

## THE FAMILY CISTACEAE IN IRAQ

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**Abstract.** In the present account the family Cistaceae in Iraq has been studied in detail, and a revised diagnosis, synonymy, keys, specimens citation, distributional map, and photographs for each species are supplied.

The species belonging to the family Cistaceae in Iraq have not been studied thoroughly, though a number of investigators has reported on them. In view of this fact all collections for the *Cistaceae* available in the Iraqi herbaria and in Kew herbarium have been critically examined.

Boissier (1867) reported a total of 35 species from the area covered by his *Flora Orientalis*, but from this area (Iraq) mentioned only one variety, namely *Helianthemum lippii* (L.) Dum.-Cours. var. *micranthum* Boiss. The other species like *H. salicifolium* (L.) Mill., *H. ledifolium* (L.) Mill., *H. aegyptiacum* (L.) Mill., *H. lippii* (L.) Dum.-Cours., *H. kahiricum* Delile, *Fumana arabica* (L.) Spach, and *F. procumbens* (Dun.) Gren. & Godr. which were reported by later investigators from Iraq have been also included by Boissier but from areas adjacent to Iraq.

Bornmüller (1911, pp 130 - 132) recorded the following taxa for the first time: *H. ledifolium* (L.) Mill. var. *lasiocarpum* (Desf.) Boiss., *H. salicifolium* (L.) Mill., *H. aegyptiacum* (L.) Mill., *H. lippii* (L.) Dum.-Cours. var. *micranthum* Boiss., and *Fumana arabica* (L.) Spach from the central and the northern parts of Iraq.

Nabelek (1923) reported *H. ellipticum* (Desf.) Pers., which by later authors has been treated as a synonym of *H. lippii* (L.) Dum.-Cours. and *H. kahiricum* Delile - but not from Iraq. He also used the name *H. niloticum* (L.) Boiss. var. *lasiocarpum* Boiss. as a synonym of *H. lasiocarpum* Desf. However, there was no addition to previous records.

Anthony (1935, p. 282) mentioned four species already reported but with different author's name which are: *H. salicifolium* Mill., *H. lippii* Dum.-Cours., *H. ellipticum* Pers., and *H. aegyptiacum* Mill.

Blakelock (1948) reported all those species which were mentioned by Bornmüller (1911) except *H. lippii* var. *micranthum* Boiss.; instead of this he reported *H. lippii* (L.) Dum.-Cours. Zohary (1950) reported seven species from Iraq, which are: *H. salicifolium* (L.) Mill., *H. lasiocarpum* Desf. ex Willk., *H. ledifolium* (L.) Mill., *H. aegyptiacum* (L.) Mill., *H. sessiliflorum* (Desf.) Pers., *H. ellipticum* (Desf.) Pers., and *Fumana arabica* (L.) Spach.

Rawi (1964) reported six species and one variety from this area, which are: *H. lippii* (L.) Dum.-Cours., *H. salicifolium* (L.) Mill., *H. ledifolium* (L.) Mill., *H. ledifolium* var. *lasiocarpum* (Desf.) Boiss., *H. aegyptiacum* (L.) Mill., *H. kahiricum* Delile, and *Fumana arabica* (L.) Spach.

Rechinger (1964) reported the following species: *H. ledifolium* (L.) Mill., *H. salicifolium* (L.) Mill., *H. lippii* (L.) Pers., and *H. aegyptiacum* (L.) Mill.

Recently Coode in Davis *Flora of Turkey* (1965) and Rechinger in *Flora Iranica* (1967) reported another species, namely *Fumana procumbens* (Dun.) Gren. & Godr. from Iraq; this is a new record from this area.

The present study is confined to a survey of taxonomy of the species belonging to the family Cistaceae in Iraq. A detail account has been given for each species including keys, synonyms, distinguishing characters, distributional maps, photographic plates, geographical area, and citation of the collections.

