabica.*

Another pure population was traced by the writer which stretches along the road sides of El Hassana-Qusseima road (N Sinai, 33° 45' N, 30° 25' E).

Distribution: Recorded from N Africa, Palestine and Jordan; also known in Arabia. It is a rare species in the northern desert of Egypt.

Floristic category: Middle and Eastern Saharo-Sindian subregions.

Status: Rare.

Salsola schweinfurthii is not going under immediate threat but care should be taken when planning future such as construction roads and establishment of new settlements in area where the species is recorded.

Conservation measures taken: N o n e

Conservation measures proposed: The population at El-Hassana-Qusseima road (N Sinai) is proposed as a wildlife sanctuary.

Biology and potential value: A study of its distribution would add to our knowledge for the evolutionary history of the genus.

Specimens examined

M. Abu Sir (Mariut, W Alex.), 17.XII.1961, *Täckholm s.n.* (CAI).

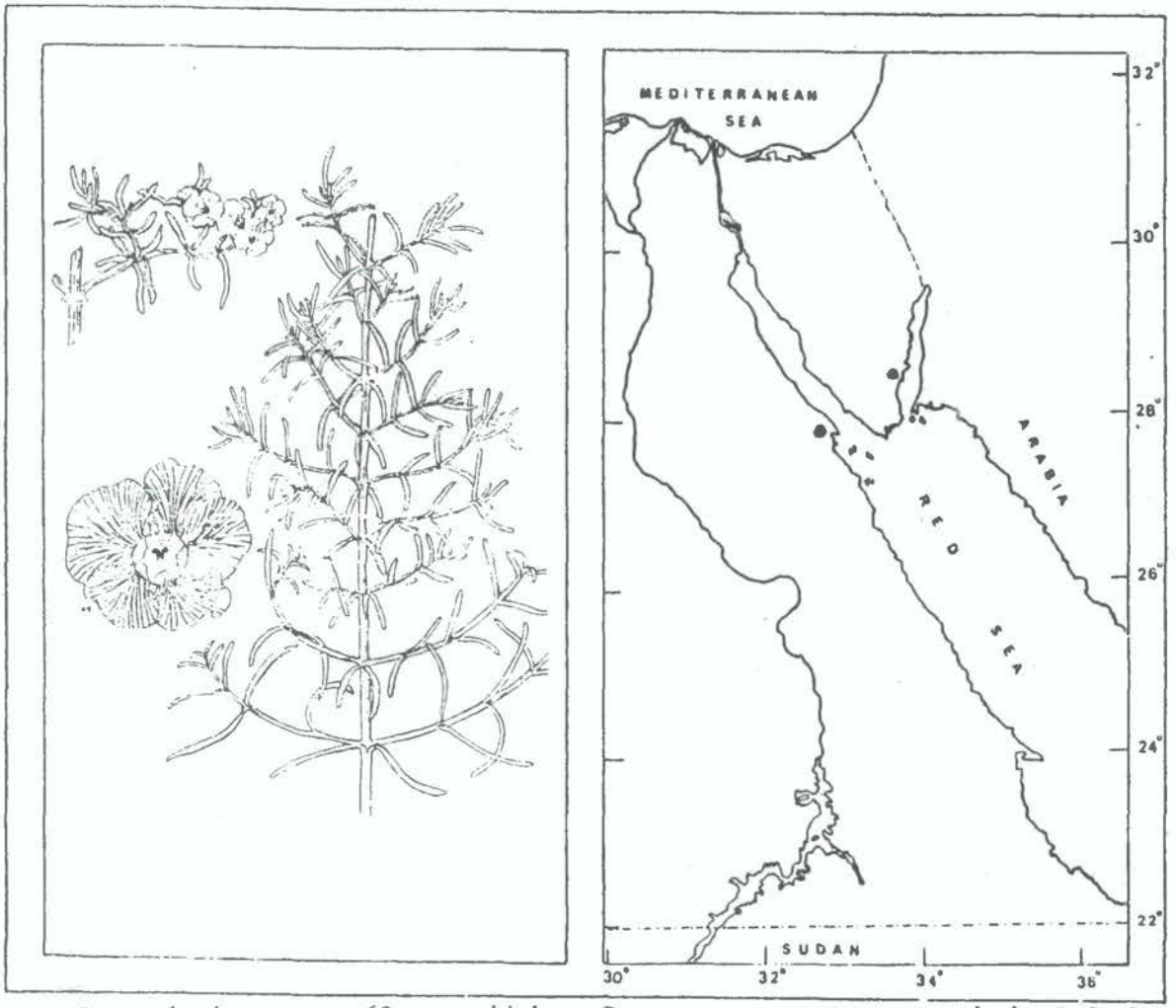
Dl. 50 Km. from Mersa Matrouh along the road to Siwa, 8.VIII.1953, *L. Boulos s.n.* (CAI); Siwa-Mersa Matrouh road, 25.I.1987, *A. G. Fahmy* 389 (CAI); El Alamein-Qattara road, 29.IX.1987, *A.G. Fahmy* 605 (CAI).

Dg. Wadi Digla, 9.VII.1953, *Täckholm et al. s.n.* (CAI); Wadi Hof, 21.XI.1952, *Täckholm s.n.* (CAI); Cairo-Suez road, 3.I.1962, *Täckholm et al.s.n.* (CAI).

Di. El Hassana-Qussiema road (N Sinai, 10 Km. east of El Hassana 10.XI. 1988, *A.G. Fahmy* 1292 (CAI).

21. Seidletzia rosmarinus Bge.ex Boiss., Fl. Orient. 4: 951 (1879): Täckholm, Stud. Fl. Egypt.ed. 2, 127 (1974); Greuter et al. in Med-Check. 1: 312 (1984).

Salsola rosmarinus (Bge. ex Boiss.) Solms-Laubach, Bot. Zeit. 59: 171 (1901).



Low shrub, up to 60 cm. high. Stem erect, terete, much branched from the base, lower internodes longer than upper; branches whitish glossy. Leaves all opposite, succulent, slightly clasping the stem; blade linear-semiterete, margin entire, apex obtuse. Flowers in clusters of 3-5 flowers, in leaf axils. Perianth lobes elliptic, obtuse, glabrous. Fruiting perianth winged, enclosing depressed urticle.

Flowring and fruiting: October - December

Arabic name: *Shnan* شنان

Habitat and ecology: Chamaephyte growing on sandy plains and wet saline sites.

Distribution: Recorded from Palestine, Jordan, eastwards to Saudi Arabia Qatar, Iraq, Iran and Afghanistan. It is very rare in Egypt, recorded from Mediterranean sand and salines, gravelly plains of Sinai as well as Tiran and Sinafir Islands (Red Sea). Hassan (1987) recorded it from several localities of the Galala Desert.

Floristic category: Mesoptamian, Medio-Asiatic provinces of the Irano-Turanian region, Middle and East saharosindian subregions.

Status: Vulnerable.

The extreme rarity of this species can be related to its limited local distribution, which seems to be the westernmost limit of its distribution.
The populations stretched along Aqaba coast (Sinai) are going under immediate threat owing to the touristic activities in the area. It is a palatable plant.

Conservation measures taken: N o n e

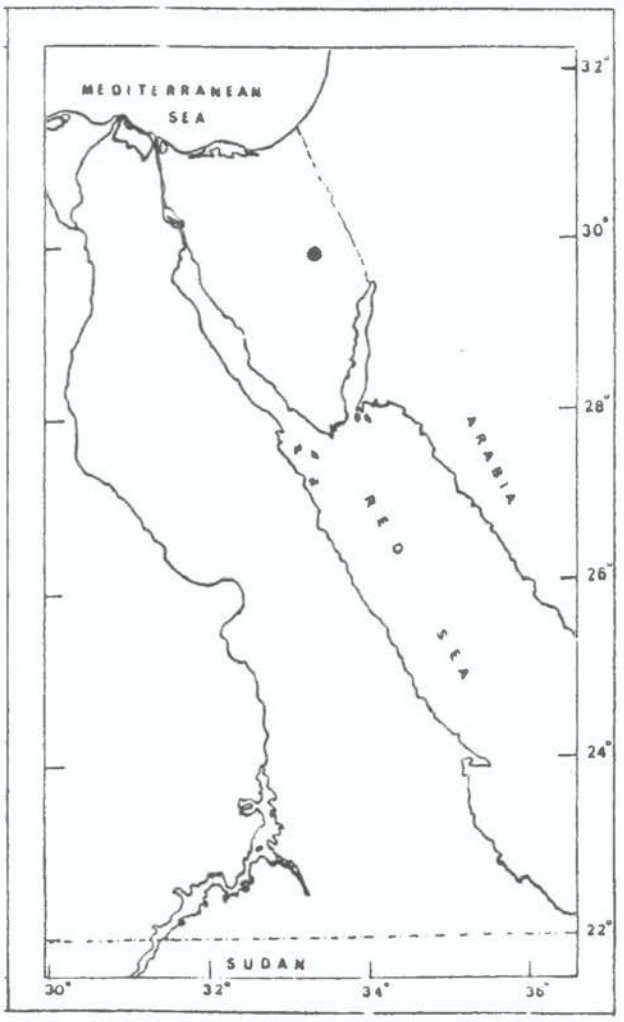
Conservation measures proposed: Gebel El Askhar (Eastern Desert) be a protected area.

Biology and potential value: *Seidletzia rosmarinus* is the only representative of the genus in Egypt. Its extinction means the complete disappearance of the genus from this country.

Specimens examined

Dg. Gebel El Askhar (El Galala El Qiblya), 26.III.1983, *L. Hassan* 2386 (CAI).

22. **Anabasis syriaca** Iljin, Bot. Mater. Gerb. Bot. Inst. Komarov Akad. Nauk S.S.S.R. 7: 215 (1938); Greuter et al. in Med-Check. 1: 291 (1984); Danin et al. in Willdenowia 15: 270 (1985); Freitag, Flora (1989) 183: 168 (1989).



Robust shrub, 20-50 cm. high. Stems erect, slender to terete, woody in lower part, sparsely branching from the base, white glaucous to green-greyish. Leaves reduced to a short cupule with 2 triangular, acute, lobes. flowers solitary, opposite at each node forming a panicle of many spikes. Perianth segments oblong-obovate, obtuse, glabrous. Fruiting perianth with 3 ascending wings at lower part; wings unequal, semiorbicular-reniform, entire or somewhat crenate.

Flowering and fruiting: October - December

Habitat and ecology: Chamaephyte growing on salty alluvial soil. The writer traced scattered populations in the area of Sadd El Rauffa, N Sinai (34° 6' N, 30° 53' E). Associate species include: *Andrachne telephioides, Eremobium aegyptiacum and Iaunaea capitata.*

Distribution: Recorded from Syria, Lebanon and extends southward to Palestine, Jordan and westwards to Sinai. Danin et al. (1985) reported its occurrence on the gravelly plains, northern Sinai anticline and Gebel El Igma.

Floristic category: Mesopotamian preovince of the Irano-Turanian region extending to the Middle Saharo-Sindian subregion.

Status: Vulnerable.

The extreme rarity of *Anabasis syriaca* is due to its limited local distribution. Northern Sinai seems to be the westernmost limit of the taxon distribution. Agricultural activities and overgrazing are main factors leading to the decline of this species.

Conservation measures taken: N o n e

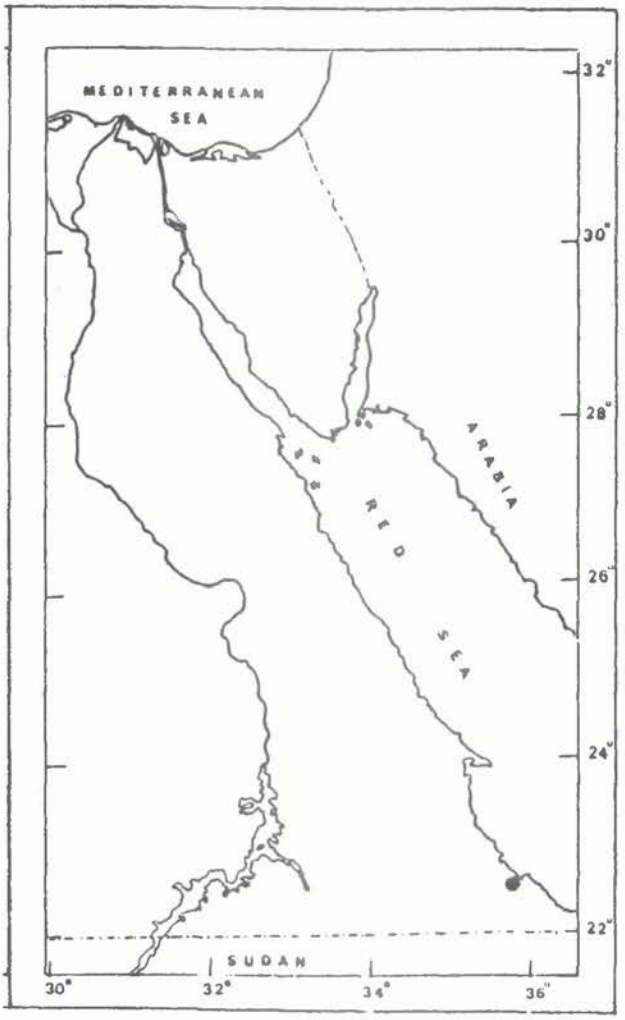
Conservation measures proposed: Sadd El Rauffa area (34° 6' N, 30° 53' E) be protected.

Biology and potential value: This species is of considerable scientific interest as a member of a critical group relevant to studies of plant geography and taxonomy.

Specimens examined

Di. Northern Sinai, Sadd El Rauffa, 10.XI.1988, *El Hadidi et al. s.n.* (CAI), Sadd El Rauffa, 10.XI.1988, *A.G. Fahmy* 1312 (CAI).

23. Cornulaca ehrenbergii Asch. in Schweinf. Beit. Fl. Aethiopensis: 184 (1867); Täckholm, Stud. Fl. Egypt ed. 2: 128 (1974); Greuter et al. in Med-Check. 1: 301 (1984).



Undershrub, up to 30 cm. high. Stems ascending and form cushion shape, terete, much and itricately branched, glabrous. Leaves simple, scale like, sessile, glabrous; blade lanceolate, margin entire, apex mucronate. Flowers solitary in the axils, not immersed in wool. Perianth segments lanceolate, shortly mucronate, glabrous. Fruit enclosed within the base of the perianth.

Flowering and fruiting: D e c e m b e r - F e b r u a r y

Vernacular name (Arabic) *Haadh* حاد

Habitat and ecology: Chamaephyte growing on sandy gravel plains.

Distribution: Recorded from Somalia, Ethiopia, Eritrea, and the Sudan eastwards to Arabia. Very rare in Egypt and confined to the southern part of Red Sea coast.

Floristic category: Middle and East Saharo-Sindian subregions with extensions in the Afro-Oriental domain of the Sudano-Zambezian region.

Status: Extinct.

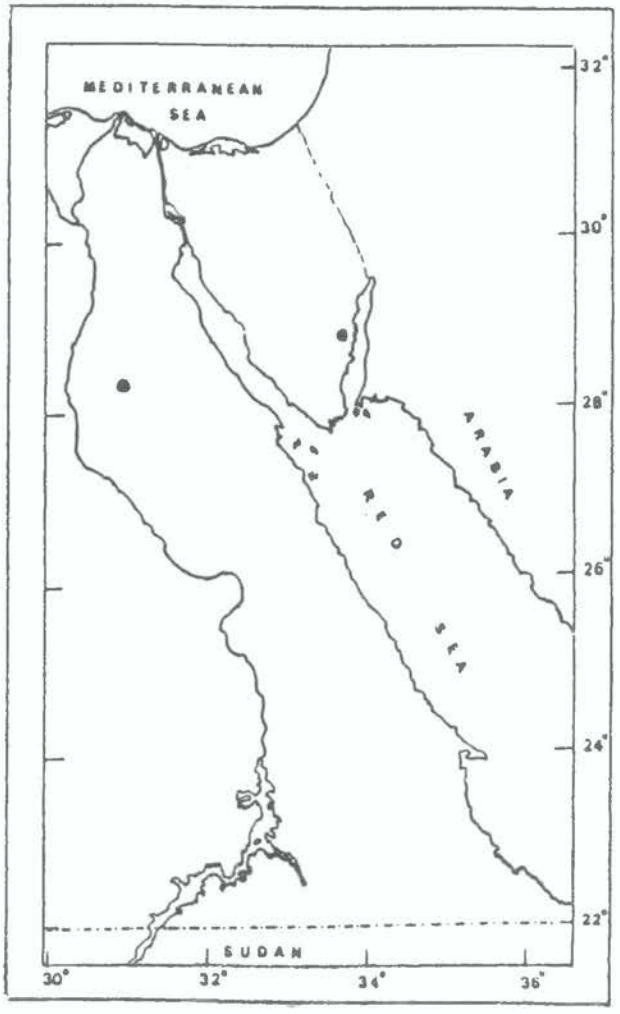
The natural rarity of *Cornulaca ehrenbergii* can be related to its limited local distribution. Egypt seems to be its northermost limit in Africa. It was lastely recorded in 1864 from Mersa Abou Ghusne along the Red Sea coast; since that time further search had been done by several botanists but without success.

Biology and potential value: The species is of considerable scientific interest as a member of a critical group relevant to studies of plant geography and taxonomy.

Specimens examined

R. Nubische Küste: Iessade bei Mersa Abou Waasne, 1864; *Schweinfurth* 723 (K).

24. Haloxylon persicum Bunge, Nouv. Mem. Soc. Nat. Moscou 12: 189 (1860); Greuter et al. in Med-Check. 1: 303 (1984); Danin et al. in Willdenowia 15: 271 (1985); Boulos et Hobbs, Candollea 41: 190 (1986); Freitag, Flora (1989) 183: 166 (1989).



Shrubs or small trees, up to 3 m. high. Stems erect, thick below and slender above, much branched, nearly glabrous, margin entire, apex acute to cuspidate. Flowers in, short, slender, spike like branchlets, sessile. Perianth segments subglobular, scarious-margined. Fruiting perianth wings nearly round, large.

Flowering and fruiting: October - November

Vernacular name (Arabic): *Ghada*

Habitat and ecology: Nano-phanerophyte growing on sandy plains.

Distribution: Recorded from Palestine, Jordan eastwards to Iran, Afghanistan and Baluchistan. It was recently reported from Sinai by *Danin* (1983) and *Danin et al.* (1985) and by *Boulos and Hobbs* (1986) from the Eastern Desert.

Floristic category: Middle and East Saharo-Sindian subregions and the Irano-Anatolian province of the Irano-Turanian region.

Status: Endangered.

The extreme rarity of this species can be related to its limited geographical distribution in Egypt which seems to be its westernmost limit.
The populations along the coasts of Suez and Aqaba Gulves (Red Sea) are highly depleted due to the establishment of touristic centers and intensive oil search in the area. Cutting by charcoalers is another causative.

Boulos and Hobbs (1986) traced a population in Wadi Abou Ghada, a tributary of Wadi Al Tarfa, Eastern Desert (31^{o} 5' N, 28^{o} 25' E). They estimated the number of individuals as about 1500 in an area 12 Km. long. This population is relatively protected by the native inhabitants of the Ma'za Bedouins.

Conservation measures taken: N o n e

Conservation measures proposed: The population of *Haloxylon persicum* in Wadi Abou Ghada (31^{o} 5' N, 28^{o} 25' E) is a proposed wildlife sanctuary. Propagation in botanic gardens will be useful to save this plant.

Biology and potential value: The species is of great scientific significance on account of its geographical distribution. It is also recommended as a plant for shade, wind breaks in extremely arid deserts.

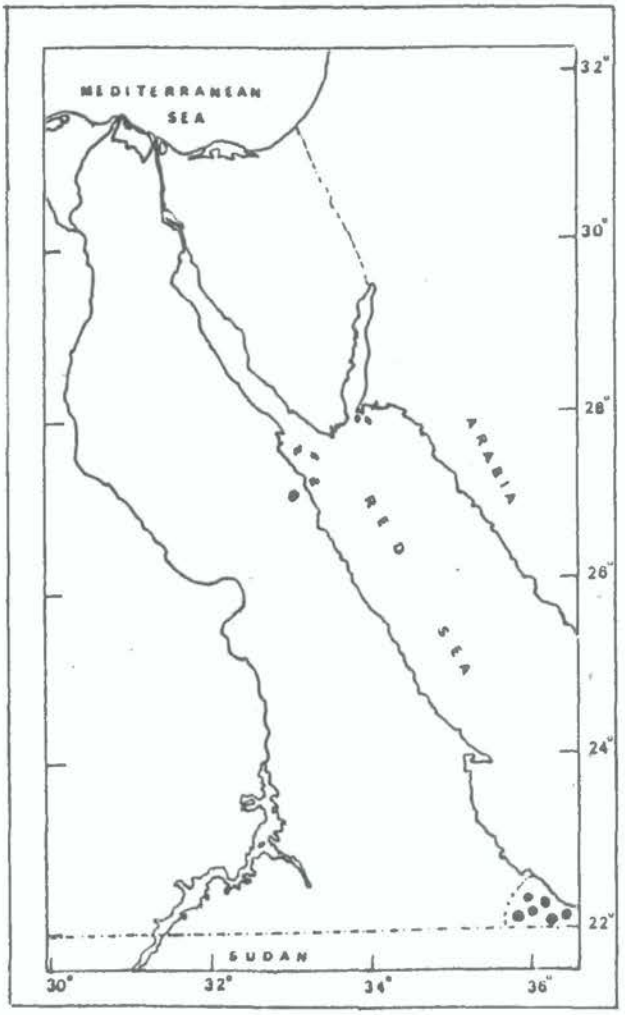
Specimens examined

Dg. Eastern Desert, Wadi Al Tarfa, 7.V.1983, *Hobbs* 106 (CAI).

R. Sinai (5 Km. north of Nweiba), 17.V.1972, *A. Danin* s.n. (K).

25. Aerva lanata (L.) Juss. ex J.A. Schultes Roemer & Schultes, Syst. Veget. 5: 546 (1819); Boissier, Fl. Orient. 4: 993 (1879); Tackholm, Stu. Fl. Egypt ed. 2: 134 (1974); El Hadidi & El Hadidy, Fl. Egypt, Taeckholmia add. ser. 1, 57: 64, Fig. 18 (1980).

Achyranthes lanata Linn., Sp., Pl.: 204 (1753).



Perennial herb, up to 60-90 cm. high, branches erect or ascending, terete, densely lanate. Leaves simple, petiolate, densely lanate on both surfaces and more thinly above; blade ovate or lanceolate-elliptic, margin entire, apex mucronulate. Flowers in solitary or axillary spikes. Perianth segments oblong to oval-oblong, lanate, subacute to acute.

Flowering and fruiting: D e c e m b e r - J a n u a r y

Vernacular name (Arabic): *Eigaab* (Täckholm, 1974).

Habitat and ecology: Chamaephyte which grows on wadi beds and rocky slopes (at the feet of slopes).

Distribution: Widely distributed in the drier parts of the Old World, extending from Sierra Leon in West Africa eastwards to the S.E. parts of Egypt; further southwards to S. Africa and Madagascar. Also recorded from Arabia, Iran, eastwards to Indonesia, the Phillipines and Papua New Guinea.

Aerva lanata is restricred in Egypt to wadis and slopes of the massive of Gebel Elba; also in the wadis of the Eastern Desert along the Red Sea coast.

Floristic category: Sahelian and Zambezian domains of the Sudano-Zambezian region; Middle Saharo-Sindian subregion, Medio- and Central Asiatic provinces of the Irano-Turanian region.

Status: Vulnerable.

Small populations of *Aerva lanata* penetrating the southern parts of the Eastern Desert of Egypt seems to represent the northernmost limit of the taxon distribution in Africa. This limited distribution is a causative for the species decline which is also combined with overgrazing by domestic livestock.

Conservation measures taken: Some populations of *Aerva lanata* are preserved within the protected area of Gebel Elba.

Conservation measures proposed: The populations in Wadi Um Dalfa (Red Sea coast) and Wadi Kansisrob (Gebel Elba) be wildlife sanctuaries.

Specimens examined

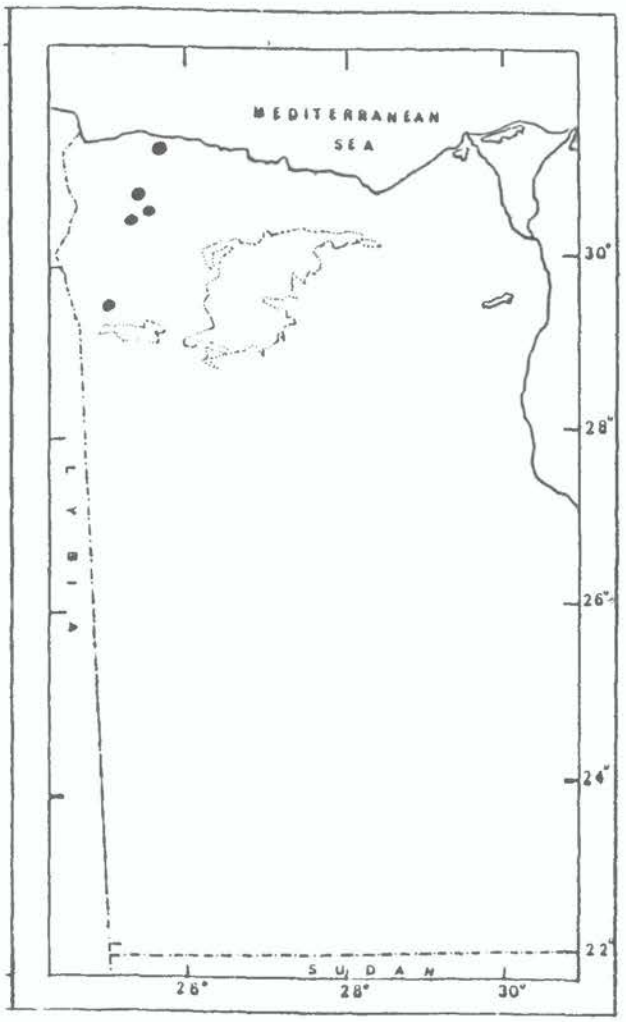
Sa. Wadi Aideib, 8.II.1962, *Täckholm et al.*, 1862 (CAI); Wadi Yahamib, 22.I.1962, *Täckholm et al.* 314 (CAI); Wadi Akau, 28.I.1933, *Drar* 237 A (CAI); Wadi Kansisrob 24.I.1933, *Shabetai* Z 2322 (K); Wadi Kansisrob, 1.II.1979, *Boulos* 12887 (CAI); Wadi Akwamtra, 27.II.1967, *Osborn & Helmy* s.n. (CAI).

R. Wadi Um Dalfa, near Hurghada, 27.I.1932, *Drar* s.n. (CAIM).

26. Capparis ovata Desf., Fl. Atl. 1: 404 (1798); Al Gohary, Tax. Rev. Capparidaceae, Ph.D. thesis, Al Azhar Univ.: 15 (1987).

C. parviflora Boissier, Fl. Orient. 1: 420 (1867).

C. deserti Täckholm, Stud. Fl. Egypt ed. 2: 164 (1974).



Shrub up to 100 cm. high, with procumbent, terete, whit, pubescent branches. Leaves simple, petiolate, sparingly pubescent on both surfaces, blade ovate-oblong or round elliptic, margin entire, apex acute, slightly mucrinulate. Flowers solitary, axillary, pedicellate. Sepale oblong, obtuse, glabrous, or thinly tomentellous. Petals white. Fruit fleshy berry, pear-shaped; ripened epicarp green, endocarp red.

Flowering and fruiting: F e b r u a r y - M a r c h

Vernacular name (Arabic): *Kabaar*

Habitat and ecology: Chamaephyte which grows on sandy gravel plains.

Two populations were recorded along Mersa Matrouh-Siwa Oasis road (160 Km. and 203 Km. north of Siwa).

Associate species include: *Atriplex inamoena, Telephium sphaerospermum, Zygophyllum simplex., Paronychia arabica, Fagonia brugieri and Zilla biparmata.*

Distribution: Known from N. Africa eastwards to Syria, Lebanon, Iraq and further eastwards to C. Asia.

In Egypt it is a very rare species and confined to El Sallum plateau and along Mersa Matrouh-Siwa road.

Floristic category: S. Mediterranean subregion, West and Middle Saharo-Sindian subregions extending to Mesopotamian and Central-Asiatic provinces of the Irano-Turanian region.

Status: Rare.

The species is not believed to be under immediate threat, but is at risk because of its very restricted distribution.

Future disturbance could result from clearing of the vegetation for search of oil or desert reclamation as well as off-road vehicles.

Conservation measures taken: N o n e

Conservation measures proposed: El Sallum plateau be a nature reserve. The two populations of *Capparis ovata* traced along Mersa Matrouh-Siwa road be wildlife sanctuaries (26^{o} 15' N, 30^{o} 00 E and 26^{o} 00 N, 29^{o} 45' E).

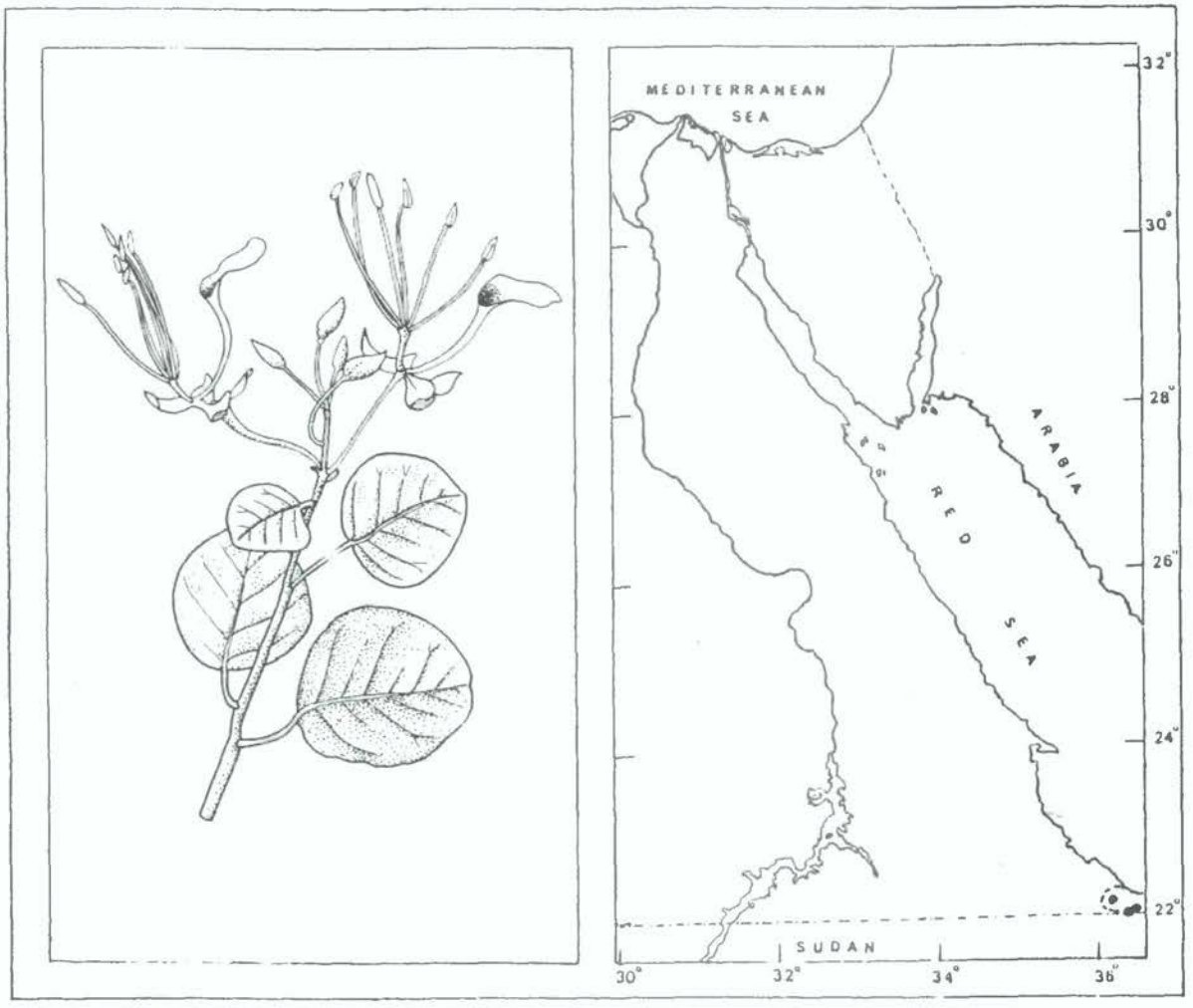
Biology and potential value: When flowering it is a very decorative plant and would be suitable for gardens as an ornamental. The flowers buds are pickled due to their pungent taste.

Specimens examined

M. El Sallum plateau, near the town, 28.IX.1963, *Boulos s.n.* (CAI).

Dl. Bir El Shqqa, 20.VIII.1964, *Osborn s.n.* (CAI): 130 Km. south of Matrouh, on the way to Siwa, 27.X.1963, *Boulos s.n.* (CAI); 36 Km. north of Siwa, 27.VII.1985, *Al Gohary s.n.* (CAI); Mersa Matrouh-Siwa Oasis road, 203 Km. north of Siwa, 15.IV.1986, *A.G. Fahmy* 17 (CAI); Mersa Matrouh-Siwa road, 160 Km. north of Siwa Oasis, 25.I.1987, *A.G. Fahmy* 397 (CAI).

27. Cadaba rotundifolia Forssk., Fl. Aegypt.-Arab.: 68 (1775); Täckholm, Stud. Fl. Egypt ed. 2: 164 (1974); Greuter et al. in Med-Check. 1: 154 (1984).



Shrub or small tree, up to 2 m. tall. Branches ascending terete; young twigs variably densely covered with short glandular hairs, soon glabrescent. Leaves leathery, simple, petiolate, glabrous or puberulent beneath; blade very broadly ovate or elliptic to often suborbicular, margin entire, apex obtuse or round to retuse. Flowers in dense short corymb, pedicellate. Sepals 4, glandular and minutely tomentose on the margins, free, 2-seriate, the outer pair enclosing the inner. Petals absent. Fruit cylindrical, slightly torulose, usually densely puberulent.

Flowering and fruiting: December - February

Vernacular name (Bishari): Kormot (Täckholm 1974)
Arabic): *Qadab*

Habitat and ecology Chamaephyte growing on wadi beds at higher altitudes. Kassas and Zahran (1971) noted that *Cadaba rotundifolia* grows on runnels dissecting the north facing slopes at higher altitudes of the Gebel Elba massive

Distribution Recorded from Kenya, Ethiopia, Djibouti, Somalia and extends northward to the Sudan; Eastwards to Saudi Arabia, Yemen and Oman

In Egypt *Cadaba rotundifolia* is very rare and confined to Gebel Elba massive and extensions to the Red Sea.

Floristic category: Afro-Oriental and S. Arabian domains of the Sudano-Zambezian region.

Status: Endangered.

The natural rarity of this species in Egypt can be related to its limited distribution representing the northernmost limit in Africa.

Cadaba rotundifolia was previously recorded from the Red Sea and Gebel Elba area. Intensive search during the last decade proved its rarity to almost complete disappearance. This can be related to the recent touristic development of the area along the Red Sea coast.
The plant is said to be purgative so that the natives gathered its parts.

Drar (1936) traced a single tree growing towards higher parts of Wadi Kansisrob

Conservation measures taken: Gebel Elba protected area.

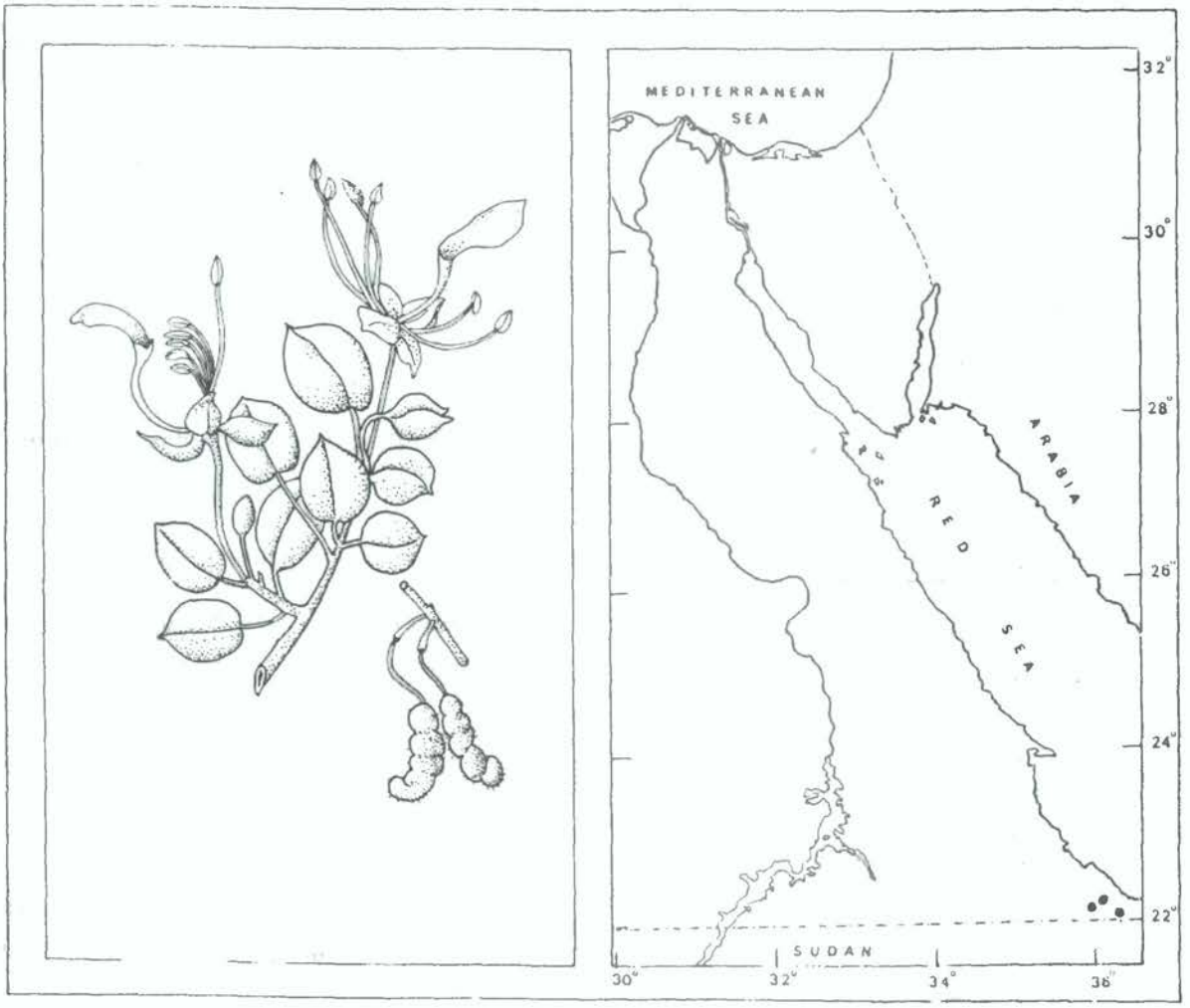
Conservation measures proposed: Cultivation in botanic gardens seems to be a reliable method to preserve the species.

Biology and potential value: *Cadaba rotundifolia* is a valuable timber plant.

Specimens examined

Sa. Wadi Siamtit, 23.I.1962, *Täckholm* 354 (CAI); Wadi Kansisrob, 4.II.1933, *Drar s.n.* (CAI); Wadi Kansisrob, 24.X.1956, *Boulos* 138 E (CAI).

28. Cadaba glandulosa Forss. Fl. Aegypt.-Arab: 68 (1775); Boissier, Fl. Orient. 1: 418 (1867); Täckholm, Stud. Fl. Egypt ed. 2: 164 (1974); Greuter et al. in Med-Check. 1: 154 (1984).



Shrub up to 90 cm. high. Stems ascending, terete and very stout, densely branched, young twigs densely covered with glandular hairs and stalked glands. Leaves simple petiolate, covered with sessile and stalked glands on both surfaces. Blade very broadly elliptic to suborbicular, margin entire, apex mucronate. Flowers in a few-flowered corymb, pedicellate. Sepals elliptical, apiculate, glandular hairy. Petals absent. Fruits ellipsoid, densely stipitate-glandular.

Flowering and fruiting: D e c e m b e r - F e b r u a r y

Vernacular name (Bishari): *Kormot* (Täckholm, 1974).

Habitat and ecology: Chamaephyte which grows on rocky plains and hills.

Distribution: Recorded from Mali, Niger, Tchad eastwards to Kenya, Uganda and northwards to Ethiopia, Somalia and the Sudan; then eastwards to Saudi Arabia and Yemen.

In Egypt, the species is rare and recorded from southern parts of the Eastern Desert, Red Sea coast and Gebel Elba massive.

Floristic category: Sahelian, Afro-Oriental and S. Arabian domains of the Sudano-Zambezian region.

Status: Vulnerable.
The species vulnerability can be related to its small population size combined with severe collecting by bedouins which use it as a firewood plant.

Conservation measures taken: Gebel Elba protected area.

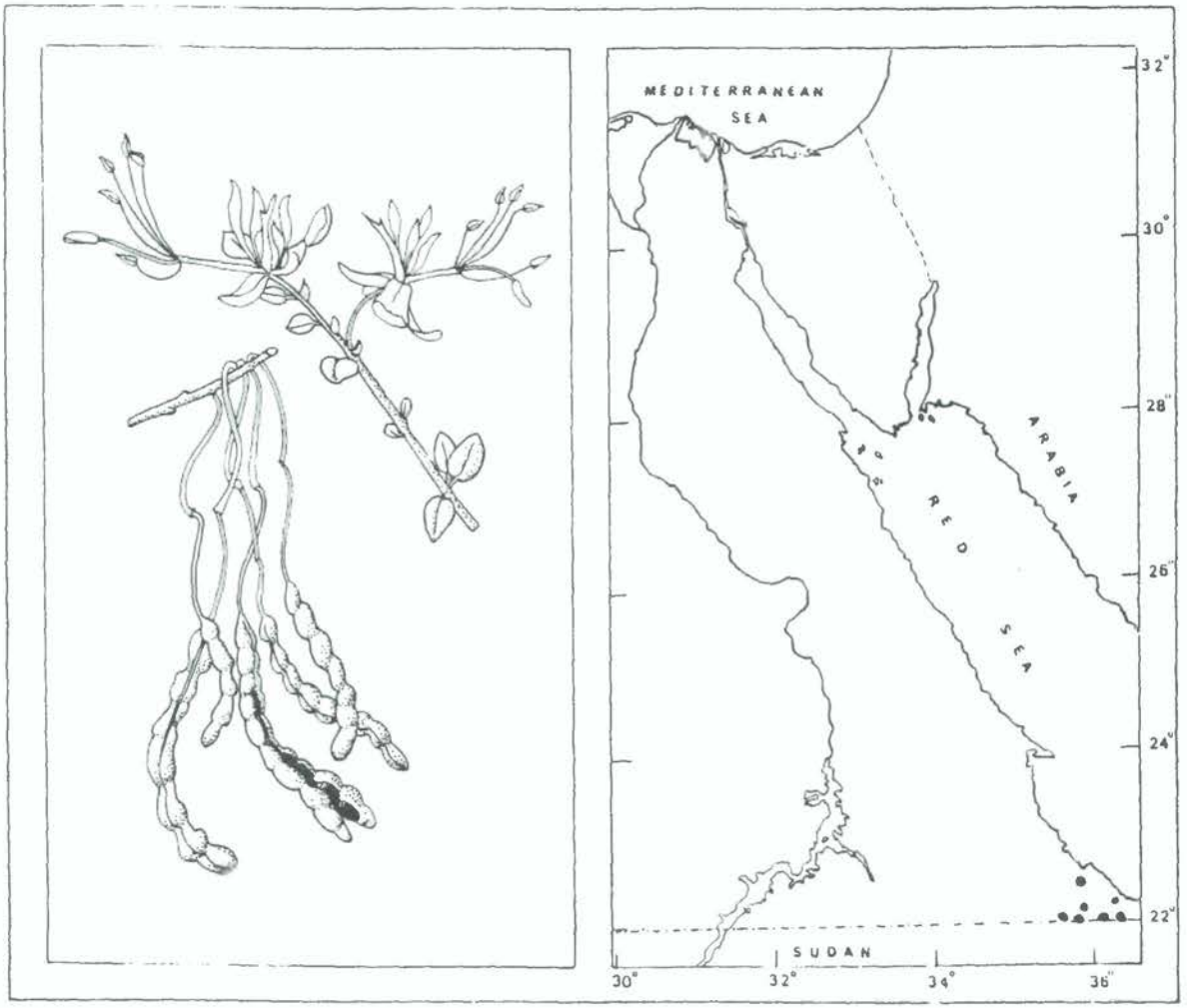
Conservation measures proposed: The populations of *Cadaba glandulosa* in Gebel Alafoot and Gebel El Kassira (Gebel Elba massive) be wildlife sanctuaries.

Specimens examined

R. Nubia (sea coast), 1896, *J.Th. Bent s.n.* (K).

Sa. Gebel Elba, 1932, *Drar s.n.* (CAI); Gebel Alafoot, 7.II.1962, *Täckholm et al.* 1680 (CAI); slope of Gebel El Kassira, 8.II.1962, *Täckholm s.n.*(CAI).

29. Cadaba farinosa Forssk. Fl. Aegypt.-Arab: 68 (1775); Boissier, Fl. Orient. 1: 418 (1867): Täckholm, Stud. Fl. Egypt ed. 2: 165 (1974); Greuter et al. in Med-Check. 1: 154 (1984).



A straggling bush which often grows climbing on other plants. Stems ascending, slender, much branched, young twigs farinaceous with small white sessile scales or with stalked scales or spreading glandular or eglandular hairs. Leaves simple, petiolate, farinaceous, especially when young; blade elliptic to roundly elliptic, sometimes obovate or obovate-oblong, margin entire, apex obtuse or mucronulate. Flowers in dense but few flowered shortly subcorymbose raceme, slightly pedicellate. Outer sepals ovate, acute and apiculate, covered with glandular hairs. Petals creamy yellow. Fruits narrowly cylindrical, torulose and farinaceous.

Flowering and fruiting: December - February

Vernacular name (Bishari): Rayaad (Täckholm, 1974).

Habitat and ecology: Chamaephyte which grows on rocky slopes.

Kassas and Zahran (1971) noted that *Cadaba farinosa* grows in the runnels dissecting the north, east and south facing slopes of Gebel Elba massive.

Distribution: Recorded from Mauritania, Cameroon, Central Africa eastwards to Ethiopia, Somalia northwards to the Sudan, and further eastwards to Saudi Arabia and Yemen.

Floristic category: Sahelian, Afro-Oriental and S. Arabian domains of the Sudano-Zambezian region.

Status: Rare.

The species is not under immediate threat; but perhaps at risk because of its low population size and very restricted geographical distribution in Egypt.

Conservation measures taken: Gebel Elba protected area.

Conservation measures proposed: The sites of *cadaba farinosa* in Wadi Merakwan, Wadi Siamtit (Gebel Elba massive). and Mersa Halaib (Red Sea) be wildlife sanctuaries.

Biology and potential value: The species is of scientific interest as a member of a critical group relevant to studies of plant geography and taxonomy.

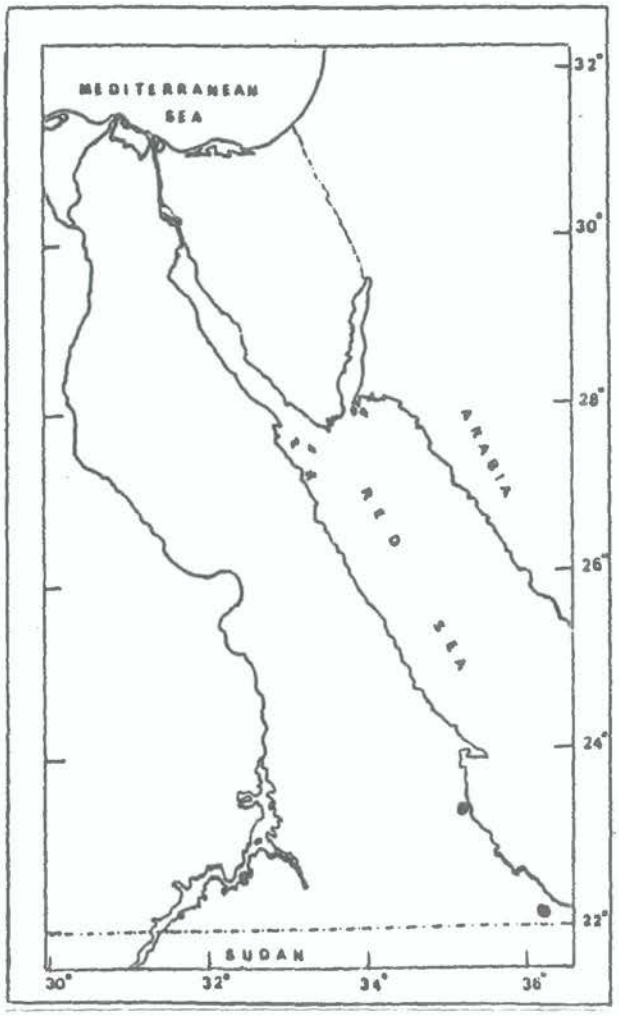
Specimens examined

R. In the wadis west of Mersa Halaib, 22.I.1929, *Täckholm s.n.* (CAI).

Sa. Khor Wadi Siamtit, 23.I.1962, *Täckholm et al.* 358 (CAI); Gorge across the N.E. slope of Gebel Elba, 21.I.1962; *Täckholm et al.* 168 (CAI); Wadi Aideib, 20.I.1962, *Täckholm et al.* 97 (CAI); Wadi Rabdeit, 1933, *Mrs C.E. Palmer* 132 (K); Gebel Shendodai, 10.II.1962, *Täckholm et al.* 1954 (CAI); Gebel Alafoot, 7.II.1962, *Täckholm et al.* 1614 (CAI); Wadi Merakwan, 10.II.1962, *Täckholm et al.* 2047 (CAI).

30. Boscia senegalensis (Pers.) Lam. ex Poir., DC. Prod. 1: 244 (1824); Täckholm, Stud. Fl. Egypt ed. 2: 165 (1974); Greuter et al. in Med-Check. 1: 154 (1984).

Podoria senegalensis Pers., Syn. Pl. 2: 5 (1806).



Shrub or small tree, up to 100 cm. tall. Stems ascending terete; branches glabrous or minutely pubescent at first. Leaves simple, coriaceous, petioled, glabrous or pubescent beneath; blade oblong-elliptical or broadly ovate, margin entire, apex obtuse or acute. Flowers racemose, collescted into small terminal panicles, pedicellate. Sepals 4, deciduous. Petals absent. Fruit globose, glabrous or pubescent tomentose.

Flowering and fruiting: December - January

Vernacular name: Not Known

Habitat and ecology: Nanophanerophyte which gows in crevices of rocky slopes.

Distribution: Recorded from Mauritania, Senegal, Niger, Tchad and Cameroon eastwards to Kenya and Ethiopia, further northwards to Somalia and the Sudan.

In Egypt, *Boscia senegalensis* is very reare and recorded from the wadis of Gebel Elba massive. Hassan (1987, p. 175) recorded it near Mersa Alam (Red Sea coast).

Floristic category: Sahelian, Congo, Afro-Oriental domains of the Sudano-Zambezian region.

Status: Endangered.

The extreme rarity of the species can be related to its limited geographical distribution in Egypt which seems to be the northernmost limit of the taxon distribution in Africa.

The natives use the dry branches as firewood while fruits are edible by children and birds. Camels also browse the young branches of the plant.

Conservation measures taken: Gebel Elba protected area.

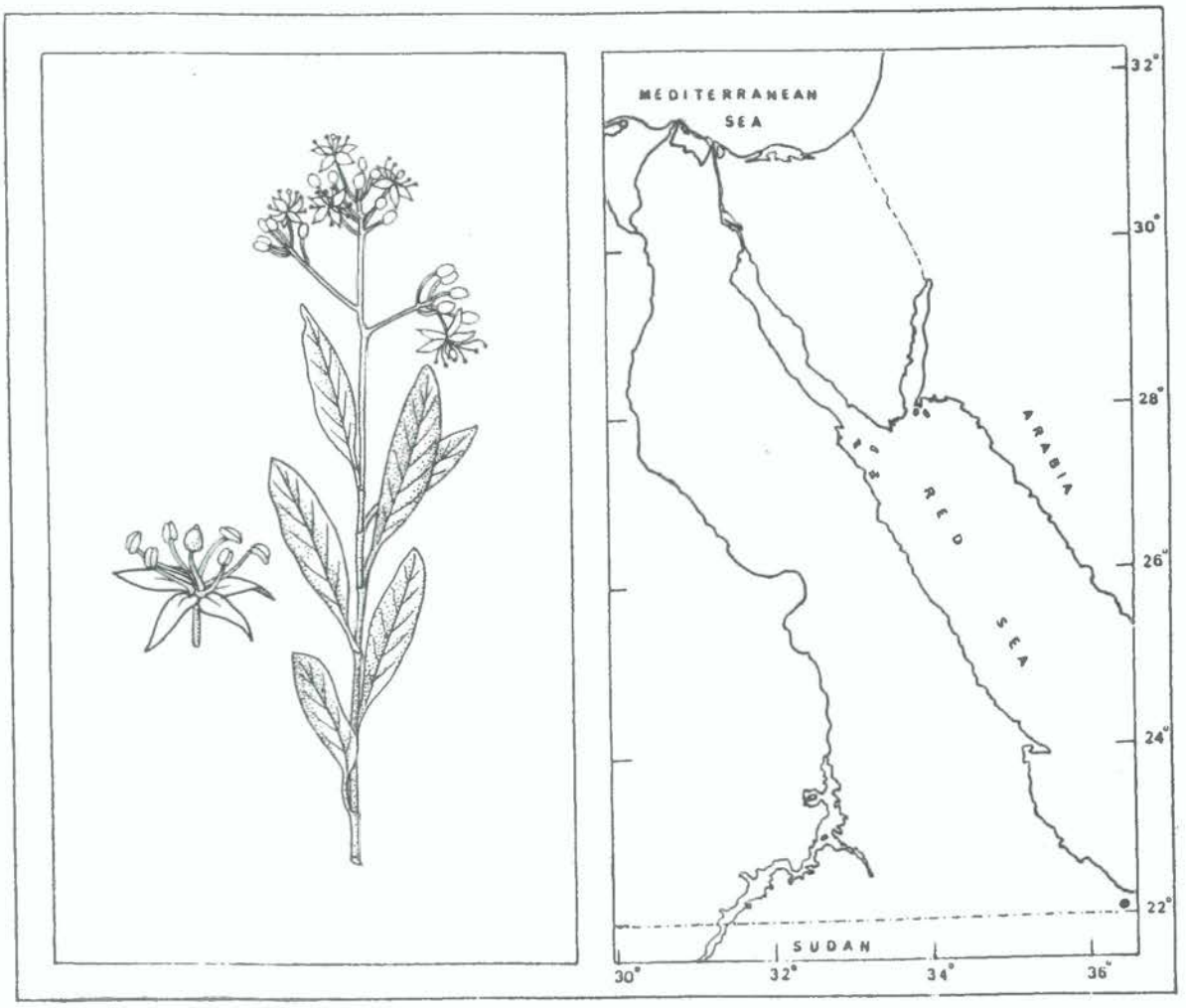
Conservation measures proposed: The populations of *Boscia senegalensis* in Wadi Aak (gebel Elba massive) and Mersa Alam (Red Sea) be wildlife sanctuaries.