All the specimens cited in this study have been examined by us and belong to six herbaria: The Herbarium, Royal Botanic Gardens, Kew (K); The National Herbarium of Iraq (BAG); The Herbarium, University of Baghdad (BUH);

The Herbarium, College of Agriculture, Baghdad University (BUA); and The Herbarium of The Natural History Institute, Baghdad University (BUNH), to whose curators we acknowledge most gratefully. The first three herbaria are indicated by their abbreviation following J. Lanjouw (Regnum Vegetabile, ed. 4. 15. 1959). The rest of herbaria's abbreviations follow Blakelock and Guest (1966).

The key and the descriptions of genera and species included in this study are specifically intended to apply only to Iraqi species of the family presented here.

#### CISTACEAE

Herbs or undershrubs, glandular or stellate hairy. LEAVES: cauline, alternate or opposite, simple. INFLORESCENCE: few to many flowered, scorpioid cyme. FLOWERS: regular, perfect. CALYX: persistent; sepals 5, outer two often linear, bract like, inner three ovate, somewhat twisted in bud. COROLLA: caducous; petals 5, twisted in bud in a direction opposite to the sepals. STAMENS: numerous, free, all fertile or outer rows sterile. OVARY: superior, one or incompletely several-celled with as many parietal placentae; style one; stigma simple, capitate. FRUITS: capsule: SEEDS: orthotropous, albuminous.

#### KEY TO THE GENERA OF THE FAMILY CISTACEAE IN IRAQ

1. All stamens fertile;  
leaves opposite; capsule  
with numerous seeds. ... I. *Helianthemum*.
1. Outer stamens sterile,  
moniliform; leaves  
alternate; capsule with  
3 - 12 seeds. ... II. *Fumana*.

I. *HELIANTHEMUM* Mill., Gard. Dict. Abr. ed. 4. (1754).

*Cistus* L., Sp. Pl. 523-529 (1753); and Gen. Pl. 234 (1754), in part.

Shrubs, undershrubs or annual herbs. STEMS: many, ascending to erect, usually profusely branched from near the base with ascending branches. LEAVES: opposite, stipulate or estipulate, sessile to short petiolate, often stellate hairy. INFLORESCENCE: loose or dense, few to many flowered, scorpioid cyme. FLOWERS: perfect, chasmogamous, sessile to pedicellate. SEPALS: 5, distinct, the outer 2 linear, much smaller than the ovate inner 3. PETALS: 5, yellow, distinct, caducous. STAMENS: numerous, all fertile. OVARY superior, 3-carpelled, 1 or incompletely 3-celled, each with few to many ovules; style one, straight; stigma capitate. FRUIT: glabrous or hairy, 3-valved capsule. SEEDS: many per capsule.

#### KEY TO THE SPECIES OF HELIANTHEMUM IN IRAQ

1. Shrubs or undershrubs.
  2. Pedicel as long as or longer than calyx. ... 1. *H. kahiricum*.
  2. Pedicel lacking or very short. ... 2. *H. lippii*.
1. Annual herbs.
  3. Inner sepals opaque, hairy all over its back; pedicels spreading or erect in fruit.
    4. Capsule marginally or all over hairy; pedicels erect in fruit. ... 3. *H. ledifolium*.
    4. Capsule glabrous; pedicels spreading in fruit. ... 4. *H. salicifolium*.
  3. Inner sepals transparent, hairy on the prominent veins only; pedicels deflexed in fruit. ... 5. *H. aegyptiacum*.

1. **Helianthemum kahiricum** Delile, Fl. Aeg. Ill. 65 (1813); and Fl. Eg. 93, t. 31, f. 2 (1813); Boiss., Fl. Orient. 1: 442 (1867).  
Type: "Aegypt. Delile" Plate: No. 1.

*Cistus stipulatus* [var.]  $\beta$  Forssk., Fl. Aeg.-Arab. 101 (1775).