Specimens examined

R. Mersa Alam, II.1977, *A. El Gazzar* 52 (CAI).

Sa. Wadi Aak, 27.I.1962, *Täckholm et al.* 784 (CAI).

31. Boscia angustifolia A. Rich. in Guillemin et al. in Fl. Seneg. Tent.: 26, t.6 (1831); Täckholm, Stud. Fl. Egypt ed. 2: 165 (1974): Greuter et al. in Med-Check. 1: 154 (1984).



Small evergreen tree, up to 120 cm. high. Stems spreading, terete; branches glabrous. Leaves simple, coriaceous, shortly petioled, glabrous or finely pubescent beneath; blade oblanceolate-elliptic to obovate, margin entire, apex rounded or acute, mucronate. Flowers in terminal and axillary corymbose racemes, pedicellate. Sepals ovate or ovate elliptic, actue, often hairy. Petals absent. Fruits spheroid or slightly ellipsoid, obscurely pointed, somewhat pitted and sometimes sparsely papillose.

Flowering and fruiting: D e c e m b e r - J a n u a r y.

Vernacular name: Not known.

Habitat and ecology: Nanophanerophyte which grows on rocky crevices at high altitudes.

Distribution: Recorded from Rwanda, Tanzania, northwards to Ethiopia, Somalia and the Sudan; eastwards to Saudi Arabia, Yemen and Oman.

Boscia senegalensis is recorded from Wadi Mawaw (Gebel Elba massive) which seems to be the northernmost limit of the taxon distribution in Africa.

Floristic category: Zambezian, Afro-Oriental and S. Arabian domains of the Sudano-Zambezian region.

Status: Endangered.

The continuous cutting of the tree by the natives endangers this taxon.

Conservation measures taken: Gebel Elba protected area.

Conservation measures proposed: Wadi Mawaw be a part of the nature reserve at Gebel Elba.

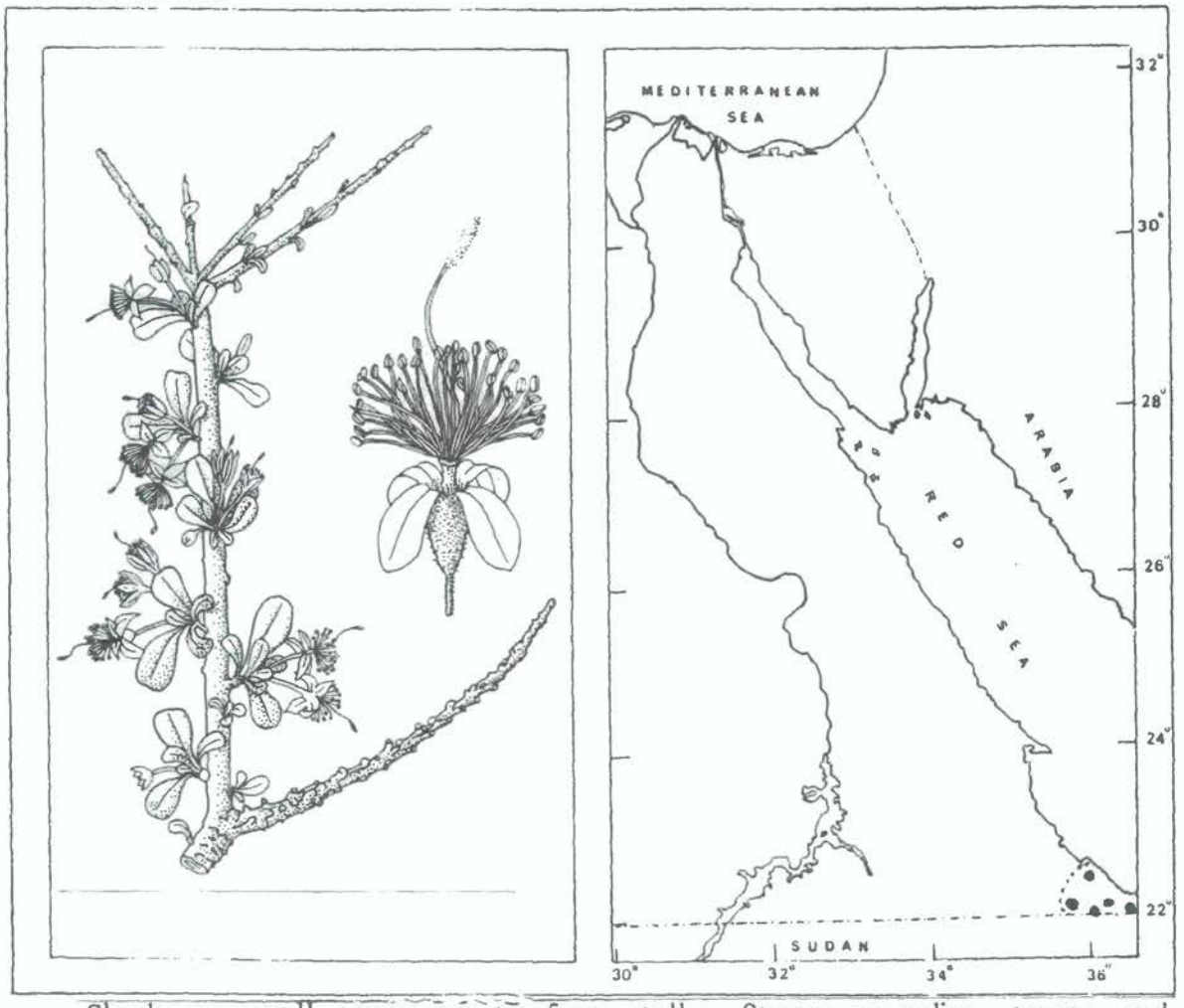
Biology and potential value: The species has its value as an ornamental plant.

Specimens examined

Sa. Upstream part of Wadi Mawaw across Gebel Elba, 28.I.1962 *Täckholm* 1044 (CAI).

32. Maerua crassifolia Forssk., Fl. Aegypt.-Arab.: CXIII (1775) Asch. & Schweinf., Mem. Inst. Egypte 2: 43, no. 108 (1887); Täckholm, Stud. Fl. Egypt ed. 2: 165, pl. 49 B. (1974); Greuter et al. in Med-Check. 1: 156 (1984).

Maerua unifolia Vahl, Symb. Bot. 1: 36 (1790); Boissier, Fl. Orient. 1: 419 (1867).



Shrubs or small trees, up to 5 m. tall. Stems ascending, terete and thick; branches and young twigs pubescent. Leaves simple, succulent, petiolate, glabrous or more usually pubescent on both surfaces; blade variable in shape and size, oblanceolate, obovate or obovate-elliptic, margin entire, apex retuse, sometimes emarginate. Flowers usually in 2-4 flowered fascicles in the axils of clustered leaves, pedicellate. Sepals oblong, obtuse, densely pubescent outside. Petals absent. Fruits cylindrical, densely pubescent or rarely glabrous.

Flowring and fruiting: December - February.

Vernacular name (Bishari): *Margaam* (Täckholm, 1974).
(Arabic): *Sarh*

Habitat and ecology: Phanerophyte which grows in sandy plains.

Kassas and Zahran (1971) noted that *M. crassifolia* grows in runnels dissecting the north and east facing slopes at the feet of the coastal hills of Gebel Elba massive.

Distribution: Recorded from Senegal, Mali, N. Nigeria, and Tchad, eastwrds to the Sudan, Somalia and Ethiopia; southwards to Uganda, Kenya, Tanzania. Also known in Saudi Arabia, eastwards to Yemen and Oman. Recorded from Libya, Egypt, Jordan, Palestine and further eastwards to Iran.

In Egypt, the species is recorded from the oases of the Libyan Desert, southern parts of the Eastern Desert, Red Sea coast and Gebel Elba massive.

Floristic category: Sahelian, Afro-Oriental, Zambezian and S. Arabian domains of the Sudano-Zambezian region; West and Middle Sabaro-Sindian subregions.

Status: Rare.

The species is not under immediate threat but is at risk because of expected future disturbance. Clearing of the vegetation for the establishment of new settlements, especially in the oases and along the Red Sea coast. Cutting by natives and using the branches in roofing or firewood, as well as overgrazing are other causatives for the species decline.

Conservation measures taken: Gebel Elba protected area.

Conservation measures proposed: Gebel Uweinat (Western Desert) be a nature reserve.

The single tree recorded by *A.G. Fahmy* in Dakhla Oasis be protected from cutting. Also cultivation in botanic gardens seems to be another valuable methode to protect the tree.

Biology and potential value: *Maerua crassifolia* is a medium sized tree and is known to have been a source of good hard timber, also it is recommended as a shade tree and wind break.

Specimens examined

Dl. 20 miles S.W. of Gebel Uweinat, 13.X.1932, *W.B. Kshaw* 16 (K), Gebel Uweinat (Wadi Talh), 28.X.1968, *L. Boulos* 3323 (CAI).

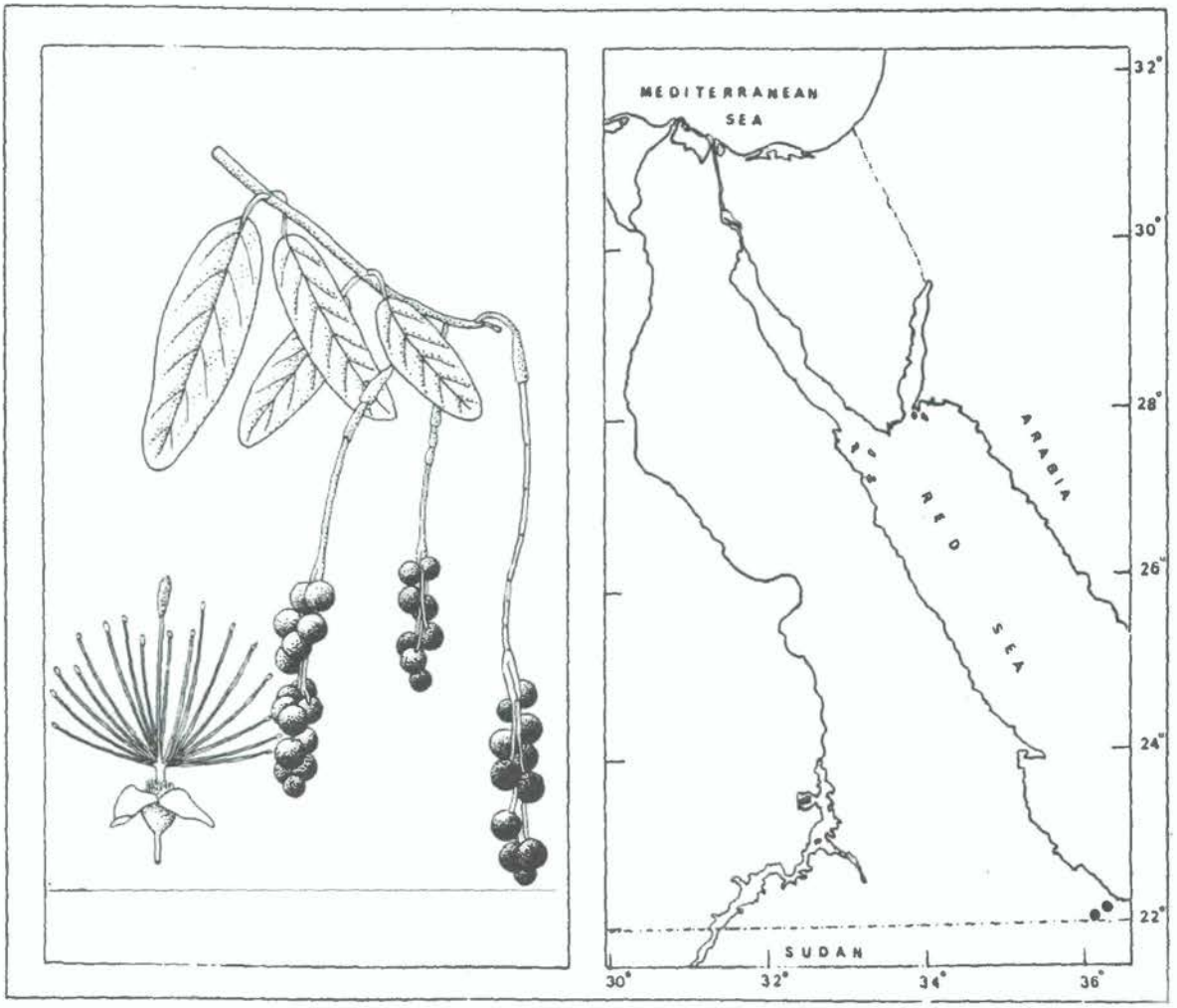
O. Ezbet El Mouhob (Dakhla Oasis), 17.VIII.1962, *M.N. El-Hadidi s.n.* (CAI); Ezbet el Giza, 16.I.1988, *A.G. Fahmy* 787 (CAI).

R. Wadis west of Mersa Halaib, 22.I.1929, *G. Täckholm s.n.* (CAI).

Sa. Gebel Elba, 27.I.1929, *G.G. Täckholm s.n.* (CAI); Wadi Ideib, 5.II.1933, *J.R. Shabetai* 1445 (CAI); Wadi El Homeara, 3.II.1962, *Täckholm et al.* 1213 (CAI); Wadi Yoider, 21.I.1956, *L. Boulos s.n.* (CAI).

33. Maerua oblongifolia (Forssk.) A. Rich., Tent. Fl. Abyss. 1: 32, t. 6 (1847); Täckholm, Stud. Fl. Egypt ed. 2: 165, pl. 49 A. (1974).

Capparis oblongifolia Forssk., Fl. Aegypt.- Arab.: 99 (1775).



Scrambling shrub with decumbent or short erect slender branches; young twigs glabrous or minutely scabrous. Leaves simple, shortly petiolate, glabrous on both surfaces; narrowlly to broadly oblong, margin entire, apex subacute, sometimes emarginate, rigidly mucronate. Flowers in dense terminal or short axillary corymbose raceme or the flowers single in the upper leaf-axils, pedicellate. Sepals ovate, actue, puberulous. Petals greenish yellow. Fruits cylindrical markedly constricted between, usually glabrous.

Vernacular name (Bishari) : *Marw* (Täckholm, 1974).

Habitat and ecology: Phanerophyte which grows on slopes of hard rocks.

Distribution: Recorded from Mauritania, Niger, N. Nigeria Tchad and Cameroon, eastwards to Uganda, Kenya; northwards to Ethiopia, Somalia and the Sudan and eastwards to Saudi Arabia, Yemen and Oman. Also recorded from Libya.

Floristic category: Sahelian, Sudanian, Afro-Oriental and S. Arabian domains of the Sudano-Zambezian region, with extensions to the Middle Saharo-Sindian subregion.

Status: Indeterminate.

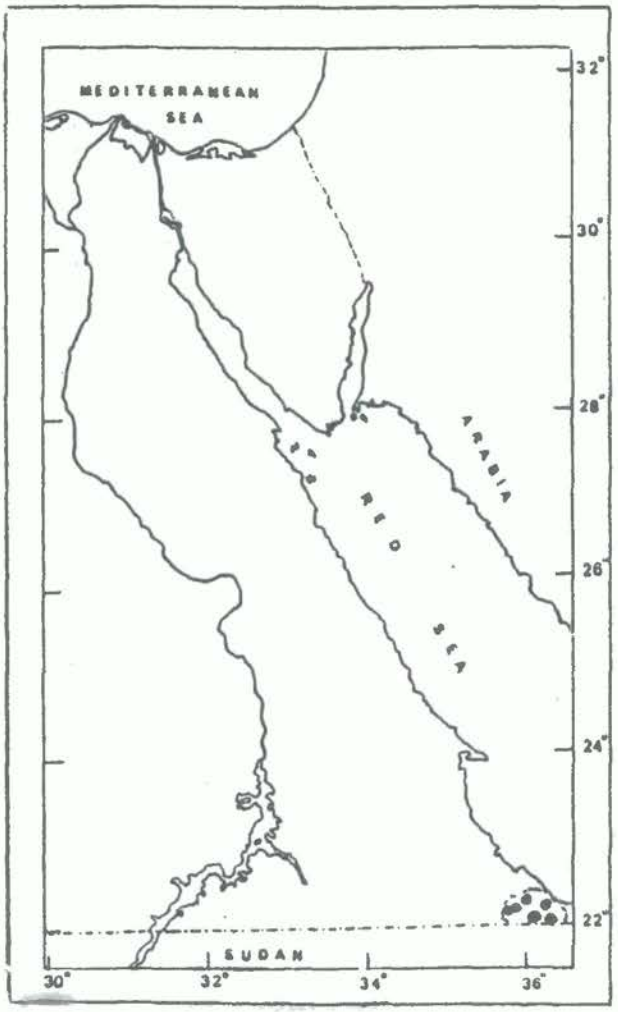
Conservation measures taken: N o n e

Conservation measures proposed: The taxon is to be traced in the northern territories of the Eastern Desert as well as Gebel Elba massive.

Biology and potential value: The species is of scientific significance as a member of a critical group relevant to studies of plant geography and taxonomy.

No specimens were seen by the writers from Egypt.

34. Matthiola elliptica R. Br. ex DC., Syst. 2: 167 (1821); Täckholm, Stud. Fl. Egypt ed. 2: 180 (1974); Zohary et al. in Consp. Fl. Orient. 1: 25 (1980).



Perennial herb, up to 30 cm high. Stems erect, terete, hard below, tomentose. Leaves simple, petiolate, stellately tomentose on both surfaces; blade elliptical or ovate-lanceolate, margin obscurely dentate-sinuate or entire, apex acute or obtuse. Flowers in racemose inflorescence, pedicellate. Sepals oblong-linear, obtuse, densely tomentose. Petals white, sweet scented. Siliqua terete, with a raised line on each side.

Flowering and fruiting: D e c e m b e r - F e b r u a r y

Vernacular name (Bishari): Hamboak (Täckholm, 1974).

Habitat and ecology: Hemicryptophyte which grows in crevices of smooth faced rocky outcrops.

Distribution: Recorded from Ethiopia, Somalia, northwards to the Sudan. Confined in Egypt to Gebel Elba massive which seems to represent the northernmost limit of the taxon distribution in Africa.

Floristic category: Mainly Afro-Oriental domain with extensions to the Sahelian domain of the Sudano-Zambezian region.

Status: Vulnerable.

The species vulnerability can be related to its limited geographical distribution and the small sized populations combined with severe grazing by domestic livestock.

Conservation measures taken: Gebel Elba protected area.

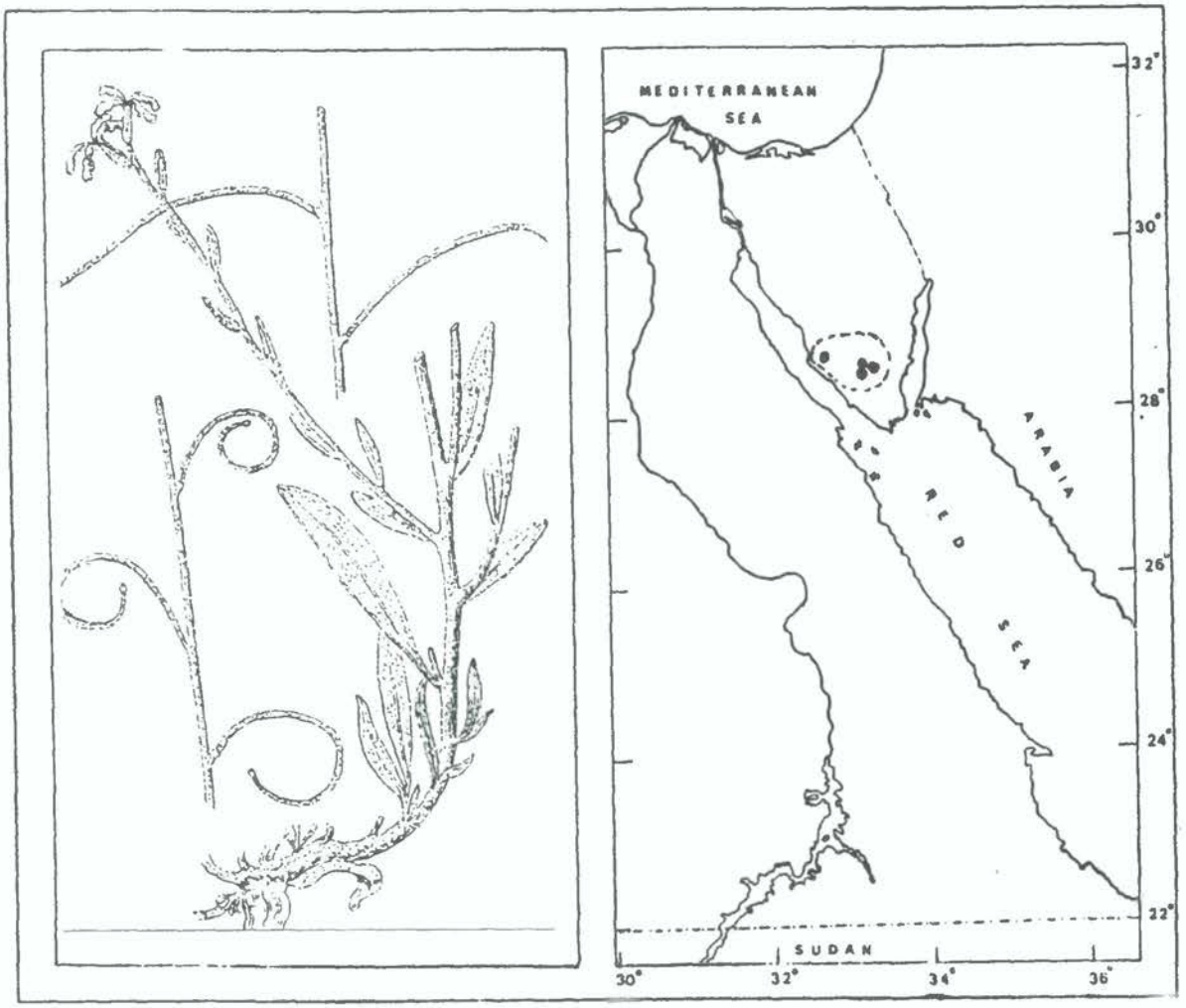
Conservation measures proposed: The populations of *Matthiola elliptica* in Wadi El Shallal and Wadi Merakwan of Gebel Elba massive be wildlife sanctuaries. Cultivation in botanic gardens as an ornamental is another method to preserve the species.

Biology and potential value: The species is of considerable significance on account of its geographical distribution. It has economic potential as a range plant in arid areas in addition to its horticultural merit.

Specimens examined

Sa. Wadi Yahameib, 22.I.1962, *Täckholm et al.* 316 (CAI); Wadi Akau, 27.X.1956, *Boulos* 159 E (CAI); Gebel Elba, 23-27.I.1929, *G. Täckholm s.n.* (CAI); Wadi Saremtai, 23.I.1962 *Täckholm et al.* 359 (CAI); Wadi El Shallal (Bir area); *Täckholm et al.*575 (CAI).

35. Matthiola arabica Boiss. Ann. Sci. Nat. Bot. ser. 2, 17: 49 (1842): Boissier, Fl. Orient. 1: 152 (1867); Täckholm, Stud. Fl. Egypt ed. 2: 180 (1974); Danin et al. in Willdenowia 15: 283 (1985); Greuter et al. in Med-Check. 3: 140 (1986).



Perennial herb, up to 50 cm. tall. Stem erect, ascending branched from a woody base, canescent. Leaves simple, petiolate and sessile, hairy on both surfaces; blade linear to lanceolate, margin entire, apex obtuse or subacute. Flowers in axillary racemes, sessile. Sepals linear, obtuse, pubescent. Petals lead coloured. Siliqua linear, twisted, or curved without horns, pubescent.

Flowring and fruiting: A p r i l - J u l y

Vernacular name: Khimkhim

Habitat and ecology: Hemicryptophyte which grows in crevices of smooth-faced rocky outcrops and slopes.

Two populations of *Matthiola arabica* were recorded in Wadi El Arbain (Mountainuous Sinai). Associate species include: *Stachys aegyptiaca, Malva rotundifolia, Andrachne aspera, Fagonia mollis and Glaucium corniculatum.*

Distribution: Believed to be endemic to Mountainuous Sinai and S. Negev Desert.

Floristic category: Middle Saharo-Sindian subregion.

Status: Vulnerable.

The few populations of *Matthiola arabica* are suffering from intensive grazing by livestock. These were subjected to the danger of extinction due to the construction of touristic settlements close to the sites of these populations.

Conservation measures taken: Gebel St. Catherine (S. Sinai) protected area.

Conservation measures proposed: The two population sites in Wadi El Arabian may be wildlife sancturies. Also Gebel Musa may be a nature reserve; the preservation of *Matthiola arabica* seeds in seed banks is another effective method to preserve the species.

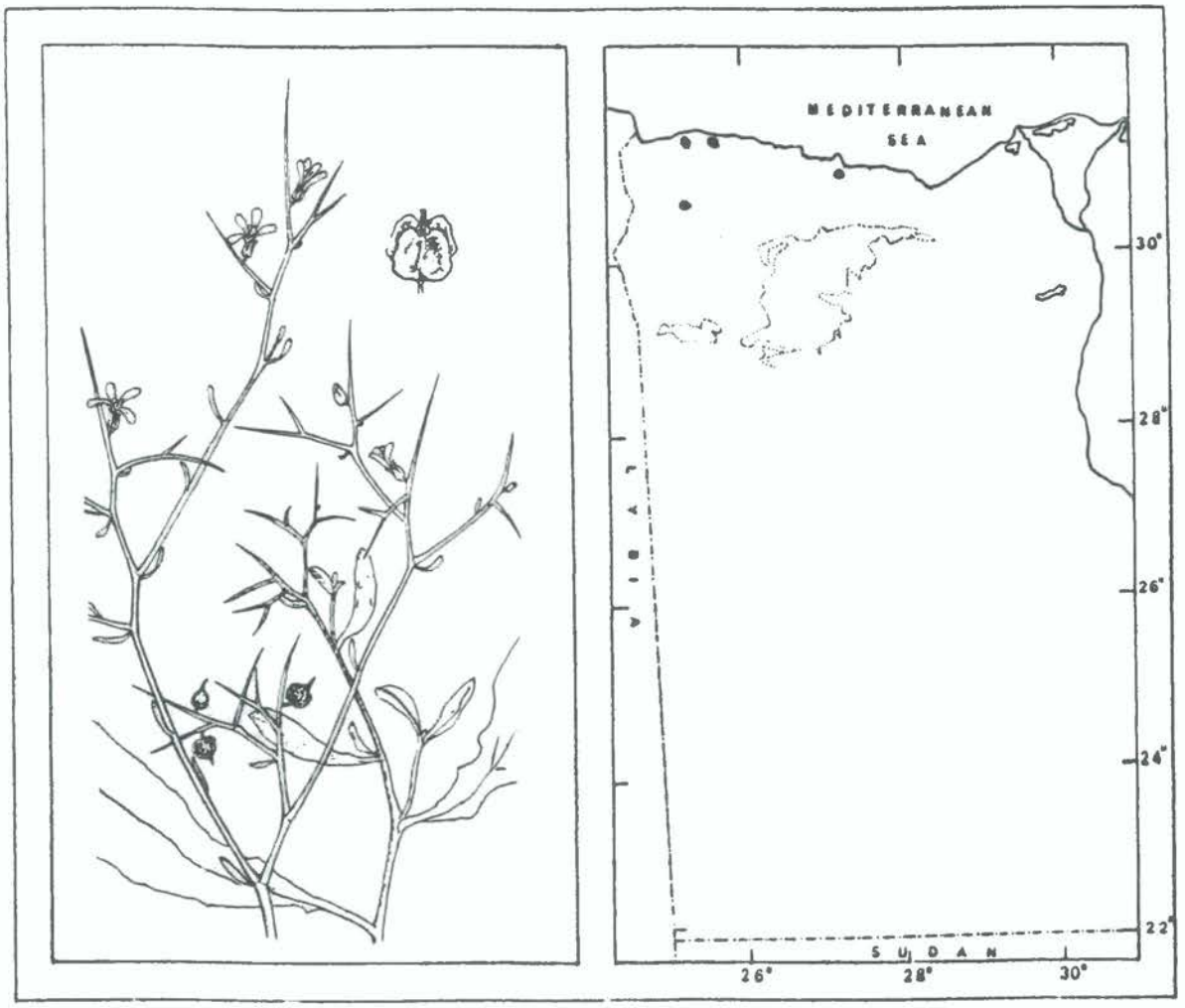
Biology and potential value: The species is of scientific significance being one of the endemic taxa of that genus. It has also the value as an ornamental with its scarlet flowers.

Specimens examined

S. Wadi Isla, IV.1940, *M. Hassib s.n.* (CAI); near the monastery of St. Catherine, 10.V.1956, Wadi El Arbain, Gebel St. Catherine Catherine, 21.IV.1987, *A.G. Fahmy* 536 (CAI); Top of Gebel Musa, 22.IV.1961, *Täckholm s.n.* (CAI); Gebel Musa, 13.III. 1989, *M. El Gibali s.n.* (CAI).

36. Zilla spinosa (L.) Prantl subsp. **biparmata** (O. E Schulz) Maire & Weiller, Bull. Soc. Hist. Nat. Afr. N. 30: 260 (1939); Greuter et al. in Med-Check. 3: 172 (1986).

Z. biparmata O.E. Schulz., Bot. Jahrb. Syst. 54: 55 (1916); Täckholm, Stud. Fl. Egypt ed. 2: 197, pl. 59 B. (1974); Boulos, Candolea 34(1): 39 (1979).



Thorny shrub, up to 30 cm high. Stems ascending, angular, dichotomously branched, glabrous. Leaves simple, petiolate or sessile, glabrous on both surfaces; basal leaves; blade spathulate, margin entire or slightly denticulate, apex obtuse. Flowers solitary, axillary, subsessile. Sepals oblong-ovate, obtuse, glabrous. Petals deep purple. Pods cube-shaped with 4 rounded corky margin, glabrous.

Flowring and fruiting: F e b r u a r y - A p r i l
Vernacular name (Arabic): *Silla*

Habitat and ecology: Chamaephyte which grows on sandy gravel plains.

Two populations of the taxon were recorded:

1. One population at 139 Km. west of Alexandrie, along Alexandrie-Mersa Matrouh road. Associate species include: *Atriplex stylosa. Traganum nudatum, Chrysanthemum coronarium, Verbascumletourneuxii, Salvia lanigera and Papaver rhoeas*

2. the other population is located about 203 Km. north of Siwa Oasis along Mersa Matrouh Siwa road. Associate species include: *Zygophyllum album, Gymnocarpos decandrum, Pituranthos tortuosus and Farsetia aegyptia.*

Distribution: Believed to be endemic to Marmarica of the Mediterranean coastal land in Egypt and Libya.

Floristic category: S. Mediterranean subregion with slight extension to the Middle Saharo-Sindian subregion.

Status: Vulnerable.

The taxon vulnerability is related to the destruction of the habitat for development combined with its limited geographical distribution which is the causative for its natural rarity.

Conservation measures taken: N o n e.

Conservation measures proposed: One or both populations (193 Km west of Alexandria and 203 Km north of Siwa) be wildlife sanctuaries.

The seeds can be preserved in a seed bank.

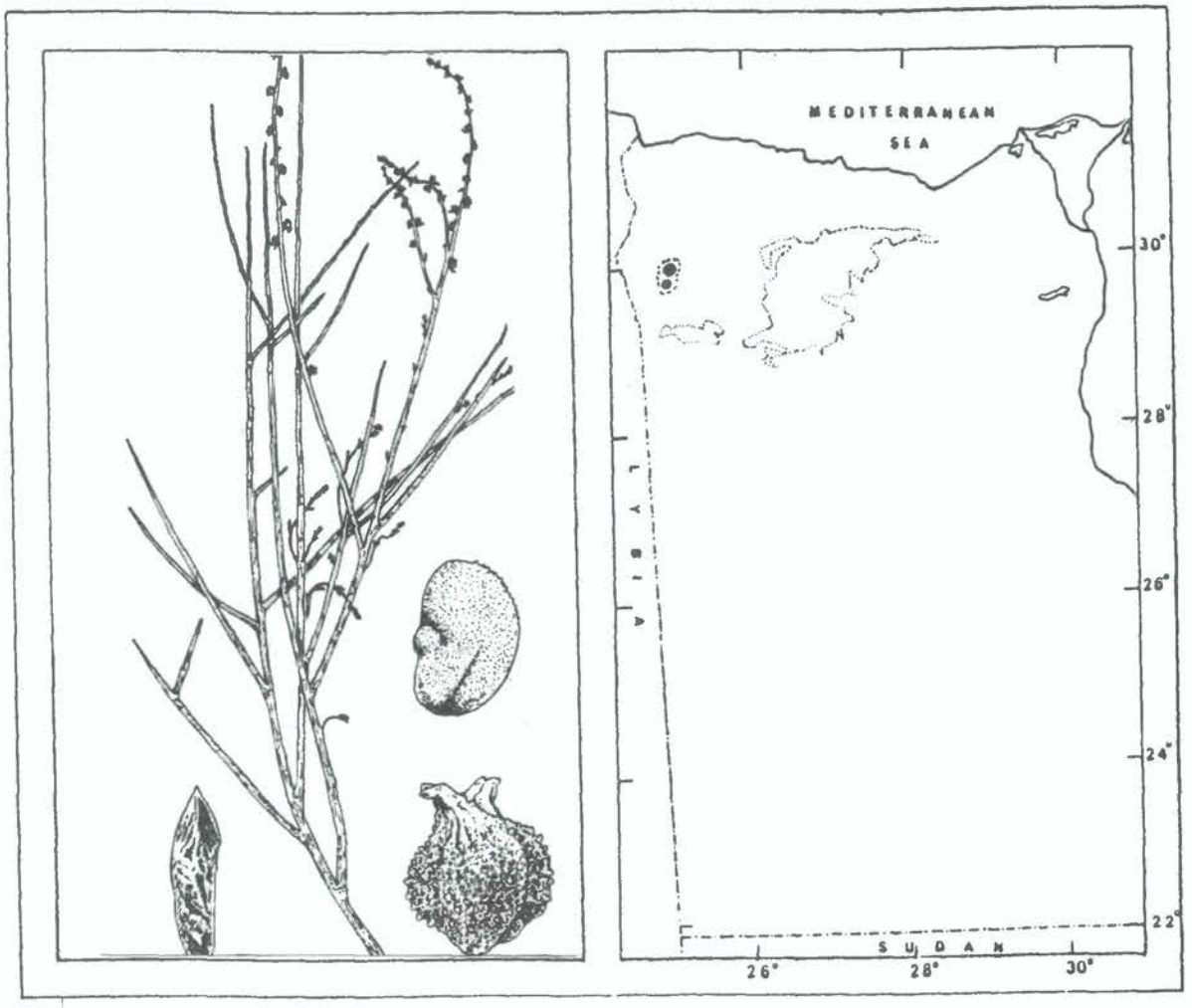
Biology and potential value: Our taxon deserves future studies relevant to its interesting characters.

Specimens examined

M. El Sallum (between the town Sallum and the Libyan frontier), 24.V.1963, *Täckholm et al. n.s* (CAI); East of Mersa Matrouh 4.V.1966, *Täckholm et al. n.s.* (CAI), 150 Km west of Alex. on the way to Ras El Hekma, 3.VI. 1964, *Täckholm s.n.* (CAI).

Dl. 128 Km south of Matrouh on the road to Siwa Oasis, 27.X.1963 *L. Boulos s.n.* (CAI); Siwa-Mersa Matrouh road, 203 Km. north of Siwa, 25.I.1987, *A.G. Fahmy* 398 (CAI).

37. Randonia africana Coss. Bull. Soc. Bot. Fr. 6: 392 (1859); Abdallah, Meded. Land. Wageningen: 94-98 (1967); Täckholm, Stud. Fl. Egypt ed. 2: 208 (1974); Greuter et al. in Med-Check. 4: 446 (1989).



Spinescent shrub, up to 100 cm high. Stems erect and spreading, terete, divaricatey branched, yellowish-green, glabrous. Leaves soon deciduous, fleshy, glabrous on both surfaces; blade ovate to oblong or spathulate, margin narrowly pallid, entire, apex rounded to acutish. Flowers in terminal spicoid racemes, short pedicellate. Sepals persistent, oblong-obovate, apex round obtuse, rarely acutish, glabrous. Petals whitish-yellow. Capsules erect, urceolate to globular, with cuspidate teeth, papillose.

Flowering and fruiting: January - March

Vernacular name: N o t k n o w n.

Habitat and ecology: Chamaephyte which grows on sandy plains.

A single population of *Randonia africana,* was recorded about 194 Km north of Siwa Oasis. Associate species include: *Farsetia aegyptia, Schismus barbatus, Zygophyllumalbum and Telephium sphaerospermum.*

Distribution: Recorded from Senegal, Mauritania, and Morocco, eastward to Algeria and Libya.

It is confined in Egypt to Siwa-Mersa Matrouh road (Libyan Desert).

Floristic category: West and Middle Saharo-Sindian subregions.

Status: Endangered.

The extreme rarity of *Randonia africana* can be related to its limited geographical distribution. Its population along Mersa Matrouh-Siwa road seems to be its easternmost limit in Africa.

Overgrazing by camels and intensive search of oil in this area resulted in depleting the small populations of our taxon leading to its decline.

Conservation measures taken: N o n e

Conservation measures proposed: Two or more population sites, including the site recorded at 194 Km north of Siwa Oasis, be wildlife sanctuaries.

Preserving the seeds in seed banks is another valuable method to protect the plant from extinction.

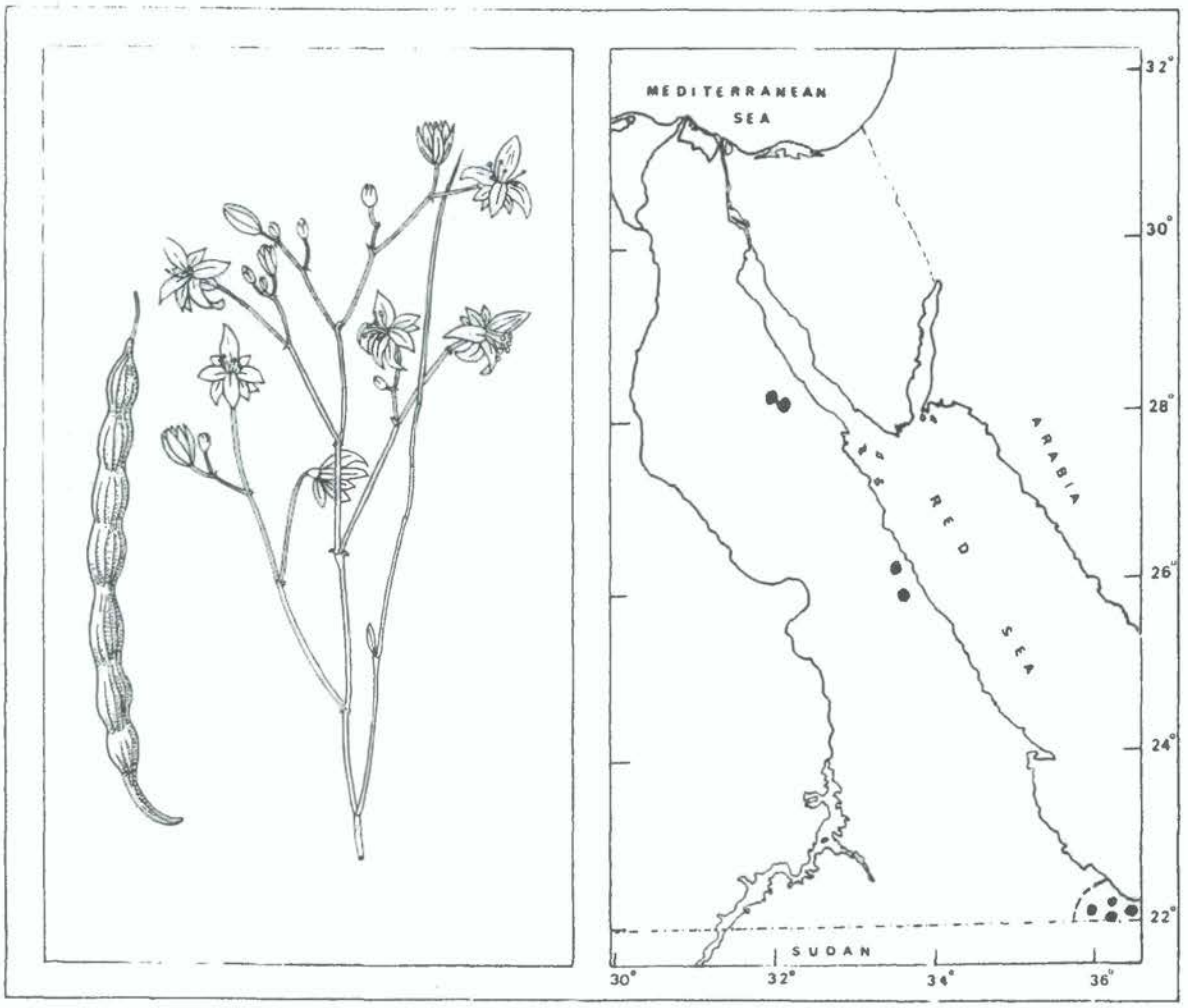
Biology and potential value: The species is of great scientific significance on account of its geographical distribution in Egypt.

Specimens examined

Dl. North of Siwa Oasis, 25.X.1963, *L. Boulos* s.n. (CAI); Siwa-Mersa Matrouh road, 194 Km north of Siwa, 25.I.1987 *A.G. Fahmy* (CAI).

38. Moringa peregrina (Forss.) Fiori, Agric. Colon. 5: 59 (1911); Tackholm, Stud. Fl. Egypt ed. 2: 211, pl. 65 (1974); Danin et al. in Willdenowia 15: 292 (1985).

M. aptera Gaertner, Fruct. Sem. Pl. 2: 315 (1791); Boissier, Fl. Orient. 2: 23 (1872); Muschler, Man. Fl. Egypt 1: 445 (1912); Ramis, Best. Fl. Aegypten: 98 (1929).



A medium sized tree, 3-5 m tall. Trunk erect, terete, branched; branches divaricate or ascending, slender, forming an ovoid or obovoid crown, green-glaucous. Leaflets early deciduous, simple, petiolate, glabrous on both surfaces; blade ovate-oblanceolate, margin entire, apex obtuse, sometimes mucronate. Flowers in panicles, pedicellate. Sepals oblong-lanceolate, acuminate, whitish. Petals white-pinkish to pale yellow. Pod pendulous, ridged, brown, with trigonous seeds.

Flowering and fruiting: F e b r u a r y - A p r i l

Vernacular name (Arabic): *Habb El Yassar* حب اليسار

Habitat and ecology: Microphanerophyte which grows in crevices and slopes.

A survey of the *Moringa peregrina,* within the Red Sea mountains extending from Gebel Abou-Dukhan (lat. 27 20' N) to Gebel el Farayid (lat. 23 30' N), by Kassas and Zahran (1962) has shown that this species is confined to the feet of the mountains that are higher than 1300-1500 m.

Distribution: Recorded from Ethiopia and Somalia, northwards to the Sudan and eastwards to Arabia. Also recorded from Palestine and Jordan.

Moringa peregrina is a rare species in Egypt and is recorded from the Eastern Desert, Red Sea coast, Gebel Elba massive and Mountainuous Sinai.

Floristic category: Afro-Oriental, S. Arabian domains of the Sudano-Zambezian region with extensions to the Middle and Saharo-Sindian subregions.

Status: Vulnerable.

The partial conservation of this tree is apparently due to their value as cash crop to some of El Ma'aza bedouins, but the use of the seed in the Nile Valley is becoming gradually out of fashion, and once its sale come to an end, the nomads would not hesitate to destroy the trees for fuel.

Conservation measures taken: Gebel Elba protected area. Also cultivated in El Orman garden (Giza) and the Botenical Garden, Ain Shams Univ. as an ornamental tree.

Conservation measures proposed: The population sites of *Moringa peregrina* Wadi Bali (N. Hurghada, 33 30' N, 27 21' E) Gebel El Shayeb (33 29' N, 26 58' E) be wildlife sanctuaries.

Biology and potential value: According to Lucas (1962) the seeds of *Moringa peregrina* are the source of Ben oil used by the Egyptians since Old and Middle Kingdoms (3000-2000 B.C.). The refined oil obtained from *Moringa* has a yellowish colour, a sweet taste and is odourless, for which reason it is much esteemed for preparing cosmetics.

Specimens examined

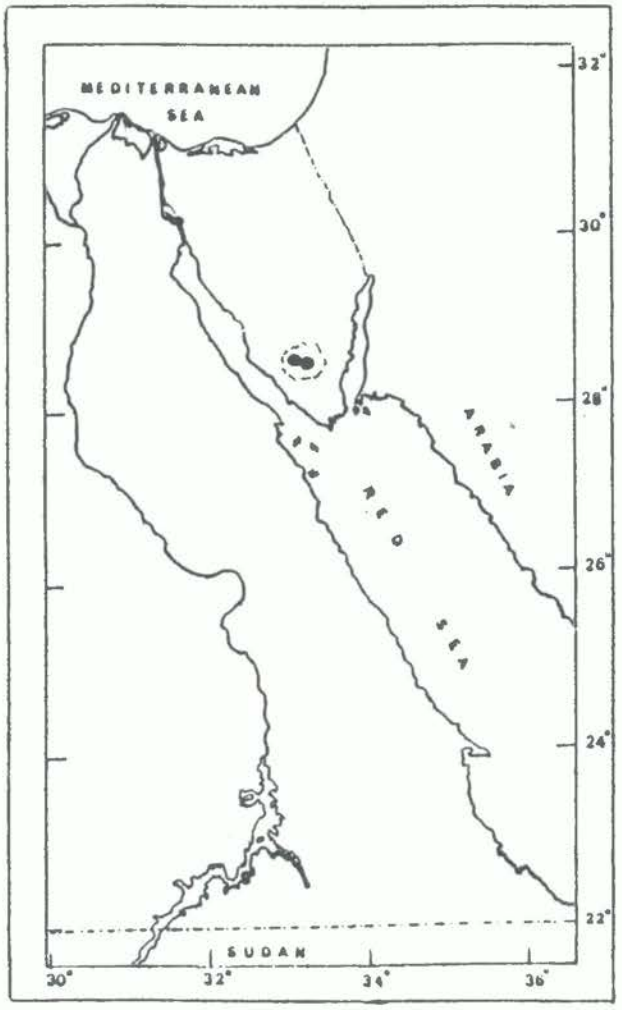
R. Wadi Bali, 15.II.1961, *Täckholm et al. s.n.* (CAI); Wadi Bali, 14.III.1964, *L. Boulos s.n.* (CAI); Wadi Um Sidr 12.IX.1960, *Täckholm et al. s.n.* (CAI); Wadi across Gebel Shayeb El Banat, 11.II.1960, *Täckholm et al. s.n.* (CAI).

Da. Wadi Fatira, 25.XI.1965, *Osborn & Helmy s.n.* (CAI); Wadi Qattar, 16.IX.1966, *Osborn & Helmy s.n.* (CAI); Wadi Qattar, 20.V.1984, *L. Hassan* 3264 (CAI); Bir Um Dalfa, 10.II.1960, *Täckholm et al.s.n.*(CAI).

Sa. Wadi Siamtit, 23.I.1962, *Täckholm et al.* 378 (CAI); Wadi Akau, 27.X. 1956, *L. Boulos s.n.* (CAI); Gebel Elba, 18-25.I.1930, *M. Hassib s.n.* (CAI); Wadi Merakwan, 10.II.1962, *Täckholm et al. s.n.* (CAI).

39. Rosa arabica Crep. Bull. Soc. Bot. Belg. 8: 389 (1869); Boissier, Fl. Orient. suppl.: 218 (1888); Täckholm, Stud. Fl. Egypt ed. 2: 217 (1974); Zohary et al. in Consp. Fl. Orient. 1: 82 (1980); Boulos, Candollea 40(2): 389 (1985); Danin et al. in Willdenowia 15: 300 (1985).

R. rubiginosa L. var **arabica** (Crep.) Boissier, Fl. Orient. 2: 687 (1872).



Thorny shrub, with erect or scrambling stems, armed with prickle; old branches covered by a thin reddish brownbark, young twigs glandular. Leaves 3-5 foliate, petiolate, glandular beneath, the glands concentrated on the midrib and the margins; blades elliptical-obovate, margin deeply double serrate apex acute. Flowers solitary, terminal, pedicellate. Sepals lanceolate, acute, glandular puberulent. Petals pink. Fruit globose, glabrous, glossy, brown, include small nuts within.

Flowering and fruiting: J u n e - A u g u s t

Vernacular name (Arabic): *Ward barri* ورد بري

Habitat and ecology: Nano-phanerophyte which grows on smooth faced rocky outcrops near fresh water springs, usually at higher altitudes over 2000 m.

Distribution: Believed to be endemic to mountainuous Sinai.

Floristic category: Middle Saharo-Sindian subregion.

Status: Endangerd.

A few populations of *Rosa arabica* are confined to the mountains of S. Sinai; the plant is going under immediate threat due its limited geographical distribution combined with cutting of its branches to graft the garden roses, and the children collect its edible fruits.

Conservation measures taken: St. Catherine protected area was established under the Egyptian Prime Ministerial decree No. 613/1988.

It was listed as a rare endemic species by El-Hadidi (1979).

Conservation measures proposed: The populations of *Rosa arabica* in Wadi El Arbain and Gebel St. Catherine (Gebel St. Catherine, S. Sinai) be dildlife sanctuaries.

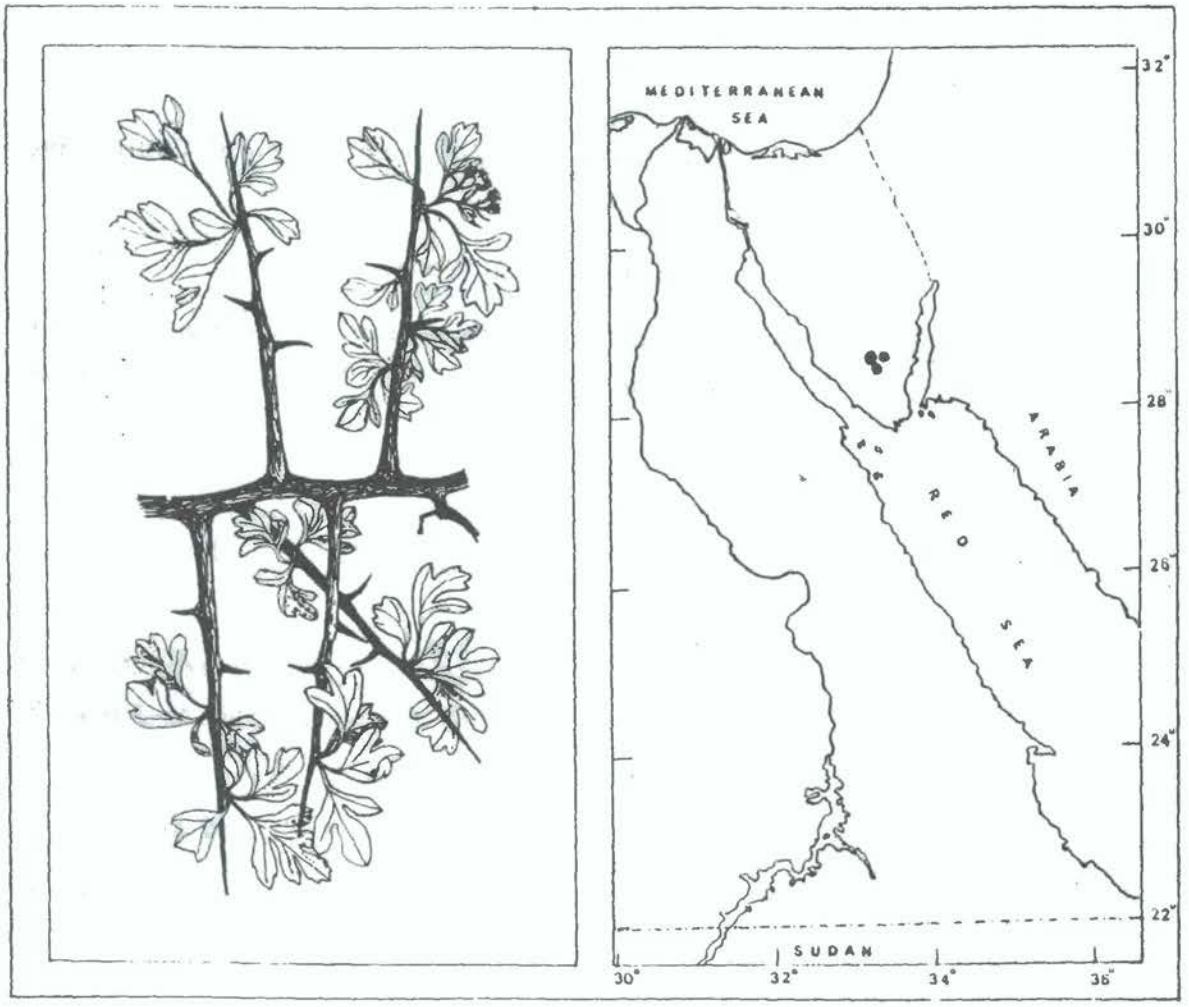
Propagation in the botanic gardens as an ornamental plant is another helpful method to protect the taxon.

Biology and potential value: *Rosa arabica* is of scientific significance on account of its geographical distribution. Boulos (1985) pointed out that this species is the only endemic species in the southeast Mediterranean. He beleives that our taxon may represent a variety of, unless identical to *R. abyssinica* and that our taxon remains as the northermost limit of the species.

Specimens examined

S. St Catherine, IV.1940, *M. Hassib* s.n. (CAI); Gebel Catherine 20.VIII. 1982, *El Hadidi et al.* s.n. (CAI); Wadi El Arbain, 23.IV.1961, *Täckholm, et al.* s.n. (CAI).

40. Crataegus sinaica Boiss., Diagn. Pl. Or. Nov. ser. 2, 2: 48 (1856); Täckholm, Stud Fl. Egypt ed. 2: 217, pl. 68 A. (1974); Danin et al. in Willdenowia 15: 300 (1985).



Thorny shrub, up to 100 cm. tall. Stems erect, glabrous, terete, much branched, covered with reddish-brown bark. Leaves petiolate, bilaterally glabrous or with scattered hairs on the underside of the midrib, dark green beneath, shining above; blade obovate, deeply 3-5 lobed, replaced by 3-5 large acute teeth. Flowers in compact or rather lax corymbs, pedicellate. Sepals triangular-lanceolate, acute reflexed, glabrous or thinly hairy. Petals white or pinkish. Fruit rounded-ovoid of pea size.

Flowering and fruiting: M a r c h - M a y

Vernacular name (Arabic): *Za'roor* (Täckholm, 1974).

Habitat and ecology: Chamaephyte which grows on slopes and wadi beds formed of smooth faced rocks and deep soil.

A small population (10 individuals) was recorded on the rocky slope below Ain El Shennara (St. Catherine, S. Sinai). Associated species include: *Artemisia judaica, Papaver decaisnei, Pulicaria undulata and Cotoneaster orbicularis.*

Distribution: Recorded from Syria and Iran, and known in Cyprus and Turkey.

In Egypt, it is confined to mountainuous S. Sinai.

Floristic category: Mesopotamian province of the Irano-Turanian region with extensions to E. Mediterranean subregion and Middle Saharo-Sindian subregion.

Status: Vulnerable.

Crataegus sinaica is only known from the higher altitudes of mountainuous S. Sinai.

The vulnerability of the species can be related to the severe cutting of the branches by natives, which they use in roofing their huts and as firewood. In addition, edible fruits are collected by children.

Conservation measures taken: Gebel St. Catherine protected area.

Conservation measures proposed: The small population recorded in the wadi bed of Ain El Shenara be a wildlife sanctuary.

Propagation in botanic gardens as an oranamental plant is also recommen

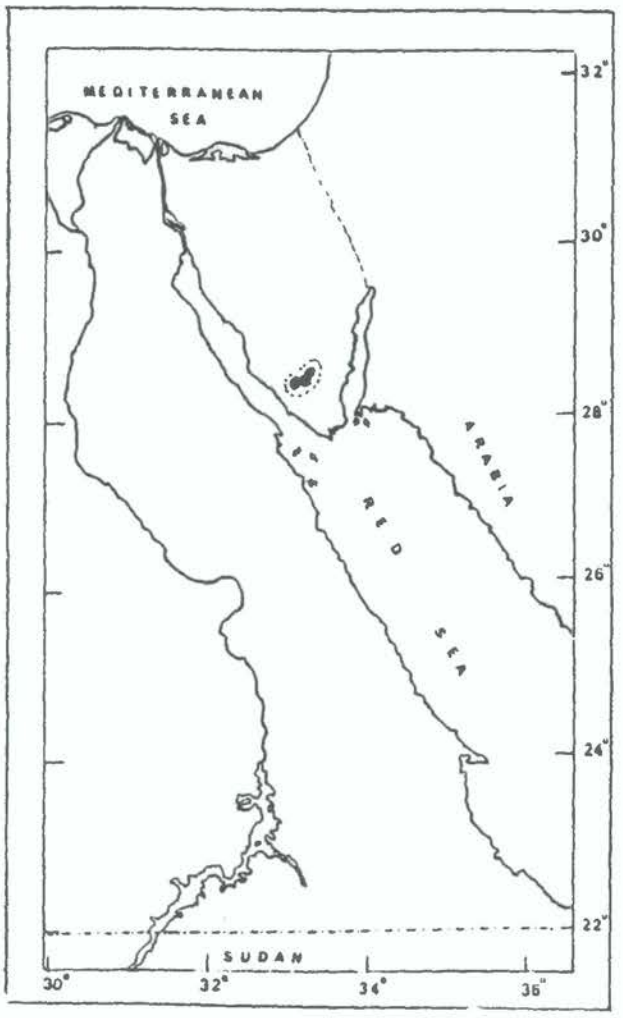
Biology and potential value: The species is of scientific significance on account of its geographical distribution. Its occurrence in S. Sinai is regarded by several scholars of phytogeography as relict populations of the Irano-Turanian element penetrating to the Saharo-Sindian region.

The plant has a horticultural merit because of its habit and decorative flowers.

Specimens examined

S. Mont Sinai et St Catherine, June 1832, *N. Bove* 181 (K); Sinai, St. Catherine, 15.V.1937, *J.R. Shabetai s.n.* (CAI); Katherine mountain, 20.VIII.1982, *El Hadidi et al. s.n.* (CAI); in the garden of Deir El Arbain, 23.IV.1962, *Täckholm et al. s.n.* (CAI); Ain El Shennara, 21.IV.1987, *A.G. Fahmy* 542 (CAI); Gebel Musa, XI.1833/II.1884, *H.C. Hart s.n.* (K); Gebel Musa, 22.IV.1961, *Täckholm et al. s.n.* (CAI).

41. Cotoneaster orbicularis Schlecht. Linnaea 27(5): 544 (1856); Täckholm. Stud. Fl. Egypt ed. 2: 217 (1974); Zohary et al. in Consp. Fl. Orient. 1: 97 (1980); Danin et al. in Willdenowia 15: 300 (1985).



Unarmed shrub or small tree, up to 90 cm tall. Stems glabrescent erect or decumbent, terete, branched, covered with ashy-grey bark. Leaves shortly petiolate, woolly beneath and dark green above; blade rounded-ovate, obovate and elliptic, margin entire, apex obtuse. Flowers in axillary clusters, 3-4 flowered, pedicellate. Sepals 5, persistent in fruit, linear, acute, villose. Petals pink. Fruit ovoid, red pome.

Flowring and fruiting: F e b r u a r y - A p r i l

Vernacular name (Arabic): *Shawhat* (Täckholm, 1974).

Habitat and ecology: Nano-phanerophyte which grows in crevices of smooth-faced rocky outcrops and in soft dykes.

A small population (15 individuals) was recorded in a wadi below Ain El Shennara (St. Catherine; S. Sinai). Associate species include: *Artemisia judaica, Papaver decaisnei, Pulicaria undulate and Crataegus sinaica.*

Distribution: Recorded from mountainuous S. Sinai; eastwards to Arabia.

Floristic category: Middle Saharo-Sindian subregion.

Status: Vulnerable.

The species extreme rarity can be related to its limited geographical distribution. Its occurrence on the higher altitudes of mountainuous S. Sinai represent a relict of earlier extension of Steppe Forest (Zohary, 1973). The severe cutting by the natives, as firewood and overgrazing by goats are main causatives leading to the decline of the taxon.

Conservation measures taken: It was proposed as a rare taxon in the initial list of endangered species prepared by El Hadidi (1979). Gebel St. Catherine protected area was established under the Egyptian Prime Ministerial dcree No. 613/1988.

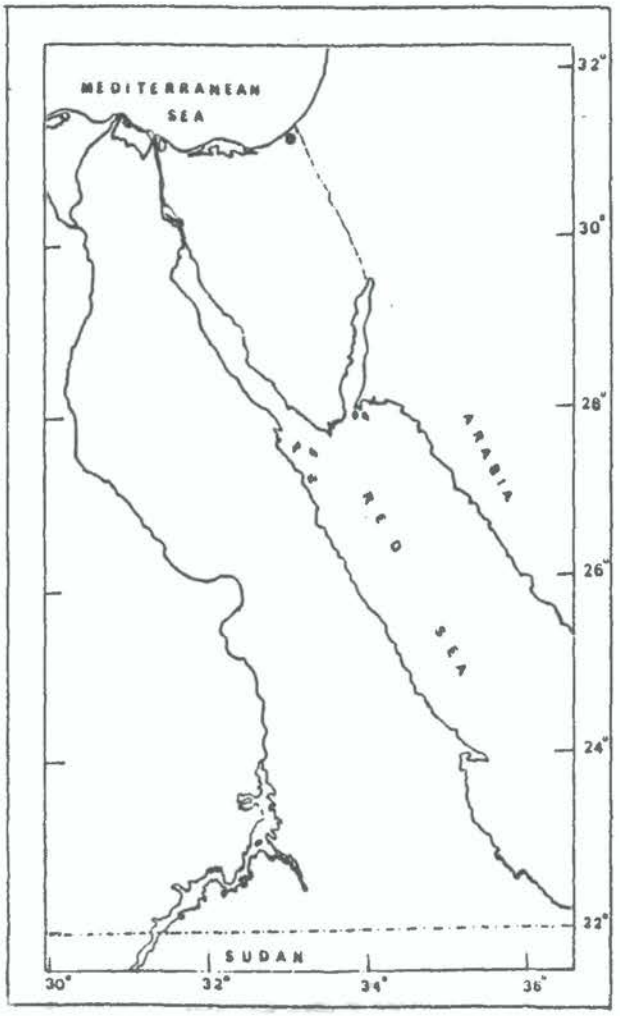
Conservation measures proposed: The population site traced in the Wadi below Ain El Shennara be wildlife sanctuary.

Biology and potential value: The species is of great scientific significance, on account of its limited geographical distribution, since its occurrence in S. Sinai mountains was treated by several botanists as a relict species. *Cotoneaster orbicularis* is the only representative of the genus in Egypt, its extinction means the complete disappearance of the genus from Egypt.

Specimens examined

S. Gebel St. Catherine, IV.1940, *M. Hassib s.n.* (CAI); Gebel St. Catherine, 20.VIII.1982, *El Hadidi et al. s.n.* (CAI); Ain El Shennara, 21.IV.1987, *A.G. Fahmy* 550 (CAI); Wadi El Arbain, 23.IV.1961, *Täckholm et al. s.n.* (CAI); Wadi El Arbain, 19.VIII.1982, *El Hadidi et al. s.n.* (CAI).

42. Anagyris foetida L., Sp. Pl.: 374 (1753); Boiss. Fl. Orient. 2: 24 (1872); Tackholm, Stud. Fl. Egypted 2: 222 (1974); Lock, Leg. Africa (check-list): 478 (1989); Greuter et al. in Med-Check. 4: 6 (1989).



Shrub with strongly foetid odour, up to 60 cm high. Stems erect or ascending, terete, branched almost from the base, younger branches appressed-pubescent of tomentose; older branches covered by dark ashy-grey bark. Leaves alternate, petiolate, 3-foliate; leaflets sessile, glabrous above, pubescent benath; blades elliptical or lanceolate, margin entire, apex mucronulate or sometimes notched. Flowers in lateral, short peduncled racemes, pedicellate. Calyx campanulate, with triangular teeth, blackishgreen. Corolla yellow, standard often with a blackish spot. Pods pendulous, narrowly oblong, generally curved, plae brown.

Vernacular name (Arabic): *Habb El melook* (Täckholm, 1974).

Habitat and ecology: Chamaephyte which grows on dry chalky slopes and sandy plains.

Distribution: Recorded from S. Europe and Cyprus, southwards to Algeria, Libya and Egypt, eastwards to Syria, Iraq and Iran; also known in Arabia.

In Egypt, it is a very rare species confined to Sinai.

Floristic category: East and South Mediterranean subregions extending to West and Middle Saharo-Sindian subregions as well as Mesopotamian province the W. Irano-Turanian subregion.

Status: Extinct.

Anagyris foetida was last seen in 1928, since that time searches had been done by several botenists (Danin et al., 1985) and El Gibali, 1987) without success.

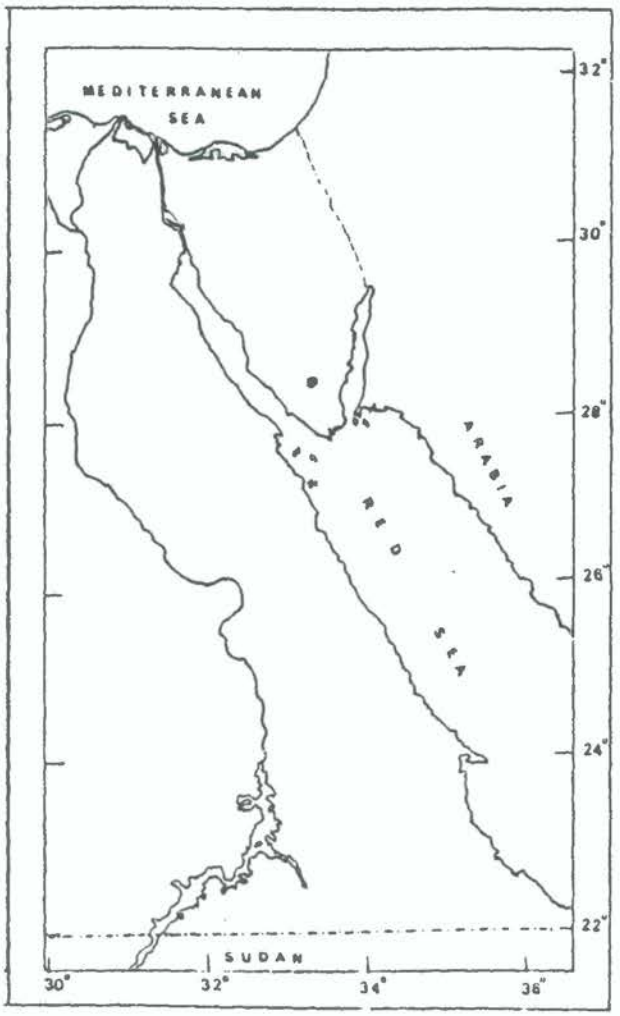
It is probably depleted by clearing of the vegetation to establish new settlements. Any remaining plants would be vulnerable to damage by livestock overgrazing.

Biology and potential value: This species is the single representative of the genus, so its extinction means the complete disappearance of the genus from Egypt.

Specimens examined

Mp. Rafah, near the station, 22.III.1928, *G. Täckholm s.n.* (CAI).

43. Indigofera arabica Jaub. & Sp., Ill. Pl. Orient. 5: tab. 479 (1856); Boissier, Fl. Orient. 2: 189 (1872); Täckholm, Stud. Fl Egypte ed. 2: 254 (1974) Collenette, Fl. Saudi aRabia: 309 (1985); Lock, Legum. Africa (check-list): 291 (1989); Greuter et al. in Med-Check. 4: 113 (1989).



Perennial woody herb, up to 45 cm high. Stems prostrate, slender, diffusely branched from the base, young branches angular, densely silky. Leaves imparipinnate, leaflets 3-5, short-petiolate; leaflets subsessile, pubescent on both sides; blade obovate or oblanceolate, margin entire, apex mucronulate. Flowers in short close racemes, 6-10 flowered, subsessile. Calyx campanulate, with setaceous teeth, pubescent, corolla scarlet. Pod straight, linear oblong slightly silvery.

Vernacular name: Not known

Habitat and ecology: Hemicryptophyte which grows in crevices of smooth-faced outcrops.

Distribution: Recorded from Djibouti, Ethiopia and Somalia, eastwards to Arabia, Iran and W. Pakistan.

Very rare in Egypt and confined to the mountains of S. Sinai.

Floristic category: Afro-Oriental domain of the Sudano-Zambezian region with extensions to the Middle Saharo-Sindian subregion and to S. Arabian domain of the W. Irano-Turanian subregion.

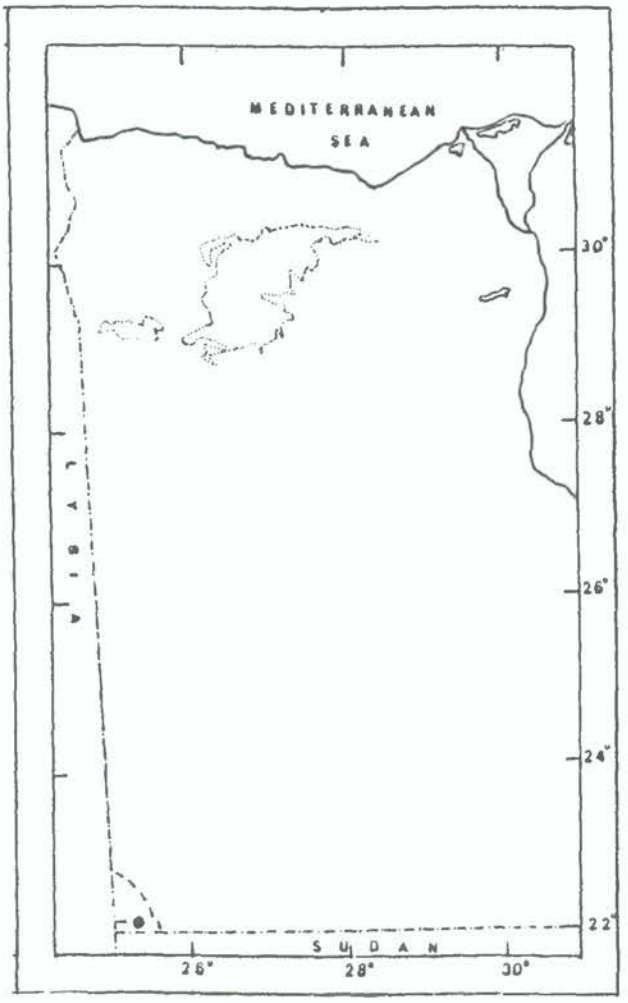
Status: Indeterminate.

Recent search for the species by several scholars (Danin, 1985) were done without success.

Specimens examined

No specimens were seen from Egypt.

44. Indigofera lotononoides Baker fil., Jour. Bot.: 187 (1903); Täckholm, Stud. Fl. Egypt ed. 2: 254 (1974); Lock, Legum. Africa (check-list): 312 (1989).



Small shrub, up to 50 cm tall. Stems erect, terete, branched, branchlets pale-brown. Leaves imparipinnate, petiolate; leaflets 3, nearly sessile, softly pubescent on both surfaces; blade oblong or obovate-oblong, margin entire, apex obtuse. Flowers in axillary clusters, pedicellate. Calyx campanulate, with triangular teeth, pubescent. Pod subglobose, 1-seeded, shortly white pilose.

Vernacular name: Not known

Habitat and ecology: Chamaephyte grows on sandy gravel plains.

Distribution: Recorded from the Sudan and Libya.

Very rare in Egypt and recorded only from Gebel Uweinat area of the Western Desert (Täckholm, 1974).

Floristic category: Middle Saharo-Sindian subregion.

Status: Endangered.

Indigofera lotononoides is known from a single locality (Gebel Uweinat, Western Desert) with a recorded rainfall which is extremely arid, once every 7-10 years, the rain is not only erratic in terms of intervals but also in terms of quantity being about 1 mm/year (Boulos, 1982). The extreme aridity of this area is actually the main causative for the species decline in Egypt.

Conservation measures taken: N o n e

Conservation measures proposed: Gebel Uweinat be a nature reserve.

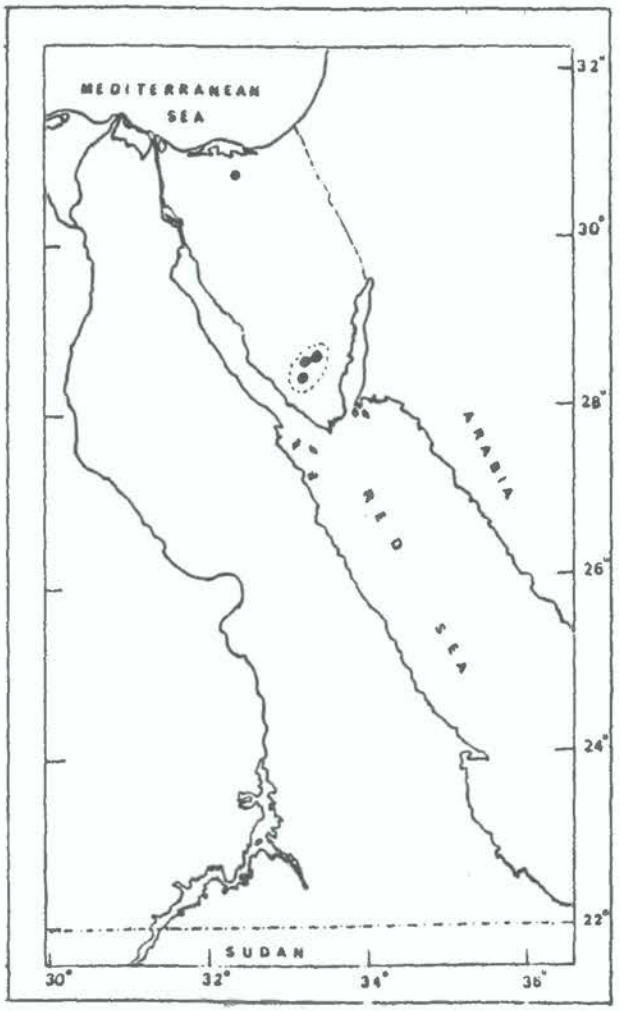
Cultivation in botanic gardens will save the taxon from extinction.

Biology and potential value: The species is of considerable scientific interest as a member of a critical group relevant to studies of plant geography and taxonomy.

No specimens seen from Egypt.

45. Colutea istria Miller, Gard. Dict. ed. 8, no. 2 (1768); Täckholm, Stud. Fl. Egypt ed. 2: 261 (1974); Danin et al. in Willdenowia 15: 295 (1985); Greuter et al. in Med-Check, 4: 79 (1989).

C. haleppica Lam., Encylc. Meth. Bot. 1: 353 (1785); Boiss. Fl. Orient. 2: 195 (1872); Täckholm, Stud. Fl. Egypt ed. 1: 302 (1956).



Shrublet, up to 1 m tall. Stems erect, slender, branched covered by white scaly bark, sparingly hairy. Leaves imparipinnate, leaflets 4-6 pairs, petiolate; leaflets subsessile, greyish-green, hairy; blade obovate-elliptical, margin entire, apex obtuse to mucronate. Flowers in axillary racemes, pedicellate. Calyx broadlyl campanulate, with unequal teeth, triangular, appressed-hirtellous. Corolla yellow, folds of standard united, wings convlute, longer than keel. Pods 5-6 cm long, split at tip, sparingly hairy with reticulate venation.

Flowring and fruiting: F e b r u a r y - A p r i l.

Vernacular name (Arabic): *Qansoor* (Täckholm, 1974).

Habitat and ecology: Nano-phanerophyte which grows on crevices of smooth-faced rocky outcrops.

Distribution: Recorded from Syria, Palestine and Jordan, southwards to Saudi Arabia.

Colutea istria is a very rare species in Egypt and confined to the Isthmic Desert and the mountainous S. Sinai.

Floristic category: Middle Saharo-Sindian subregion with slight extensions to Mesopotamian province of the West Irano-Turanian subregion.

Status: Vulnerable.

Sinai seems to be the easternmost limit of the species distribution. Its vulnerability can be related to its small population size combined with cutting by the natives for the preparation of ropes from the bark fibres. Older branches are used as firewood while overgrazing by domestic livestock leads to the species decline.

Conservation measures taken: Gebel St. Catherine area was established as reserve under the Egyptian Prime Ministerial decree No. 613/1988.

Conservation measures proposed: Two populations of *Colutea istria* in Gebel El Rabba (St. Catherine, S. Sinai) and Gebel El Maghara (N. Sinai) be wildlife sanctuaries. Cultivation in botanic gardens as an ornamental is another useful device to protect the species from extinction.

Biology and potential value: The plant is of horticultural value, because of its habit and decorative flowers.

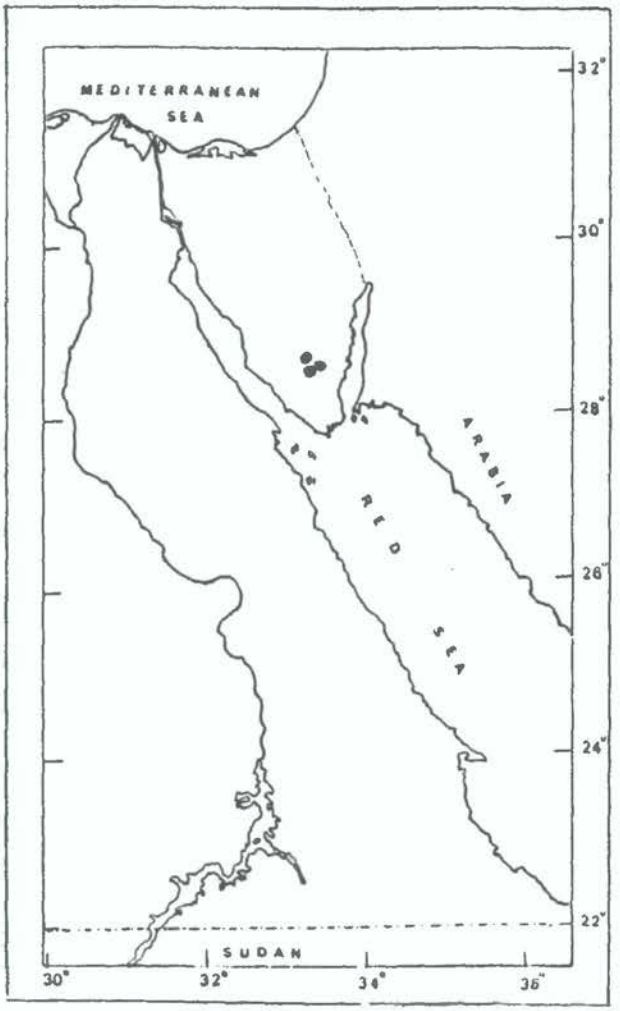
Specimens examined

Di. Wadi El Maghara, 23-IV-1959, *Boulos s.n.* (CAI).

S. Sinai (in monte Sinai and scat uriginem), 2-V-1835, *W. Schimper* 160 (K); Sinai, 1930, *A. Kaiser s.n.* (CAI); top of Gebel Um-Shomer, 15-V-1937, *J.R. Shabetai s.n.* (K); Geninet El Rabba (St. Catherine) 15-V-1937, *J.R. Shabetai s.n.* (K); The garden of Deir El Arbain (St. Catherine), 23-IV-1961, *Täckholm et al. s.n.* (CAI).

46. Astrachantha echinus (DC.) Podl. in Mitt. Bot. Staatssamml. München 19: 9 (1983); Gruter et al. in Med-Check. 4: 22 (1989).

Astragalus echinus DC., Astragalogia: 197, t. 34 (1802); Boissier, Fl. Orient. 2: 338 (1872); Täckholm, Stud. Fl. Egypt ed. 2: 268 (1974); Danin et al. in Willdenowia 15: 294 (1985).



Thorny cushion shrub, 25-50 cm high. Stems erect, intricately branched with erect-patulous spines, glabrous. Leaves imparipinnate, leaflets 5-7 pairs, petiolate; leaflets sessile, appressed canescent; blade oblanceolate, margin entire, apex mucronate to spinulose. Flowers in racemes congested into a globular head. Calyx with densely villouse teeth corolla twice as long as calyx. Pod globular, 1-seeded, hidden in calyx, densely villouse.

Flowering and fruiting: March - April

Vernacular name (Arabic): *Qadas* (Täckholm, 1974).

Habitat and ecology: Chamaephyte which grows on stony and rocky slopes at higher altitudes.

Distribution: Recorded from Palestine, Jordan, northwards to Syria and Lebanon; also known from Cyprus.

In Egypt, *A. echinus* is confined to the higher massif of S. Sinai.

Floristic category: Mesopotamian province of the Irano-Turanian region with extensions to the Middle Saharo-Sindian subregion and E. Mediterranean subregion.

Status: Endangered.

The occurrence of *Astrachantha echinus* on the high mountains of S. Sinai agrees with Rabinowitz's opinion (1980) that this region is a well defined "island" of Central Asian Steppe vegetation. Accordingly this species is a relic one of the Irano-Turanian zone that covered most parts of the Middle East during colder and wetter periods of the past. The species is going under immediate threat due to the limited geographical distribution of that taxon. The spines are burnt-out and the plants are made into plaited bundles of fodder (Abdallah et al., 1984).

Conservation measures taken: Gebel St. Catherine protected area.

Conservation measures proposed: The population sites of *A. echinus* scattered around Gebel Musa (St. Catherin, S. Sinai) be wildlife sanctuaries.

Preserving the seeds in seed banks is also recommended.

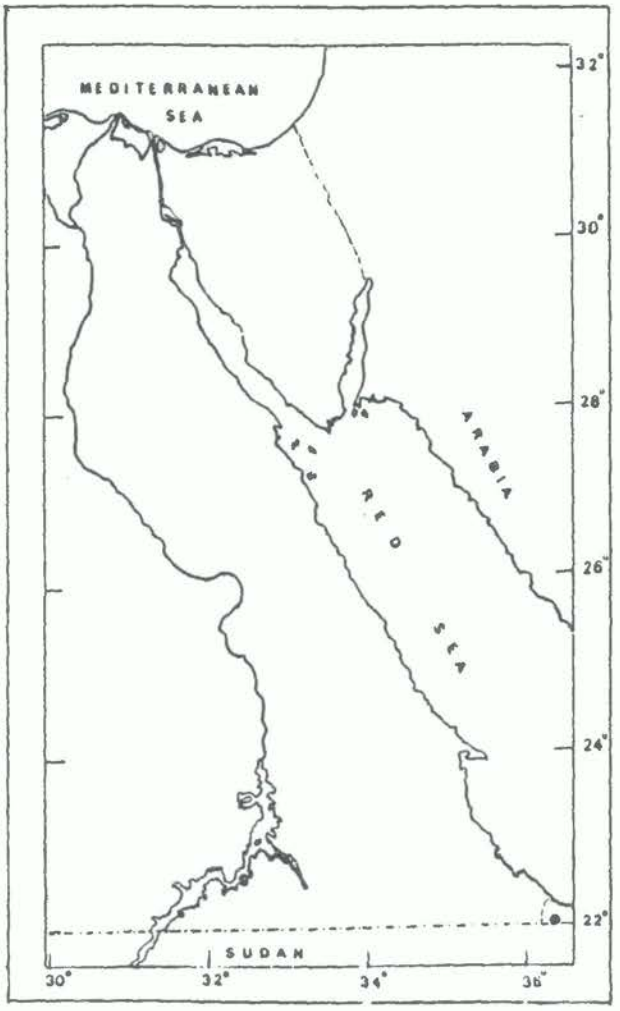
Biology and potential value: The species is of great scientific significance on account of its geographical distribution. It is a relic of the Irano-Turanian zone in the Saharo-Sindian region.

Specimens examined

S. Sinai mountain region, IV.1940, *M. Hassib s.n.* (CAI); Farsh El Gebel, below the summit of Gebel Musa, 11.V.1956, *Täckholm* 239 (CAI); on the summit of Gebel Musa, 22.IV.1961, *Täckholm et al. s.n.* (CAI).

47. Taverniera lappacea (Forssk.) DC., Prod. 2: 339 (1825); Täckholm, Stud. Fl. Egypt ed. 2: 270 (1974); Lock, Legum. Africa (check-list): 288 (1989).

Hedysarum lappaceum Forssk., Fl. Aegypt.-Arab.: 136 (1775).



Low shrub up to 50 cm tall. Stems erect, slender, intricately branched, greyish silky or tomentose. Leaves 3-foliate, petiolate; leaflets fleshy, tomentose, to velutinus on both surfaces, blade obovate, margin entire, apex slightly mucronulate, sometimes notched. Flowers in axillary 3-6 flowered racemes, pedicellate. Calyx campanulate, with subulate teeth, tomentose. Corolla yellow. Pod 1-2 seed, densely echinulate.

Flowering and fruiting: January - March

Vernacular name: Not known

Habitat and ecology: Chamaephyte which grows in crevices of rocky slopes.

Distribution: Recorded from Kenya, northwards to Somalia and the Sudan, eastwards to Arabia, Iran and Pakistan.

A very rare species in Egypt, recorded from Gebel Elba massive.

Floristic category: Afro-Oriental domain and S. Arabian domains of the Sudano-Zambezian region with extensions to the Irano-Turanian region.

Status: Endangered.

The extreme rarity of the species can be related to its limited geographical distribution. Gebel Elba area seems to be the northernmost limit of the taxon in Africa.

Overgrazing depletes the small populations scattered in the wadi beds.

Conservation measures taken: Gebel Elba protected area.

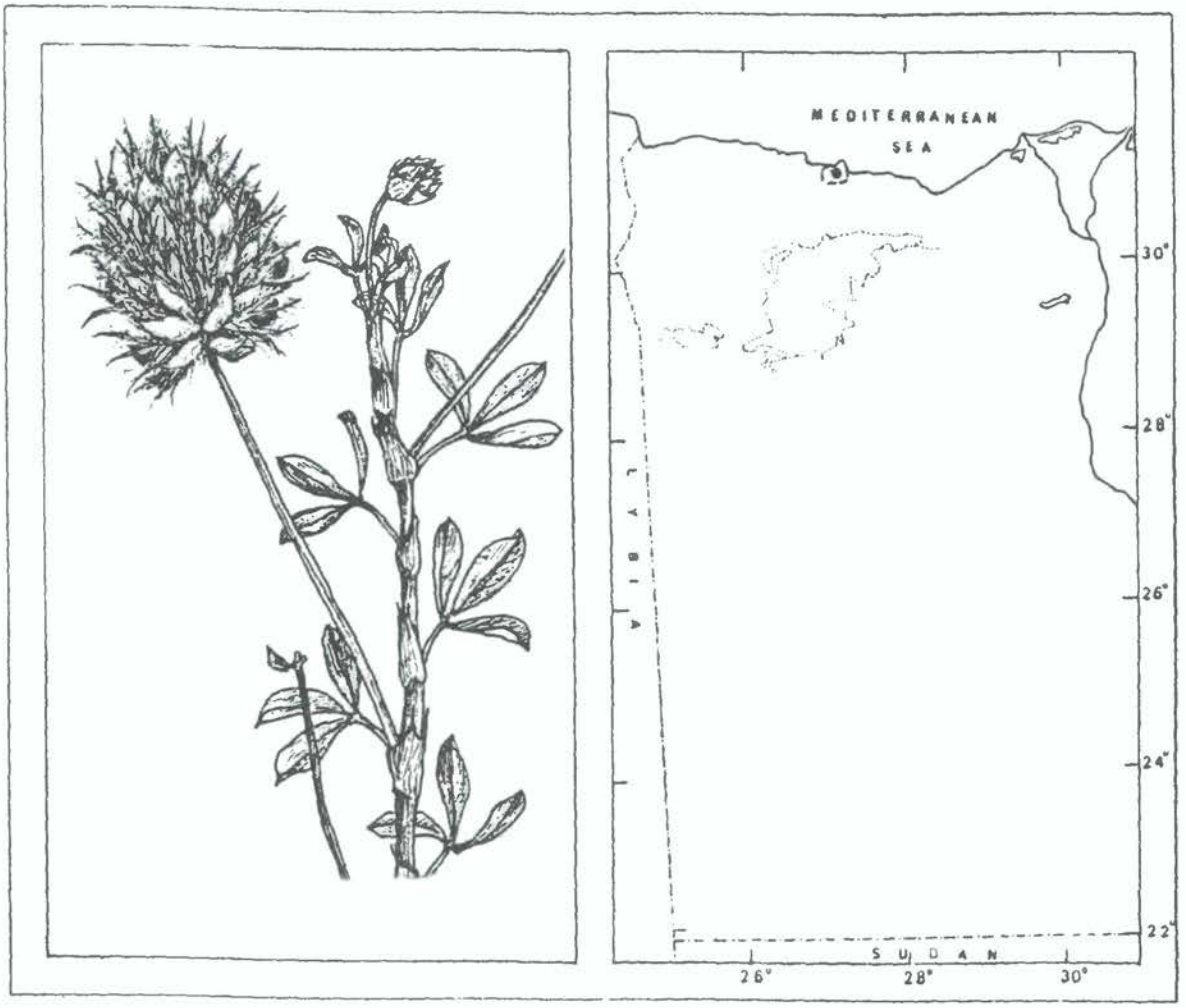
Conservation measures proposed: The population sites of *Taverniera lappacea* in Wadi Laseotit (Gebel Elba massive) be wildlife sanctuaries. Also increasing the size of the wild populations through cultivation "in situ".

Biology and potential value: The species is of scientific interest on account of its limited geographical distribution, and horticultural merit.

Specimens examined

Sa. Mouth of Wadi Laseotit, 5.II.1962, *Täckholm et al.* (CAI).

48. Ebenus armitagei Schweinf. et Taub., Bull. Herb. Boiss. 1: 645 (1893); Täckholm, Stud. Fl. Egypt ed. 2: 272 (1974); Lock, Legum. Africa (check-list): 285 (1989); Greuter et al. in Med-Check. 4: 89 (1989).



Dwarf shrublet, up to 30 cm high. Stems erect or prostrate, slender, branched from the base, silky canescent. Leaves 3-foliolate, short petioled; leaflets nearly sessile, densely canescent on both surfaces; blade obovate or oblanceolate, margin entire, apex mucronate. Flowers in head-like spike, on angled pedicel longer than leaves. Calyx teeth filiform, plume-like, longer than corolla. Corolla glabrous, rose coloured. Pod small, 1-seeded, included in the calyx.

Flowering and fruiting: F e b r u a r y - A p r i l

Vernacular name: N o t k n o w n

Habitat and ecology: Chamaephyte which grows on rocky ridges under maritime influence.

Migahid & Ayad (1971) noted that wind is the major factor affecting vegetation in this type of habitat. It hastens the blowing away of sand and the weathering of rock. Sea waves cause spray salt water upon the plants.

A small population of 10 individuals on the rocks nearby the sea of Ras El Hekma was recorded.

Associate species include: *Crucianella maritima, Helianthemum stipulatum, Gnaphallum luteo-album and lotus creticus.*

Distribution: Endemic to Marmarica in Egypt and Libya.

Floristic category: S. Mediterranean subregion.

Status: Endangered.

It is only recorded from Ras El Hekma area where populations tend to be very small often of less than 10 individuals, and which are also susceptible to grazing. In addition, the pods are severly attacked by insects which threaten plant reproduction.

Conservation measures taken: N o n e

Conservation measures proposed: The population sites of *Ebenus armitagei* at Ras-Elhekma (27^{o} 52' N, 31^{o} 15' W) be wildlife sanctuaries. Preserving the seeds of the plant in seed banks is also recommended.

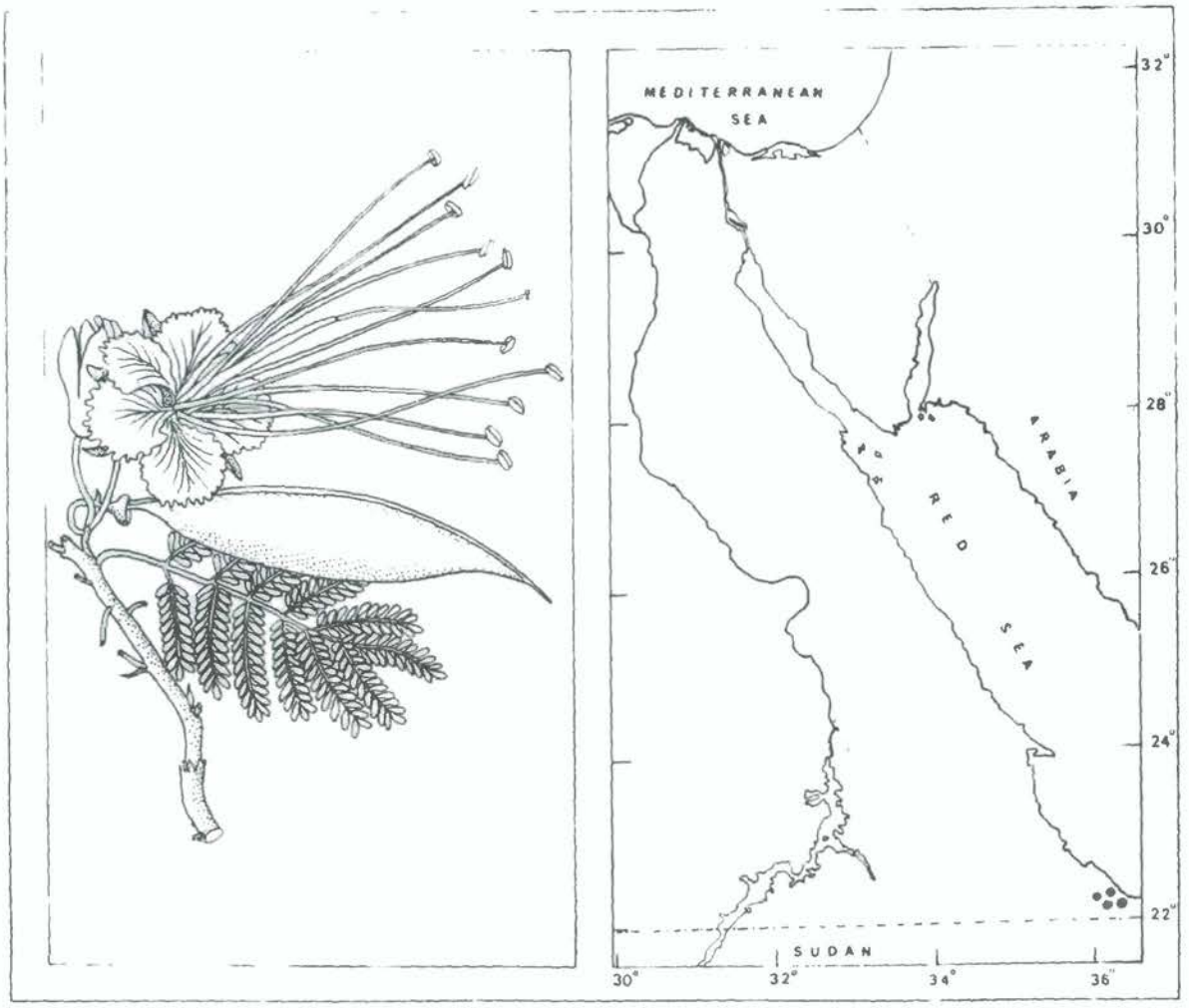
Biology and potential value: *Ebenus armitagei* is endemic to the area and its extinction means the complete disappearance of the genus from Egypt.
With its fragrant, rose flowers, the plant is potentially an attractive garden plant.

Specimens examined

M. Ras El Hekma, IV. 1955, *Täckholm s.n.* (CAI); Ras El Hekma; 12.III. 1969, *Täckholm s.n.* (CAI); Ras El Hekma, 17. IV.1972, *M. Zahran s.n.* (CAI); Ras El Hekma, I.V.1988, *A.G. Fahmy* 1015 (CAI).

49. Delonix elata (L.) Gamble, Fl. Madras 1(3): 396 (1919); Täckholm, Stud. Fl. Egypt ed. 2: 286 (1974); Lock, Legum. Africa: 23 (1989).

Poinciana elata L., Cent. Pl. 2: 16 (1756); Forss., Fl. Aegypt.-Arab.: 86 (1775).



Small to medium-sized tree, 2-15 m tall, with rounded spreading crown. Leaves bipinnate, petioled, pinnae 4-8 pairs; leaflets 10-14 pairs, sessile or subsessile, minutely pubescent on both surfaces; blade oblong, margin entire, apex obtuse and slightly mucronate. Flowers in terminal racemes on dark brown hairy peduncles. Calyx leathery with narrow and sharp pointed teeth. Corolla white with crisped margin, upper petals are smaller and darker in colour. Pod linear-oblong, reddish-brown, calyx persistent, 4-8 seeded.

Flowering and fruiting: D e c e m b e r - M a r c h

Vernacular name (Arabic): *Habaab* (Täckholm, 1974).

Habitat and ecology: Nano-phanerophyte which grows on canal banks.

Distribution: Recorded from Tanzania, Uganda, and Kenya, northwards to Ethiopia, Somalia and the Sudan; eastwards to Saudi Arabia, Yemen and India.

In Egypt, it is a very rare species and confined to Gebel Elba massive.

Floristic category: Zambezian, Afro-Oriental, and S. Arabian domains of the Sudano-Zambezian region with extensions to the Indo-Malaysian region.

Status: Vulnerable.

The extreme rarity of the species can be related to its limited geographical distribution, where Gebel Elba area seems to be its northernmost limit in Africa.

The tree is under immediate threat as a source of timber which is used by the natives for roofing their huts. Overgrazing (leaves and young branches) by camels is another causative for the species decline.

Conservation measures taken: Gebel Elba protected area.

Conservatin measures proposed: Two or more population sites of *Delonix elata* in Gebel Karam Elba or Gebel Shindodai be wildlife sanctuaries.

Cultivation in botanic gardens as an ornamental plant is a valuable and effective method to protect the species.

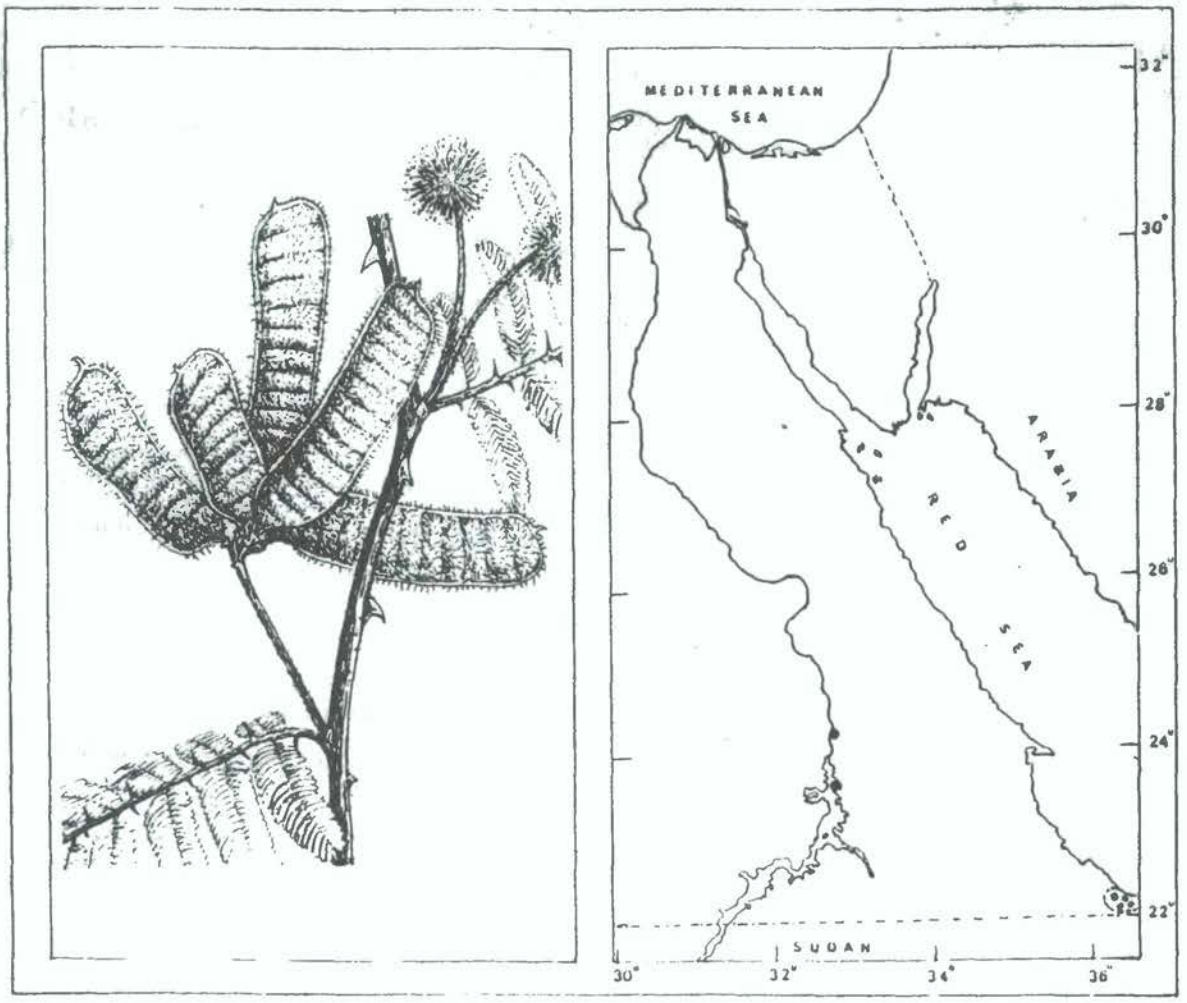
Biology and potential value: The species is of considerable scientific significance on account of its geographical distribution.

Specimens examined

Sa. Gebel Elba, 1925-1926, G.W. *Murray* 3866 (K); Gebel Elba, III. 1933, *Mrs Palmer* s.n. (K); Gebel Elba, 19.III.1928; *Khattab* 6332 (K); Wadi Kansisrob, 24.X.1956, *Boulos* 148 E (CAI); Bir Kansisrob, 3.II.1962, *Täckholm et al.* 1239 (CAI); Wadi Aideib, 3.II.1933, *J.R. Shabetai* s.n. (K); Gebel Karam Elba, 1925-1926, *Murray* 3685 (K); Gebel Karam Elba, 7.II.1962, *Täckholm et al.* 1725 (CAI).

50. Mimosa pigra L., Cent. Pl. 1: 13 (1775); Brenan in Hubbard & Redhead, F.T.E.A. (Mimosiodeae): 43, Fig. 13 (1959); Täckholm, Stud. Fl. Egypt ed. 2: 286, pl. 92A. (1974); Lock, Legum. Africa: 94 (1989); Greuter et al. in Med.-Check. 4: 149 (1989).

Mimosa asperata L., Sp. Pl. 1: 317 (1753).



Shrub up to 3 m high. Stems erect, slender, armed with broad-based prickles. Leaves fragile, bipinnate, shortly petioled, pinnae 7-16 pairs; leaflets 25-40 pairs, pubescent on both surfaces, sessile; blade linear, margin entire, apex acute. Flowers in spherical pedunculate heads. Calyx minute laciniate with setaceous teeth. Corolla pink or mauve. Pod linear, compressed, hispid of stiff yellow hairs, breaking up transversely into segments, each segment contain 1 pale brown seed.

Flowering and fruiting: March - April.

Vernacular name (Bishari): *Ogoag* (Täckholm, 1974).

Habitat and ecology: Nano-phanerophyte which gows on rocky slopes.

Kassas and Zahran (1971) noted that *Delonix elata* is abundant within certain localities, namely the north and northeast slopes of Gebel Karam Elba, the foothills and the middle zone of the north facing slopes zone of the north facing slopes of Gebel Shindodai of the Elba group.

Distribution: Widespread in Tropical Africa, and America, also known in Madagascar, Mauritius and Asia.

In Egypt, *Mimosa pigra* is a very rare species and confined to the southern parts of the Nile Valley (Aswan province) and Eastern Desert.

Floristic category: Tropics of the world.

Status: Endangered.

The species vulnerability can be related to its limited geographical distribution combined with clearing of the vegetation on the canal banks to enlarge the water courses. This deplets the small populations of our taxon.

Conservation mesures taken: N o n e

Conservation measures proposed: Further investigation is needed to determine accurately the sites of *Mimosa pigra,* , and hence be wildlife sanctuaries.