Suffruticose perennial, 10-30 cm tall. STEMS: with erect and ascending branches; branchlets tomentose stellate hairy. LEAVES: cauline, opposite below and becoming often alternate above, simple; stipule c. 1 mm long, linear, densely hairy; blade 4-9 (-12) mm long, 1 (-3) mm wide, oblong-lanceolate; both surfaces stellate-hairy; base obtuse, apex subacute, margin revolute. INFLORESCENCE: 4-8 flowered loose scorpioid cyme; bracts 0.6-0.7 mm long, lanceolate, densely hairy. FLOWERS: chasmogamous; pedicel 2-4 mm long, densely hairy. CALYX: sepals 5, twisted in bud, outer two sepals 1.5-2.5 mm long, c. 1 mm wide, linear, connate to inner sepal; inner sepals 3-5 mm long, 2-3 mm wide, ovate, 4-6 nerved, stellate hairy intermixed with long simple hairs. COROLLA: petals 5, yellow, imbricate, 2-3 mm long, 1.5-1.8 mm wide, obovate, with 5 orange nerves. STAMENS: 8-12, fertile, free. PISTIL: one, 2-3 mm long; ovary superior, 3-carpelled, incompletely 3-celled; ovules many in each cell; style one, c. 1.3 mm long; stigma one,  $\pm$  capitate. FRUIT: capsule, c. 4 mm long, globular-ovoid, pilose pubescent becoming dense towards apex. SEEDS: many per capsule, 0.3-0.4 mm long, suborbicular, brownish, glabrous. FLOWERING: March-April. HABITAT: dry rocky limestone and sandy places. DISTRIBUTION: Iraq - collected from Southern Desert only. Map: No. 1; North Africa, Egypt, Sinai, Palestine, Jordan, Kuwait, Saudi Arabia, and Bahrain. AREA: E Sahara-Arabian. DISTINGUISHING CHARACTERS: can be distinguished by its suffruticose habit; pedicels as long as or shorter than calyx; and capsule pilose pubescent becoming dense towards apex. REPRESENTATIVE SPECIMENS: BASRA LIWA: Jabal Sanam, alt. 150 m, 6 March 1961, *Chakravarty, Rawi, and Khatib* 29913 (K). Jabal Sanam, alt. 100-150 m, 3 April 1955, *Guest et al.* 14380 (BAG, K). Jabal Sanam, alt. 150 m, 3 April 1965, *Khatib & Alizzi* 33474 (BAG, K). DIWANIYA LIWA: calcareous with sandy patches, Ansab, alt. 360 m, 24 April 1957, *Rechinger* 9357 (BUH). Ansab, alt. c. 340 m, 24 April 1957, *Guest et al.* 18932 (BAG, K). Rocky limestone, 33 km N. N. W. of Ansab, alt. c. 350 m, 24 April 1957, *Guest et al.* 19027 (BAG, K). Salman, 25 March 1960, *Haines & Agnew* 4816 (BUH). RAMADI LIWA: between Rutba & Syrian

border, 22 April 1961, *Bahrucha & Askari* 948 (BUA).

2. **Helianthemum lippii** (L.) Dum.-Cours., Bot. Cult. 3: 130 (1802). Plate: No. 2.

*Cistus lippii* L., Mant. Alt. 245 (1771); "lippii". Type: "Habitat in Aegypto." (Hb. Linn. 689/53!).

*H. lippii* (L.) Willk. var. *micranthum* Boiss., Fl. Orient. 1: 443 (1867) p.p.

*H. ellipticum* (Desf.) Pers., Syn. Pl. 2: 78 (1806).

*H. sessiliflorum* (Desf.) Pers., Syn. Pl. 2: 78 (1806).