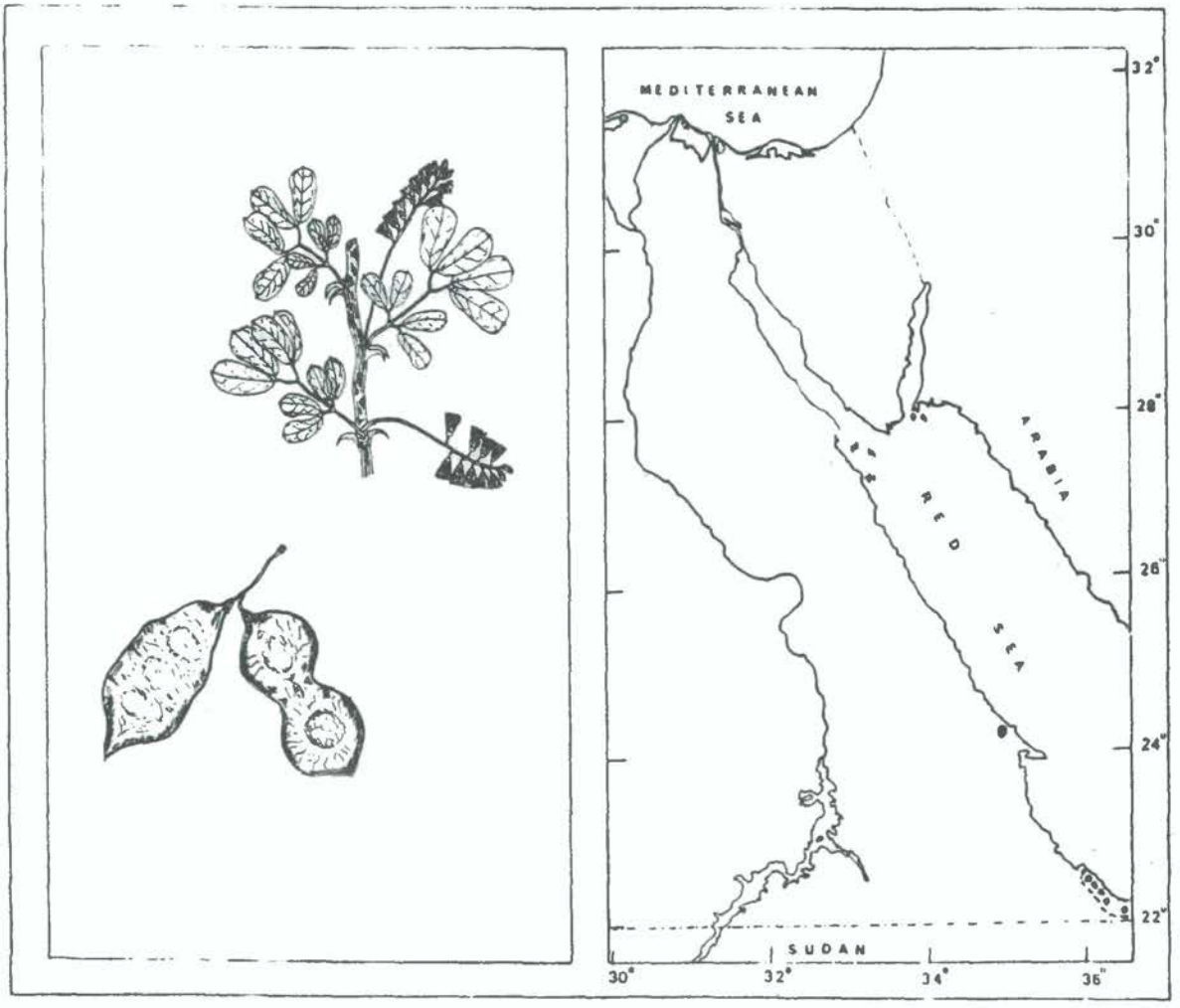
Biology and potential value: The tree have a horticultural merit because of its habit and fragrant flowers, so it can be propagated in botanic gardens as an ornamental.

Speciems examined

Nv. Kom-Ombo, 11.V.1882, *Schweinfurth s.n.* (K); Aswan, 1829, Wallic *Wallich s.n.* (K); At the foot of the rock Abu-Sir at the 2nd Cataract (Wadi Halfa), 1.IV.1962, *S. Ekmam s.n.* (CAI).

51. Acacia mellifera (Vahl) Benth., Lond. Jour. Bot. 1: 507 (1842); Brenan in Hubbard & Redhead, F.T.E.A. (*Mimosoideae*): 84, *Fig.* 14 (1959); Täckholm, Stud. Fl. Egypt ed. 2: 289, pl. 93 A (1974); Lock, Legum. Africa: 71 (1989); Greuter et al. in Med-Check. 4: 3 (1989).

Mimosa mellifera Vahl, Symb. bot. 3: 103 (1791).



Shrub or small tree, stems deep brown, erect, terete, branched, provided with hooked prickles, in pairs. Leaves petiolate, pinnae 2-3 pairs; leaflets 1-2 pairs, sessile, glabrous on both surfaces, blade obovate to obovate-elliptic, margin entire, apex obtuse. Flowers in heads, pedicellate. Calyx glabrous. Corolla cream to white, exceeding the calyx. Pods pale brown, oblong, rounded to shortly acuminate at apex.

Flowering and fruiting: November - January

Vernacular name (Arabic): *Khashab* (Täckholm, 1974).

Habitat and ecology: Nano-phanerophyte which grows in the crevices of rocky slopes.

Distribution: Ethiopia and Somalia northwards to the Sudan, eastwards to Saudi Arabia and Yemen.

Very rare in Egypt and confined to the southern parts of the Eastern Desert, Red Sea coast and Gebel Elba massive.

Floristic category: Afro-Oriental and S. Arabian domains of the Sudano-Zambzian region.

Status: Vulnerable.

The populations of *Acacia mellifera* are threatened by collection for fire-wood, since its hard, clean burning wood is a valued cooking fuel in rural areas. Grazing contributes to the rarity of the species.

Conservation measures taken: Cultivated in the Agricultural Museum garden (Giza) from seeds collected by Drar in 1937. Gebel Elba was established as a protected area under the Egyptian Prime Ministerial decree No. 450/1986.

Conservation measures proposed: The sites of *Acacia mellifera* in Gebel Hamata (Red Sea), Wadi Kansisrob and Wadi Yahameib (Gebel Elba area) be wildlife sanctuaries.

Biology and potential value: A medium-sized tree of good hard timber.

Specimens examined

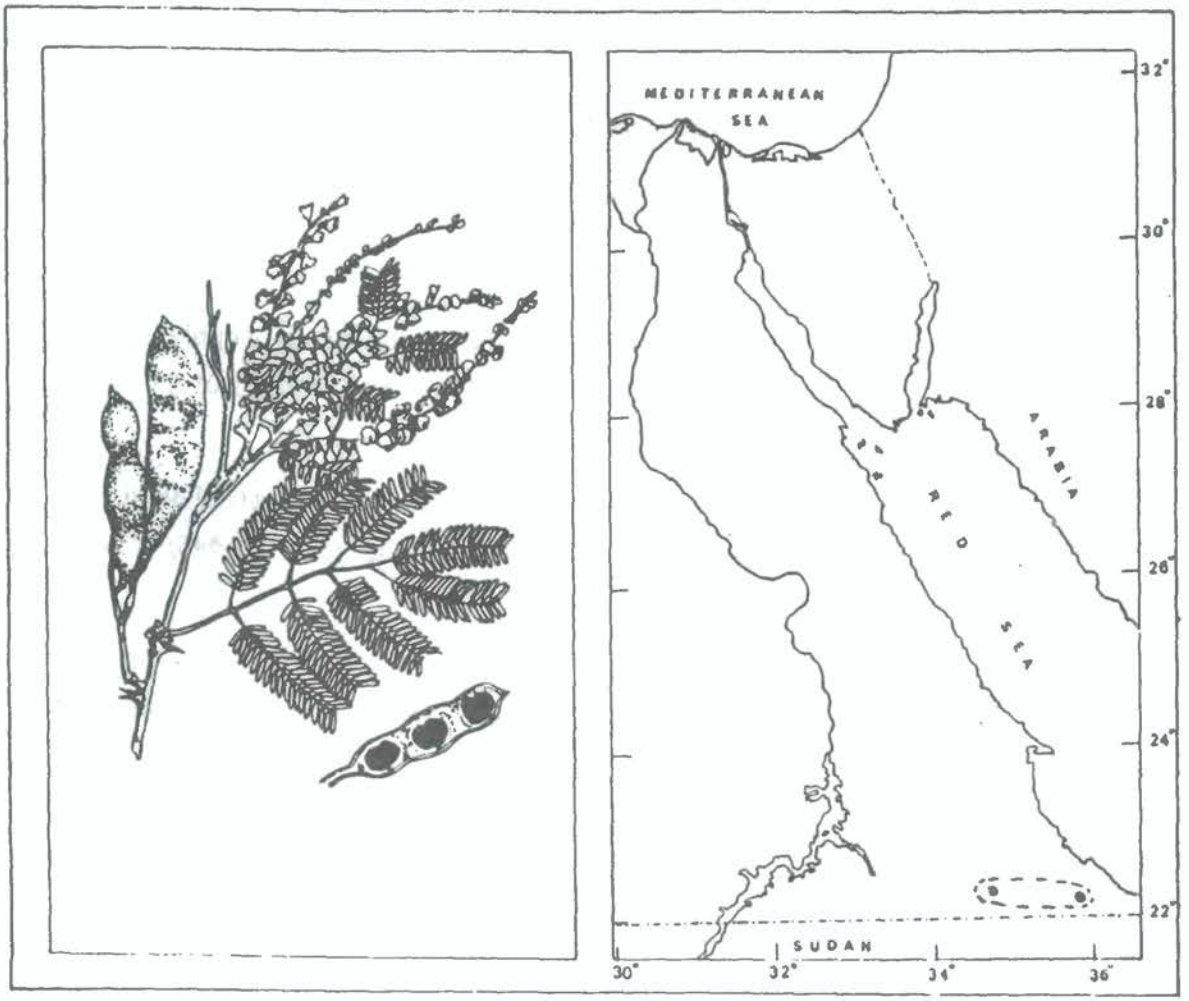
Sa. Gorge across Wadi Yahameib, 22.1.1962, *Tackholm et al.* 330 (CAI); Gebel Elba, 16.II.1967, *Osborn & Helmy* s.n. (CAI) Wadi Kansisrob, 24.I. 1933, *J.R. Shabetai* s.n. (K); Bir Kansisrob, 3.II.1962, *Tackholm et al.* 1266 (CAI); Slope hill of Wadi Aideib, 8.II.1962, *Tackholm et al.* 1876 (CAI); Wadi Aak, 27.I.1962, *Tackholm et al.* s. n. (CAI); Bir Shallal, 24.I.1962, *Tackholm et al.* 512 (CAI).

R Gebel Hamata, Red Sea coast, 7.II.1961, *Täckholm et al.* s.n. (CAI); Mersa halaib, 21.I.1929, *Täckholm et al.* s.n. (CAI).

52. Acacia asak (Forssk.) Willd., Sp. Pl. 4: 1077 (1805); Täckholm, Stud. Fl. Egypt ed. 2: 289 (1974); Lock, Legum. Africa: 63 (1989).

Mimosa asak Forssk., Fl. Aegypt-Arab.: 176 (1775).

Acacia glaucophylla Steud. ex A. Rich., Tent. Fl. Abyss. 1: 243 (1847); Täckholm, Stud. Fl. Egypt ed. 1: 323 (1956).



Large shrub or small tree, 0.5-3 m high. Stems brown or reddish brown, erect, terete, branched, prickles short, straight or slightly recurved. Leaves petiolate, pinnae 3-6 pairs; leaflets 12-20 pairs, nearly sessile, glabrous on both surfaces, blade oblong or oval-oblong, margin entire, apex obtuse. Flowers in axillary spikes, usually shorter than leaves. Calyx campanulate, with triangular teeth, glabrous. Corolla cream to white. Pods linear, flat with coriaceous valves, glabrous and transversly reticulate, slightly convex over each seed.

Flowering and fruiting: December - February

Vernacular name (Arabic): *Sant* (Täckholm, 1974) *Asak* اسك

Habitat and ecology: Nano-phanerophyte which grows in crevices of rocky wadi beds and feet of hills.

Distribution: Ethiopia and Somalia, eastwards to the Sudan, Saudi Arabia and Yemen.

Confined in Egypt to the wadis dissecting Gebel Elba massive.

Floristic category: Afro-Oriental and S. Arabian domains of the Sudano-Zambezian region.

Status: Indeterminate.

It was last seen in 1932 and 1933 by Drar who noted small populations of *Acacia asak* along the way from Gebel Elba to the Nile valley through Wadi Allaqi. The natives cut the trees for charcoal.

Conservation measures taken: Wadi El Allaqi was established as a protected area under the Egyptian Prime Ministerial decree No. 945/1989.
Cultivated in the Agricultural Museum garden (Giza).

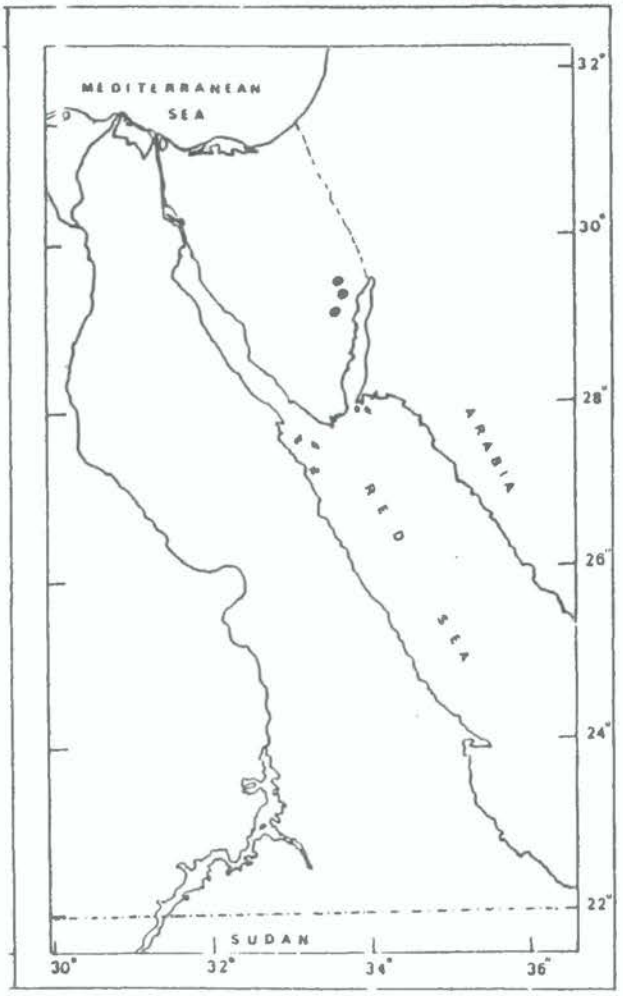
Conservation measures proposed: Search is required to determine accurately the population sites of *Acacia asak* and hence be wildlife sanctuaries.

Biology and potential value: The species is of scientific significance on account of its geographical distribution. Egypt seems to represent the northernmost limit of the species distribution in Africa.

No specimens seen by the writers from Egypt.

53. Acacia iraqensis Rech. fil. in Osterr. Akad. Wiss., Math.-Naturewiss. Kl., Anz. 101: 16 (1964); Greuter et al. in Med-Check. 4: 2 (1989).

Acacia gerrardi Benth. subsp. negevensis Zohary, Israel Jour. Bot. 13: 39 (1964); Townsend, Kew Bull. 21: 436 (1968); Täckholm, Stud. Fl. Egypt ed 2: 290 (1974); Danin et al. in Willdenowia 15: 291 (1985).



Shrup or small tree, up to 8 m tall. Stems erect, with reddish grey bark, terete, branched, young branches pubescent. Leaves petiolate, pinnae 2-7 pairs; leaflets 8-20 pairs; nearly sessile, pubescent on both surfaces; blade linear to oblong, margin entire, apex obtuse. Flowers in axillary heads. Calyx campanulate with triangular teeth. Corolla yellow, twice as long as calyx. Pod leathery falcate, rarely straight, mucronate, brown; valves puberulent with longtudinal nerves.

Vernacular name (Arabic): *Sant* (Täckholm, 1974)

Habitat and ecology: Nano-phanerophyte which grows on wadis of gravel plains.

Danin (1983) noted that our taxon in Sinai and Negev confined to the drainage systems of the Tertiary period. He believes that torrents may have transported seeds to the present tree sites.

Distribution: Fairly common in Negev (Zohary, 1927), recorded in Jordan and Kuwait; very rare in Iraq (Townsend, 1974); confined in Egypt to Eastern Sinai.

Floristic category: Middle Saharo-Sindian subregion.

Status: Vulnerable.

The natural rarity of the species can be related to its limited geographical distribution. Eastern Sinai seems to represent the southernmost limit of the taxon distribution. Its vulnerability can be related to severe cutting by natives, as a source of hard timber.

Conservation measures taken: N o n e

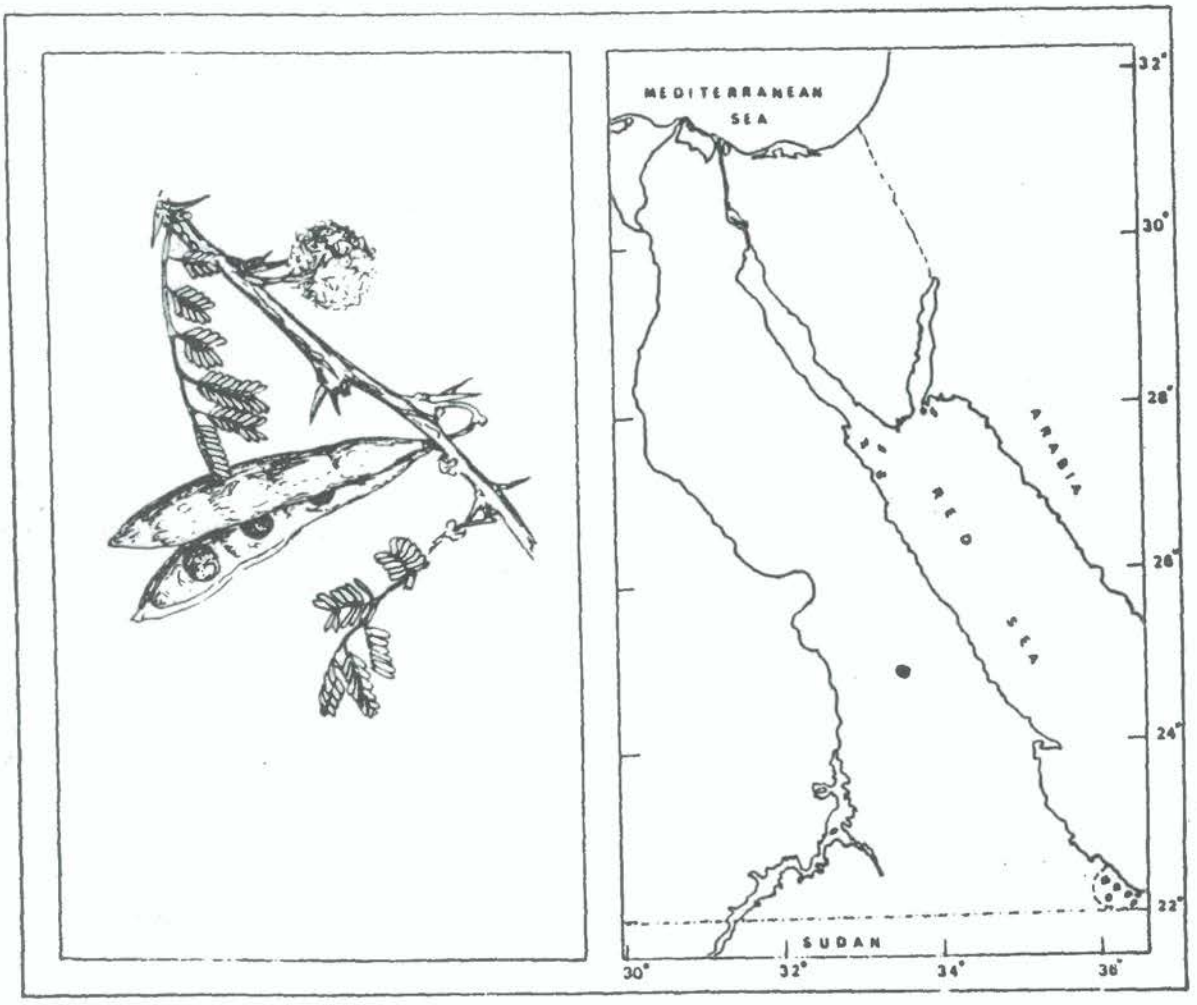
Consercation measures proposed: The sites of *Acacia iraqensis* in Wadi Abu-Tuweiya (El Kuntilla, E. Sinai) be wildlife sanctuaries. Cultivation in botanic gardens is recommended to protect the taxon.

Biology and potential value: This taxon is of considerable scientific interest on account of its limited geographical distribution in Egypt.

No specimens seen by the writers from Egypt.

54. Acacia nubica Benth., Lond. Jour. Bot. 1: 498 (1842); Boissier, Fl. Orient. 2: 637 (1872); Brenan in Hubbard & Redhead. F.T.E.A. (Mimosoideae): 129 (1959); Täckholm, Stud. Fl. Egypt ed. 2: 290 (1974).

A. orfota (Forssk.) Schweinf., Bull. Herb. Boiss. 4, app. II: 213 (1896).



Shrub 1-5 m tall. Stems erect, terete, branched from the base; branches covered with green bark below, pale grey to whitish or whitish green above. Leaves petiolate, pinnae (2-) 3-7 (-11) pairs; leaflets 5-16 pairs; sessile, ciliate to glabrous, blade narrowly elliptic, margin entire, apex obtuse. Flowers in heads on axillary pubescent peduncles. Corolla white, conspicuously pubescent outside. Pods straight or sometimes slightly curved, coriaceous, dehiscent, puberulous to pubescent, straw coloured to pale brown or grey-brown.

Flowering and fruiting: November - January

Vernacular name (Bishari) *Orfot*

Habitat and ecology Micro-phanerophyte which grows on coastal hills covered by surface sheets of sand.

Kassas and Zahran (1971) noted that our taxon is of a lower water requirement and has a limited distribution. It abounds in a few habitat types within the Elba district and dominates the north slopes of the coastal hills, but absent from the south slopes of the same hills.

Distribution: Tanzania, Uganda, and Kenya, northwards to Ethiopia, Somalia and the Sudan, then eastwards to Saudi Arabia and Yemen.
Very rare in Egypt and confined to the wadis dissecting Gebel Elba massive.

Floristic category: E. Sahelian, Afro-Oriental and S. Arabian domains of the Sudano-Zambezian region.

Status: Vulnerable.

Very small populations of this taxon exist in the wild. The bushes are often collected for feeding camels, and for its bast-fibre.

Conservation measures taken: Gebel Elba protected area.

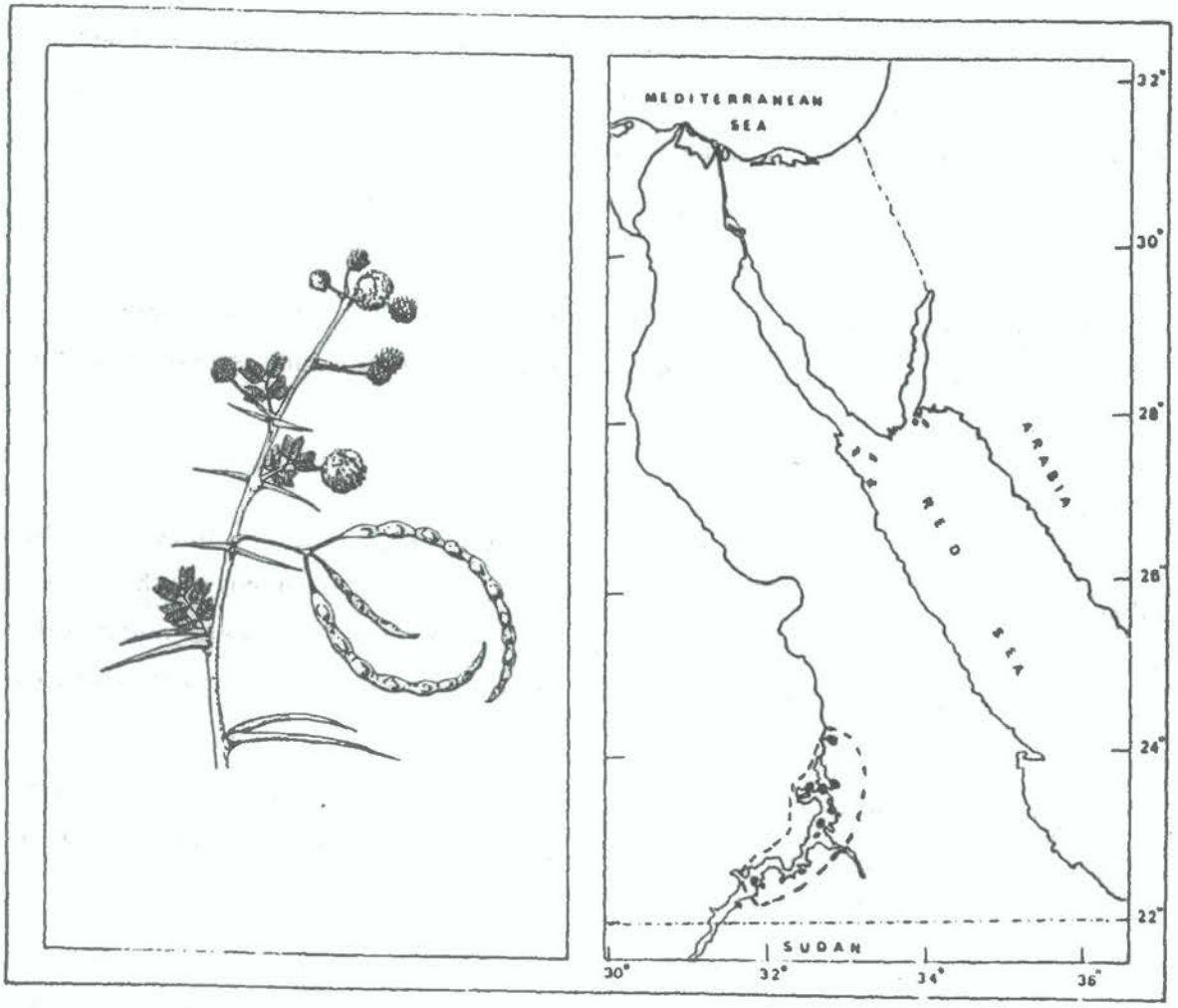
Conservation measures proposed: The tree sites in Wadi Akwamtra, Gebel Hadarba, Gebel Karam Elba (Gebel Elba region) be wildlife sanctuaries Cultivation in botanic gardens is needed to protect the plant.

Biology and potential value: The species is of considerable scientific interest as a member of a critical group relevant to studies of plant geography and taxonomy.

Specimens examined

Sa. Wadi Akwamtra, 19.II.1967, *Osborn & Helmy* s.n. (CAI), Wadi Yahameib, 22.I.1962, *Täckholm et al.* 264 (CAI); Gebel Elba, 21.III.1928, Khattab 6344 (K); Wadi Kansisrob, 25.I.1933, *J.R. Shabetai* 1885 (K); Wadi Saremtai, 9.II.1962, *Täckholm et al.* 1917 (CAI); Gebel Karam Elba, 1925-1926, *G.W. Murray* 3776 (K); Gebel Alafoot, 7.II.1962, *Täckholm et al.* 1634 (CAI); Gebel Hadarba, 1925-1926, *G.W. Murray* 3776 (K).

55. Acacia seyal. Del., Descr. Egypte, Hist. Nat.: 142, t. 52, Fig. 2 (1813-1814); Boiss., Fl. Orient. 2: 636 (1872); Boulos, Fedd. Repert. 73(3): 202 (1966); Täckholm, Stud. Fl. Egypt ed. 2: 290 (1974); Lock, Legum. Africa: 76 (1989); Greuter et al. in Med-Check. 4: 3 (1989).



A tall tree, up to 10 m high. Stems erect, stout, branched, covered with reddish-brown bark; stipular spines patent, ivorywhite with brown tips. Leaves petiolate; pinnae 3-9 pairs; leaflets 8-25 pairs; nearly sessile, glabrous on both surfaces; blade linear-oblong, margin entire, apex obtuse. Flowers in axillary pedunclate heads, appearing before the leaves. Calyx teeth short, obtuse. Corolla as long as calyx. Pods linear slightly curved, and constricted between the seeds, valves coriaceous, fruit split and remain on the tree.

Flowering and fruiting: November - January

Vaernacular name (Arabic): *Seyal* سيال

Habitat and ecology: Meso-phanerophyte which grows on humid silt terraces.

Distribution: Mauritania, Senegal, Mali, Niger, and Tschad, southeastwards to Uganda and Kenya, northwards to Ethiopia, Somalia, Eritrea and the Sudan; and eastwards to Saudi Arabia. Also recorded in Algeria.

Very rare in Egypt, confined to the southernmost parts of the Nile valley.

Floristic category: Sahelian, Afro-Oriental and S. Arabian domains of the Sudano-Zambezian region with extensions to West and Middle Saharo-Sindian subregions.

Status: Endangered.

The establishment of Nasser Lake of the Aswan High Dam resulted in the submerging of most of the trees in this area. Consequently, the small populations of *Acacia seyal* in Ballana and surroundings were completely inundated. Few trees are scattered in the Cataract Islands of Aswan (Boulos, 1966).

Conservation measures taken: Saluga and Ghazal Islands of the first Cataract, Aswan constitute a protected area under the Egyptian Prime Ministerial decree No. 928/1989.

Cultivated in Zoological garden, Giza.

Conservation measures proposed: Further survey is needed around Aswan to record any escaped individuals of *Acacia seyal* . The protection of its natural habitat, indeed, be encouraged.

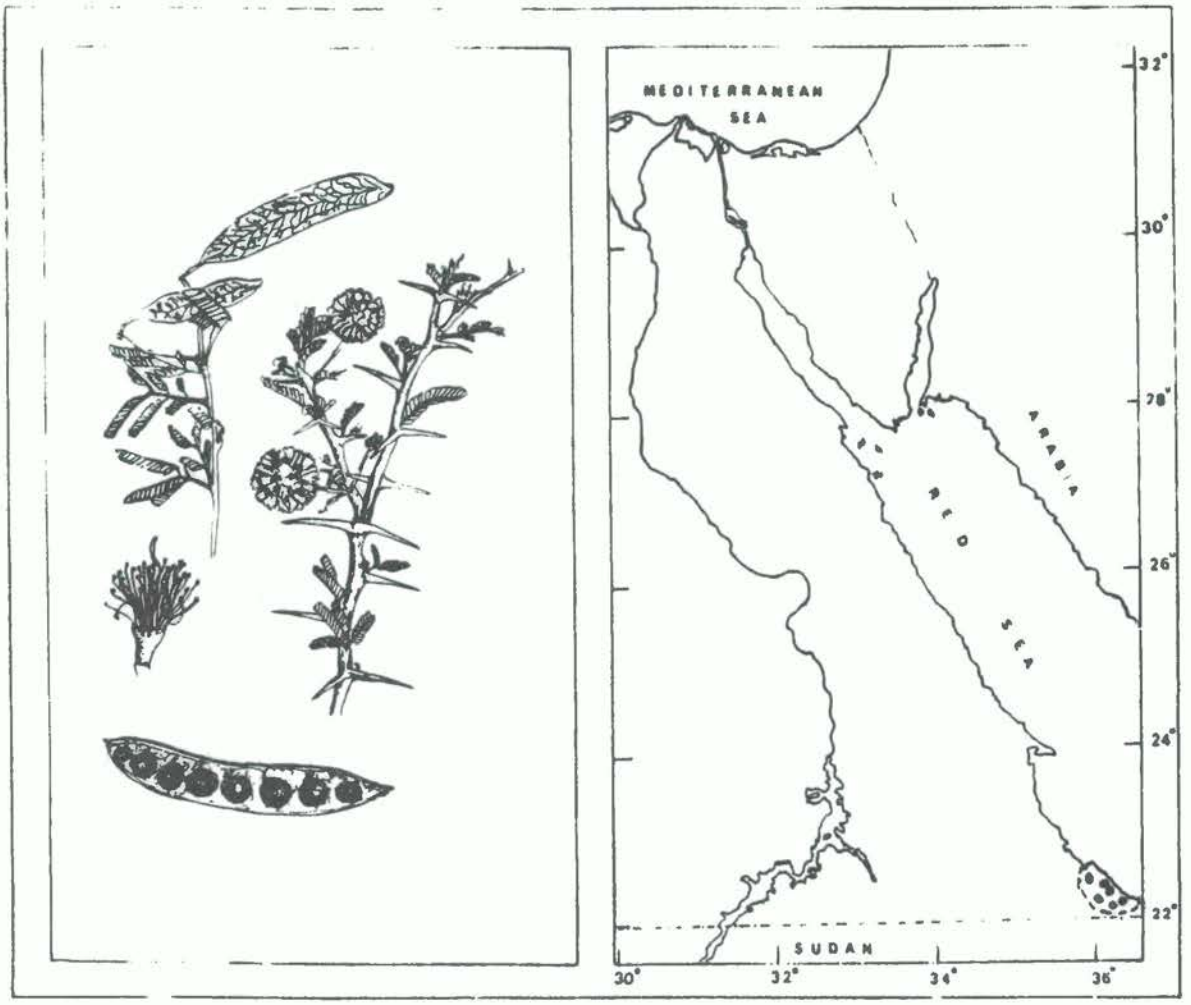
Biology and potential value:

The wood of *Acacia seyal* used as a fuel, but often mixed with the wood of *A. nilotica* for preparing charcoal. The fumes of burning wood are used as a cure for rheumatic pains.

Specimens examined

Nv. Aswan, II.1909, *Schweinfurth s.n.* (CAI); Aswan, 29.XI.1926, Drar 4227 (K); Shelil El Nil, 7.V.1882, *Schweinfurth s.n.* (K); *Aswan*, Saluga Island, 7.II.1943, *Davis* 6009B (K); Aswan, Siheil Island, 14.II. 1927, *Simpson* 4432 (K); South east of elephantine, 15.II.1927, *Simpson* 4453 (K); Aswan Dam, W. Nile, 8.XII.1964, *L. Boulos s.n.* (CAI); Nubia, (Ballana), Nag El Amiria, 25.XII.1963, *L. Boulos s. n.* (CAI); Abu Simbel (on the Nile bank), 4.IV.1931, *J.R. Shabetai* 21621 (K).

56. **Acacia etbaica** Schweinf. Linnaea 35: 330, Fig. 7, 8 (1867); Brenan in Hubbard & Redhead, F.T.E.A. (Mimosoideae): 114 (1959); Täckholm, Stud. Fl. Egypt ed. 2: 291 (1974); Lock, Legum. Africa: 67 (1989).



Shrub or small tree, with rounded crown, covered with rough, brown, fissured bark. Branchlets glabrescent, stipular spines short, hooked or straight. Leaves petiolate, pinnae 3-6 pairs, leaflets 10-30 pairs per pinnae; nearly sessile, glabrous on both surfaces; blade oblong, margin entire, apex obtuse. Flowers in panicles. Peduncles 2-5 in each axil. Pods straight or slightly curved, red-brown, glossy, Linear-oblong, longtudinally veined, apex acuminate.

Flowering and fruiting: D e c e m b e r - F e b r u a r y (Arabic)

Vernacular name (Bishari): Arad (Täckholm, 1974), Qaradh

Habitat and ecology: Nano-phanerophyte which grows on rocky slopes at higher altitudes.

Distribution: Tanzania, Kenya and Uganda, northwards to Ethiopia, Somalia and the Sudan, then eastwards to Saudi Arabia and Yemen.

Confined in Egypt to the mountains of Elba region.

Floristic category: E. Sahelian, Afro-Oriental and S. Arabian domains of the Sudano-Zambezian region.

Status: Vulnerable.

The natural rarity of the species can be related to its limited geographical distribution. Gebel Elba area seems to be its northermost limit in Africa.

Acacia etbaica has weaker thorns than other *Acacia* species and is readily eaten by camels and goats. The trees are cut down for the use of its leaves in leather tanning.

Conservation measures: Gebel Elba protected area. Cultivated in the Agricultural Museum Garden.

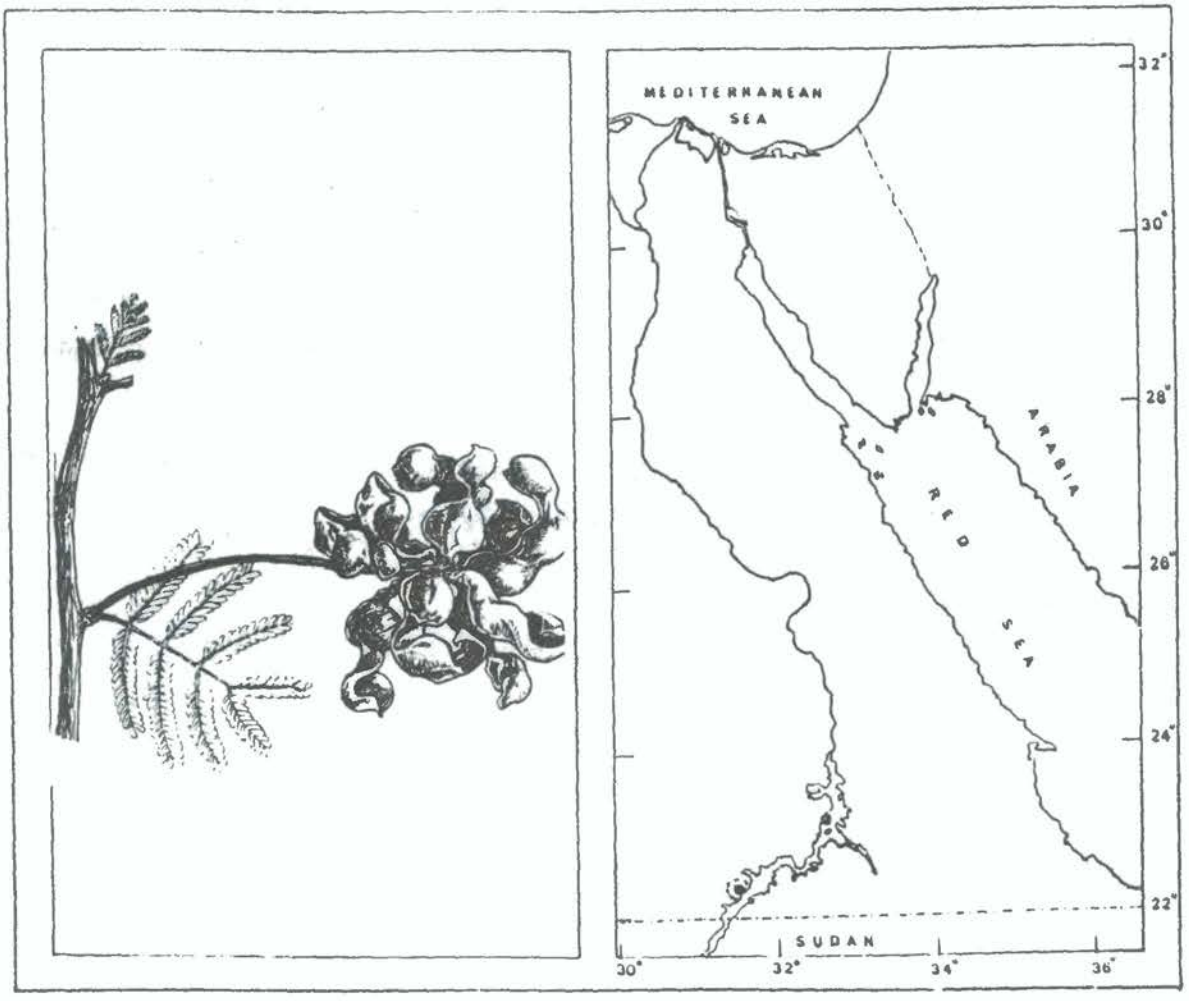
Conservation measures proposed: The sites of *Acacia etbaica* in wadi Simtit, Wadi Akwamtra, and Wadi Yahamib (Gebel Elba) be wildlife sanctuaries.

Biology and potential value: The tree is a source of good hard timber.

Specimens examined

Sa. Wadi Siamtit, 23-I-1962, *Täckholm et al.* 356 (CAI); Wadi Akwamtra, 27-II-1967, *Osborn & Helmy s.n.* (CAI); Khor Wadi Yahameib, 22-I-1962, *Täckholm et al.*227 (CAI); Wadi Akau, 27-X-1956, *L. Boulos s. n.* (CAI); Gebel Elba, 21-III-1928, *Khattab* 6347 (K); Gebel Elba, 26-I-1933, *J.R. Shabetai*1520 (K); Wadi Aideib, 21-I-1962, *Täckholm et al.*108 & 153 (CAI); Khor across Gebel Shallal, 24-I-1962, *Täckholm et al.*426 (CAI).

57. **Dichrostachys cinerea** (L.) Wight et Arn. Prod. Fl. Ind. Or.: 271 (1834); Boulos, Fedd. Reper. 73(3): 204 (1966); Täckholm, Stud. Fl. Egypt ed. 2: 291 (1974); Lock, Legum. Africa: 89 (1989); Greuter et al. in Med-Check. 4: 87 (1989).



Shrub up to 1 m high. Stems erect, terete, branched; branches slightly hairy, armed with sharp woody spines. Leaves bipinnate, petiolate; pinnae 7-15 pairs with a single gland between each pair; leaflets 15-40 pairs, glabrous on both surfaces; blade linear to oblong, margin entire, apex obtuse. Flowers in pendulous spikes on long peduncles, each spike 2-coloured, at the base sterile flowers, each with 10-hair-like mauve of pink staminodes; upwards fertile flowers with 10 short yellow stamen and pistil. Pods in twisted clusters, dark brown, sparingly hairy, 4-seeded.

Flowering and fruiting: December - January

Vernacular name: N o t k n o w n

Habitat and ecology: Nano-phanerophyte which grows on Nile banks.

Distribution: A widespread species, recorded in Tropical Africa, and extending eastwards through Tropical Asia to Indonesia; also known in Australia.

Floristic category: Sudano-Zambezian region with extension to Indo-Malaysian region.

Status: Extinct.

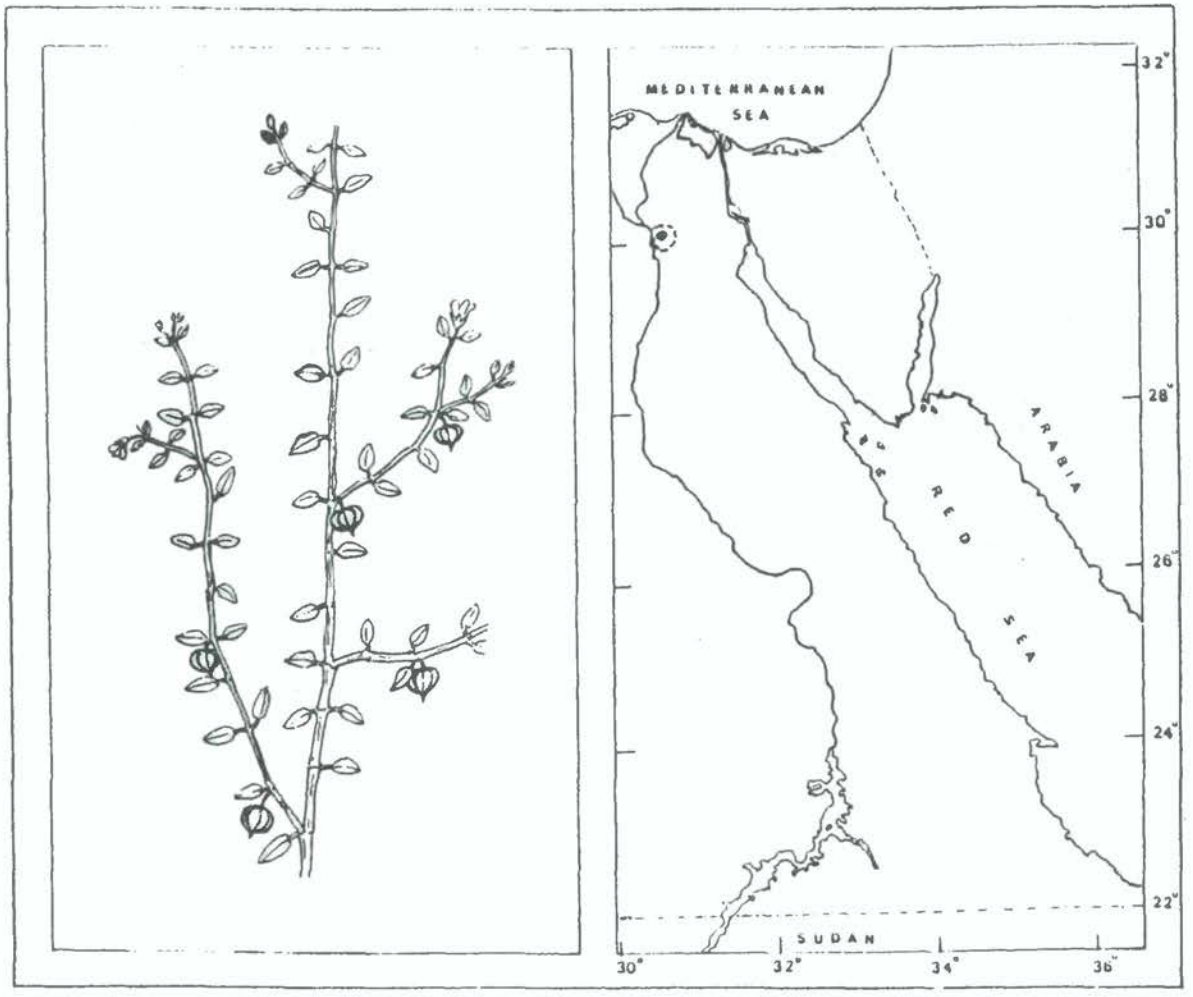
This species was known from a single locality, Nubia, El Ballana (Boulos, 1966); the establishment of Lake Nasser behind the Aswan High-Dam resulted in covering this site by water, and consequently the complete disappearance of vegetation of the area.

Biology and potential value: The plant is of scientific interest as being the only representative of the genus in Egypt.

Specimens examined

Nv. Nubia, Banha, Ballana, 8.I.1964, *L. Boulos s. n.* (K & CAI).

58. **Fagonia taeckholmiana** Hadidi, Candollea 21: 29, Fig. 7A (1966); Täckholm, Stud. Fl. Egypt ed. 2: 304, pl. 98B (1974).



Spineless, pale green shrublets. Stems procumbent or ascending, terete and striate, branched. Leaves unifoliate, short petioled; blade narrowly ovate-lanceolate, margin entire, apex mucronate. Flowers solitary, axillary, pedicellate. Sepals ovate, acute, glandular. Petals rose coloured. Capsule pyramidal, 5-carpelled, hairy.

Vernacular name: Not known

Habitat and ecology: Chamaephyte which grows on sandy desert plains.

Distribution: Only known from type locality (Heliopilis desert, near Cairo).

Floristic category: Endemic

Status: Extinct.

Known only from type locality (Helioplis desert), where it was recorded in 1952. At present, the area is under heavy industrial activity and the establishment of Nasr twon.

The species has been searched for repeatidly in the type locality and similar sites, without success.

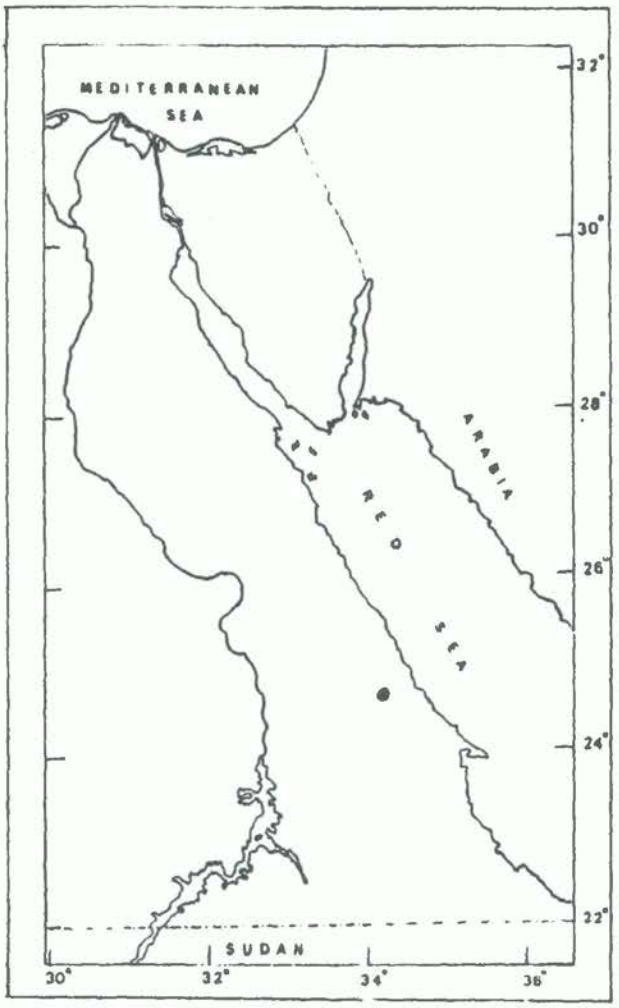
Biology and potential value: The species is important to studies of plant geography and evolution.

Specimens examined

Heliopilis desert, 15.VIII.1952, *Hadidi s.n.* (CAI).

59. Fagonia tenuifolia Steud. & Hochst. ex Boiss., Fl. Orient. 1: 909 (1867); Täckholm, Stud. Fl. Egypt ed. 2: 307 (1974).

F. bischarorum Schweinf., Bull. Herb. Boiss. 7: 276 (1899); El Hadidi, Candollea 21: 40 91966).



Spiny shrublet, up to 30 cm high. Stems erect or ascending, much branched, angular, terete and striped. Branches slender, spreading, forked. Leaves mostly 3-foliolate, petioled, blade linear, margin entire, apex mucronate, the lateral leaflets shorter than the middle one. Flowers solitary, axillary, pedicellate. Sepals ovate, acute, glabrous. Petals rose coloured. Capsule conical adpressed hairy.

Flowering and fruiting: D e c e m b e r - F e b r u a r y

Vernacular name: N o t k n o w n

Habitat and ecology: Chamaephyte which grows in crevices of rocky outcrops.

Distribution: Southern Arabian Desert in Egypt, those deserts on the same latitude in Arabia and Central Sahara.

Floristic category: Saharo-Sindian region.

Status: Endangered.

Clearing of vegetation along the Red Sea coast to establish touristic centres is responsible for disturbing the small populations of *F. tenuifolia* which were last seen in 1961.

Conservation measures taken : N o n e.

Conservation measures proposed: Further investigations are needed to determine exactly the sites of *Fagonia tenuifolia* along the Red Sea coast, and hence be wildlife sanctuaries.

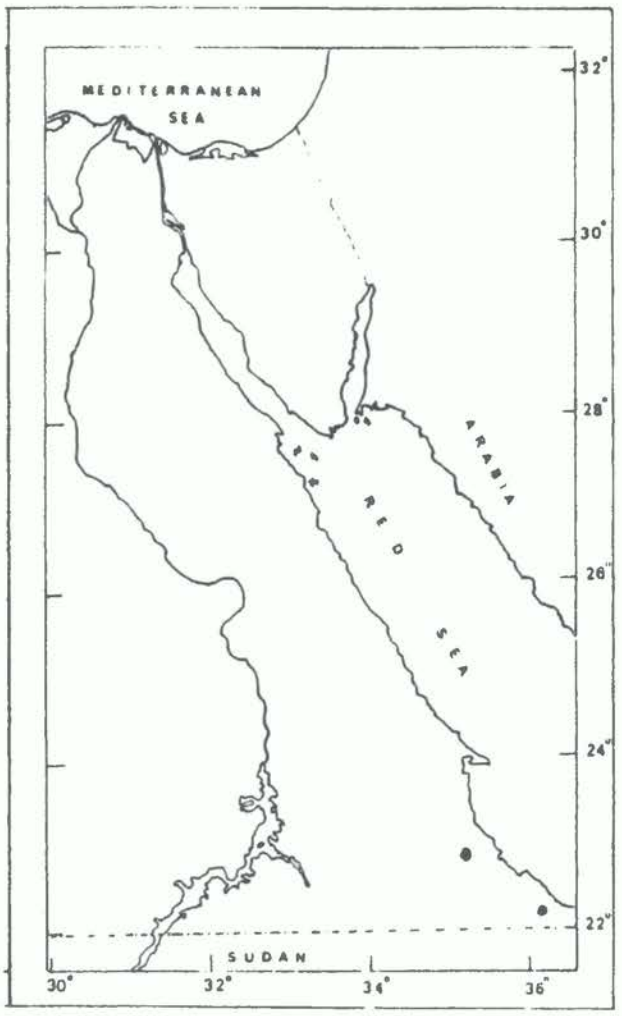
Biology and potential value: The species is of considerable interest being a member of the ancestoral stock of the genus *Fagonia*.

Specimens examined

Dg. Sudlich Wadi Asher, 1877, *Schweinfurth* 223 (K).

R. Red Sea coast, Gebel Hamata, 7-II-1961, *Täckholm et al.*444 (CAI).

60. Fagonia isotricha Murbeck, Acta Reg. soc. Physiogr. Lund 8: 54 (1897); Täckholm, Stud. Fl. Egypt ed. 2: 306 (1974).



Spiny viscid shrublet, up to 30 cm, covered entirely with sparse trichomes. Branches erect or suberect, terete and striate. Leaves mostly 3-foliolate, petiolate; blade broadly ovate to narrowly lanceolate, margin entire, apex mucronulate. Flowers solitary, axillary, pedicellate. Sepals ovate-lanceolate, glandular. Petals rose coloured. Capsule pyramidal, hairy and glandular, on refluxed glandular peduncle.

Flowering and frutiing: December - February.

Vernacular name (Arabic): *Shoka'a*

Habitat and ecology: Chamaephyte which grows on rocky wadi beds.

Distribution: Widely spread through the N. African Sahara, westwards to the Cape Verde Islands, also known from the Sudan, Somalia, Ethiopia, along the coasts of SW Africa, and Tropical E. Africa.

Floristic category: West and Middle Saharo-Sindian subregions with extensions to the Sudano-Zambezian region.

Status: Rare.

Fagonia isotricha is not under immediate threat but the populations scattered along the Red Sea coast are highly depleted. Those among the rocks of Gebel Elba massive, are relatively protected from human impact.

Conservation measures taken: Gebel Elba protected area.

Conservation measures proposed: Further investigations are needed to determine another populations of *F. isotricha* , and hence be wildlife sanctuaries.

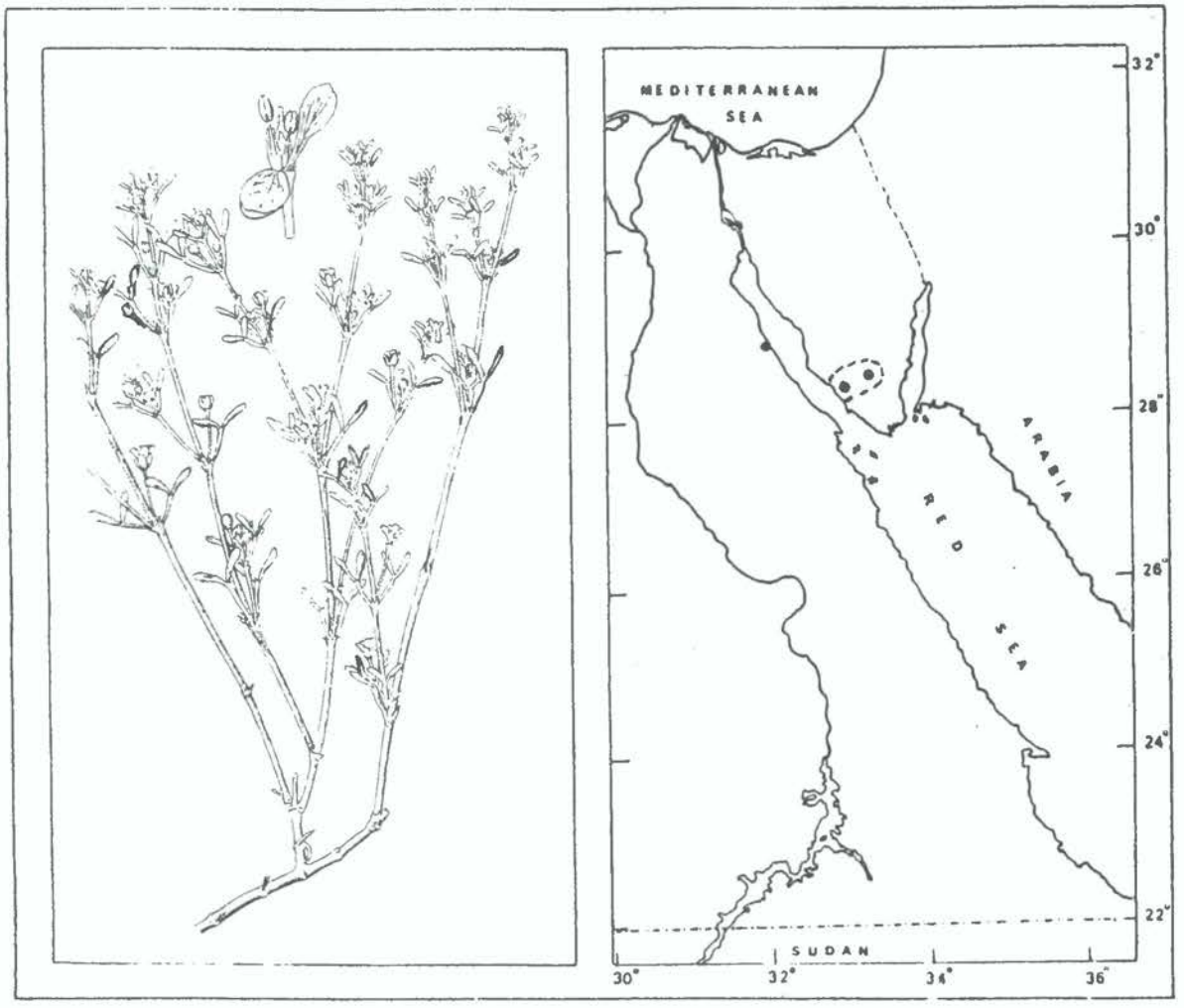
Biology and potential value: The species is of scientific interest being a member of the ancestoral stock of the genus *Fagonia*.

Specimens examined

R. Wadi Samiuki, Red Sea coast, 6.II.1961, *Täckholm et al. s.n.* (CAI); Gebel Hamata, 6.II.1961, *Täckholm et al.* 329 (CAI).

Sa. Wadi Merakwan, at the northern ends, 5.III.1963, *Abdallah* 1325 & 1365 (CAI).

61. Zygophyllum propinquum Decne., Ann. Sci. Nat. ser. 2, 3: 283 (1835); Täckholm, Stud. Fl. Egypt ed. 2: 309 (1974); Hadidi, Bot. Notiser 131: 442 (1978).



Shrub up to 75 cm high. Stems ascending, slender, dichotomously branched, glandular, yellowish green. Leaves petiolate; leaflets in a single pair, sessile, fleshy, white-pubescent; blade cylindrical, margin entire, apex obtuse. Flowers solitary, axillary, pedicellate. Sepals ovate, obtuse glabrous. Petals white. Capsule obconical or cylindrical, glabrescent.

Flowering and fruiting: F e b r u a r y - A p r i l

Vernacular name (Arabic): *Khreiza* (Täckholm, 1974)

Habitat and ecology: Chamaephyte which grows on saline sandy soil.

Distribution: Saudi Arabia, Kuweit, Jordan and Iraq, eastwards to Iran, Afghanistan and Pakistan.

Very rare in Egypt, recorded from S. Sinai and Red Sea coast.

Floristic category: Middle Saharo-Sindian subregion with extensions to Irano-Anatolian province.

Status: Vulnerable.

The extreme rarity of the species can be related to its limited geographical distribution, which represents its westernmost limit. The small populations scattered along Aqaba Gulf (Sinai) is greatly depleted due to the establishment of touristic centres around Dahab.

Conservation measures taken: The species was listed by El Hadidi (1979) among the threatened plants of Egypt.

Conservation measures proposed: The population sites of *Zygophyllum propinquum* in Wadi Mahlaq (St. Catherine-Dahab road, S. Sinai) be wildlife sanctuaries.

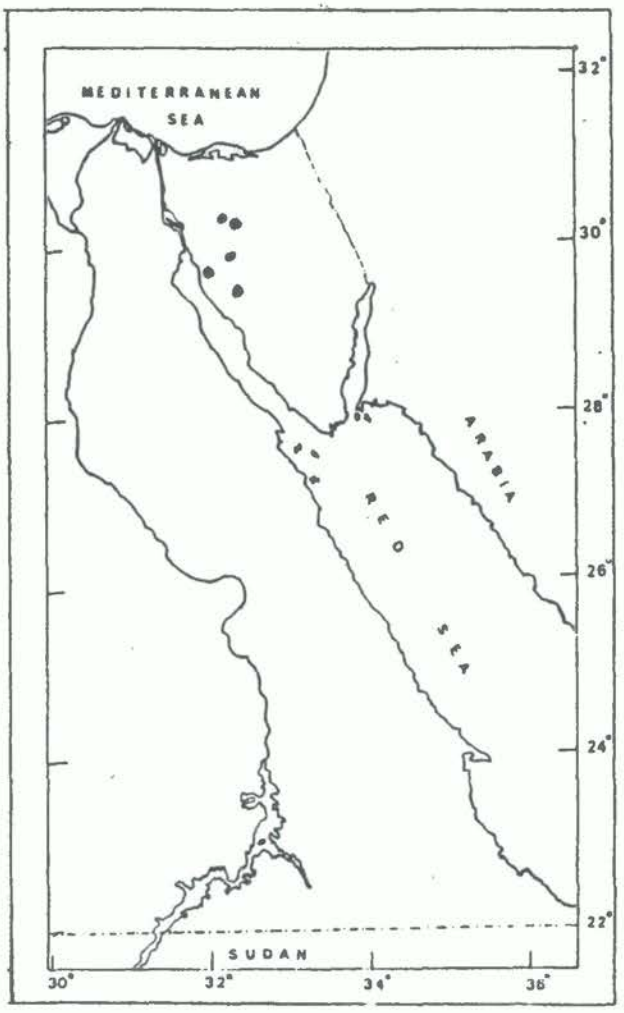
Biology and potential value: It is one of the most resistent species to salinity.

Specimens examined

S. Environs de Tor, VI-1832, Bove 172-173 (K); Circa El Tor, IV-1836, Bove 274 & 275 (K).

R. Ghobet El Bose, 20-IV-1976, *El Hadidi & Hosni s. n.* (CAI); Wadi Mahlaq (Dahab-Catherine road), 9-V-1982 s.n. (CAI).

62. Zygophyllum dumosum Boiss., Diagn. Pl. Orient. ser. 1, 2(8): 125 (1849); Boiss., Fl. Orient. 1: 911 (1867); Hadidi in Täckholm, Stud. Fl. Egypt ed. 2: 311 (1974); Hadidi, Bot. Notiser 131: 443 (1978); Danin et al. in Willdenowia 15: 307 (1985).



Woody shrub, up to 75 cm high. Stems ascending, angular, intricately branched, appressed canescent. Leaves petiolate; leaflets in a single pair, sessile, fleshy, hairy; blade cylindrical, margin entire, apex obtuse. Flowers solitary, axillary, pedicellate. Sepals oblong, obtuse, hairy. Petals white. Capsule globular with 5-undulate wings.

Flowering and fruiting: F e b r u a r y - A p r i l

Vernacular name (Arabic): *Qallam*

Habitat and ecology: Chamaephyte which grows on fissured limestone and on outcrops, slopes or wadi beds. Several populations were recorded in Gebel El Maghara (N. Sinai).

According to Zohary (1973), the shrubs of *Zygophyllum dumosum* may attain an age of 200-300 years, which is related to the plant adaptation to seasonal and annual changes in rainfall.

Distribution: Endemic to Jordan, Palestine, and the Isthmic Desert (N. Sinai).

Floristic category: Middle Saharo-Sindian subregion.

Status: Vulnerable.

The species rarity can be related to its limited distribution (Sinai). The plant grows on limestone rocks which contain several elements which are not present in magmatic rocks. Grazing by camels disturbs the small populations of the species.

Conservation measures taken: N o n e

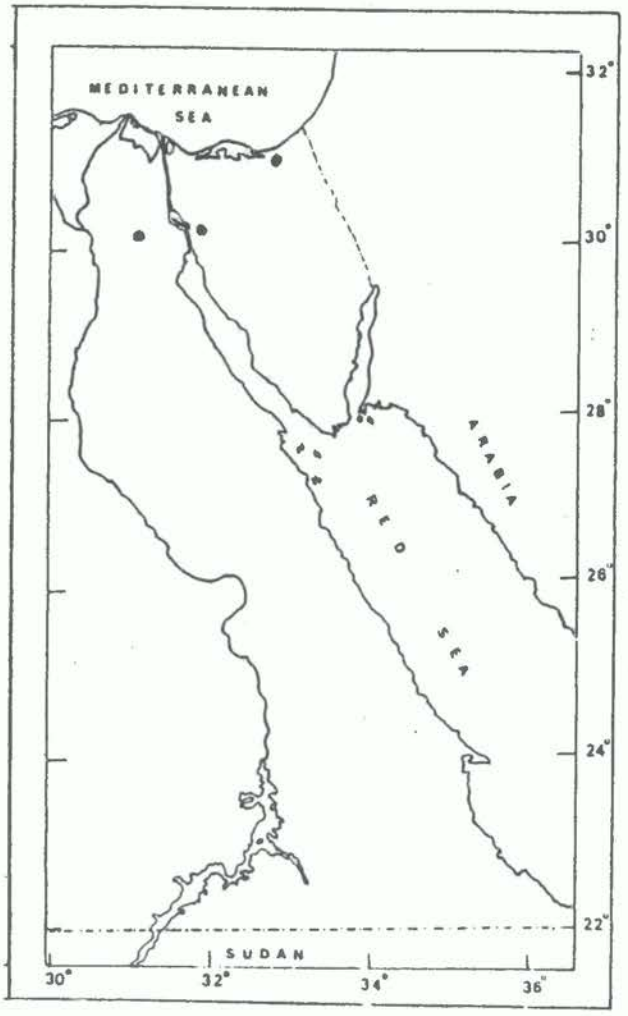
Conservation measures proposed: Gebel El Maghara, Gebel Halal, and Gebel Libni (N. Sinai) be nature reserves.

Biology and potential value: Due to the longevity of the shrub and the durability of the wood, the older specimens and remaining dead parts are likely to be of great value to dendrochronological studies.

Specimens examined

Di. Ras Sudr, Wadi Sudr, 8-II-1981, *M. Kassas s.n.* (CAI); Wadi gharandal 14-V-1956; *El Hadidi* s.n. (CAI); Wadi Hammamat Faaron, 15-V-1956, *Täckholm* 259 (CAI); North Sinai, branch of Wadi El Maghara, 22-IV-1959, *Boulos* s.n. (CAI); Gebel El Maghara, 24-IX-1987, *A.G. Fahmy* 612 & 626 (CAI).

63. Zygophyllum fabago L. Sp. Pl.: 385 (1753); Boiss., Fl. Orient. 1: 913 (1867); Hadidi in Täckholm, Stud. Fl. Egypt ed. 2: 311 (1974); Hadidi, Bot. Notiser 131: 440 (1978).



Perennial shrublet, up to 100 cm high. Stems erect, slender, somewhat fleshy, glabrous and green Leaves petiolate; leaflets sessile, coriaceous, glabrous on both surfaces; blade broadly ovate and flattened, margin entire, apex obtuse. Flowers solitary, axillary, pedicellate. Sepals oblong-obovate with hyaline margin, obtuse glabrous. Petals pink. Capsule pod-like, glabrous.

Vernacular name: Not known

Habitat and ecology: Chamaephyte which grows on wet saline soil.

Distribution: Jordan, Palestine, and Syria eastwards to Iraq and Iran. In Egypt, the species was recorded from the Eastern Desert and El Arish (N. Sinai).

Floristic category: Middle Saharo-Sindian subregion and Mesopotamian province of the Irano-Turanian region.

Status: Extinct.

Zygophyllum fabago was previously recorded in Egypt from Wadi Digla and Wadi Rishd Helwan (S. Cairo). At present the localities are well-established cities including factories and laboratories.

Biology and potential value: The species is of scientific significance on account of its morphological characters, since it posses flattened, obovate leaflets, which is almost fleshy and cylindrical in the genus.

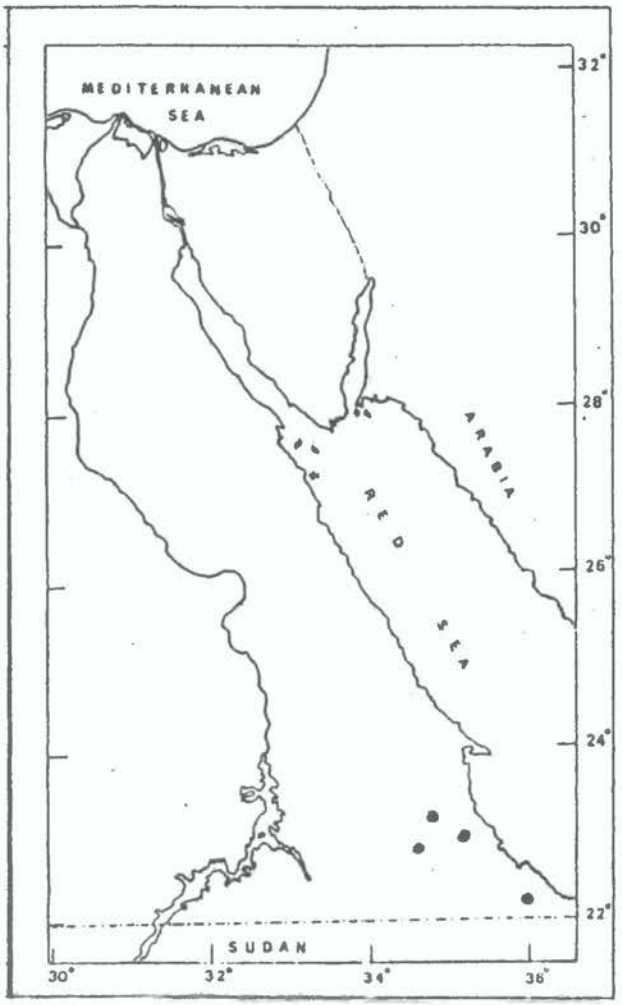
Specimens examined:

No collections seen in the present investigation, those qouted by El-Hadidi (1978) are:

Dg. Desert a loin du Caire, 27.I.1831 (Fl); Desert between Cairo and Suez, 1867, *Figari* (Fl).

Di. Mountains deserts, salt spring along Suez, eastwards in El Arish and Ghaza, 1876, *Figari* (Fl).

64. Chrozophora brocchiana Vis. Pl. Qaed. Aeg. Nub.: 39, t. 8, Fig. 2 (1836); Täckholm, Stud. Fl. Egypt ed. 2: 316 (1974); Greuter et al. in Med-Check, 3: 205 (1986).



Perennial shrub, up to 100 cm tall; branches more or less erect, terete and stout, woolly tomentose. Leaves petiolate, stellate hairy on both surfaces; blade rhomboid or ovate, margin undulate, apex obtuse. Flowers in spike-like racemes, male flowers numerous, upwards; female flowers few, below. Sepals narrowly lanceolate, acute, stellate-tomentose. Petals pale yellow. Capsule 3-sulcate, covered with scales and tubercled.

Flowering and fruiting: August - October

Vernacular name (Ababdi): *Neeli* (Drar, 1936).

Habitat and ecology: Chamaephyte which grows on fixed sand of the wadi beds, where the water table is near the surface (White, 1983).

Distribution: Mauritania and Algeria, eastwards to Tschad and the Sudan.

Very rare in Egypt, confined to the southern parts of the Eastern Desert, Red Sea coast, and Gebel Elba massive.

Floristic category: Sahelian domain of the Sudano-Zambezian region with extnsions to Central and Eastern Saharo-Sindian subregions.

Status: Vulnerable.

The species natural rarity is related to its limited geographical distribution.

Egypt seems to be the its northernmost limit, the small populations of *C. brocchiana* scattered along the Red Sea coast is highly depleted due to the exploitation of the area for touristic settlements.

Conservation taken: Gebel Elba protected area.

Conservation measures proposed: The population sites of Gebel Hamra-Dom (34 30' N, 28 35' E) be wildlife sanctuaries. Cultivation in botanic gardens is another reliable method to protect the species.

Biology and potential value: *Chrozophora brocchiana* is a good sand binder, and is a reliable indicator that the water table in the area is near the surface.

Specimens examined

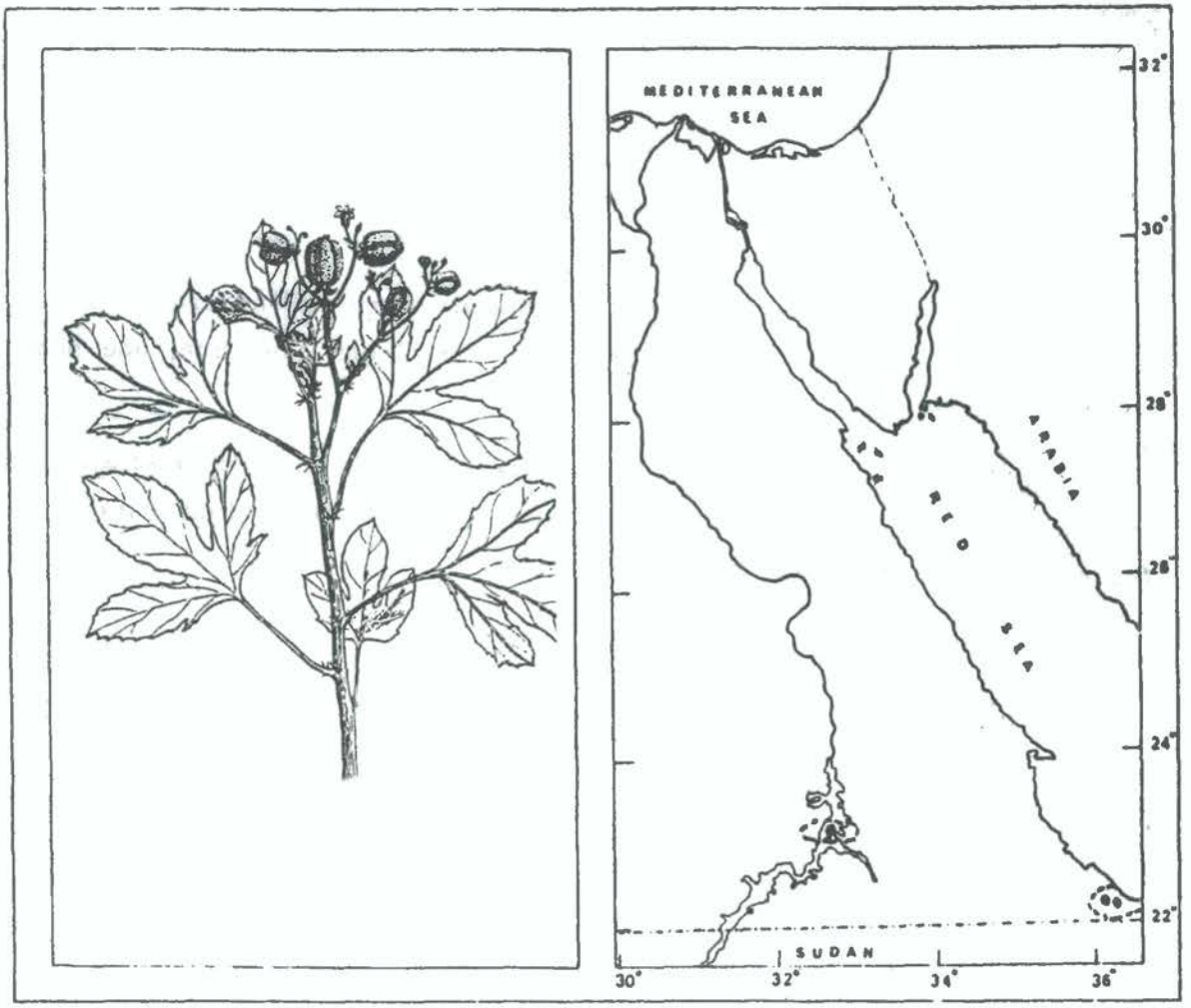
R. Between Gebel Hamra-Dom and Red Sea coast, 2.III.1967, *Osborn & Helmy s.n.* (CAI), El Shalatine, 21.X.1956, *Boulos s.n.* (CAI).

Da. Bir Abraque, 1925-1926, *G.W. Murray* 3762 (K); Wadi Abraq, I.1933, *C.E. Palmer* 194 (K); Wadi Allaqui, 6.III.1963, *Abdallah* 1338 (K).

Sa. Wadi Idib, 2.III.1967, *Osborn & Helmy s.n.* (CAI).

65. Jatropha glauca Vahl. Symb. Bot. 1: 78 (1790); Täckholm, Stud. Fl. Egypt ed. 2: 318, pl. 103 (1974).

J. lobata Muller-Argoviensis in DC., Prod. Syst. 15(2): 1085 (1866).



Woody undershrup, about 30 cm high. Branches terete, glabrous. Leaves long petioled, glaucous on both surfaces; blade obovate in outline and digitate to 3-5 lobes, margin dentate, apex acute. Flowers in few-flowered cymes, subsessile. Sepals ovate-lanceolate, acute, glabrous. Petals pale yellow. Capsule subglobose, rough-tubercled.

Flowering and fruiting: D e c e m b e r - F e b r u a r y

Vernacular name: N o t k n o w n.

Habitat and ecology: Chamaephyte which grows in crevices of hard rocks.

Distribution: Ethiopia and Somalia, northwards to the Sudan and eastwards to Saudi Arabia and Yemen.

Very rare in Egypt and recorded from Cataract Islands of Aswan and Gebel Elba massive.

Floristic category: Afro-Oriental, Sahelian and S. Arabian domains of the Sudano-Zambezian region.

Status: Endangered.

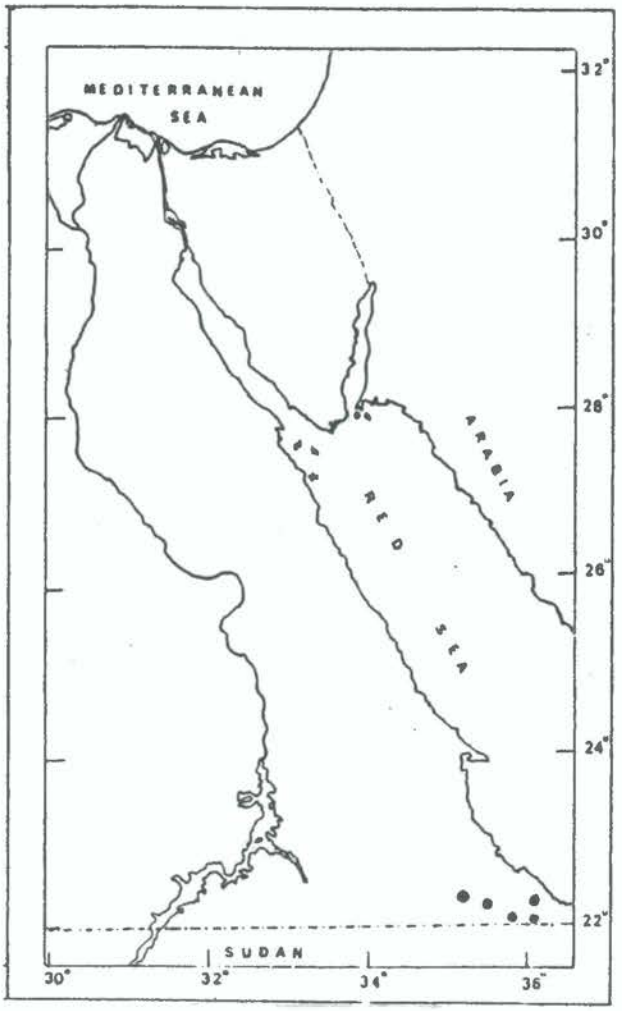
Conservation measures taken: Gebel Elba protected area.

Conservation measures proposed: Further investigations are needed to determine the population sites of *J. glauca* in Gebel Elba area, and hence be wildlife sanctuaries.

Biology and potential value: Our taxon is the only representative of the genus in Egypt, so its extinction means the complete disappearance of the genus from the flora of the country.

66. Securinega virosa (Roxb. ex Willd.) Baill., Adansonia 6: 334 (1865-1866); Täckholm, Stud. Fl. Egypt ed. 2: 318 (1974).

Phyllanthus virosus Roxb. ex Willd., Sp. Pl.: 578 (1805).



Shrub, up to 100 cm tall. Stems erect, terete or angular, branched, glabrous. Leaves petiolate, glabrous on both surfaces; blade elliptic or obovate, margin entire, apex obtusely pointed or emarginate. Flowers in axillary fascicles, pedicellate. Sepals obovate-oblong, acute, glabrous. Petals creamy yellow. Capsule depressed globose with persistent styles, glabrous.

Flowering and fruiting: D e c e m b e r - F e b r u a r y

Vernacular name (Bishari): *Na'ayit hindeeb* (Täckholm, 1974).

Habitat and ecology: Chamaephyte which grows on the upstreams or rocky wadi beds.

Distribution: Senegal to Nigeria and eastwards to Somalia and southwards through E. Africa to Kenya. Widely distributed in the southern provinces of the Sudan (Wickens, 1976); also known in Arabia, Malay penisula, and Philipines.

Floristic category: Palaeotropical.

Status: Vulnerable.

The extreme rarity of the species can be related to its limited geographical distribution. Gebel Elba area seems to be the northernmost limit in Africa. Overgrazing by Camels is another causative of the species decline and vulnerability.

Conservation measures taken: Gebel Elba protected area. It has been cultivated in Zoological gardens (Giza) since 1956.

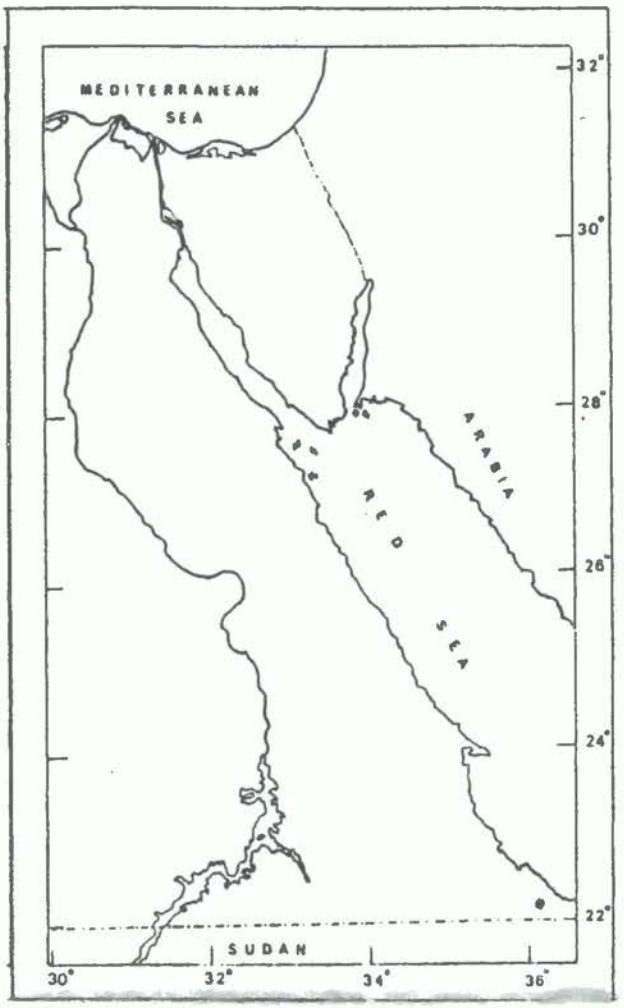
Conservation measures proposed: The population sites of *Securinega Virosa* in Wadi Yahameib, W. Merakwan and Gebel Shallal (Elba region) be wildlife sanctuaries.

Biology and potential value: That species is the single representative of *Securinega* in Egypt, and its extinction means complete disappearance of the genus from Egypt.

Specimens examined

Sa. Khor Wadi Yahamieb, 22-I-1962, *Täckholm et al.* 217 (CAI); Wadi Haikwal, 17-IX-1938, Drar 133/1936 (K); Up stream part of Wadi Mawaw, 28-I-1962, *Täckholm et al.* 1043 (CAI); Wadi Darawein, 29-I-1933, *J.R. Shabetai* F 1610 (K); Gebel Shallal, 24-I-1962, *Täckholm et al.* Wadi Merakwan, 10-II-1962, *Täckholm et al. s.n.* (CAI).

67. **Phyllanthus reticulatus** Poir. in Lam., Encycl. Bot. 5: 298 (1804); Täckholm, Stud. Fl. Egypt ed. 2: 318 (1974); Zohary et al. in Consp. Fl. Orient. 2: 17 (1983).



Small tree or shrub, up to 100 cm tall. Stems erect, terete, much branched, pubescent, at length nearly glabrous. Leaves somewhat membranous petiolate, glabrous or sparingly pubescent on both surfaces; blade oblong or elliptic, margin entire or slightly crisped, apex rounded obtuse. Flowers monoecious, in clusters of three male and one female in each fascicle, pedicellate. Sepals 5, ovate-elliptic, obtuse to subacute, glabrescent. Petals absent. Capsule black, fleshy when ripe.

Flowering and fruiting: December - February

Venacular name: N o t k n o w n.

Habitat and ecology: Chamaephyte which grows on rocky slopes and wadi beds.

Distribution: Siera Leone and Cameroon, eastwards to Somalia and southwards to SW AFrica. It is widespread throughout the Sudan, also known in Madagascar, S. Asia and Australia.

Very rare in Egypt, and confined to Gebel Elba area.

Floristic category: Palaeotropical.

Status: Endangered.

The populations of the species from Gebel Elba tend to be very small, and are particularly susceptible to grazing.

Conservation measures taken: Gebel Elba protected area.

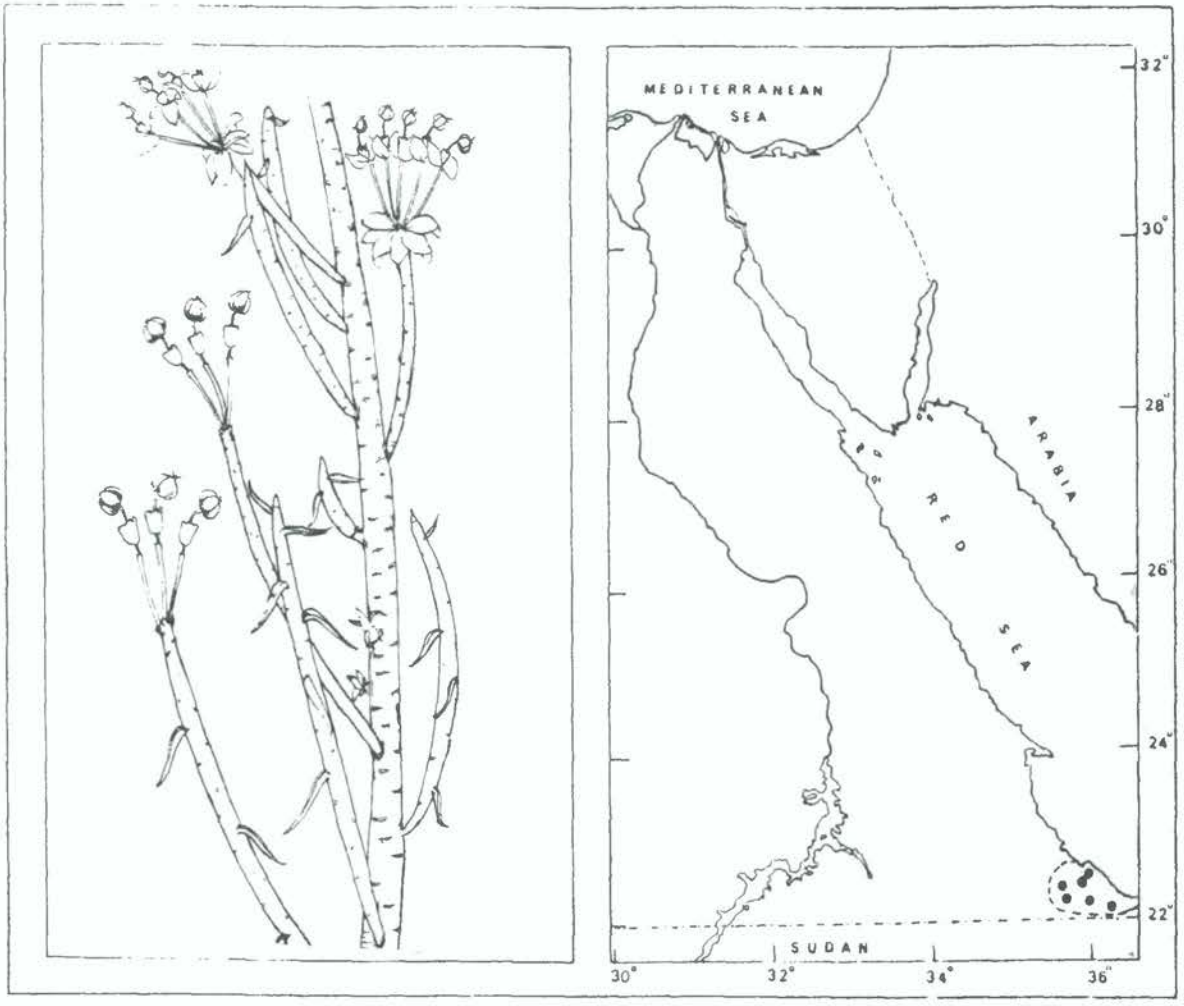
Conservation measures proposed: The population sites in Wadi Akwamtra (Gebel Elba massive be wildlife sanctuaries. Cultivation in botanic gardens would be useful to protect the species.

Biology and potential value: The species is of scientific significance as a member of a critical group relevant to studies of plant geography and taxonomy.

Specimens examined

Sa. Wadi Akwamtra, 27.II.1967, *Osborn & Helmy s.n.* (CAI).

68. **Euphorbia nubica** N.E. Br. in Dyer, F.T.A. 6(1): 554 (1911); Täckholm, Stud. Fl. Egypt ed. 2: 327 (1974); Hadidi & Fayed, Taeckholmia 9: 29-32 (1978); Zohary et al. Consp. Fl. Orient. 2: 27 (1983); Greuter et al. in Med-Check. 3: 217 (1986).



Succulent glabrous shrup, up to 15 cm high. Stems erect, terete, branched; branches alternate, more or less clustered, subparallel, up to 30 cm. length, with prominent leaf scars, greyish-green. Leaves soon-deciduous, sessile, glabrous on both surfaces; blade linear to lanceolate, somewhat fleshy, margin entire, apex acute. Cyathia in terminal, simple umbels, young umbel is subtended by a whorl of 2-3 acute bracts, soon deciduous, umbel rays 3-7 each bearing a single involucre. Capsule obtusely 3-angled, glabrous. Seed ellipsoid, tuberculate rugulose, whitish a small caruncle.

Flowering an fruiting: D e c e m b e r - F e b r u a r y

Vernacular name (Bishari): *Maagoog* (Täckholm, 1974).

Habitat and ecology: Succulent shrub on moist slopes.

Distribution: Kenya and northwards to Ethiopia, Somalia and the Red Sea hills of the Sudan.

Rare species in Egypt, confined to the Red Sea coast and the Gebel Elba massive.

Floristic category: Afro-Oriental, Sahelian of the Sudano-Zambezian region with extension to the Middle Saharo-Sindian subregion.

Status: Vulnerable.

The natural rarity of the species can be related to its limited geographical distribution. Egypt seems to be its northernmost limit in Africa.

The dry plants are used as firewood, and the populations scattered nearby the Red Sea coast are highly endangered due to the recent touristic development of the area.

Conservation measures taken: Gebel Elba protected area. Cultivated in the Orman Botanic Gardens, Giza.

Conservation measures proposed: Wadi Aideib, Wadi Haikwal and Wadi Akwamtra (Gebel Elba) be wildlife sanctuaries.

Biology and potential value: The species is of scientific interest on account of its geographical distribution.

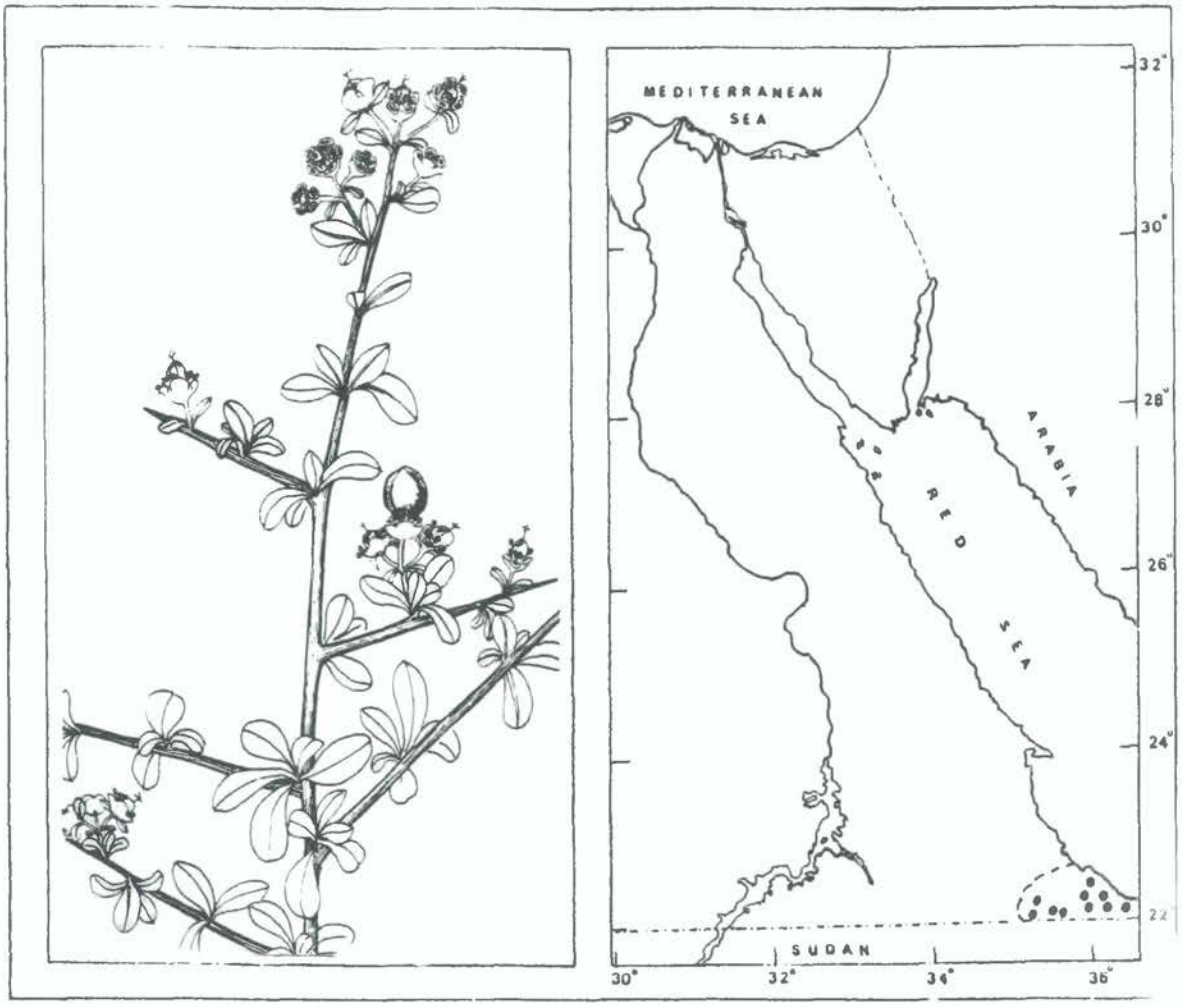
It is of horticultural merit for growers of succulents.

Specimens examined

Sa. Wadi Akwamtra, 21-X-1956, *Boulos s. n.* (CAI); Bir Akwamtra, rocky hillsides east of this place, 22-II-1967, *Osborn & Helmy s.n.* (CAI); Wadi Aku, 27-X-1956, *Boulos s.n.* (CAI); Foot hills of Gebel Elba, 20-I-1962, *Täckholm et al.* 78 (CAI); Wadi Haikwal, 23-X-1956, *Boulos* 70E (CAI); Wadi Kansisrob, 3-II-1962, *Täckholm et al.* 1297 (CAI); Wadi Aideib, 20-I-1962, *Täckholm et al. s.n.* (CAI).

69. Euphorbia cuneata Vahl, Symb. Bot. 2: 53 (1791); Täckholm, Stud. Fl. Egypt ed. 2: 327, pl. 105 (1974); El Hadidi & Fayed, Taeckholmia 9: 33, pl. 6A (1978); Greuter et al. in Med-Check. 3: 210 (1986).

E. perrottetii Jaub. & Sp., Ill. Pl. Or. 5: 72, tab. 464 (1855).



Small tree, up to 3 m tall. Stems erect, terete, branched into horizontal, glabrous branches. Leaves shortly petioled, glabrous on both surfaces; blade linear cuneate, margin entire, apex rounded or notched. Cyathia in terminal or lateral cymes, short pedicelled. Involucre cup-shaped, puberulous or glabrous outside. Capsule oblong-ovate, 3-sulcate, minutely tomentose. Seed ellipsoid, rounded in T.S., testa smooth, brown.

Flowering and fruiting: D e c e m b e r - F e b r u a r y

Vernacular name (Bishari): *Yaab* (Täckholm, 1974).

Habitat and ecology: Nano-phanerophyte which grows in crevices of rocky slopes.

Kassas and Zahran (1971) noted that *Euphorbia cuneata* is one of the most abundant species within the coastal hills, the foothills and the base-zone of the Elba massive.

Distribution: Tanzania and Kenya, northwards to Somalia, Ethiopia and the Sudan, eastwards to Saudi Arabia, Yemen and Oman.

Rare in Egypt, confined to southern part of the Eastern Desert and Gebel Elba area.

Floristic category: Zambezian, Afro-Oriental, E. Sahelian, S. Arabian domains of the Sudao-Zambezian region with extensions to E. Saharo-Sindian subregion.

Status: Vulnerable.

Due to destruction of the habitat for civil development combined with the natural rarity and the restricted geographical distribution of the plant.

Conservation measures taken: Gebel Elba protected area.

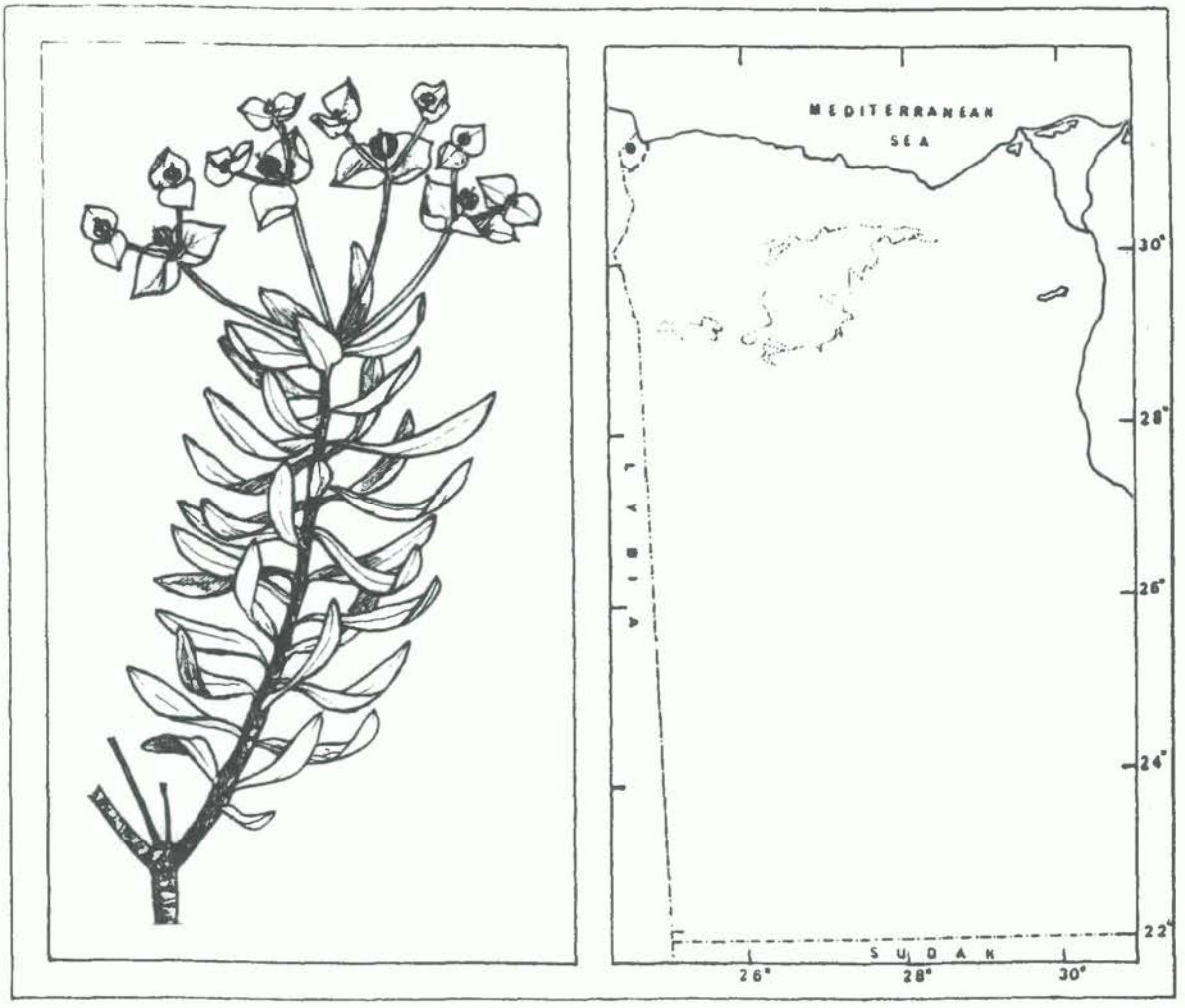
Conservation measures proposed: The population sites of *E. cuneata* Wadi Aideib, Wadi Kansisrob and Wadi Akwamtra of Gebel Elba massive be wlildlife sanctuaries. The cultivation in botanic gardens is recommended.

Biology and potential value: The species is of considerable interest to studies of plant geography, also for its horticultural merit.

Specimens examined

Sa. Wadi Siamtit, 23-I-1962, *Täckholm* 399 (CAI); Wadi Akwamtra, 3-II-1962, *Täckholm* 1212 (CAI); Stony ground to the well, Gebel Elba, 19-III-1928, *Khattab* 6310 (K); Gebel Elba, 23-27-I-1929, G. *Täckholm* s.n. (CAI); Gebel Elba, 11-I-1933, *C.E. Palmer* 189 (CAI); Wadi Haikwal, 23-X-1956, *L. Boulos* s.n. (CAI); Wadi Kansisrob, 3-II-1962, *Täckholm* 1298 (CAI); Wadi Aideib, 20-I-1962, *Täckholm* 86 (CAI); Gebel Karam Elba, 1925-1926, *Murrey* 3797 (K), Wadi Rabdeit, 21-I-1933, *J. R. Shabetai* 1079 (K).

70. Euphorbia dendroides L., Sp. Pl.: 462 (1753); Täckholm, Stud. Fl. Egypt ed. 2: 327 (1974); El Hadidi & Fayed, Taeckholmia 9: 35-37 (1978); Zohary et al. in Consp. Fl. Orient. 2: 23 (1983); Greuter et al. in Med-Check. 3: 210 (1986).



Woody glabrous shrub, up to 50 cm high. Stems erect, terete, di- or trichotomously branched, covered with thin greyish indumentum. Leaves alternate, sessile, glabrous on both surfaces, blade linear-lanceolate, margin entire, apex acute. Cyathia in terminal umbels, umbel rays 3-10, biforked, bracts subcordate or semicircular, yellowish. Capsule depressed globular, deeply 3-grooved, covered with short hair. Seed ovoid-oblong, testa smooth, greyish green.

Flowering and fruiting: F e b r u a r y - A p r i l

Vernacular name (Arabic): *Libbeina* (Täckholm, 1974).

Habitat and ecology: Chamaephyte which grows on limestone slopes.

Distdribution: Recorded from the Mediterranean coast of North Africa and Europe from Spain to Greece, also from most of the Mediterranean Islands, Palestine and Turkey.

Rare in Egypt and restricted to Marmarica district of the West Mediterranean coastal land.

Floristic category: Mediterranean region.

Status: Vulnerable.

Due to its limited geographical distribution combined with clearing of the vegetation to establish new civil centers.

Conservation measures taken: Cultivated in Alfred Bircher's Garden (El Saff, Giza).

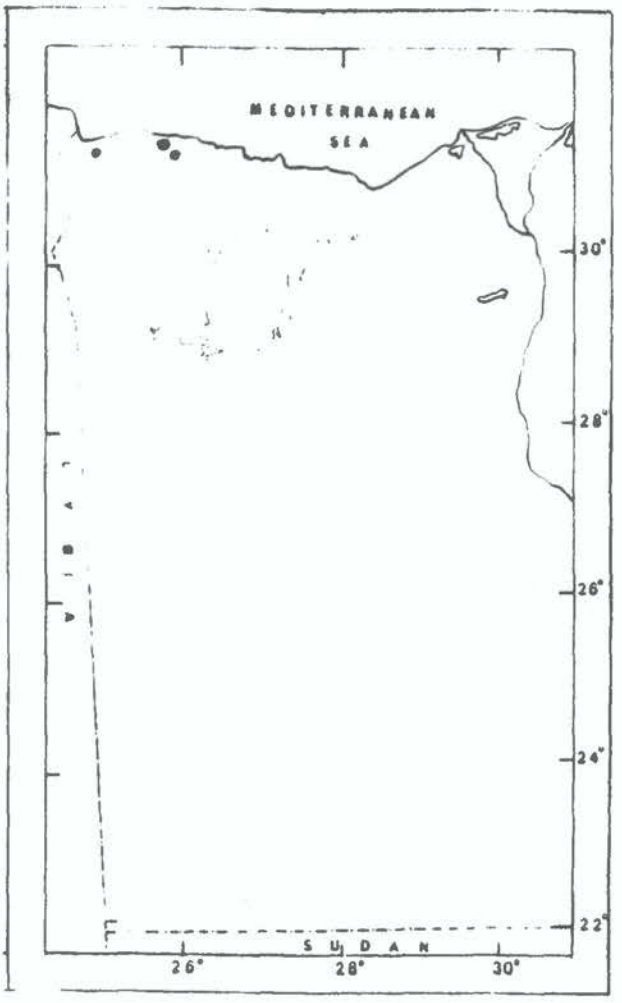
Conservation measures proposed: The population sites of *E. dendroides* in El Sallum plateau be wildlife sanctuaries.

Biology and potential value: It is of interest being a horticultural plant.

Specimens examined

M. Sallum, 2-5 Km. east of the Libyan frontier, 24.V.1963, *Täckholm et al.* s.n. (CAI).

71 **Euphorbia bivonae** Steud. Nomencl Bot ed 2. 1: 610 (1840); Täckholm Stud. Fl. Egypt ed 2: 330 (1974); Zohary et al. in Consp. Fl. Orient 2: 21 (1983); Greuter et al. in Med-Check 3: 207 (1986)



Woody shrublet, up to 50 cm. high. Stems ascending, slender, branched near the middle, glabrous. Leaves simple, subsessile, glabrous on both surfaces; blade ovate to elliptic or obovate, margin entire, apex almost obtuse, sometimes obscurely mucronate. Cyathia terminal, 5-rays. Capsule globose, covered with short cylindrical tubercles. Seed ovoid, dark brown-shiny.

Flowering and fruiting: February - April

Vernacular name: Not known.

Habitat and ecology: Chamaephyte which grows in crevices of coastal limestone ridges.

Distribution: Recorded from the Mediterranean coast of N. Africa, also in Sicily and Malta.

Rare in Egypt, confined to the rocks of the Marmarica district (West Mediterranean) and the Isthmic Desert (Sinai).