Undershrub, 10-80 cm tall. STEMS: profusely branched with ascending branches, stellate hairy. LEAVES: opposite, simple; stipules c. 2 mm long, linear-lanceolate, sessile or petiole up to 2.5 mm long; blade (5-) 10-15 (-25) mm long, 2-4 (-6) mm wide, linear-lanceolate to oblong-lanceolate; both surfaces stellate-hairy; base cuneate, apex obtuse, margin revolute or flat. INFLORESCENCE: scorpioid cyme, 5-14 - flowered; bracts 2-3 mm long, more or less lanceolate, stellate-hairy. FLOWERS: sessile, regular, perfect, chasmogamous. CALYX: sepals 5, outer two sepals bract like, 1.5-2.5 mm long, linear; inner sepals ovate, twisted in bud, 3.0-4.5 mm long, 3-6 nerved, stellate-hairy intermixed with simple pilose hairs. COROLLA: petals 5, yellow, imbricate, c. 3 mm long, obovate. STAMENS: 15-23, fertile. PISTIL: one, c. 2.5 mm long; ovary superior, 3-carpelled, incompletely 3-loculed; ovules many; style one, c. 1.3 mm long; stigma capitate. FRUIT: capsule 3-4 mm long, globose-ovoid, stellate hairy intermixed with simple pilose hairs all over the upper half. SEEDS: many per capsule, 1.0-1.3 mm long, ovate, compressed, brownish. FLOWERING: March-April. HABITAT: sandy gypsaceous or gravelly desert or subdesert soil on conglomerate or calcareous hillsides and sandy ditches. DISTRIBUTION: Iraq - throughout Kirkuk, Persian foothill, Eastern Alluvial Region, Southern and Western Deserts; Map No. 2. North Africa, Egypt, Sinai, Palestine, Jordan, Syria, Lebanon, Sicily, Greece, Kuwait, Saudi Arabia, Bahrain, Dubai, Qatar, Muscat, Iran, and Pakistan (Baluchistan). AREA: Sahara-Arabian and E. Sudanian. DISTINGUISHING CHARACTERS: it can be readily distinguished by its sessile flowers or nearly so, hairy capsule, and suffruticose habit. REPRESENTATIVE SPECIMENS: AMARA LIWA: conglomerate hills, 70 km N. of Amara, 27 March 1957, *Guest, Rawi, & Rechinger* 17557 & 17557A (BAG, K).