Floristic category: Mediterranean region with extensions to the Middle Saharo-Sindian subregion.

Status: Endangered.

The species rarity can be related to its limited geographical distribution combined with its small population size. The plant is susceptible to grazing as other smaller-sized species of *Euphorbia*.

Conservation measures taken: N o n e

Conservation measures proposed: Agiba shore and Wadi Habis west of Mersa Matrouh (Marmarica district) and Ain El Gedeirat (N. Sinai) be nature reserves.

Preservation of the plant seeds in a seed bank is another method to protect the species from extinction.

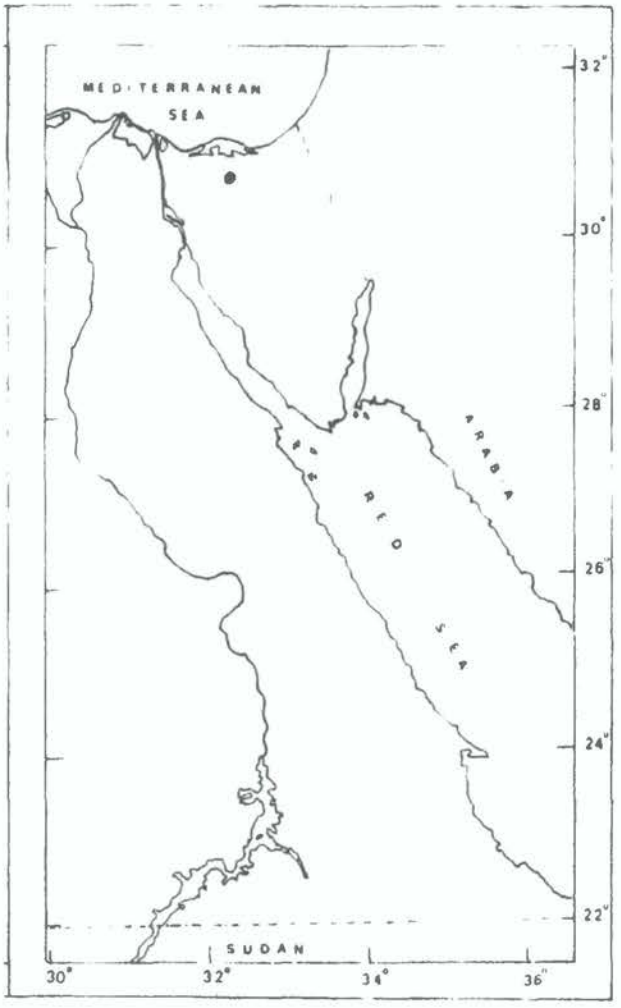
Biology and potential value: A polymorphic species possess morphological charactears that are helpful to understand evolution of the genus.

Specimens examined

M. Wadi Regeit, 34 Km. SE. of El Sallum, 5.III.1976, *Täckholm et al. s.n.* (CAI); Agiba near Mersa Matrouh, acing the sea, 21.III.1975, *Täckholm et al. s.n.* (CAI); Sanniet Hagg Ayyad, Wadi El Habs betweeen Mersa Matrouh Agiba, 27.III.1974, *Täckholm et al. s.n.* (CAI).

Di. 5 Km. south of Bir El Maghara (N. Sinai), 26.IV.1959, *Boulos s.n.* (CAI).

72. **Euphorbia erinacea** Boiss. & Kotschy in Boiss., Diagn. Pl. Orient. ser. 2. 4: 87 (1859); Tackholm. Stud. Fl. Egypt ed. 2: 330 (1974); Zohary et al. in Consp. Fl. Orient. 2: 23 (1983); Greuter et al. in Med-Check-3: 211 (1986).



Woody shrublet, 20-30 cm high with swollen root. Stems erect terete, intricately branched, covered with a very thin greyish bark, older branches usually terminating in forked spines. Leaves alternate, subsessile, glabrous on both surfaces; blade elliptic, margin entire, apex acute, serrulate. Cyathia solitary terminal on simple or forked branches, rays 3-4; involucre hemispherical, turbinate, hirsute within. Capsule ovate-spherical, villous between short cylindrical warts. Seed ovoid, dark brown.

Flowring and fruiting: M a y - J u l y

Vernacular name: N o t k n o w n

Habitat and ecology: Chamaephyte which grows on limestone slopes.

Distribution: Alpine and subalpine regions of Syria and Lebanon.

Very rare in Egypt, confined to the Isthmic Desert (Sinai).

Floristic caregory: Mesopotamian province of the Irano-Turanian region.

Status: Indeterminate.

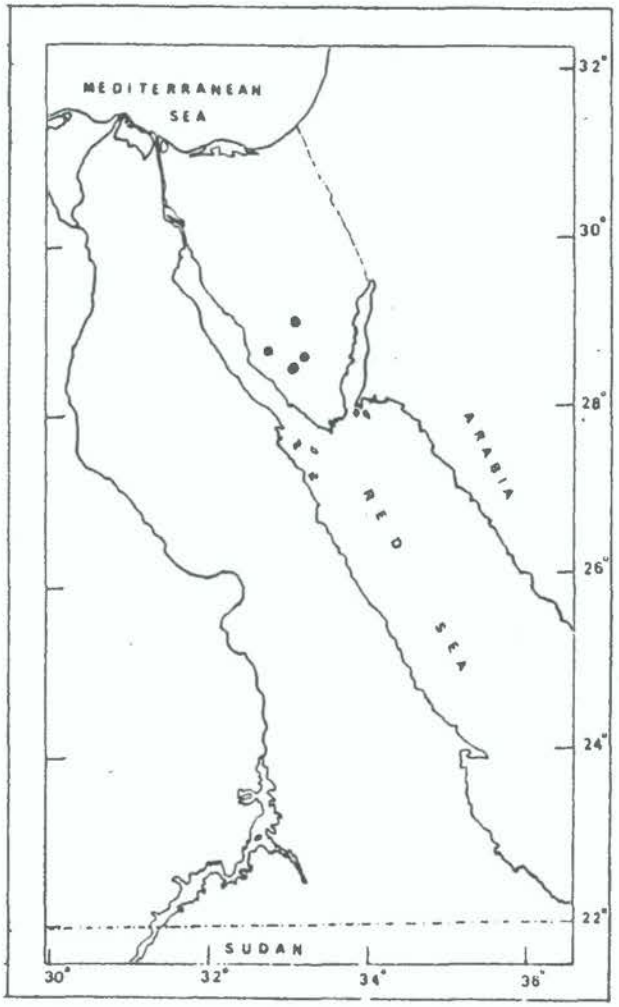
The species was last seen in 1959, Intensive search is done, but without success.

Biology and potential value: The plant is of scientific interest on account of its limited geographical distribution.

Specimens examined

Di. Wadi El Arousiya (Gebel El Maghara), 27.IV.1959, *L. Boulos s.n.* (CAI).

73. Euphorbia obovata Decne., Ann. Sci. Nat. Bot. ser 2, 2: 241 (1834); Boiss., Fl. Orient. 4: 1117 (1879); Täckholm, Stud. Fl. Egypt, ed. 2: 334 (1974); Danin et al. in Willdenowia 15: 286 (1985); Greuter et al. in Med-Check. 3: 217 (1986).



Woody green-blue shrublet. Stems decumbent or ascending, slender, dichotomously branched near the base, glabrous. Leaves short petioled, glabrous on both surfaces; blade obovate to oblong-elliptical, margin entire, apex broadly obtuse. Cyathia terminal, rays 3-5, simple or forked, pedicellate. Involucre campanulate, hispid. Capsule ovate-oblong, slightly grooved. Seed oblong, tetragonal, sparcely fleecy.

Flowring and fruiting: A p r i l - J u n e

Vernacular name: Not known.

Habitat and ecology: Hemicryptophyte which grows on sandy wadi beds.

Distribution: Endemic to Sinai.

Floristic category: Middle Saharo-Sindian subregion or Mesopotamian province of the Irano-Turanian region.

Status: Endangered.

The natural rarity of the species combined with the severe grazing by goats are causatives that highly endanger our taxon.

Conservation measures taken: Gebel St. Catherine protected area.

Conservation measures proposed: The population sites of *E. obovata* Gebel St. Catherine and Gebel El Igma (S. Sinai) which are reported by Danin et al. (1985), be wildlife sanctuaries.

Preservation of the seeds in a seed bank is also recommended.

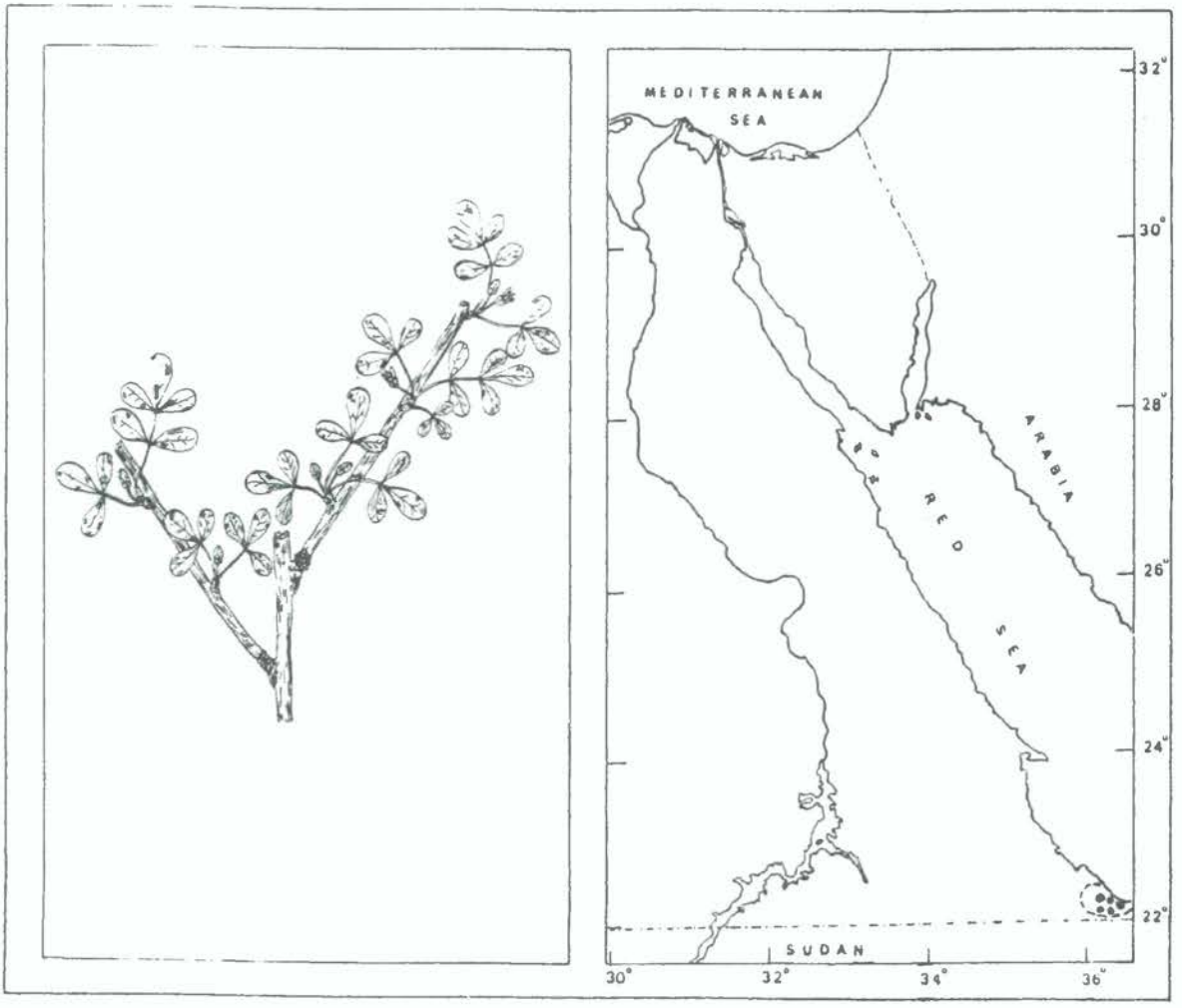
Biology and potential value: As endemic to Sinai, the species is of considerable scientific interst being a member of a critical group relevant to studies of plant geography and taxonomy.

No specimens seen , for records of Sinai, see *Danin et al.* 1985

74. Commiphora gileadensis (L.) C. Christ., Dansk. Bot. Ark. 4, no. 3: 18 (1922).

C. opobalsamum (L.) Engler, Monog. Phan. 4: 15 (1883); Täckholm, Stud. Fl. Egypt ed. 2: 337, pl. 118 B (1974).

Amyris gileadensis L. Amoen. Acad. 7: 68 (1769).



A stout tree of a large shrub up to 2 m tall. Stems spreading, slender to terete, branched, glabrous. Leaves 3-5 foliolate, petiolate, finely pubescent on both surfaces, balde obovate, margin entire, apex obtuse. Flowers in small panicles, pedicellate. Calyx tubular, persistent, 4-lobed. Corolla 4 lobes, valvate. Fruit a drupe, ovoid-ellipsoid, glabrous.

Flowering and fruiting: December - February

Vernacular name (Bishari): *Mayoak* (Täckholm, 1974).

Habitat and ecology: Nano-phanerophyte which grows on rocky slopes.

Kassas and Zahran (1971) noted that *commiphora gileadensis (C. opobalsamum)* is a very rare species within the wadis of Gebel Elba massive. It is most abundant bush within the runnels of the slopes forming patches or thickets.

Distribution: Somalia and Eritrea (Ethiopia), northwards to the Sudan; eastwards to Saudi Arabia, Yemen and Oman.

Rare in Egypt, confined to Gebel Elba area.

Floristic category: Afro-Oriental, E. Sahelian and S. Arabian domains of the Sudano-Zambezian region.

Status: Rare.

Commiphora gileadensis is a mountainuous species growing in places difficult of access for grazing animals. The only danger would be from tourists or a gradual extinction because of some external factors.

The occurrence of this taxon in Elba district represents the northern-most limit of its distribution in Africa.

Conservation measures taken: Gebel Elba protected area.

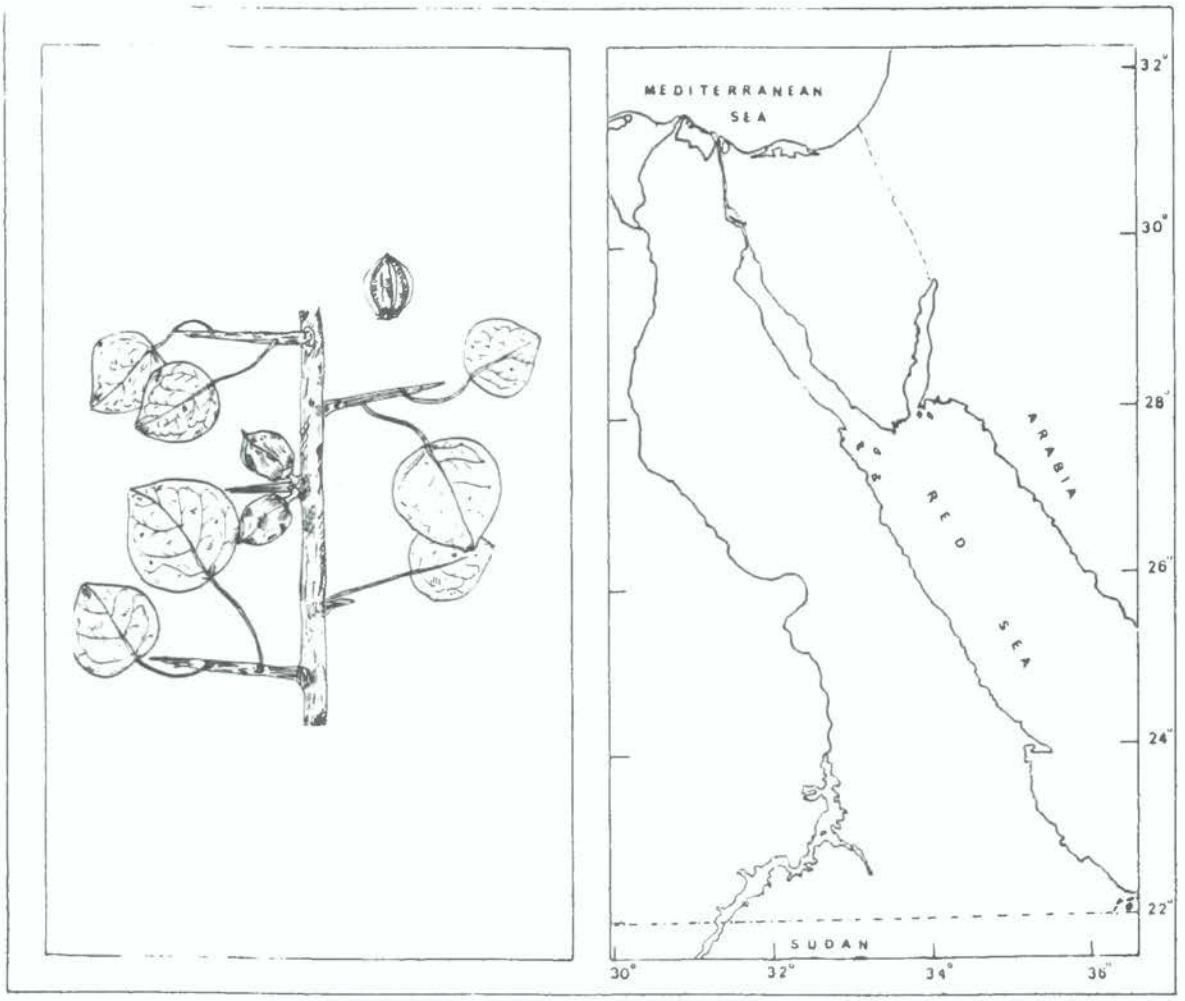
Conservation measures proposed: The population sites of *Commiphora gileadensis* in Wadi Kansisrob, Gebel Shallal and Gebel Shendodai be wildlife sanctuaries. Cultivation in botanic gardens as an ornamental tree is recommended.

Biology and potential value: The plant is of considerable scientific significance on account of its restricted geographical distribution. The trees of *Commiphora* produce several resins such as myrrhs which yields a volatile oil and bedlium which used in pharmacy (Holland, 1908).

Specimens examined

Sa. Stony soil west of the route to the well Gebel Elba, 21.III.1928, *Khattab* F. 3865 (K); Gebel Elba, 3.II.1933, *J.R. Shabetai* F. 1405 (K); Wadi Kasisrob, 24.X.1956, *Boulos s.n.* (CAI); Wadi Seramtai, 29.I.1962, *Täcknolm et al.*1100 (CAI); Gebel Karam Elba, 1925-1926, *G.W. Murray* 3768 (K); Gebel Shindodai, 10.II.1962, *Täckholm et al.* 1955 (CAI); Wadi Merakwan, 10.II.1962, *Täckholm et al.* 2079 (CAI).

75. Commiphora quadricincta Schweinf., Bull. Herb. Boiss. 7, app. 2: 283 (1899); Täckholm, Stud. Fl. Egypt ed. 2: 337, pl. 113 A (1974); Greuter et al. in Med-Check, 1: 117 (1984).



Stout trunk covered by peeling papery bark, lateral branches are thorny, glabrous. Leaves simple, rarely trifoliate, long petiolate, glabrous on both surfaces; blade broadly ovate or orbicular, margin entire, apex acute. Flowers cymose, pedicellate. Fruit a drupe, oblong-ovoid, the seed having a wing at each corner.

Flowering and fruiting: December - February

Vernacular name: Not known

Habitat and ecology: Nano-phanerophyte which grows on dry sandy or gravel wadi beds.

Distribution: Niger and N. Nigeria, eastwards from Somalia and Eritrea (Ethiopia) to the Sudan, Saudi Arabia and Yemen.

Very rare in Egypt, confined to Gebel Elba area.

Floristic category: Sahelian, Afro-Oriental and S. Arabian domains of the Sudano-Zambezian region.

Status: Endangered.

Cutting of the trees by the natives of Gebel Elba (Bisharian) for extraction of gums is the real danger for this species. The trees scattered in the plains along the Red Sea coast are highly threatened because of the recent touristic development of the area.

Conservation measures taken: Gebel Elba protected area.

Conservation measures proposed: The trees *Commiphora quadricincta* in Wadi Laseitit (Gebel Elba) be included within a wildlife sanctuary. Cultivation in botanic gardens is also recommended.

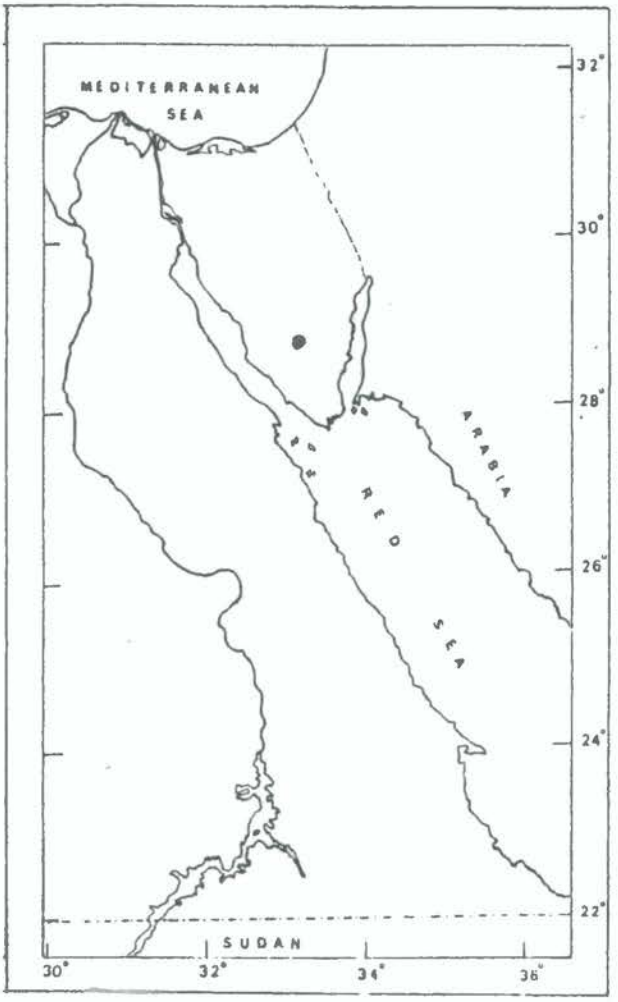
Biology and potential value: The species is of considerable interst being the source of myrrhs in the local markets of the Nile Valley (Aswan Province).

Specimens examined

Sa. Wadi Laseitit, 7.II.1962, *Täckholm et al.* 1795 (CAI).

76. Polygala sinaica Botsch., Novsti Sist. Vyss. Rast 1: 368 (1964); Täckholm, Stud. Fl. Egypt ed. 2: 337 (1974); Greuter et al. in Med-Check. 4: 350 (1989).

P. spinescens Decne., Ann. Sci. Nat. ser. 2, 3: 275 (1835); Boissier, Fl. Orient. 1: 470 (1867).



Undershrubs up to 30 cm tall. Stems erect and ascending, slender, much branched; branches virgate, spinescent, yellowish green, velvety-pubescent. Leaves soon deciduous, sessile, pubescent on both surfaces; blade oblong-linear, margin entire apex acute. Flowers terminal racemes, about 10 scattered flowers, shortly pedicellate. Sepals 5; the 3 outer sepals elliptical, membranous with a broad hairy green midrib, the inner 2 sepals broadly elliptical clawed, densely nerved. Petals shorter than the inner sepals, wings white, keel purple. Capsule obovate, truncate, glabrous.

Flowring and fruiting: M a r c h - M a y

Vernacular name (Arabic): *Sarr* (Täckholm, 1974).

Habitat and ecology: Chamaephyte which grows in crevices of hard rocks or slopes of wadis.

Distribution: Recorded from Palestine, eastwards to Saudi Arabia.

Very rare in Egypt and confined to mountainuous S. Sinai.

Floristic category: Middle Saharo-Sindian subregion.

Status: Vulnerable.

The natural rarity of this taxon is due to its limited geographical distribution.

Overgrazing by domestic livestock highly depletes the small populations of *Polygala sinaica* . The populations scattered nearby the coast of Aqaba Gulf are going under immediate threat due to the recent touristic development of the area.

Conservation measures taken: Gebel St. Catherine protected area.

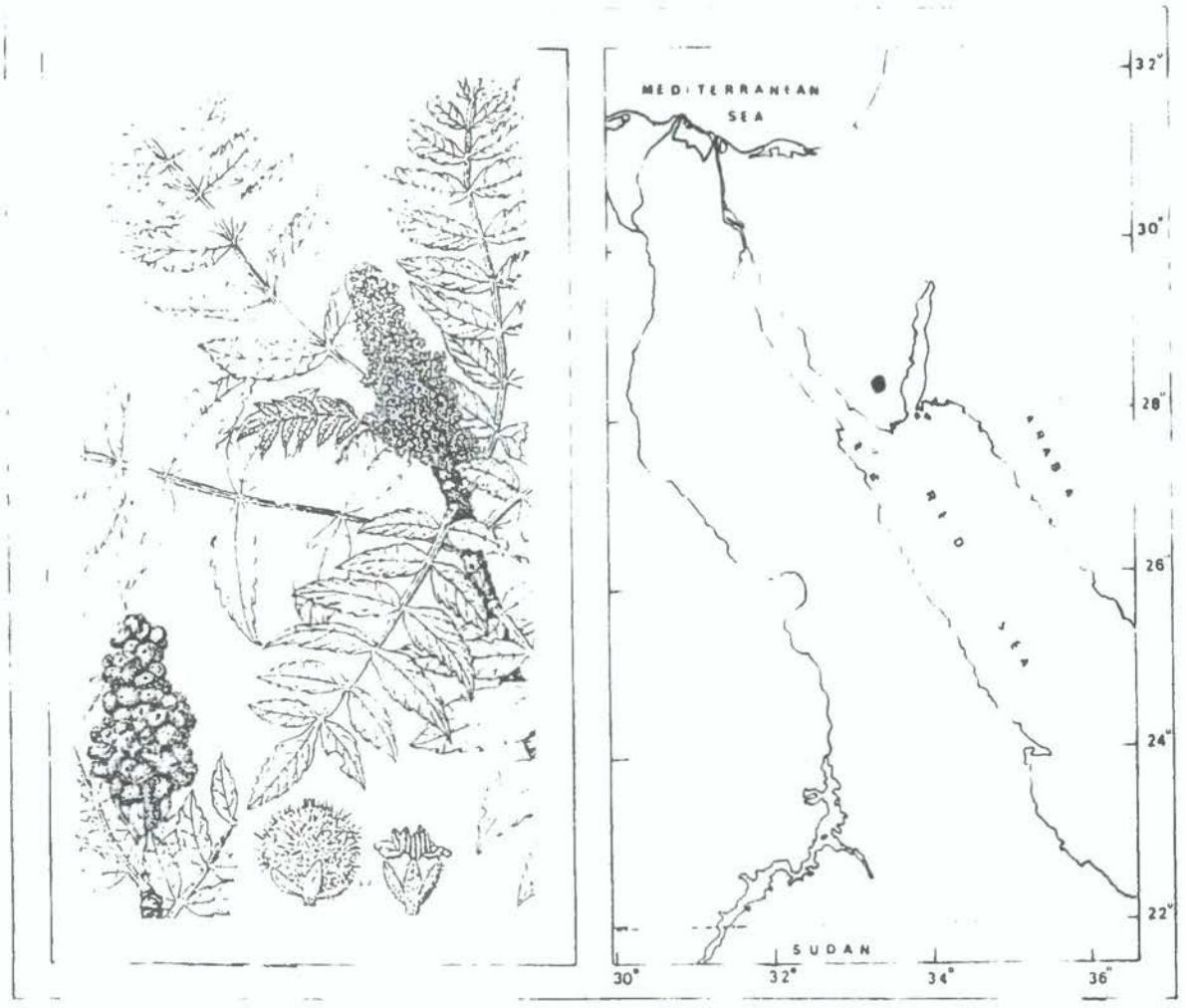
Conservation measures proposed: Gebel Musa (S. Sinai) be a nature reserve, also two or populations of *Polygala sinaica* along Aqaba and Suez Gulfs be wildlife sanctuaries.

Biology and potential value: The plant is of interest on account of its ecological modification. Danin (1983) noted that the stem assimilants of *Polygala sinaica* possess a characteristic mechanism in which the outer epidermal walls rapidly swell when they absorb water, but release the water very slowly.

Specimens examined

S. Stepway to Gebel Musa (S. Sinai), 11.V.1956, *Täckholm s.n.* (CAI).

77. Rhus coriaria L. Sp. Pl. 1: 265 (1753); Boiss. Fl. Orient. 2: 4 (1872). Täckholm. Stud. Fl. Egypt ed. 2: 339 (1974) Greuter et al. in Med-Check 1: 49 (1984).



Tree or shrub up to 2.5 cm tall. Stems erect, slender, glabrous. Leaves deciduous, imparipinnate, short petioled; leaflets 5-7 paired, sessile; blade oblong to ovate, margin coarsly serrate-dentate, apex acute or obtuse, villose beneath. Flowers in dense terminal or axillary panicles. Calyx lobes 5, ovate to orbicular, obtuse, villose. Petals 5, about twice as long as calyx. Fruit globular-reniform, umbilicate, brown, villose and glandular hairy.

Vernacular name (Arabic): *Semaaq*

Habitat and ecology: Nano-phanerophyte which grows on mountain slopes.

Distribution: Widespread in S. Europe, the Mediterranean Basin and the Canary Islands, eastwards to Turkey, Syria, Iraq and Iran; also recorded from Palestine and Algeria.

Confined in Egypt to mountainous S. Sinai.

Floristic category: Mesopotamian and Irano-Anatolian provinces of the Irano-Turanian region with extensions to the Mediterranean region as well as Middle Saharo-Sindian subregion.

Status: Extinct.

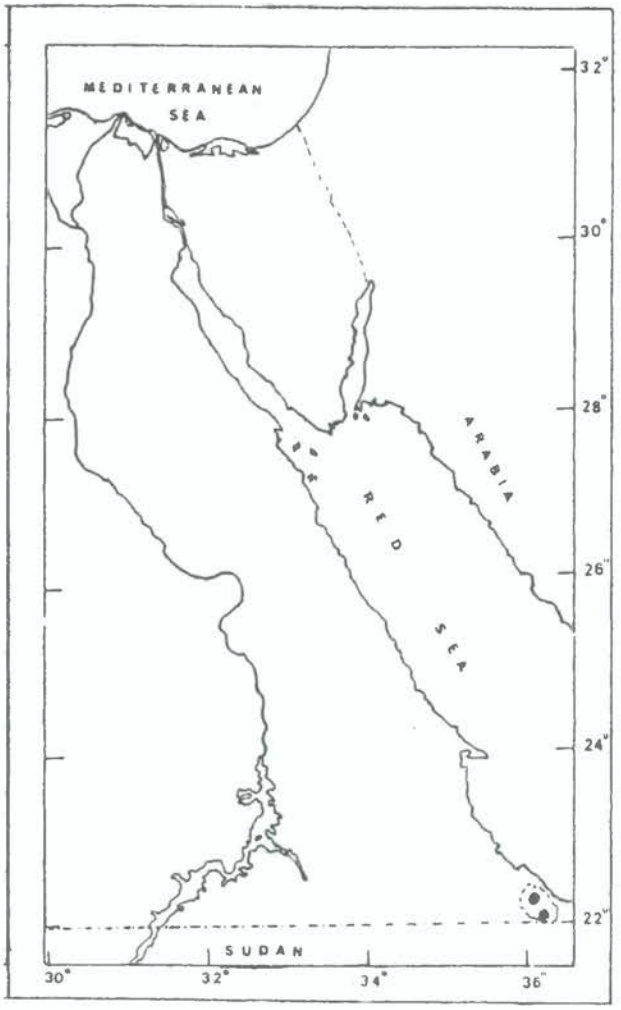
Our taxon was last seen in Sinai in 1930. It has been searched for repeatidly without success.

Biology and potential value: The disjunct distribution of this taxon may propose that it occurs in Sinai as enclave.

Specimens examined

S. Sinai, 1930, *Alfred Kaiser (Arbon)* 822 (K).

78. Rhus abyssinica Hochst. ex Oliv. in Oliver, F.T.A. 1: 438 (1868); Täckholm, Stud. Fl. Egypt ed. 2: 339 (1974); Zohary et al. in Consp. Fl. Orient. 2: 40 (1983).



A medium sized tree up to 4 m tall. Stems erect, slender to terete, branched, tomentose. Leaves 3-foliolate, petiolate; leaflets sessile, more or less pubescent on both surfaces; blade oblanceolate or ovate, margin almost entire but crenate at apex, apex obtuse or acute. Flowers in terminal hairy panicles, shorter than the leaves. Calyx 5 lobed, ovate. Petals ovate, obtuse. Fruit a small brown drupe.

Flowering and fruiting: December - February

Vernacular name (Bishari): *Samoot* (Fahmy, 1936).

Habitat and ecology: Nano-phanerophyte which grows on rocky slopes.

Kassas and Zahran (1971) noted that *R. abyssinica* is a species of higher water requirements. Accordingly, it grows on higher altitudes of the north and east facing slopes of Gebel Elba massive where orographic precipitation is available.

Distribution: Eritrea (Ethiopia) northwards to the Sudan and eastwards to Saudi Arabia.

Confined in Egypt to Gebel Elba area.

Floristic category: Afro-Oriental, E. Sahelian, and S. Arabian domains of the Sudano-Zambezian region.

Status: Rare.

The occurrence of the plant at higher altitudes relatively protect it from cutting and grazing.

Conservation measures taken: Gebel Elba protected area.

Conservation measures proposed: The trees scattered in Wadi Yahameib and Wadi Haikwal (Gebel Elba) must be included within wildlife sanctuaries. The cultivation in botanic gardens can help in protecting this taxon.

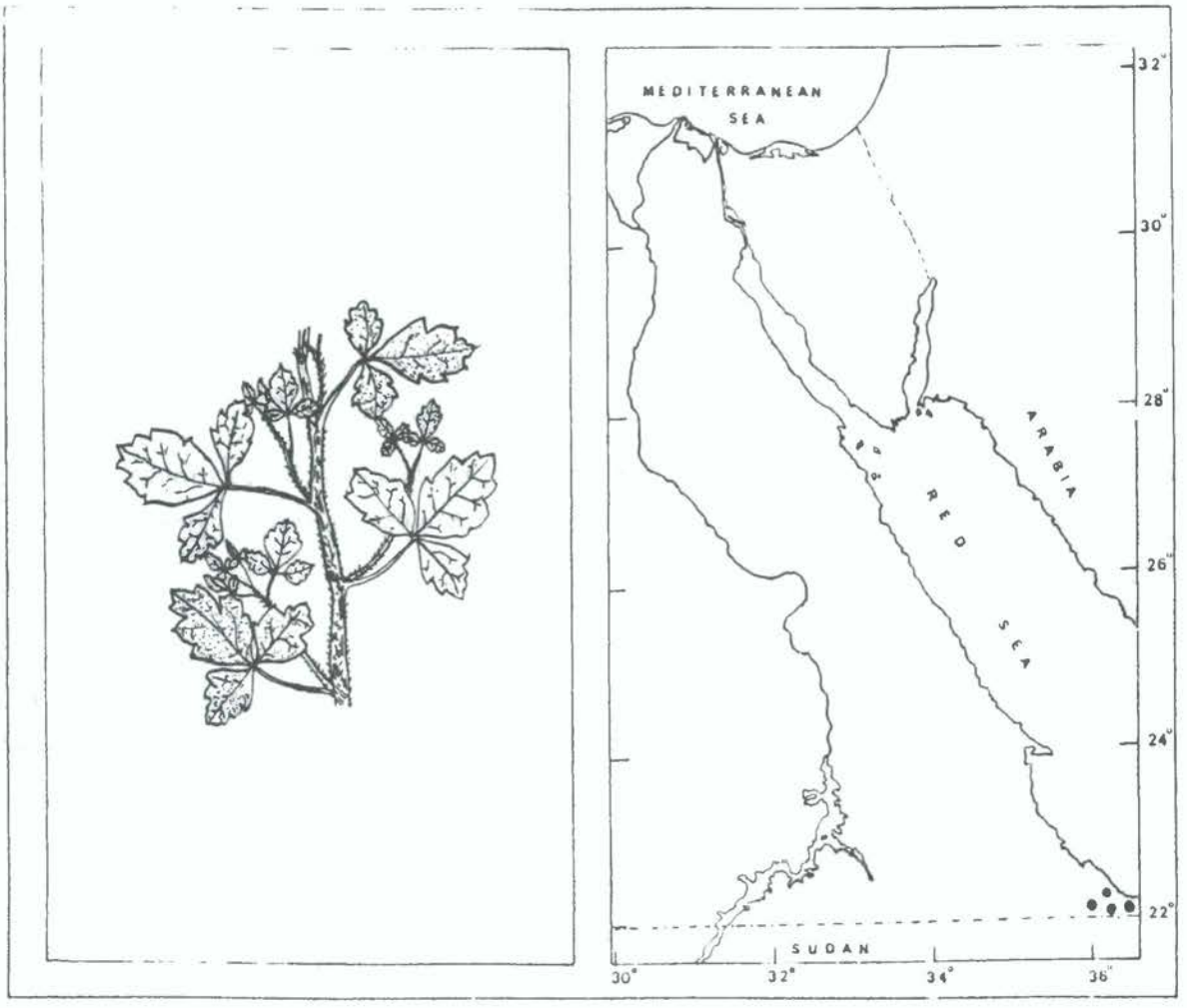
Biology and potential value: The plant is of considerable scientific significance on account of its geographical distribution. Egypt seems to be its northernmost range in Africa.

Specimes examined

Sa. Khor Wadi Yahameib across Gebel Elba, 22-I-1962, *Täckholm et al.* 219 (CAI); Gebel Elba, Wadi Haikwaal, 17-IX-1936, *Drar* 156/36 (K).

79. Rhus tripartita (Ucria) Grande, Bull. Orto. Bot. Regia 339, Napoli 5: 242, 243 (1916), Täckholm, Stud. Fl. Egypt ed. 2: 339, pl. 114 A (1974); Zohary et al. in Consp. Fl. Orient. 2: 40 (1983); Greuter et al in Med-Check. 1: 49 (1984); Danin et al. in Willdenwia 15: 263 (1985).

Rhamnus tripartitus Ucria, Nouvo Racc. Opusc. Aut Sicil. 6: 249 (1793).



Shrub, up to 1 m tall. Stems erect, terete, branched; branches spiny covered by dark brown bark. Leaves 3-foliolate, petiolate; leaflets sessile, glabrous or slightly glabrescent on both surfaces; blade obovate, margin entire till the middle becomes dentate near the apex, apex obtuse. flowers in short, axillary or terminal panicles. Sepals ovate, acute, glabrous. Petals greenish. Fruit drupe, glossy, of about peasize, pale green.

Flowring and fruiting: December - February

Vernacular name (Arabic): Areen (Täckholm, 1974),

Habitat and ecology: Nano-phanerophyte which grows in crevices of hard rocks and limestone slopes.

Kassas and Zahran (1971) noted that *Rhus tripartita* is a species with higher water requirements. Its occurrence at higher altitudes may be related to the exploitation of the moisture from the clouds (mist of the mountains).

Distribution: Recorded from Ethiopia, northwards to Somalia and the Sudan, eastwards to Saudi Arabia. Also known in the Mediterranean Basin, Syria and Palestine.

Rhus tripartita is confined in Egypt to areas where adequate moisture is available. It is recorded from El Sallum plateau in the far west of the Mediterranean coast, Sinai peninsula, and Gebel Elba area.

Floristic category: Mesopotamian and Medio-Asiatic provinces of the Irano-Turanian region with extensions to the Mediterranean region and the Middle and West Saharo-Sindian subregions.

Status: Vulnerable.

The species natural rarity can be related to changes in climatic conditions (mainly reduced precipitation). Relict populations of this taxon are confined to wet habitats. Its vulnerability can be related to clearing of the vegetation nearby the coast of the Red and Mediterranean Seas. Overgrazing in gebel Elba area and S. Sinai is the main causative for the species decline.

Conservation measures taken: Gebel Elba protected area.

Conservation measures proposed: El Sallum plateau (west of Mersa Matrouh) be a nature reserve. Also the population sites in Wadi Akwamtra and Wadi Merakwan (Gebel Elba) be wildlife sanctuaries. The cultivation in botanic gardens is also recommended.

Biology and potential value: The disjunct distribution of this taxon is of interest to studies of plant geography and evolution. At present it is restricted to less drier habitats; Zohary (1973) pointed out that *Rhus tripartita*

is a remnant of a past climatic period, and have not been incorporated within the present typical climax vegetation while Danin (1983) claimed that this species was widely distributed when the Negev and Sinai had moisture climate.

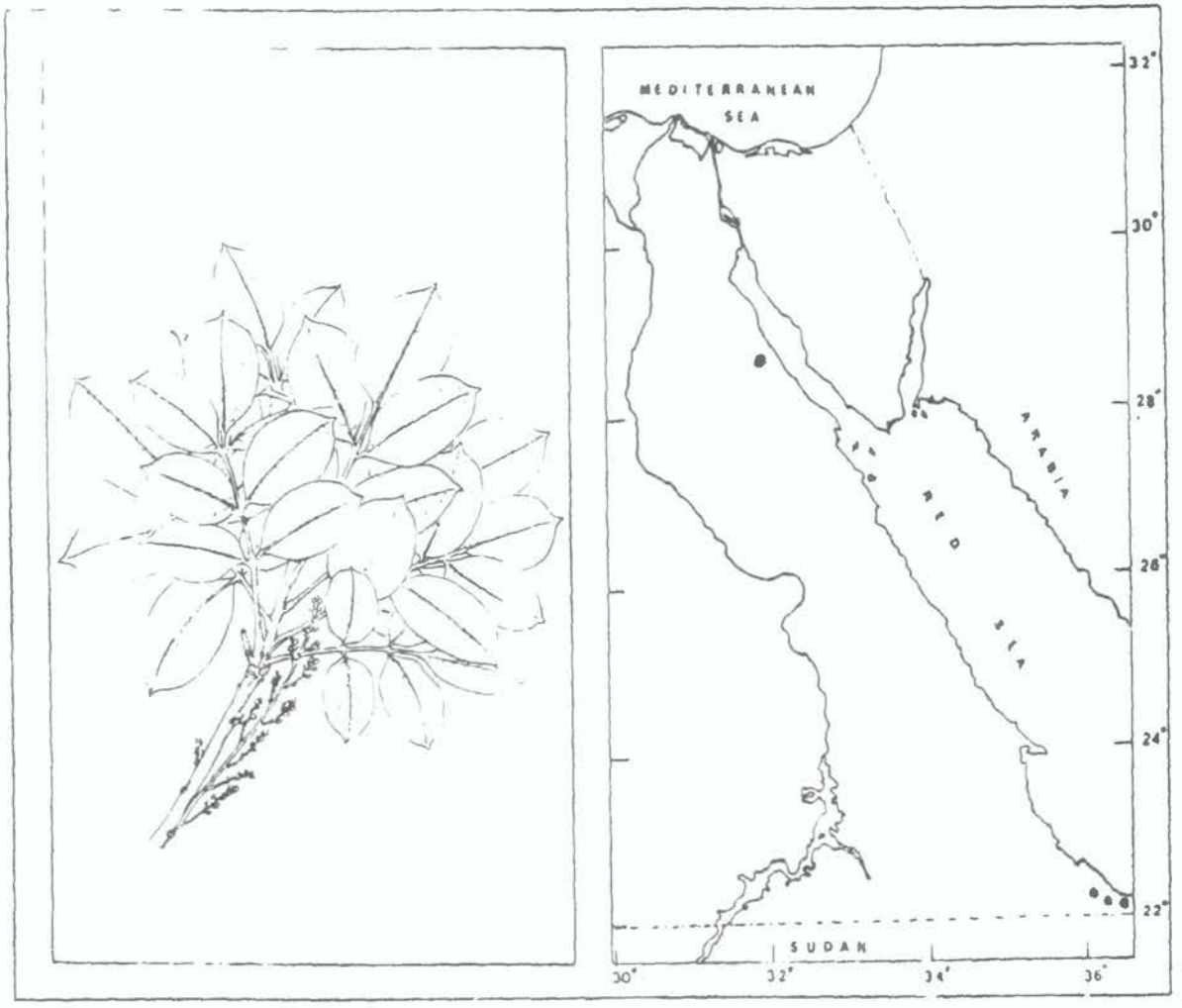
Specimens examined

M. El Sallum, along the road to the boundary, 24.V.1963, *Täckholm et al.* s.n. (CAI); El Sallum plateau, near the town, 28.IX.1963, *L. Boulos* s.n. (CAI).

Sa. Wadi Akwamtra, Mountain tributary, 27.II.1967, *Osborn & Helmy* s.n. (CAI); Wadi Yahameib, 22.I.1962, *Täckholm et al.* 326 (CAI); Gebel Karam Elba, 1925-1926, *Murray* 3788 (K); Gebel Shindodai, 10.II.1962, *Täckholm et al.* 1968 (CAI).

80. Pistacia khinjuk Stocks in Hook. var. *glabra* Schweinf. ex Engl., Monog. Phaner. 4: 291 (1883); Zohary et al. *in* Consp. Fl. Orient. 2: 39 (1983).

P. khinjuk Stocks var. *glaberrima* Schweinf. ex Boiss., Fl. Orient. suppl. 154 (1888); Zohary, Palest. Jour. Botany 5: 212 (1952); Täckholm, Stud. Fl. Egypt ed. 2: 339 (1974).



Decidous tree, 3-7 m tall. Trunk erect, stout, covered by reddish brown resin gum; branches erect or ascending, slender. Leaves imparipinnate, petiolate, leaflets 2-4 paired, coriaceous, glabrous on both surfaces; blade lanceolate, margin entire, apex acuminate. Flowers unisexual in axillary racemes or panicles. Staminate panicles 5-12 cm, erect, much branched, loose; pistillate panicles 7-15 cm, loose, with erect or spreading branches.

Staminate flowers almost sessile; stamen 4-5, filaments nearly 0, rudimenta v pistil minute. Pistillate flowers: pedicellate; perianth 2-5-3 mm; Pistil 2-5 mm, style very short, stigmas longer than ovary and style.

Flowering and fruiting January - March

Vernacular name (Bishari): *Haasheit* (Täckholm, 1974).

Habitat and ecology: Micro-phanerophyte which grows in gorges and wadis, mainly at higher altitudes at least 900 m ASL.

Distribution: Recorded from Palestine and Saudi Arabia. In Egypt it is recorded from S. Galala plateau (Eastern Desert), Gebel Elba area and mountainous S. Sinai.

Floristic category: Irano-Turanian as a relict in the Middle Saharo-Sindian subregion.

Status: Vulnerable.

The extreme rarity of this taxon can be related to its geographical range. It is extensively used by bedouins as a fodder for goats; a decoction of the leaves is taken for 7 days for the treatment pain in bones (Abdallah et al., 1984).

Conservation measures taken: Gebel Elba protected area. It is cultivated in Zoological Garden (Giza) and in the Plants Island (Aswan).

Conservation measures proposed: Gebel Serbal (S. Sinai) be wildlife sanctuary.

The population traced by Hassan (1987) in Wadi Qattar (west of Hurghada, Red Sea coast); also in Wadi Haikwal Shendodai (Gebel Elba massive) be wildlife sanctuaries.

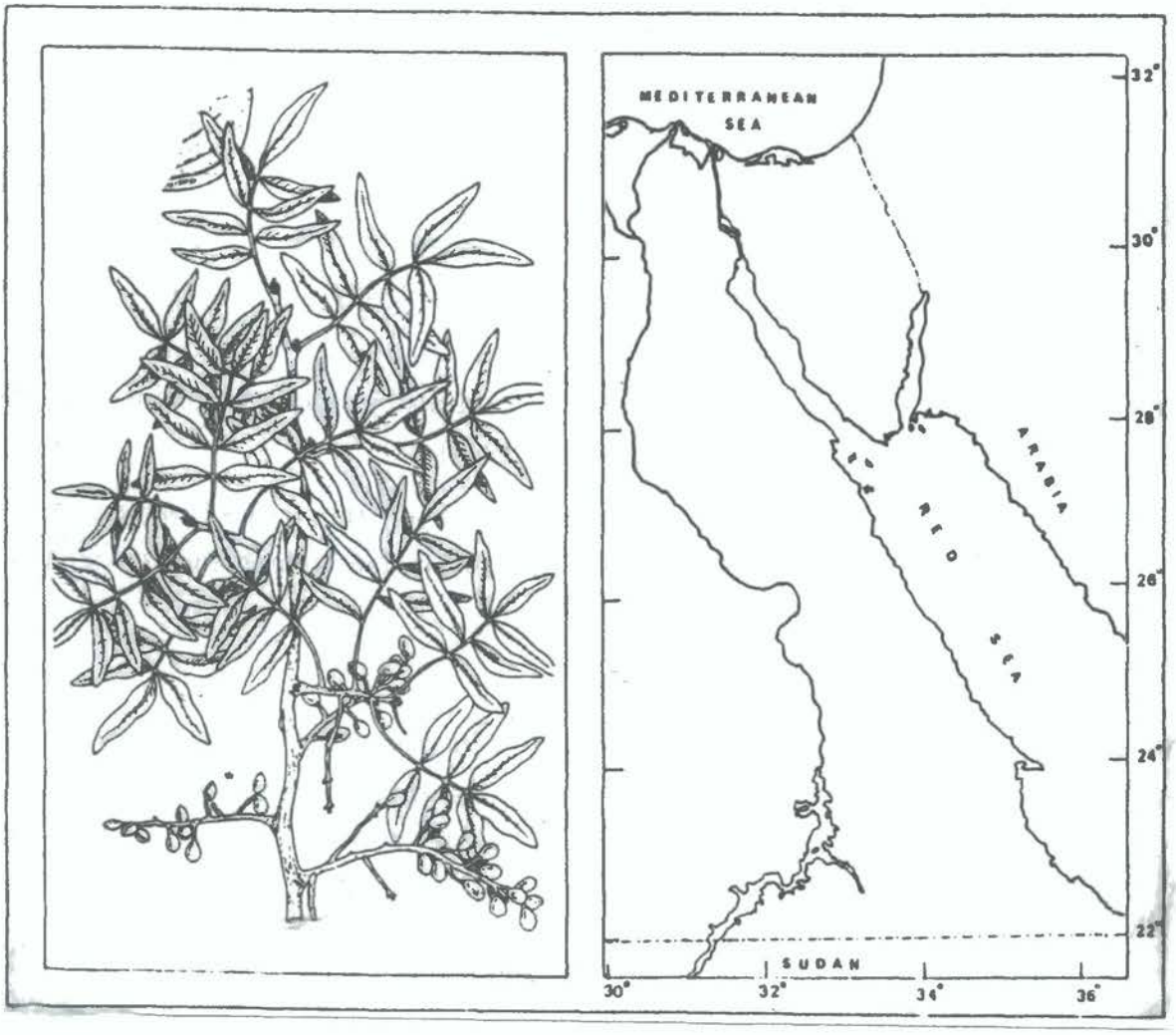
Biology and potential value: The species is of scientific interest being a relict of the Irano-Turanian element in the Middle Saharo-Sindian subregion. It is a decorative tree; also a medicinal plant.

Specimens examined

Dg. Wadi Qattar (west of Hurghada), 20.V.1984, *L. Hassan* 3229 (CAI).

Sa. Gebel Elba, gorge across the north east slope of Gebel Elba, 21.I.1962, *Täckholm et al.* 204 (CAI); Wadi Haikwal, 23.X.1956, *L. Boulos* s.n. (CAI); Gebel Shindodai, 10.II.1962, *Täckholm et al.*1983 (CAI).

81. Pistacia atlantica Desf., Fl. Atl. 2: 364 (1799); Boiss., Fl. Orient. 2: 7 (1872); Zohary et al. in Consp. Fl. Orient. 2: 39 (1983); Greuter et al. in Med-Check. 1: 48 (1984); Danin et al. in Willdenowia 15: 263 (1985).



Deciduous tree, up to 10 m tall. Trunk erect, very stout, branched near the top forming a broad crown, bark ashy greybrown, fissured. Leaves imparipinnate, petiolate, 3-5 pairs; leaflets sessile or subsessile, glabrous or very thinly puberulous; blade lanceolate or oblong to broadly oblong, margin entire, apex obtuse. Flowers unisexual, in axillary racemes or panicles, shortly pedicellate. Male flowrs solitary or in small clusters, perigonial bracteoles usually 5, narrowly oblong, acuminate, glabrous externally. Female flowers solitary or in smallgroups, perigonial bracteoles 6-8, the outer linear-ovate,

the inner ovate or oblong, acute or obtuse, glab·ous. Fruit obovoid or obvoid globular to glooular.

Flowering and fruiting: F e b r u a r y - M a r c h

Vernacular name (Arabic): *But'm*

Habitat and ecology: Meso-phanerophyte which grows on wadi bed formed of hard limestone.

Distribution: Recorded from Palestine northwards to Syrian Deser and eastwards, to Iran; known from N. Africa (Algeria & Libya), Greece Turkey and Cyprus.

In Egypt, *Pistacia atlantica* is confined to gravelly plains and the table mountains of N. Sinai (Danin et al., 1985).

Floristic category: Mesopotamian province of the Irano-Turanian region with extensions to West and Middle Saharo-Sindian subregions as well as E. Mediterranean subregion.

Status: Endangered.

Pistacia atlantica was firstly recorded from the Isthmic Desert (N. Sinai) by Danin (1973). The extreme rarity of this species is related to its high moisture requirements. It flourishes in areas with a rainfall of 500-600 mm/year.

Danin (1980) noted that the frequent drought years in Negev highlands (E. Sinai's Isthmic Desert) cause the death of individual trees and seedlings.

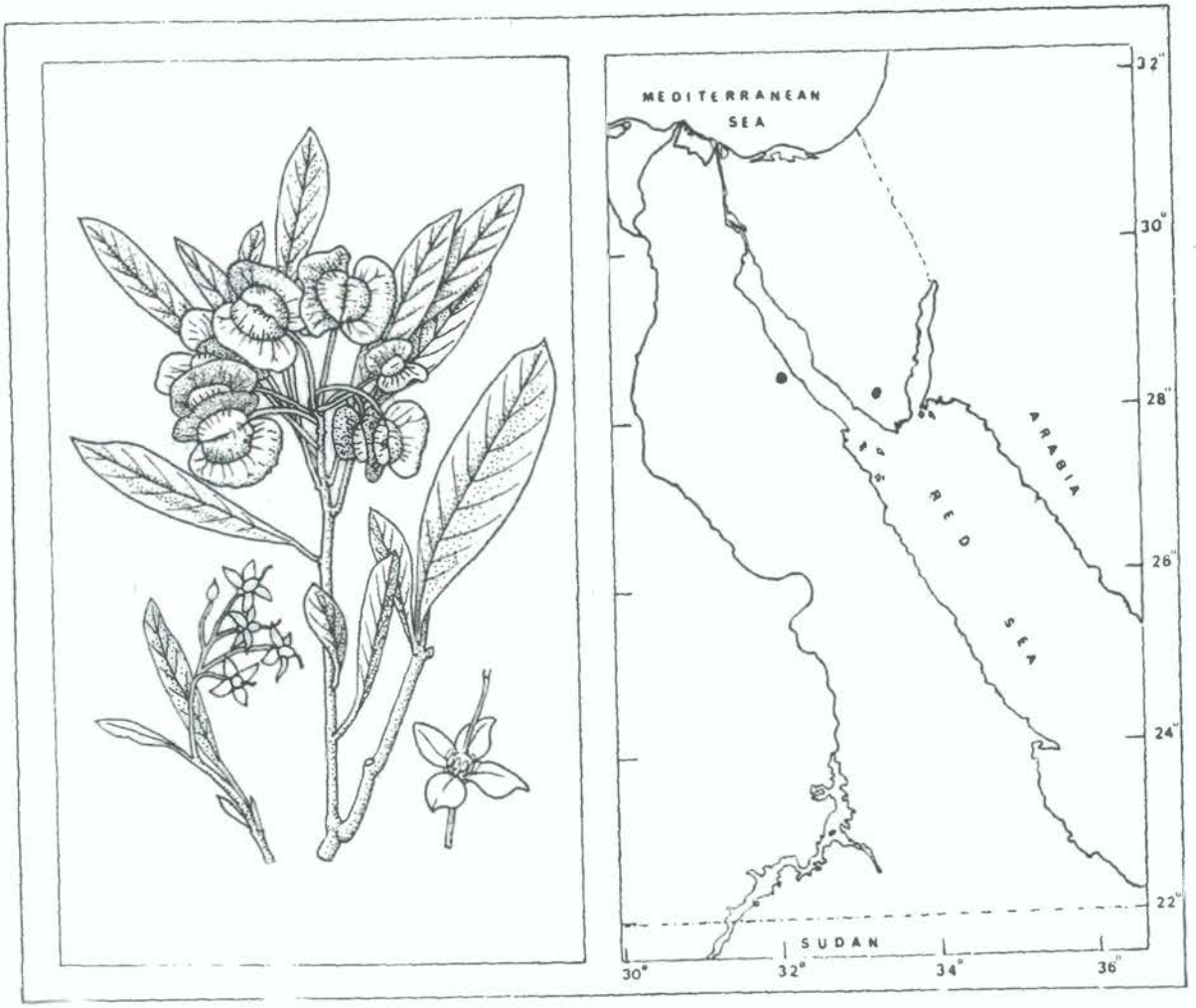
The bedouins do not cut the whole tree, they use the young branches together with leaves as a good todder for their animals.

Conservation measures taken: N o n e

Conservation measures proposed: Gebel Sahaba (13 Km. SW Bir Gifgafa, N. Sinai) be a nature reserve. The cultivation in botanic gardens is another useful method to save the endangered tree.

Biology and potential value: *Pistacia atlantica* is used as stock for the grafting *P. vera* (true Pistachio) which yields the tasty and expensive pistachio; also the resin is sometimes used in folk medicine.

82. **Dodonaea viscosa** Jacq., Enum. Pl. Carib.: 19 (1760); Boiss., Fl. Orient. 1: 953 (1867); Täckholm, Stud. Fl. Egypt ed. 2: 341 (1974).



Shrub or small tree, up to 4 m high. Stems erect, terete, much branched; branchlets slender, often angular, viscid. Leaves membranous or slightly coriaceous, subsessile, glabrous, viscid especially on the upper surface; blade narrowly lanceolate to oblong-lanceolate, elliptic, margin entire, apex acute to obtuse and sometimes apiculate. Flowers in few to many in terminal or axillary cymes. Sepals 4, ovate-triangular, acute, glabrous. Petals absent. Capsule 2 or 3-valved, each valve with a broad longitudinal dorsal membranous wing, brown or reddish when ripe.

Flowring and fruiting: J a n u a r y - M a r c h

Vernacular name (Bishari): *Neeh* (Täckholm, 1974).

(Arabic): *Shath*

Habitat and ecology: Nano-phanerophyte which grows in crevices of hard rocks at higher altitudes.

Kassas and Zahran (1971) noted that *Dodonaea viscosa* is a high water requirements species confined to the north and east facing slopes in Gebel Elba area.

Distribution: Widespread in tropical and warmer subtropics of both hemispheres. Known from Egypt eastwards to Arabia, Iran and Afghanistan; further eastwards to Malaysia, India and Tropical Australia.

Shrub or small tree, up to 1.5 m tall. Stems twisted, terete, branched ito spinescent twigs, with ashy-grey bark. Leaves deciduous, shortly petiolate at first velvety, later glabrous; blade narrowly spathulate, margin entire, apex obtuse. Flowers 4-merous, iminute, in axillary clusters. Sepals triangular-ovate, acute, 3-nerved. Petals minute, reddish yellow. Fruit dry, subglobular, 2-lobed, brown.

Flowering and fruiting: F e b r u a r y - M a r c h

Vernacular name (Arabic): *Za'roor* (Täckholm, 1974).

Habitat and ecology: Chamaephyte which grows in crevices of hard rocks, almost at higher altitudes.

Distribution: Recorded from Jordan and Palestine; eastwards to Saudi Arabia. Very radre in Egyppt, confined to El Galala plateau (Eastern Desert) and mountainuous Sinai.

Floristic category: Middle Saharo-Sindian subregion.

Status: Rare.

The species is of very limited geographical range. It grows in places difficult of access for grazing animals. Danger would be from tourists or a gradual extinction because of some external factors.

Conservation measures taken: N o n e.

Conservation measures proposed: Gebel Senaa (S. Sinai) be a nature reserve.

The population traced by Hobbs in Gebel Shayeb El Banat (Eastern Desert) be a wildlife sanctuary.

Biology and potential value: The species is of considerable scientific interest on account of its limited geographical distribution. Egypt seems to be the northernmost limit of its distribution.

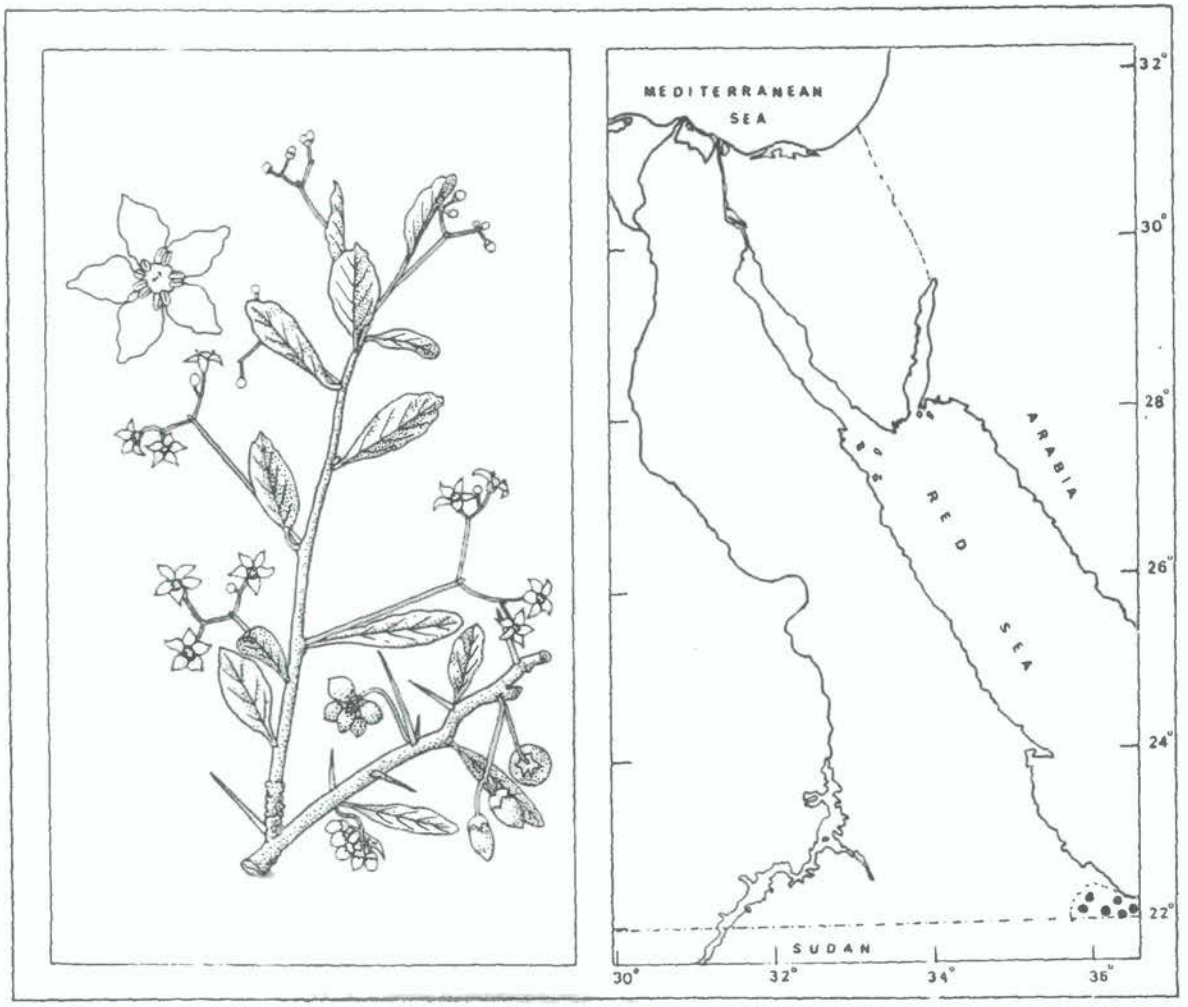
Specimens examined

Dg. Hurghada, Gebel Shayib El Banat, 12-14.X.1983, *Hobbs* 222 (CAI).

S. Gebel Senna, 24.IV.1961, *Täckholm et al. s.n.*(CAI).

83. Maytenus senegalensis (Lam.) Exell, Bol. Soc. Brot. ser. 2, 26: 223 (1952); Täckholm, Stud. Fl. Egypt ed. 2: 341 (1974); Greuter et al. in Med-Check. 1: 289 (1984).

Celastrus senegalensis Lam., Encycl. Meth. Bot. 1: 661 (1785); Boissier, Fl. Orient. 2: 11 (1872).



Woody shrub, up to 2 m tall. Stems ascending, slender to terete, branched, glabrous. Leaves coriaceous, petiolate, glabrous on both surfaces; blade obovate-elliptical or oblanceolate, margin denticulate or nearly entire, apex obtuse, sometimes retuse. Flowers in axillary cymes, pedicellate. Sepals oblong-lanceolate, obtuse, glabrous. Petals white. Capsule subglobose or obovoid, smooth.

Flowering and fruiting: J a n u a r y - M a r c h

Floristic category: Palaeotropical

Status: Rare

Dodonaea viscosa is restricted to higher altitudes at Gebel Elba, which seems to be the northernmost limit of its distribution in Africa. The occurrence of the species at higher altitudes relatively protect the species from overgrazing by domestic livestock.

Conservation measures taken: Gebel Elba protected area. Cultivated in Zoological garden (Giza).

Conservation measures proposed: The population sites in Wadi Yahameib, Gebel Shindodai and Wadi Siamtit be wildlife sanctuaries to insure the long term survival of this species.

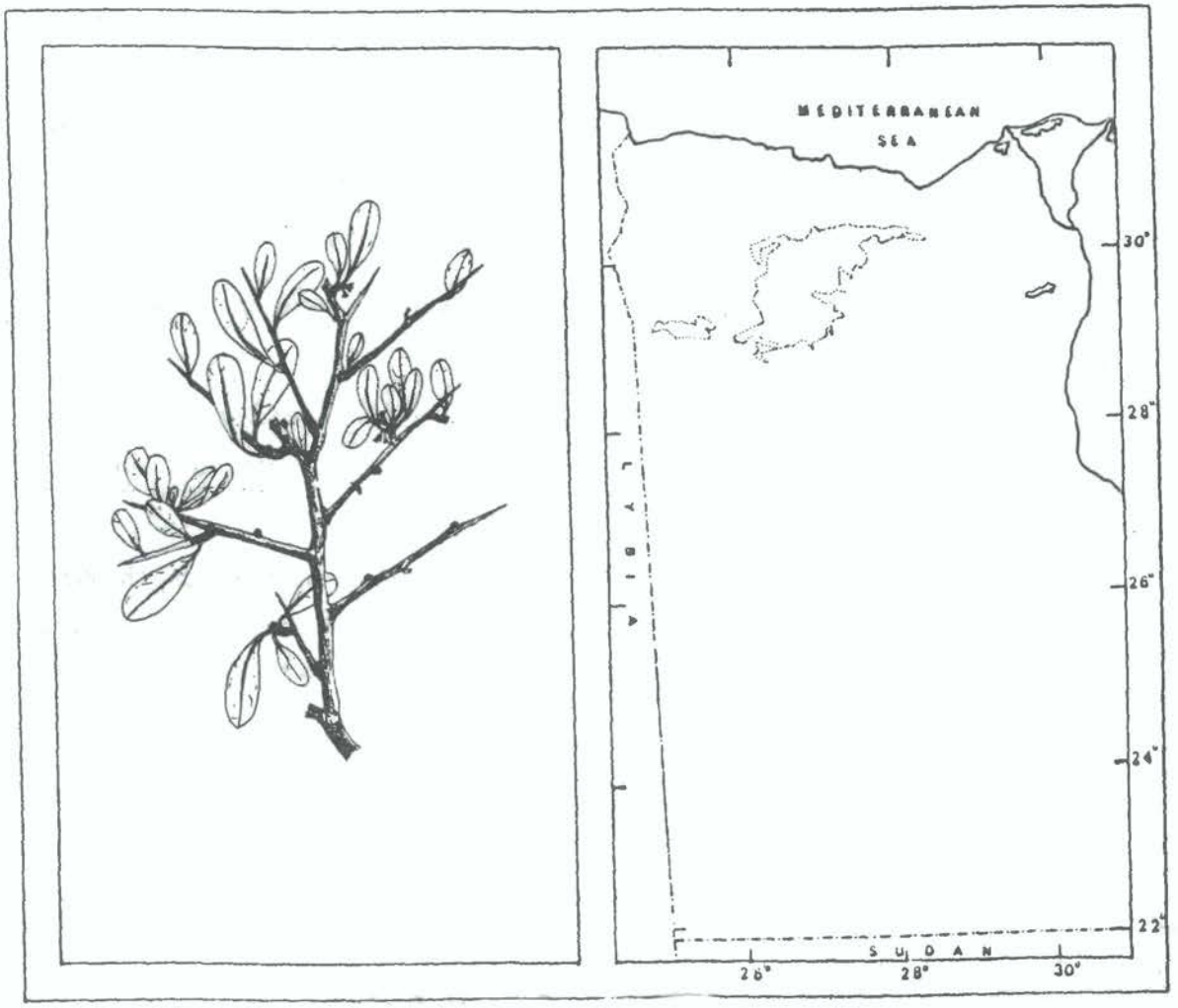
Biology and potential value: *Dodonaea viscosa* is a decorative plant.

Specimens examined

Sa. Wadi siamtit, 23-I-1962, *Täckholm et al.* 342 (CAI), Wadi akwamtra, 27-II-1967, *Osborn & Helmy s.n.* (CAI); Wadi Yahameib, 22-I-1962, *Täckholm et al.* 303 (CAI); Gebel Shindodai, 10-II-1962, *Täckholm et al.* 1952 (CAI); Gorge across Gebel El Shallal, 24-I-1962, *Täckhlom et al.* 479 (CAI); Wadi Aak, 27-I-1962, *Täckholm et al.* 825 (CAI); Wadi Haikwal, 23-X-1956, *L. Boulos s.n.* (CAI).

84. Rhamnus lycioides L. subsp. *oleoides* (L.) Jahandiez et Maire, Cat. Pl. Maroc: 476 (1932); Täckholm, Stud. Fl. Egypt ed. 2: 343 (1974); Greuter et al. in Med-Check. 4: 455 (1989).

R. oleoides L., Sp. Pl. ed. 2: 279 (1762); Boiss., Fl. Orient. 2: 15 (1872); Täckholm, Stud. Fl. Egypt ed. 1: 236 (1956); Zohary et al. in Consp. Fl. Orient. 2: 46 (1983).



Shrub up to 1 m high and 2 m across. Stems erect or prostrate, terete, intricately branched; branches alternare, terminating in a long rigid thorn; bark grey, glabrous or minutely puberulous. Leaves alternate or clustered, petiolate, glabrous or minutely pubescent, distinctiy reticulate veined beneath, blade narrowly oblanceolate, oblong, obovate, obcordate or

almost orbicular, margin entire or subentire, apex acute, mucronate, obtuse, rounded or emarginate. Flowers in axillary clusters, dioecious, pedicellate. Sepals 4, ovatedeltoid, acute, 3-nerved, glabrous. Petals 4 minute, greenish. Fruit subglobose or ovoid drupe, exocarp reddish.

Flowering and fruiting: F e b r u a r y - A p r i l

Vernacular name: N o t k n o w n

Habitat and ecology: Chamaephyte which grows on limestone cliffs along the Mediterranean.

Distribution: Recorded from S. Europe including the Aegean Islands and NW Africa. Confined in Egypt to the northwestern Mediterranean coast.

Vernacular name (Bishari): *Alhoy* (Tackholm, 1974).

Habitat and ecology: Nano-phanerophyte which grows in crevices of hard rocks at higher altitudes.

Kassas and Zahran (1971) noted that *Maytenus senegalensis* is a species of higher water requirements. It grows cn the north and eastern parts of Gebel Elba district.

Distribution: Recorded from Senegal to Cameroon southwards through E. Africa to Tanzania and S.W. Africa; northwards to the Sudan and Egypt, eastwards to Ethiopia, Arabia and Afghanistan to India. Very rare in Egypt, confined to Gebel Elba area.

Floristic category: Sudano-Zambezian region, with extensions to Madagascar; Middle and East Saharo-Sindian subregions.

Status: Vulnerable.

Conservation measures taken: Gebel Elba protected area.

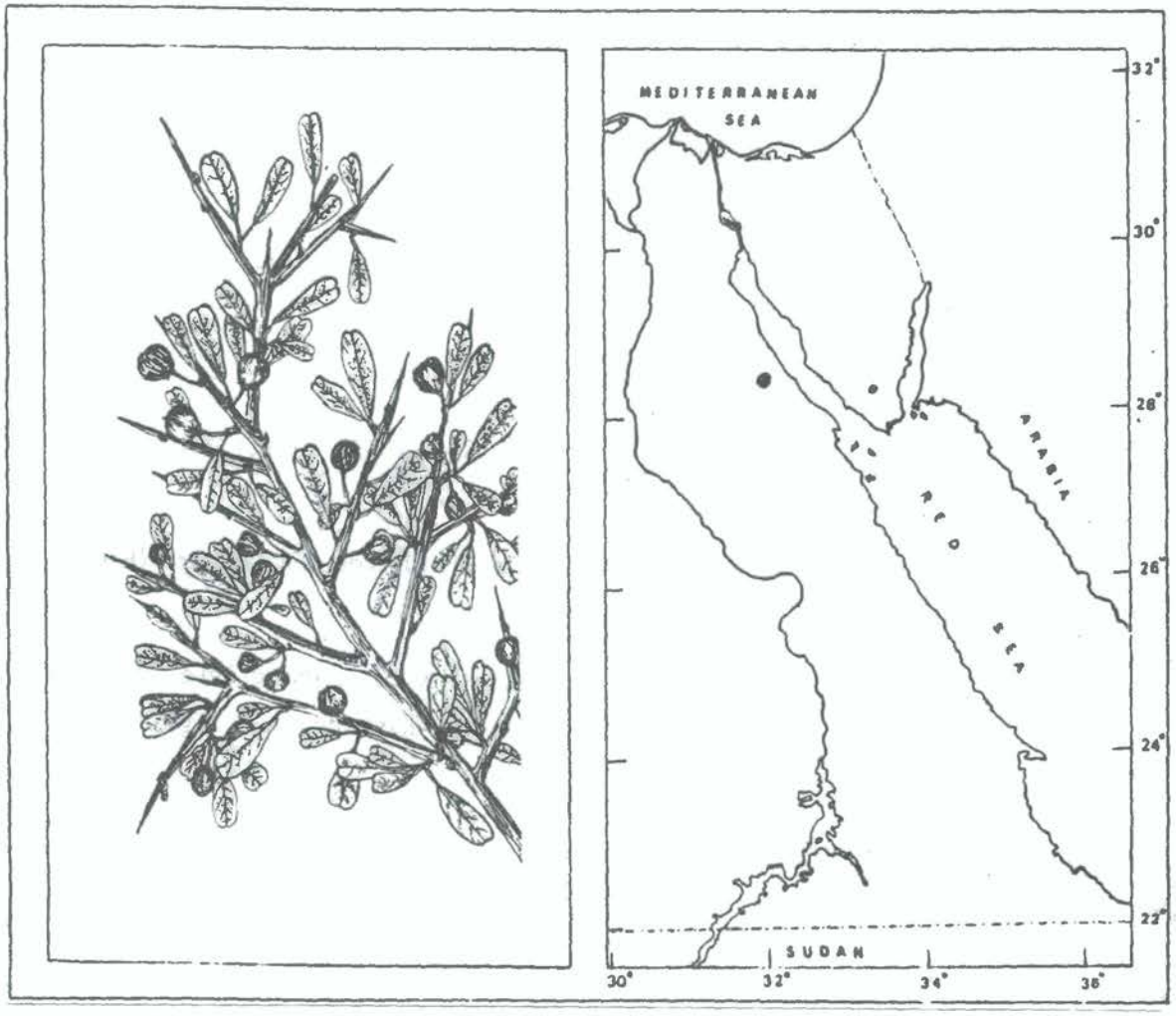
Conservation measures proposed: The population sites in Wadi Merakwan (Gebel Shindodai, Gebel Elba massive) be wildlife sanctuaries.

Biology and potential value: The natives use the branches as dunnage for the roofs of their houses; other branches and trunks are used as firewood.

Specimens examined

Sa. Gebel Shindodai, 10-II-1962, *Täckholm et al.* 1970 (CAI).

85. Rhamnus disperma Ehrenb. ex Boiss., Fl. Orient. suppl.: 156 (1888; "*disperma*"); Täckholm, Stud. Fl. Egypt ed. 2: 343 (1974); Check. 4: 454 (1989).



Shrub or small tree, up to 1.5 m tall. Stems twisted, terete, branched into spinescent twigs, with ashy grey bark. Leaves deciduous, shortly petiolate, at first velvety, later glabrous; blade narrowly spathulate, margin entire, apex ontuse. Flowers 4-merous, minute, in axillary clusters. Sepals triangular-ovate, acute, 3-nerved. Petals minute, reddish yellow. Fruit dry, subglobular, 2-lobed, brown.

Flowering and fruiting: F e b r u a r y - M a r c h

Vernacular name (Arabic): *Za'roor* (Täckholm, 1974).

Habitat and ecology: chamaephyte which grows in crevices of hard rocks, almost at higher altitudes.

Distribution: Recorded from Jordan and Palestine; eastwards to Saudi Arabia. Very rare in Egypt, confined to El Galala plateau (Eastern Desert) and mountainous Sinai.

Floristic category: Middle Saharo-Sindian subregion.

Status: Rare.

The species is of very limited geographical range. It grows in places diffi cult of access for grazing animals.

Conservation measures taken: N o n e

Conservation measurs proposed: Gebel Senaa (S. Sinai) be a nature reserve.

The population traced by Hobbs in Gebel Shayeb El Banat (Eastern Desert) be a wildlife sanctuary.

Biology and potential value: The species is of considerable scientific interest on account of its limited geographical distribution. Egypt seems to be the northernmost limit of its distribution.

Specimens examined

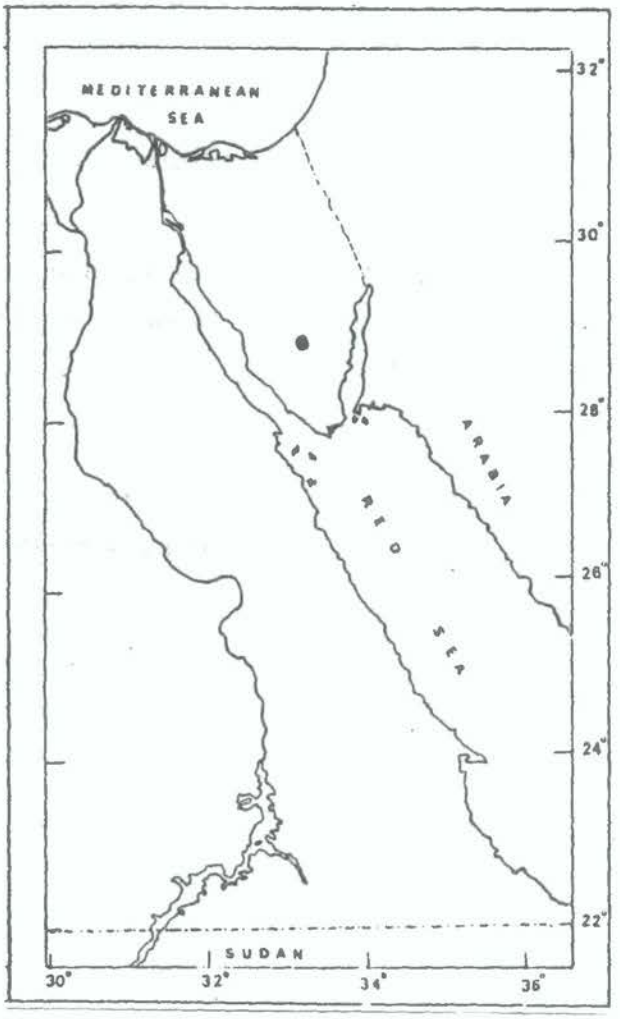
Dg. Hurghada, Gebel Shayib El Banat, 12-14.X.1983, *Hobbs* 222 (CAI).

S. Gebel Senna, 24.IV.1961, *Täckholm et al. s.n.* (CAI).

86. Sageretia thea (Osbeck) M.C. Johnst., Jour. Arnold. Arb. 49: 378 (1968); Zohary et al. in Consep. Fl. Orient. 2: 45 (1983); Greuter et al. in Med-Check 4: 457 (1989).

Rhamnus thea Osbeck, Dagb. Ostind. Resa: 232 (1757).

Sageretia brandrethiana Aitch. sensu Täcknolm, Stud. Fl. Egypt ed. 2: 343 (1974); Danin et al. in Willdenowia 15: 300 (1985).



Shrub up to 1 m tall. Stems ascending, terete, intricately branched; branches opposite, spinescent, pubescent or glabrous. Leaves opposite, subcoriaceous, petiolate, glabrous or sparingly pilose on upper surface, glabrous or lanate beneath; blade ovate, elliptic or suborbicular, margin entire or minutely denticulate, apex obtuse or acute. Flowers in terminal panicles,

sessile. Sepals 5, ovate-deltoid, acute, glabrous. Petals 5, greenish-cream. Fruit small, globose drupe.

Vernacular name (Arabic): *Orontel* (Täckholm, 1974).

Habitat and ecology: Chamaephyte which grows in crevices of smooth-faced rocky outcrops.

Distribution: Recorded from Saudi Arabia, eastwards through S. Iran, Afghanistan, Pakistan to India and SE. Asia. Known from Syria, Lebanon and Turkey.

In Egypt, *Sageretia thea* is a very rare species and confined to mountainuous Sinai.

Floristic category: Middle Saharo-Sindian subregion with extensions to E. Mediterranean subregion, Mesopotamian province of the Irano-Turanian region and Indo-Malaysian region.

Status: Endangered.

The extreme rarity of the species can be related to its limited geographical distribution. Sinai peninsula seems to represent its western limit.

Danin et al. (1989) noted that *S. thea (S. brandrethiana)* sporadically grows in rocky habitats of Southern Sinai, the small populations of the species is highly endangered by uprooting. The natives use the whole plant as a fuel.

Conservation measures taken: N o n e

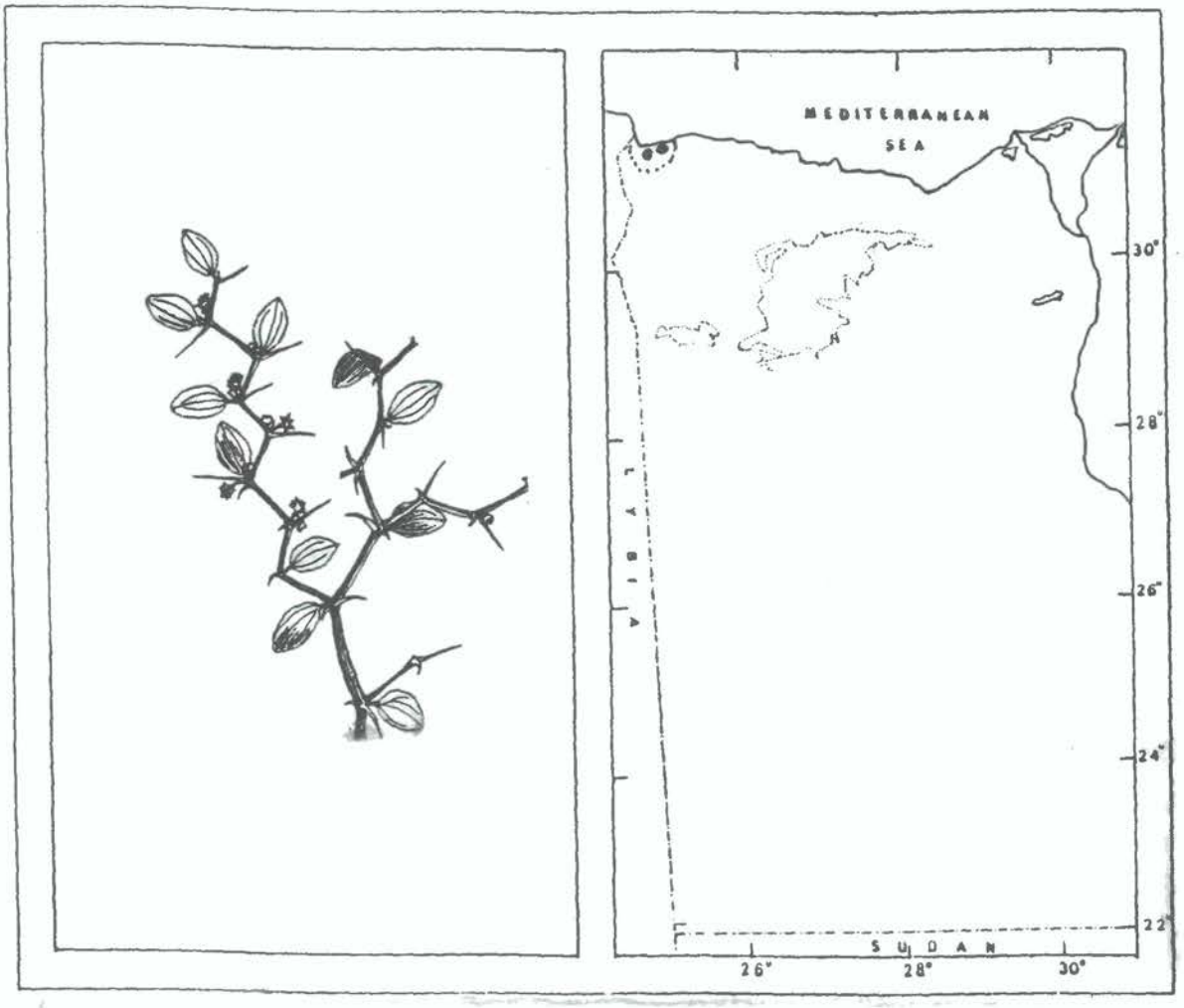
Conservation measures proposed: The population sites of *Sageretia thea* in S. Sinai be wildlife sanctuaries. Cultivation in botanic gardens can help in protecting this taxon.

Biology and potential value: *Sageretia thea* like several other plants, is confined to rock-crevice communities. It provides a model for studying the variational and evolutionary patterns in systems of small isolated populations.

No specimens seen.

87. Ziziphus lotus (L.) Lam., Encycl. Meth. Bot. 3: 317 (1789); Boiss., Fl. Orient. 2: 12 (1872); Täckholm, Stud. Fl. Egypt ed. 2: 345, Pl. 117 B. (1974); Zohary et al. in Consp. Fl. Orient. 2: 47 (1983); Greuter et al. in Med-Check. 4: 457 (1989).

Rhamnus lotus Linn., Sp. Pl.: 194 (1753).



Deciduous thorny shrub up to 2.5 m high. Stems sprawling or ascending, slender, very intricately branched and zigzag, armed with slender spines, bark whitish or ashy grey, glabrous. Leaves shortly petiolate, 3-nerved, glabrous on both surfaces, blade ovate-oblong to broadly elliptical, margin minutely crenulate, apex obtuse or subacute. Flowers solitary, axillary or in small clusters, pedicellate. Sepals ovate, acute, glabrous. Petals yellowish. fruit globose, yellow or reddish-brown when ripe.

Flowering and fruiting: M a r c h - A p r i l

Vernacular name (Arabic): *Nabk, Sidr* نبق، سدر

Habitat and ecology: Nano-phanerophyte which grows on slopes and cliffs of limestone.

Distribution: Recorded from S. Europe and N. Africa, eastwards to Turkey, Syria, Palestine and Arabia.

Floristic category: Mediterranean region with extensions to Middle Saharo-Sindian subregion.

Status: Endangered.

Ziziphus lotus is only known from El Sallum plateau at the higher boundries. Its habitat becomes further depleted in size due to the establishment of new settlements into the area.

Conservation measures taken: N o n e

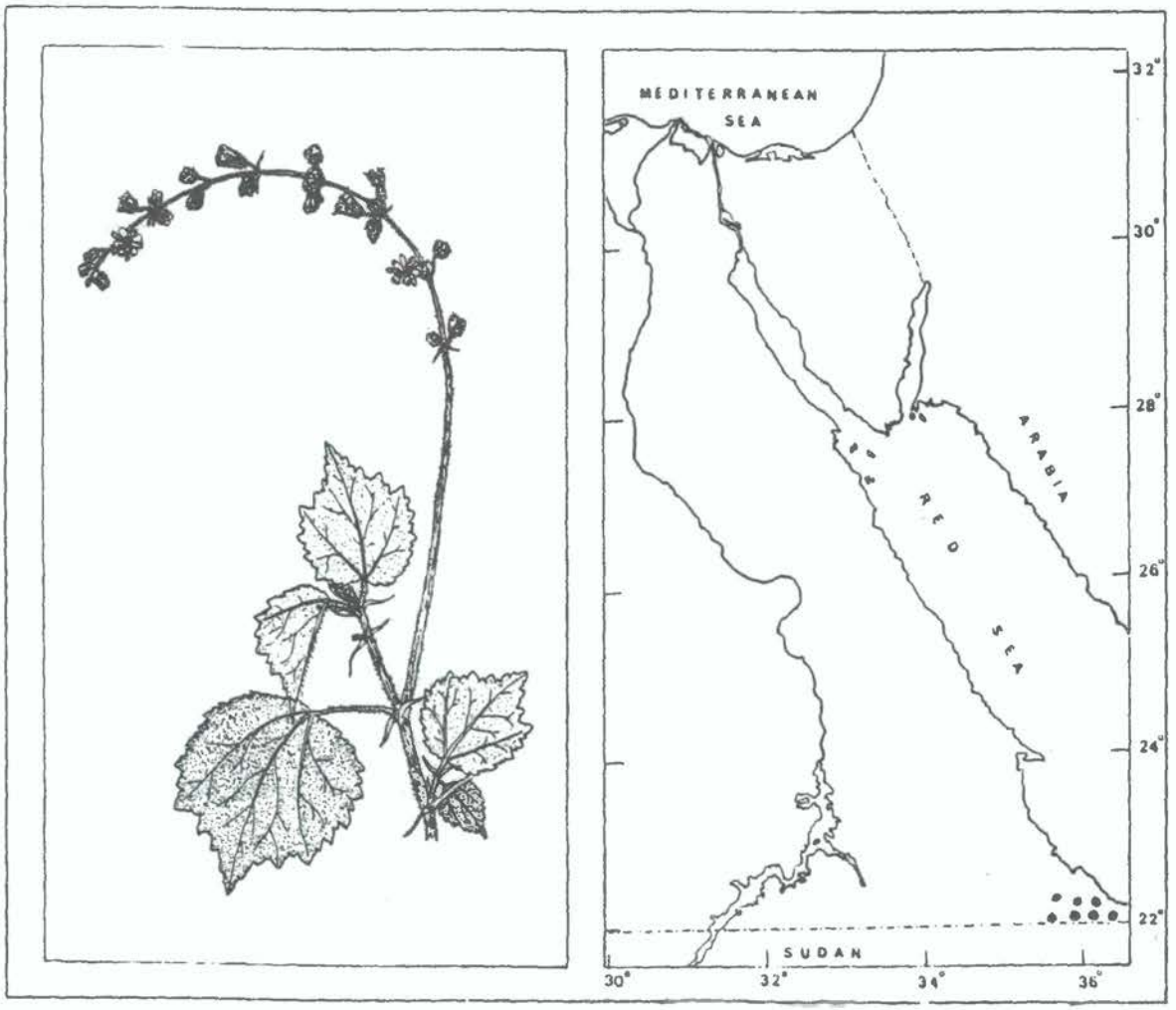
Conservation measures proposed: El Sallum plateau, west of Mersa Matrouh be a nature reserve.

Biology and potential value: *Ziziphus lotus* is a potential source of genetic variation. It can be exploited in future programmes of breeding for the selection of new fruit varieties.

Specimens examined

M. El Sallum town, 24.V.1963, *Täckholm et al., s. n.* (CAI); 10 Km. east of El Sallum, 29.IX.1963, *L. Boulos s.n.* (CAI); El Sallum, 5 Km. east on the plateau, 21.X.1965, *Osborn & Helmy s.n.* (CAI).

88. Triumfetta flavescens Hochst. ex. A. Rich., Tent. Fl. Abyss. 1: 82 (1874); Boissier, Fl. Orient. 1: 844 (1867); Täckholm, Stud. Fl. Egypt ed. 2: 348 (1974).



Shrubs up to 2 m high. Stems erect and ascending, terete, branched, studded with black dots; young branches slender, villose and brown. Leaves long petiolate, tomentose on both surfaces especially beneath; blade ovate-orbicular, margin crenate or irregularly dentate, apex acute. Flowers in leafless, terminal spike-like racemes, subsessile. Sepals linear or oblong, apiculate, tomentose. Petals yellow. Fruit indehescent, oblong, covered with greyish small, ciliated hooked prickles.

Flowering and fruiting: D e c e m b e r - F e b r u a r y

Vernacular name (Bishari): *Handboak* (Täckholm, 1974).

Habitat and ecology: Nano-phanerophyte which grows on gorges and slopes of mountains.

Distribution: Recorded from Tanzania, Uganda and Kenya, northwards to Ethiopia, Somalia and the Sudan; eastwards to Saudi Arabia and Yemen. Very rare in Egypt, confined to Gebel Elba area.

Floristic category: Zambezian, Afro-Oriental, E. Sahelian and S. Arabian domains of the Sudano-Zambezian region.

Status: Rare

Most of the populations of *Triumfetta flavescence* are confined to Gebel Elba area, which seems to be the northern limits of the taxon distribution in Africa.

The vegetation spread and regeneration of our taxon is rather good; there seems to be no danger of serious decline facing this species.

Conservation measures taken: Gebel Elba protected area.

Conservation measures proposed: The population sites of *Triumfetta flavescens* scattered in Wadi Kansisrob, Wadi Aak and Wadi Merakwan of Gebel Elba massive be wildlife sanctuaries.

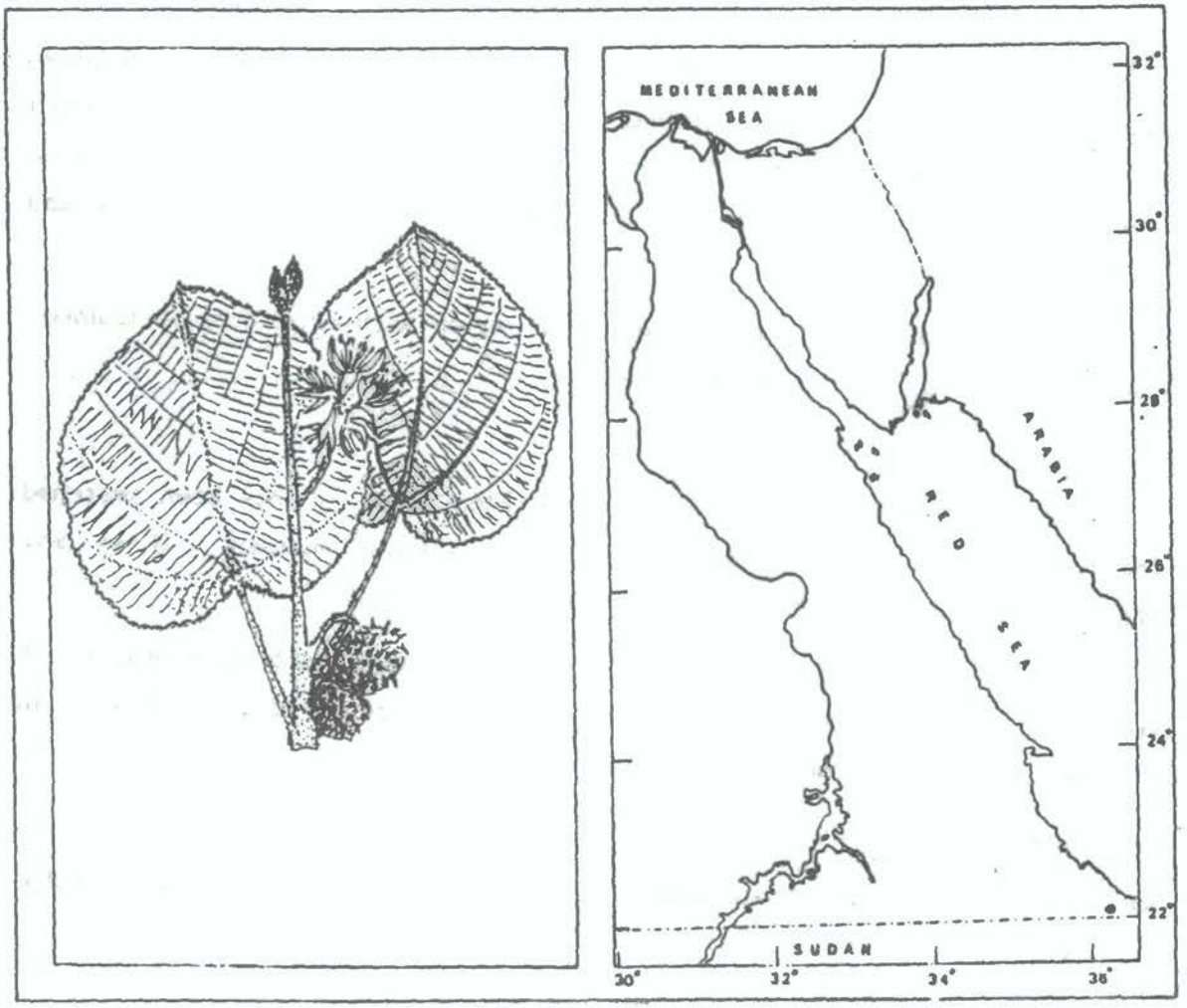
Cultivation in botanic gardens as an ornamental plant seems to be another reliable method to protect our taxon.

Biology and potential value: The species is of scientific interest on account of its geographical distribution. With its fragrant flowers, it is potentially an interesting garden plant.

Specimens examined

Sa. Gebel Elba, Wadi Siamtit, 23-I-1962, *Täckholm et al.* 350 (CAI); Gebel Elba, across north-east slopes of Gebel Elba, 21-I-1962, *Täckholm et al.* 197 (CAI); Wadi Kansisrob, 24-I-1933, *J.R. Shabetai* F. 1847 (K); Wadi Aideib, 14-I-/6-II-1933, *Fahmy & Hassib s.n.* (CAI); Wadi Saremtai, 23-I-1962; *Täckholm et al.* 350 (CAI); Khor across Gebel Shallal, 24-I-1962, *Täckholm et al.*462 (CAI); Gebel Shallal, 6-III-1863; *Schweinfurth* 2481 (K); Wadi Merakwan, 10-II-1962, *Täckholm et al.* 2043 (CAI).

89. Grewia villosa Willd., Ges. Naturf. Freund. Berlin Neue Schr. 4: 205 (1803); Boiss., Fl. Orient. suppl.: 136 (1888); Täckholm, Stud. Fl. Egypt ed. 2: 348 (1974).



Shrubs up to 1 m tall. Stems ascending, terete, branched, brown, glabrous; branches spreading, slender, covered with long setaceous hairs. Leaves petiolate, rugose above, villose beneath, blades subcircular to broadly elliptic, margin serrate, apex rounded. Flowers in terminal and axillary panicles, sessile. Sepals linear-lanceolate, acute, silky pubescent outside, slightly pubescent and yellow inside. Petals yellow. Fruit globose, of cherry-size, hard, coppery-red, hairy.

Flowering and fruiting: December - February

Vernacular name (Bishari): *Diwal* (Täckholm, 1974).

Habitat and ecology: Chamaephyte which grows in crevices of hard rocks.

Distribution: Recorded from Senegal, Ivory Coast, and N. Nigeria, eastwards to Ethiopia, Saudi Arabia, Yemen and India, southwards through E. Africa to Uganda, Kenya, Tanzania, Rhodesia and S. Africa, and northwards to Somalia and the Sudan. In Egypt it is a very rare species and confined to Gebel Elba area.

Floristic category: Sudano-Zambezian region with extensions to Guineo-Congo region and Indo-Malaysian region.

Status: Extinct.

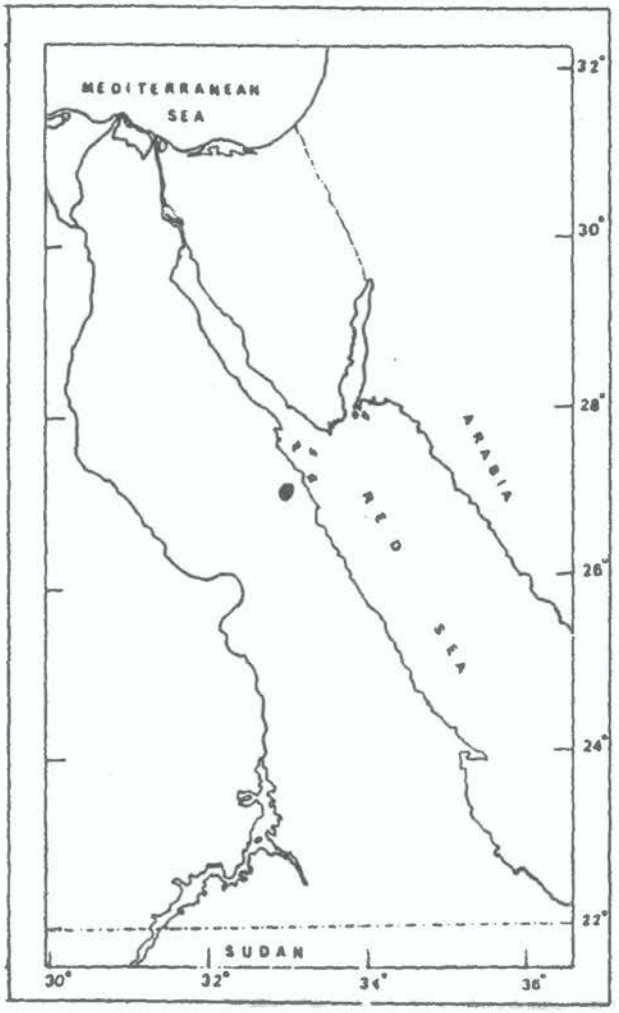
The species was last seen in 1933 in Gebel Elba area. It has been searched for repeatidly in earlier collecting localities without success. If by any chance it does survive, the species would be endangered.

Biology and potential value: The species is of considerable interest to studies of plant geography since it belongs to a genus that is tropical in distribution. Its branches are used for bows.

Specimens examined

Sa. Gebel Elba, Wadi Akau, 2-II-1933, *Hassib s.n.* (CAI); Gebel Elba, V-1932, *Drar s.n.* (CAI).

90. Abutilon figarianum Webb, Fragm. Fl. Aethiop.: 52 (1854); Täckholm, Stud. Fl. Egypt ed. 2: 354 (1974); Zohary et al. in Consp. Fl. Orient. 2: 51 (1983).



Leafy shrub up to 2 m tall. Stems erect, terete, branched, covered with down, interspresed with a few spreading villi. Leaves petiolate, hairy on both surfaces; blade orbicular-cordate, margin coarsly crenate, apex acuminate. Flowers solitary or in pairs, pedicellate. Sepals ovate, acuminate villose. Petals deeply yellow. Carpels membranous, oblong, with rounded apex, 3-seeded.

Vernacular name (Bishari): *Hamboak* (Täckholm, 1974).

Habitat and ecology: Chamaephyte which grows on sandy gravel plains and fallow land.

Distribution: Recorded from Egypt and Saudi Arabia.

Floristic category: Middle Saharo-Sindian subregion.

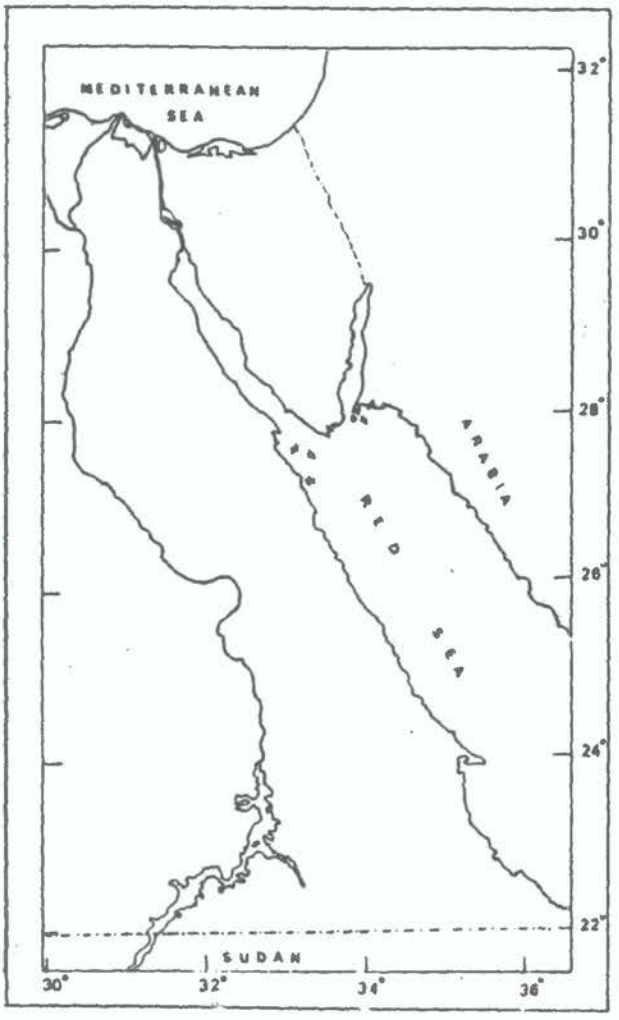
Status: Indeterminate.

Further investigations are needed to determine accurately the distribution sites of the species in Egypt.

Specimens examined

R. Wadi Ghweiba, Red Sea coast (two large shrubs), 9.VI.1960, *Täckholm et al. s.n. (CAI).*

91. Pavonia kotschyii Hochst. ex Webb, Fragm. Fl. Aethiop.: 43 (1854); Täckholm, Stud. Fl. Egypt ed. 2: 355 (1974).



Woody perennial up to 30 cm high. Stems erect and spreading, slender, branched, densely villose. Leaves petiolate, villose on both surfaces; blade oblong-ovate, margin serrate, apex obtuse. Flowers solitary, axillary, pedicellate. Epicalyx of 10 linear, ciliate bracts, exceeding calyx. Calyx cup-shaped, 5-parted, lobes lance-shaped, villose. Corolla yellow, as long as or longer than epicalyx. Mericarps oblong, each provided with two large wings.

Flowering and fruiting: December - February

Vernacular name: Not known

Habitat and ecology: Chamaephyte which grows on sandy pockets between hard rocks.

Distribution: Recorded from Mali, N. Nigeria and Tschad, eastwards to Ethiopia, then southwards to Kenya and northwards to Somalia and the Sudan; known also from Saudi Arabia.

Confined in Egypt to Gebel Elba area.

Floristic category: Sahelian, Afro-Oriental and S. Arabian domains of the Sudano-Zambezian region.

Status: Extinct.