- Sandstone, near Tib police station, 28 March 1957, *Rechinger* 8932 (BUH). Gravelly hillside, 25 km N. N. E. of Shaikh Sad, alt. 190 m, 4 April 1958, *Rawi & Haddad* 25564 (BAG). On hillside, Fakka-laqlaq valley, alt. 550 m, 20 Oct. 1958, *Rawi* 25857 (BAG). 75 km N. of Amara, 2 June 1961, *Nuri* 30638 (BAG, K). 7 km N. E. of (BAG). BAGHDAD LIWA: near Injana, Jabal Hamrin, 29 May 1930, *Guest* 673 (BAG). Jabal Hamrin, 16 April 1932, *Guest* 1823 (K). Sandy soil, Jabal Hamrin, 28 March 1932, *Guest* 1823A (BAG, K). Jabal Hamrin, 4 April 1957, *Rechinger* 9006 (BUH). Sandy desert, 65 km N. N. W. of Falluja, 4 April 1957, *Rawi* 20237 (BAG). Gravel soil, 50 km S. E. of Samarra, alt. 65 m, 25 May 1959, *Rawi & Shahwani* 25480 (BAG, K). Adhaim, 9 April 1963, *Lawand & Passour* 1253 (BUNH). Gypsiferous desert, 35 km W. of Baghdad, 3 May 1963, *Agnew & Brahim* 6005 (BUA). E. of Tharthar, 3 April 1964, *Selman* 229A (BUA) and 229 (K). Sandy gravel soil, Samarra, 3 April 1964, *Issac & Matti* 345 (BUA, K). Sandy clayey, Adhaim, 30 March 1968, *Daoud, Sheikh, & Khazir* 145 (BUH). BASRA LIWA: sandy desert, Zubair, 4 May 1932, *A. W. Mustafa* 3160 (BAG). Gravelly, sand subdesert, 10 km S. of Zubair, alt. 10 m, 13 Feb. 1947, *Gillet* 6074 (BAG, K). Jabal Sanam, alt. 50 m, 13 Feb. 1947, *Gillet & Rawi* 6142 (BAG, K). Sandy soil, Zubair, alt. 3 m, 22 Feb. 1955, *Rawi & Walter* 16224 (BAG). Compact sandy soil, 14 km E. S. E. of Khadhar al-Mai, alt. c. 185 m, 28 March 1956, *Guest* 15240 (BAG). Ditches, between Basra and Qurna, 17 March 1957, *Rechinger* 8511 (BUH). 5-6 km S. of Zubair, 18 March 1957, *Dept. of Botany* 8497 (BUH). Foot of Jabal Sanam, 18 March 1957, *Dept. of Botany* 8559 (BUH). near Zubair, 20 March 1957, *Rechinger* 8639 (BUH). c. 40 km S. E. by S. of Zubair, alt. 4 m, 23 March 1957, *Guest, Rawi, & Rechinger* 16894 (BAG). Sandy stony slopes, Jabal Sanam, c. 30 km S. of Zubair, alt. 25-150 m, 23 March 1957, *Guest, Rawi, & Rechinger* 16979 (BAG). Gravel desert, 5 km S. E. by E. of Zubair, alt. 4 m, 23 March 1957, *Guest, Rawi, & Rechinger* 16799 (K). Haswan plain, c. 30 km W. by S. of Safwan, alt. c. 70 m, 24 March 1957, *Guest, Rawi, & Rechinger* 17018 (BAG, K). Batin, c. 65 km S. W. of Basra, 24 March 1957, *Guest, Rawi, & Rechinger* 17167 (BAG, K). Sandy Haswa, 10 km S. E. by S. of Jiraihiyat, alt. 175 m, 24 March 1957, *Guest, Rawi, & Rechinger* 17167A (BAG). c. 110 km S. W. by of Basra, alt. 185 m, 25 March 1957, *Guest, Rawi, & Rechinger* 17227 (BAG). Between Batin and Railway, 25 March 1957, *Rechinger* 8786 (BUH). Jabal Sanam, 4 Feb. 1959, *Agnew* 1757 (BUH). Khadhar al-Mai, 22 March 1960, *Agnew* 4789 (BUH). Khadhar al-Mai, alt. 180 m, 16 April 1963, *Khatib & Alizzi* 32699 (K). Sandy dry soil, 12 km S. of Khadhar al-Mai, 24 Feb. 1966, *Alizzi* 34410 (K). Sandy clay soil, 75 km S. of Khadhar al-Mai, 25 March 1966, *Alizzi* 34420 (K). Sandy gravel, 80 km S. E. of Basra, alt. c. 150 m, 7 March 1961, *Rawi et al.* 29935 (BAG, BUA). Sandy soil, Umm Qasr, 2 April 1965, *Alizzi & Khatib* 33440 (BAG, K). Sandy gravelly soil, between Zubair and Safwan 23 March 1966, *Alizzi* 34350 (BAG, K). DIWANLIYA LIWA: 5 km E. of Salman, alt. 200 m, 24 Feb. 1947, *Gillett & Rawi* 6225 (BAG, K) & 6224 (K). 50 km N. of Salman, alt. 180 m, 17 March 1955, *Rawi* 14861 (BAG, K). c. 35 km E. by S. of Shabicha, alt. c. 275 m, 13 April 1955, *Guest, Rawi, & Long* 14070 (BAG, K). Haswa-gravel plain, near Busaiya, alt. 135 m, 15 April 1955, *Guest & Rawi* 14231 (BAG, K). Near Busaiya, 19 Feb. 1956, *S. Serkahia* 18345 (BAG). 50 km S. S. W. of Busaiya, 7 Nov. 1956, *Rechinger* 8230 (BUH). 3 km N. W. of Abu-Sukhair, alt. 25 m, 11 Nov. 1956, *Rawi & Joseph* 16273 (BAG). 25 km S. E. of As-Salman, alt. 180 m, 18 March 1955, *Rawi* 14900 (K). Sandy with silty patches, c. 30 km E. of Salman, 22 April 1957, *Guest, Rawi, & Rechinger* 18759 (BAG, K). Ansab, 145 km S. by E. of Salman, alt. c. 340 m, 24 April 1957, *Guest, Rawi, & Rechinger* 18943 (BAG, K). Rocky limestone plateau, c. 27 km W. N. W. of Ansab, alt. c. 340 m, 24 April 1957, *Guest, Rawi, & Rechinger* 19012 (BAG, K). Silty soil, 62 km W. N. W. of Ansab, alt. c. 360 m, 24 April 1957, *Guest, Rawi, & Rechinger* 19055 (BAG, K). Limestone, W. N. W. of Ansab, 24 April 1957, *Rechinger* 9377 (BUH). Compact silty sand, 45 km N. by E. of Lussuf, alt. 260 m, 26 April 1957 *Guest, Rawi, & Rechinger* 19463 (BAG, K). Sandy patches, 90 km N. W. by W. of Shabicha, alt. c. 330 m, 26 April 1957, *Guest, Rawi, & Rechinger* 19433 (BAG, K). Flood plains, 15 km S. E. of Ashuriya, alt. 360 m, 26 April 1957, *Guest, Rawi, & Rechinger* 19398 (BAG, K). Sandy silty depression, c. 40 km W. N. W. of Shabicha, alt. c. 390 m, 26 April 1957, *Guest, Rawi, & Rechinger* 19301 (BAG, K). Gypsiferous soil, 120 km N. E. of Shabicha, alt. c. 50 m, 26 March 1960, *Rawi et al.*, 29270 (BAG, K). c. 104 km from Busaiya to Salman, alt. 200 m, 10 March 1961, *Chakravarty et al.* 30001 (BAG). c. 22 km E. of Shabicha, alt. 360 m, 12 March 1961 *Chakravarty et al.* 30110 (BAG). Sandy soil, 60 km W. of Shabicha, alt. 360 m, 12 March 1961, *Rawi et al.* 30085 (BAG). c. 80 km N. of Shabicha, alt. 400 m, 12 March 1961, *Chakravarty et al.*, 30027 (BAG, K). Sandy gravel, near Maniya, alt. 300 m, 14 Oct. 1961, *Hazim* 32502