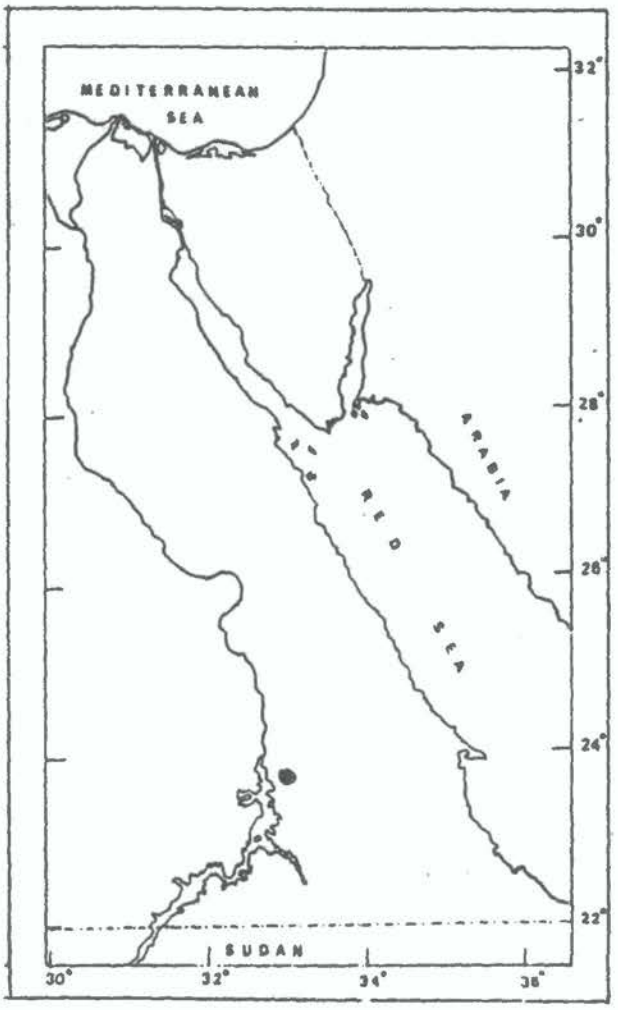
The species was last seen in 1933 in Gebel Elba area. If by any chance the species does survive it would be endangered.

Biology and potential value: The species is of scientific interest on account of its geographical distribution, since Egypt seems to be the northern-most limit of the taxon's distribution in Africa.

Specimens examined

Sa. Gebel Elba, Wadi Daqa laieb, 5-III-1933, *J.R. Shabetai* F. 1434 (K).

92. **Pavonia arabica** Hochst. ex Steud., Nom. Bot. ed. 2, 2: 279 (1841); Boiss., Fl. Orient. 1: 837 (1867); Täcknolm, Stud. Fl. Egypt ed. 2: 355 (1974).



Woody perennial up to 3 m high. Stems erect, tufted, with spreading branches, tomentose. Leaves petiolate, silvery downy; blade oblong-ovate, margin entire or with small teeth at tip, apex obtuse. Flowers pedicellate. Epicalyx of 10-20 linear, villose bracts, arching over the ripe fruit. Calyx cupshaped shorter than bracts, 5 parted, lobes lanceolate, acute. Corolla pink. Fruit subglobose, pea-size, 3-sided, villose.

Flowering and fruiting: January - March

Vernacular name: Not known

Habitat and ecology: Chamaephyte which grows on sandy gravel plains.

Distribution: Recorded from Tanzania, Uganda and Kenya, northwards to Ethiopia, Somalia and the Sudan, eastwards to Saudi Arabia, Yemen, Oman and India.

Floristic category: Zambezian, Afro-Oriental, and S. Arabian domains of the Sudano-Zambezian region with extensions to Indo-Malaysian region.

Status: Indeterminate.

This species was collected once from Nubia (without locality) in 1896.

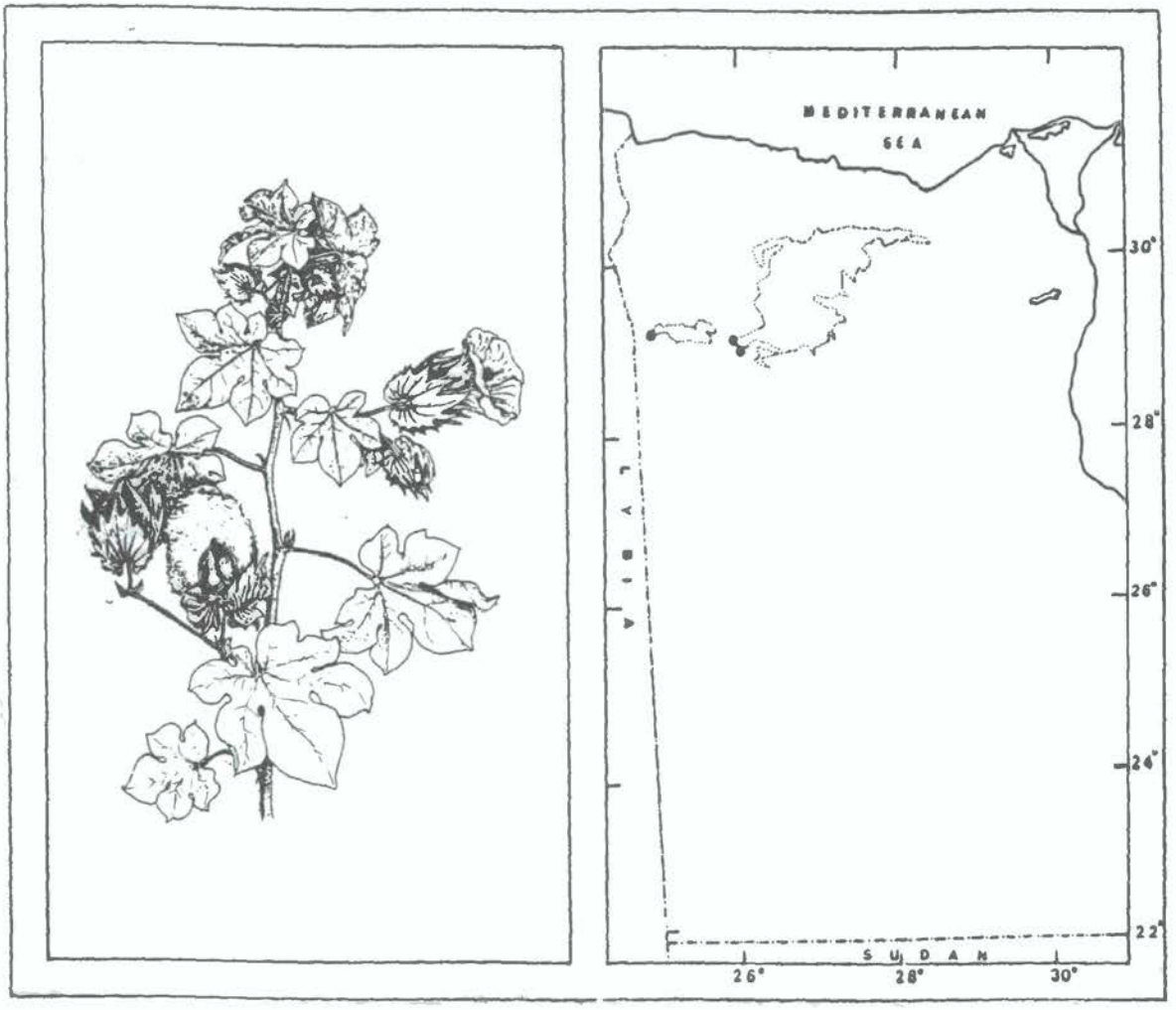
Biology and potential value: The species is of scientific interest as a member of a critical group relevant to studies of plant geography and taxonomy.

Specimens examined

Nubia, 1896, Mr *J.H. Bent s.n.* (K).

93. Gossypium arboreum L., Sp. Pl.: 693 (1753); Sickenberger, contrib. Fl. Egypte: 195 (1901); Täckholm, Stud. Fl. Egypt. ed. 2: 356, Pl. 121 (1974); Greuter et al. in Med-Check. 4: 235 (1989).

G.obtusifolium Roxb., Hort. Beng.: 51 (1814).



Tall shrubs up to 6 m tall. Stems erect, stout, branched; branchlets slender, brown, pilose. Leaves petiolate, sparingly hairy on both surfaces; blade palmately lobed, 5-7 lobes; lobes oblong- lanceolate, margin entire, apex mucronulate. Flowers solitary in leaf axils, pedicellate. Epicalyx of 3 cordate, ovate, acute bracts, much longer than calyx. Calyx campanulate with 5 short teeth. Corolla pale yellow, with purplish blotches to purple-red with darker centre. Fruit a loculicidal capsule with numerous hairy seeds.

Flowring and fruiting: J a n u a r y - F e b r u a r y

Vernacular name (Arabic): *Cotton*

Habitat and ecology: Micro-phanerophyte which grows on sandy loam.

Distribution: Recorded from Niger, eastwards to Ethiopia; northwards to Somalia and the Sudan. Also recorded from India and Japan.

In Egypt, the species is very rare and confined to the Western Desert.

Floristic category: Sahelian and Afro-Oriental domains of the Sudano-Zambezian region with extensions to the Indo-Malaysian region and E. Irano-Turanian subregion.

Status: Endangered.

Gossypium arboreum was recorded earlier from Egypt in Bahariya Oasis (Tackholm, 1974).

Two populations were traced in Ain (spring) Makhlouf (an olive orchard at Um-Saghier Oasis, 120 Km. east of Siwa Oasis) and Ain (spring) Shohba Date palm grove at El Maraqi, 60 Km. west of Siwa Oasis.

Conservation measures taken: N o n e.

Conservation measures proposed: The two population sites traced by the writer at Ain Makhluof and Ain Shohba in Siwa Oasis be wildlife sanctua

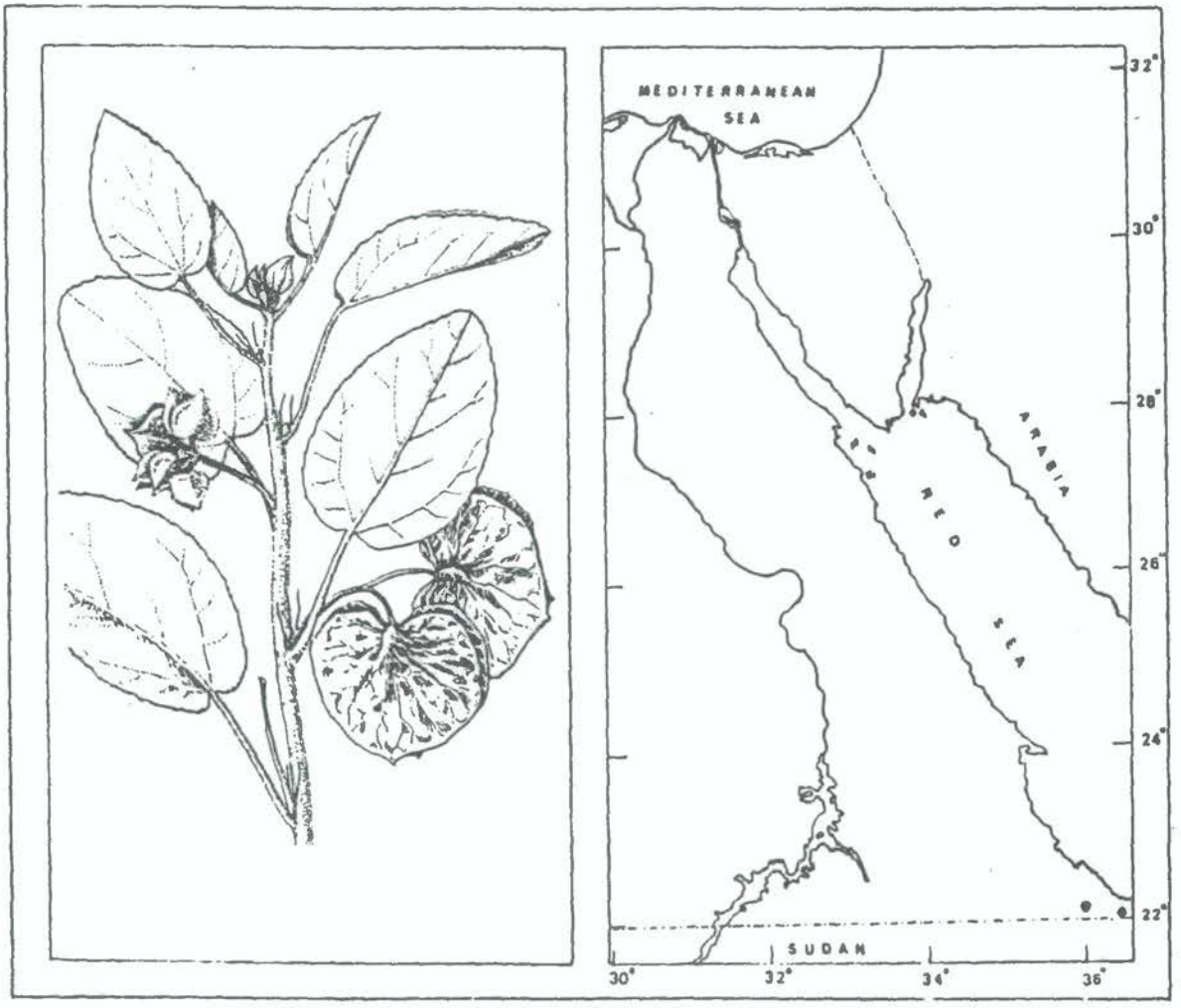
Preserving the seeds in seed banks is also recommended to protect the species from extinction.

Biology and potential value: According to Sickenberger (1901) *Gossypium arboreum* is the wild relative of the cotton cultivars in Egypt, such as: *G. arboreum* x *G. barbadense* (cotton-Mit-Afifi) and *G arboreum* x *G. punctatum* (cotton Zafiri). It is absolutely essential to preserve this wild relative as the genetic base for future breeding.

Specimens examined

O. Ain-Shohba (El Maraqi 60 Km. west of Siwa Oasis), 18.IV.1986, *El-Hadidi et al s.n.* (CAI) Ain-Kakhlouf (Um El Saghier, 120 Km. east of Siwa Oasis), 17.IV.1986, *A.G. Fahmy* 153 (CAI); Ain-Kakhlouf (Um El Saghier, 120 Km. east of Siwa oasis), 28.I.1987, *A.G. Fahmy* 421 (CAI).

94. Melhania denhamii R. Br. in Denh. & Clapp., Narr. Trav. Afr. App.: 232 (1826); Täckholm, Stud. Fl. Egypt ed. 2: 358, Pl. 122 (1974).



Small shrubs with woody stocks up to 60 cm high. Branches terete, slightly compressed, beset with stellate hair. Leaves petiolate, velvety on both sides; blade ovate, ovate-elliptic, or oblong-elliptic, margin crenate-serrate, apex obtuse. Flowers in 2-5-flowered cymes or solitary, pedicellate. Bracts cordate-reniform, becoming membranous, reticulately veined. Sepals lanceolate or ovte, acute, densely hairy outside, sparsely within. Petals red. Capsule subglobose-globose, villouse.

Flowering and fruiting: December - February

Vernacular name (Bishari): *Dabaagh* (Täckholm, 1974).

Habitat and ecology: Chamaephyte which grows on rocky slopes.

Kassas and Zahran (1971) noted that *Melhania denhamii* is a species of higher water requirements. It grows mainly at higher altitudes.

Distribution: Recorded from Senegal through Tropical Africa to Ethiopia, Somalia and the Sudan, eastwards to Arabia, Iran, W. Pakistan and India.

Very rare in Egypt, and confined to the north slopes of Gebel Elba.

Floristic category: Sahelian, Afro-Oriental and S. Arabian domains of the Sudano-Zambezian region to Irano-Anatolian province of the Irano-Turanian region with extensions to the Indo-Malaysian region.

Status: Vulnerable.

The extreme rarity of the species is due to its limited geographical distribution. Gebel Elba area seems to be its northernmost limit in north-east Africa. In addition, the small-sized populations are subjected to overgrazing.

Conservation measures taken: Gebel Elba protected area.

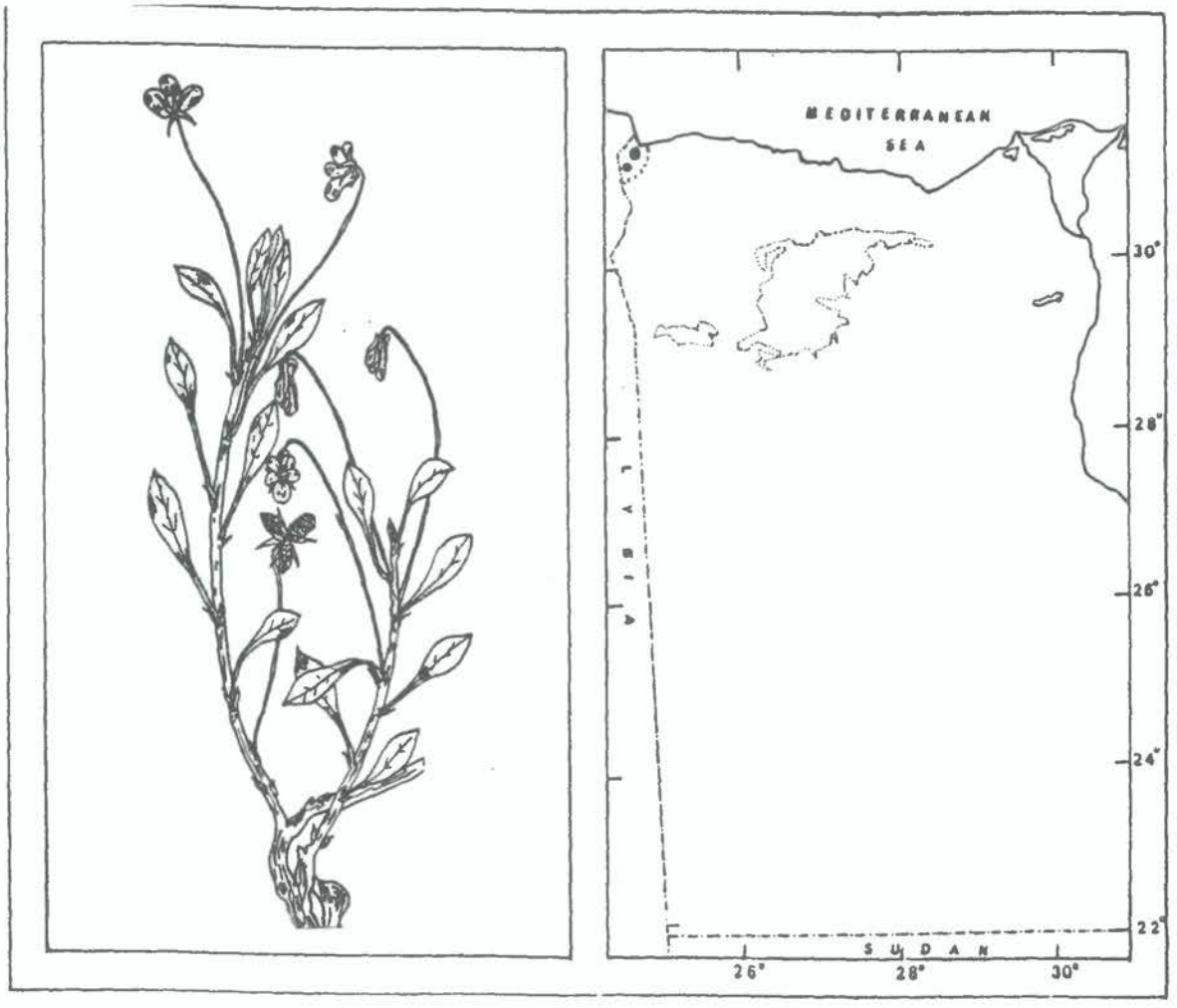
Conservation measures proposed: Two or more populations of *Melhania denhamii* in Gebel Karam Elba and Wadi Laseitit (Gebel Elba massive) be wildlife sanctuaries.

Biology and potential value: The species is of scientific interest on account of its geographical distribution. It is also a valuable food plant for livestock in arid areas.

Specimens examined

Sa. Gebel Karam Elba, 7-II-1962, *Täckholm et al.* 1745 (CAI); Wadi Laseitit, 7-II-1962, *Täckholm et al. s.n.* (CAI).

95. Viola scorpiuroides Coss., Bull. Soc. Bot. France 19: 80, t. 3 (1872); Täckholm, Stud. Fl. Egypt ed. 2: 360 (1974); Zohary et al. in Consp. Fl. Orient. 2: 65 (1983).



Perennial herb, woody at base, up to 20 cm high. Stems ascending, slender, branched near the base, hairy. Leaves petiolate, greenish on the upper surface, sparsely hairy at the margins and nerves, glabrous beneath; blade spathulate or lanceolate, margin entire, apex acute. Flowers small, solitary, axillary, pedicellate. Sepals lanceolate, acute, with ciliate margins. Petals yellow with a little black throat, super hairy within. Capsule subglobose, ovate-subtrigonus, many seeded.

Flowering and fruiting: January - March

Vernacular name: N o t k n o w n

Habitat and ecology: Chamaephyte which grows on limestone slopes and cliffs.

Distribution: Recorded from S. Aegean Islands and Libya.
Very rare in Egyppt, confined to El Sallum plateau (Marmarica district)

Floristic category: Endemic to S. Mediterranean subregion.

Status: Indeterminate

The species was last seen in 1934, since that time, several searches failed to found that taxon in its earlier collection sites. If by any chance it does survive in the wild, it would be endangered, owing to its small populations size confined to El Sallum plateau which is subjected to future development.

Conservation measures taken: N o n e

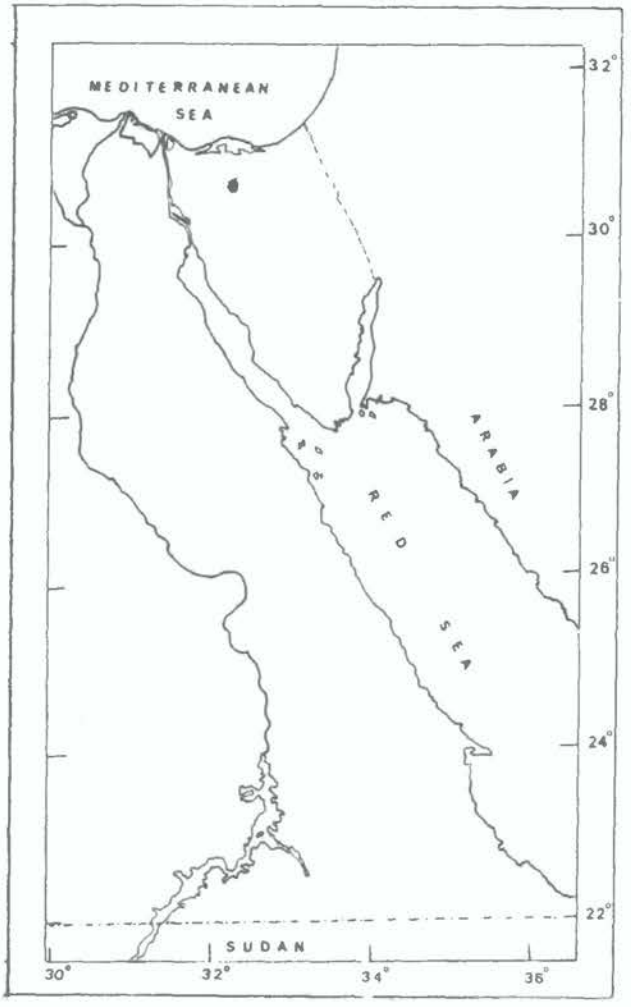
Conservation measures proposed: El Sallum plateau be a nature reserve. Cultivation of the plant in botanic gardens as an ornamental is recommended.

Biology and potential value: The species is of scientific interest on account of its geographical distribution; it could also be of horticultural value, because of its decorative habit.

Specimens examined

M. El Sallum, I.1932, *Mrs. Palmer s.n.* (CAI); El Sallum on rocks, 24.I. 1934, *J.R. Shabetai* 7132 A (CAI).

96. Helianthemum ventosum Boiss., Diagn. Pl. Orient. 8: 50 (1849); Boiss. Fl. Orient. 1: 442 (1867); Täckholm, Stud. Fl. Egypt ed. 2: 364 (1974); Zohary et al. in Consp. Fl. Orient. 2: 69 (1983); Greuter et al. in Med-Check. 1: 328 (1984); Danin et al. in Willdenowia 15: 274 (1985).



Dwarf shrub up to 30 cm high. Stems from a woody base, erect or ascending, slender, richlybranched, young branches appressed-canescent, becomes glabrescent. Leaves petiolate, appressed pubescent on both surfaces; blade elliptical, margin revolute, apex acute. Flowers in one sided lax spike, 2-3(-5)-flowered, pedicellate. Sepals 5, outer sepals linear-subulate, innersepals ovate; all the sepals are acute, appressed and stellately hairy, with ciliate margins and prominently nerved. Petals yellow. Capsule globular, tomentose, shorter than calyx.

Flowering and fruiting: M a r c h - M a y

Vernacular name (Arabic): *Qadib* (Täckholm, 1974).

Habitat and ecology: Chamaephyte which grows on limestone and dolomite slopes.

Danin (1983) noted that *Helianthemum ventosum* is almost the companion plant of *Artemisia herba-alba-Reaumuria negevensis association* in the Negev Desert east of Sinai.

Distribution: Recorded from Jordan and Palestine, eastwards to Saudi Arabia.

Very rare in Egypt, confined to the Galala Desert and Sinai.

Floristic category: Endemic to Saharo-Sindian subregion.

Status: Vulnerable.

Egypt seems to be the westernmost limit of the species distribution. Small populations are scattered and confined to the Isthmic Desert, massive of Sinai and the Galala Desert.

Overgrazing is the causative which leads to the species decline.

Conservation measures taken: N o n e

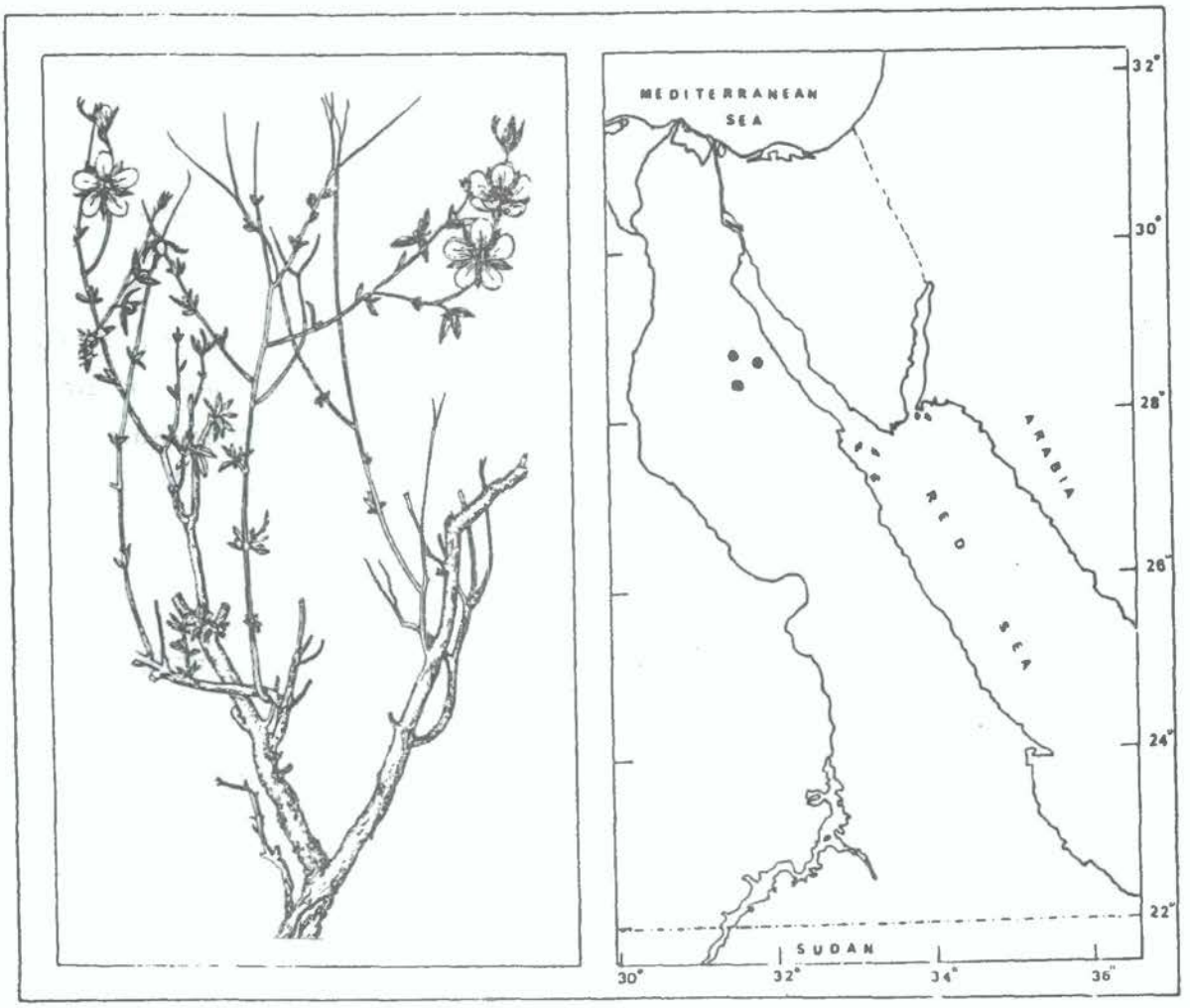
Conservation measures proposed: The population sites of *Helianthemum ventosum* in Wadi El Mezeiria near Gebel El Maghara (Isthmic Desert) be wildlife sanctuaries.

Biology and potential value: The species with its fragrant, yellow flower, is potentially an attractive garden plant.

Specimens examined

Di. A branch of Wadi El Mizeira, near Gebel El Maghara, 25-IV-1959, *L. Boulos s.n.* (CAI).

97. Helianthemum sancti-antonii Schweinf. ex Boiss., Fl. Orient. suppl.: 70 (1888); Täckholm, Stud. Fl. Egypt ed. 2: 364 (1974); Greuter et al. in Med-Check. 1 : 327 (1984); Danin et al. in Willdenowia 15: 273 (1985).



Shrublet up to 30 cm high. Stems erect, terete, intricately and dichotomously branched, old branches somewhat spinescent, glabrous, glossy. Leaves short petioled, appressed canescent on both surfaces; blade oblong to oblong-linear, margin strongly revolute, apex subacute. Flowers in 2-5-flowered, one sided raceme, shortly pedicellate. Sepals oblong to elliptical or lanceolate, acute to acuminate, pilose on both sides. Petals yellow. Capsule ovoid, tomentose, shorter than the accrescent fruiting calyx.

Flowering and fruiting: F e b r u a r y - A p r i l

Vernacular name (Arabic): *Gadeem* (Täckholm, 1974).

Habitat and ecology: Chamaephyte which grows on stony slopes and wadi beds.

Distribution: Recorded from Jordan, Palestine and Saudi Arabia.

Very rare in Egypt, confined to the Galala Desert and Sinai.

Floristic category: Endemic to Middle Saharo-Sindian subregion.

Status: Endangered.

Helianthemum sancti-antonii had nearly disappeared from the Galala Desert and it was last seen there in 1906; while the populations in Sinai peninsula are greatly depleted, especially those scattered along Suez and Aqaba Gulfs owing to the touristic development of the area. Grazing by domestic livestock deplete the populations.

Conservation measures taken: N o n e

Conservation measures proposed: The population sites along Aqaba and Suez Gulfs, and the lower Sinai massif be wildlife sanctuaries.

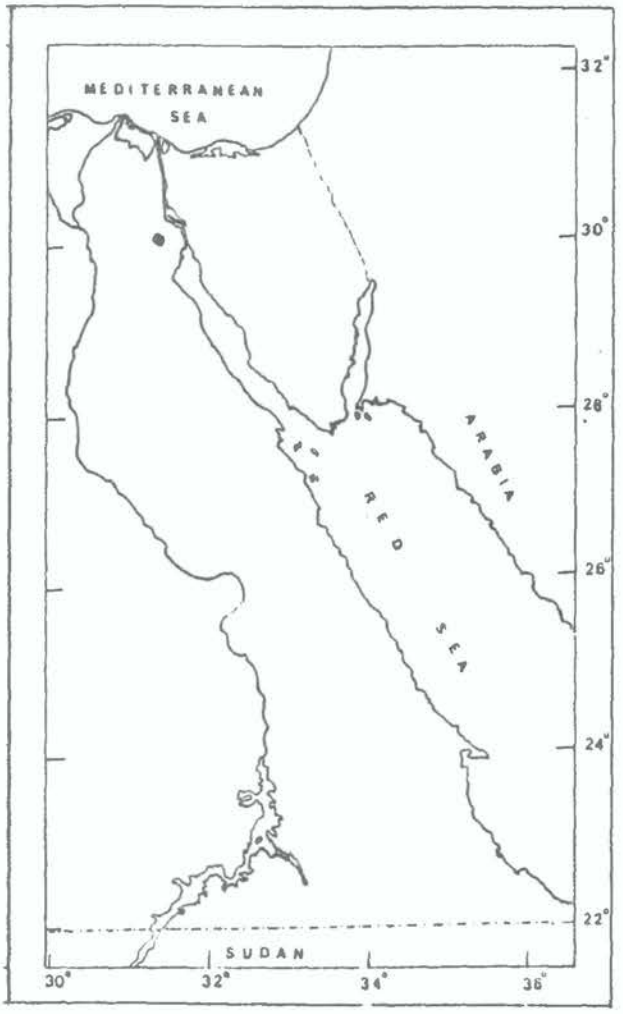
Biology and potential value: The species is of great scientific interest on account of its geographical distribution; being an endemic to the Middle Saharo-Sindian subregion.

Egypt seems to represent its westernmost limit. This taxon is of a considerable horticultural merit and is worthy cultivation as ornamental.

Specimens examined

Dg. Om Ruthi sudliche Galala, Oest. Wuste Aegypten, 3.V.1887, *Schweinfurth s.n.* (K); Galala, 6.IV.1877, *Schweinfurth* 194 (K); Galala, II.1906; *Muschler s.n.* (K).

98. Helianthemum schweinfurthii Grosser in Engler, Pflanzenr. 14: 95, Fig. 16 (1903); Täckholm, Stud. Fl. Egypt ed. 2: 364 (1974); Greuter et al. in Med-Check. 1: 327 (1984).



Shrub up to 40 cm tall. Stems ascending, slender, intricately branched, glabrous. Leaves sessile, stellate hairy on both surfaces; blade elliptic-lanceolate, margin slightlyl revolute, apex acute. Flowers in 6-10-flowered, loose racemes, long pedicelled. Sepals ovate-lanceolate, acuminate, hairy outside. Petals yellow. Capsule ovoid, villouse, shorter than calyx.

Flowering and fruiting: F e b r u a r y - A p r i l

Vernacular name (Arabic): *Ra'al* (Täckholm, 1974).

Habitat and ecology: Chamaephyte which grows on rocky slopes.

Distribution: Seems to be endemic to Gbel El Shallufa area of the Galala Desert of Egypt.

Floristic category: Middle Saharo-Sindian subregion.

Status: Indeterminate.

It is only known from Gebel El Shallufa, which was mined during the Egyptian-Israeli wars (1967-1973). At present it is of great risk to botanize in this area, which is the type locality of our taxon.

Conservation measures taken: N o n e

Conservation measures proposed: Further investigations are needed to explore the area around Gebel El Shallufa with the hope to discover other localities for this taxon.

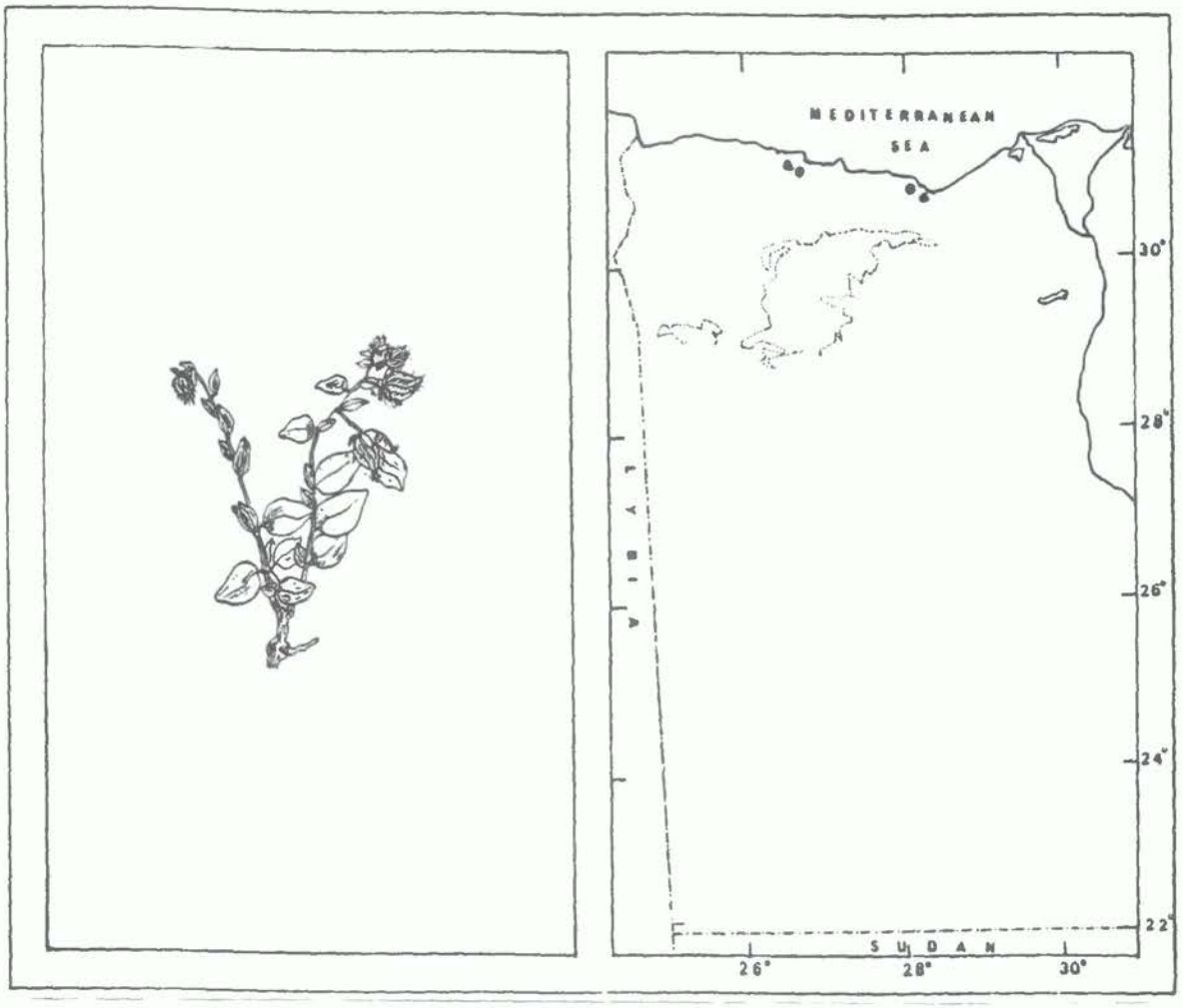
Biology and potential value: The species is endemic to Galala Desert of Egypt, its extinction means the complete disappearance of the species.

Specimens examined

Dg. Gebel Schalufa (Arabischen Wuste von Aegypten), 24.IV.1880, *Schweinfurth* 129 (K).

99. Helianthemum crassifolium Pers. subsp. *sphaerocalyx* (Gauba et Janchen) Marie, Bull. Soc. Hist. Afrique N. 30: 263 (1939); Greuter et al. in Med-Check. 1: 321 (1984).

H. sphaeorcalyx Gauba et Janchen, Oster. Bot. Zeitschr. 79: 349 (1930); Täckholm, Stud. Fl. Egypt ed. 2: 364 (1974).



Dwarf shrublet, about 15 cm high. Stems ascending, slender, branched, glabrous. Leaves shortly petioled, glabrous on both surfaces; blade ovate-lanceolate, margin entire, apex obtuse or subacute. Flowers in terminal racemes, few-flowered, pedicellate. Sepals ovate, acuminate, red-nerved, villouse. Petals yellow. Capsule globose, with globose persistent calyx.

Flowering and fruiting: F e b r u a r y - A p r i l

Vernacular name (Arabic) *Khoshein* (Täckholm, 1974).

Habitat and ecology: Chamaephyte which grows on calcareous rocky outcrops among white maritime sand dunes.

Distribution: Known from Egyppt and Libya.

Floristic category: Endemic to S. Mediterranean subregion.

Status: Endangered.

It is only known from a few closely adjacent localities along the western Mediterranean coast extending from Burg-El Arab (55 Km. west of Alexandria) eastwards to El Alamein (100 Km. west of Alexandria). About 10 sites are known and its population believes to be in the low hundreds.

Clearing of the vegetation to establish new touristic centres along the coast is the main causative threat to this taxon.

Conservation measures taken: It was reported as an endangered species in the IUCN Plant Red Data Book by El Hadidi in Lucas and Synge (1978, pp 129).

Conservation measures proposed: The population sites in El-Alamien be wildlife sanctuaries. Cultivation in botanic gardens will be useful to save our taxon from extinction; also preserving the seeds in a seed bank is recommended.

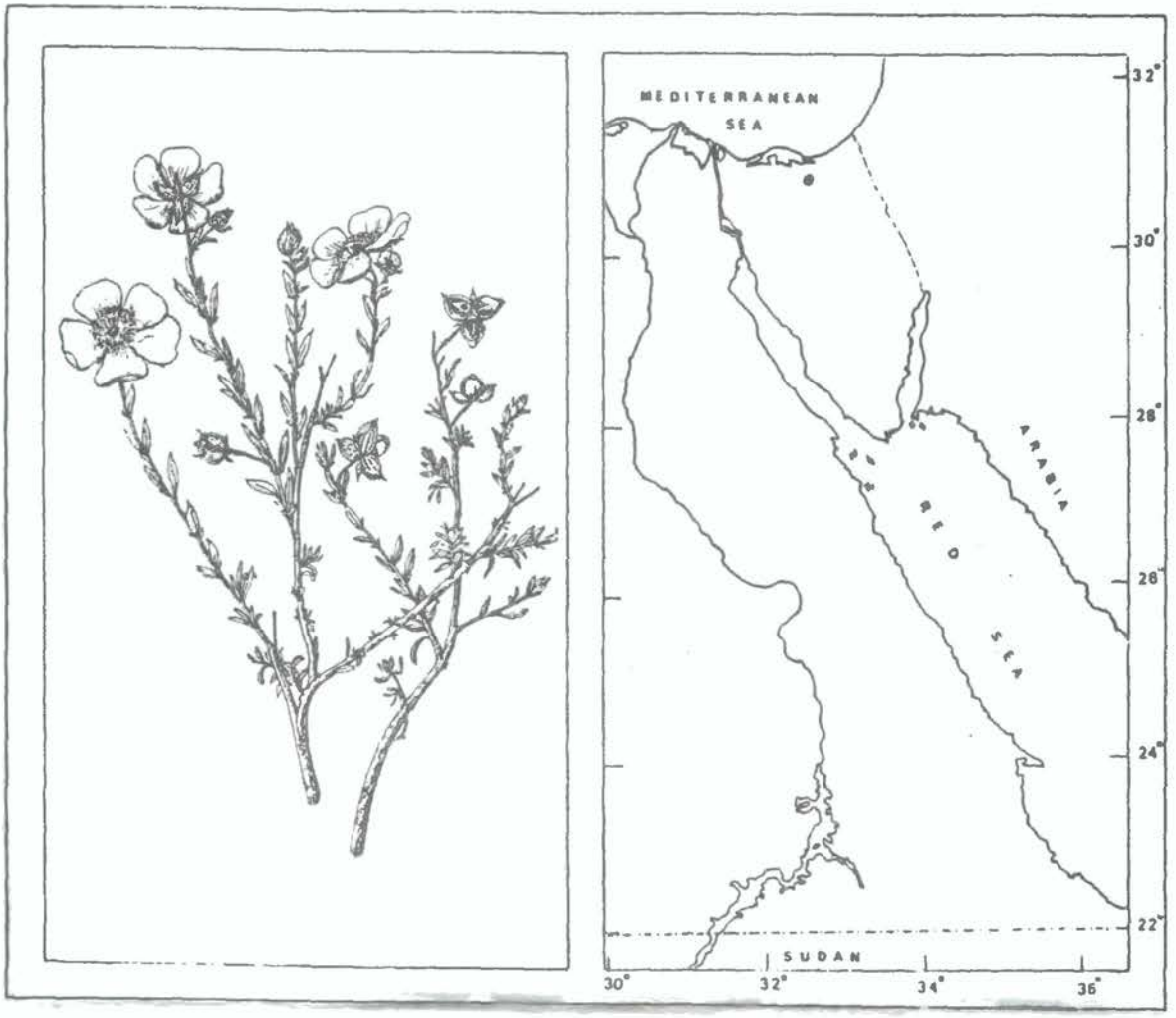
Biology and potential value: The species is of scientific interest on account of its limited geographical distribution; the slightly fleshy leaves and inflated spherical calyx in the fruiting stage are both unusual feature in the genus and of considerable interest.

Specimens examined

M. 16 Km. east of El Alamein, 3.IV.1989, *Podlech & Soliman s.n.* (CAI); El Alamein, 24.III.1961, *Täckholm s.n.* (CAI); El Alamein, III.1962, *El Hadidi s.n.* (CAI); Abu-Sir Alex. road, 13.III.1952, *El Hadidi s.n.* (CAI); sandy cliffs of Abu-Sir, 22.III.1956, *Ibrahim El Sayed s.n.* (CAI); Dekhela, 11.II.1909, *Maire s.n.* (CAI).

100. Fumana arabica (L.) Spach. Ann. Sci. Nat. Bot. ser. 2, 6: 359 (1836); Boissier, Fl. Orient. 1: 449 (1867); Täckholm, Stud. Fl. Egypt ed. 2: 366 (1974); Zohary et al. in Consp. Fl. Orient. 2: 69 (1983); Greuter et al. in Med-Check. 1: 317 (1984); Danin et al. in Willdenowia 15: 273 (1985).

Cistus arabicus Linn., Cent. Pl. 1: 14 (1755).



Shrub, up to 30 cm high. Stems procumbent or ascending, slender, branched, clothed with short glandular hairs. Leaves sessile to short petioled, hairy or hairy-glandular on both surfaces; blade linear or linear lanceolate, margin revolute, apex obtuse to acute. Flowres solitary, scattered in the upper part of the branches, pedicellate. Outer sepals linear-lanceolate,

reddish, glandular-pilose, inner sepals ovate-oblong, glandular-pilose externally. Petals yellow. Capsule globular-ovoid, triquetrous.

Flowering and fruiting: Not known

Vernacular name: Not known

Habitat and ecology: Chamaephyte which grows in crevices of smooth-faced limestone.

Distribution: Recorded from Turkey, Cyprus, and the islands of the Mediterranean region, Algeria, Libya and eastwards to Egypt, Palestine, Syria, Iraq and Iran.

Floristic category: Mediterranean basin with extensions to the Mesopotamian province of the Irano-Turanian region.

Status: Endangered.

It is recorded only from a single locality (Gebel El Maghara, Isthmic Desert).

Danin et al. (1985) noted that this taxon occurs sporadically among the limestone fissures of Gebel El Maghara. The extreme rarity of the this species is owing to its limited habitat distribution in Egypt.

Overgrazing by domestic livestock depletes the small populations of the plant.

Conservation measures taken: None

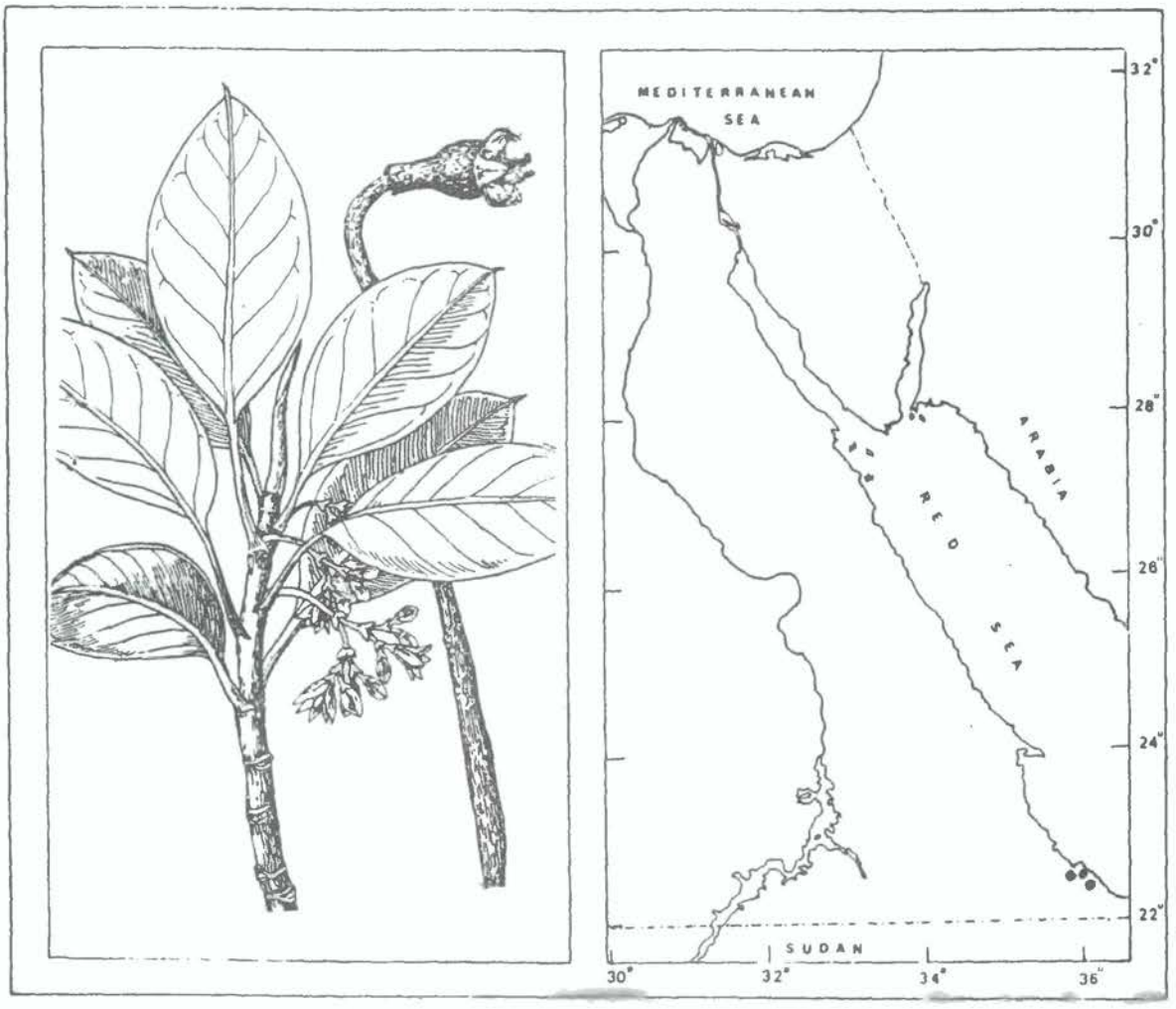
Conservation measures proposed: Gebel El Maghara (N Sinai) be a nature reserve.

Cultivation of the species in botanic gardens is valuable to protect the species.

Biology and potential value: With its fragrant flowers, it is potentially an attractive garden plant.

No specimens seen.

101. Rhizophora mucronata Lam., Encylc. Meth. Bot. 6: 189 (1804); Täckholm, STud. Fl. Egypt ed. 2: 378, Pl. (1974).



Mangrove tree of muddy habitat, up to 3 m tall, with prop roots emerging from the lower stem. Stems ascending terete, branched, glabrous. Leaves opposite, coriaceous, petiolate, glabrous on both surfaces; blade broadly elliptic to ovate, margin entire, apex mucronate. Flowers in cymes, shortly pedicellate. Sepals oblong-lanceolate, mucronulate, glabrous. Petals cream coloured or yellowish-white. Fruit ovate-conical, pendulous.

Flowering and fruiting: January - March

Vernacular name: *Qondul*

Habitat and ecology: Nano-phanerophyte which grows in estuaries and lagoons under sea water.

Kassas and Zahran (1967) noted that *Rhizophora mucronata* may be mixed with *Avicennia marina* as a codominant or as an abundant associate, or it may form pure stands.

Distribution: Cover the shores of E. Africa along the Red Sea to S. Africa; Madagascar; Seychelles, eastwards to the Islands of Polynesia; also known from Australia.

In Egypt, it is a very rare species confined to the southern lagoons of the Red Sea coast.

Floristic category: Usambaro-Zululand, Afro-Oriental and S. Arabian domains of the Sudano-Zambezian region with extensions to Madagascar, Polynesia and Australia.

Status: Endangered.
Egypt seems to be the northernmost limit of the taxon distribution in Africa; and its habitat becomes further depleted in size each year.

Conservation measures taken: N o n e

Conservation measures proposed: The population sites of *Rhizophora mucronata* in Mersa Koleis and Mersa Eikwan (near Ghubet Isa, 100 Km. south of Mersa Halaib, Red Sea coast) be wildlife sanctuaries.

Biology and potential value: The species is of scientific interest on account of its geographical distribution, being also the single representative of the genus in Egypt. Its extinction means the complete disappearance of the genus from Egypt.

Rhizophora mucronata is of ecological importance on account of its aerial prop roots.

Specimens examined

R. Mersa Eikwan, 1.II.1962, *Täckholm et al.* 1175 (CAI); Sea shore of Wadi Aheetib, 3.II.1962, *Täckholm et al.* 1314 (CAI); Mersa Koleis, 4.II.1962, *Täckholm et al.* 1315 (CAI).

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