(BAG). Sandy saline depression, 50 km N. of Busaiya, 28 March 1965, *Haddad* 9553 (BUA). Sandy soil, midway between Shabicha & Nukhaib, 17 March 1968, *Alizzi & Omar* 35490 (K). DIYALA LIWA: Gypseous hill, Khanaqin, alt. 150 m, 11 April 1947, *Gillett & Rawi* 7332 (BAG). Jabal Hamrin, alt. 200 m, 19 March 1948, *Rawi & Gillett* 10252 (BAG, K). Ten km E. of Mandali, 2 June 1957, *Rechinger* 9624 (BUH). Kama Sang, 6-7 km N. E. of Mandali, alt. c. 130 m, 2 June 1957, *Rawi* 20588 (BAG, K). Sandy gravel hillside, Chilat police station, alt. 150 m, 5 April 1958, *Rawi & Haddad* 25681 (BAG, K). Khalis, 11 April 1961, *Lawand* 282 (BUNH). Sandstone, Jabal Hamrin, 10 km N. of Miqdadiya, 8 April 1964, *Barkley & Brahim* 7338 (BUA). Sandstone, 87 km from Baquba-Khanaqin, alt. 100-110 m, 22 March 1968, *Dauod, Sheikh, & Khazir* 104 (BUH). HILLA LIWA: desert, c. 5 miles S. of Iskandariya, 28 Sept. 1961, *Agnew et al.* 16 (BUH, BUA). Sandy gypsum, Iskandariya, 16 Nov. 1956, *Rechinger* 8267 ((BUH). KARBALA LIWA: 15 km W. of Karbala, sandy gravelly soil, 17 March 1969, *Rawi, Alizzi, & Omar* 36237 (K). Sandy gypseous subdesert, 5 km W. of Karbala, 9 March 1947, *Gillett & Rawi* 6381 (BAG). Subdesert, 3 km W. of Abu Sukhair, alt. 25 m, 11 Nov. 1956. *Rawi & Joseph* (BUNH). 20 km N. W. of Karbala, alt. 40 m, 12 Nov. 1956, *Rawi & Joseph* 16273 (BAG, K). W. of Karbala, 20 Nov. 1956, *Rechinger* 8316 (BUH). Sandy clayey, 12 km W. of Ukhaidhir, alt. 60 m, 17 April 1961, *Rawi* 30850 (BAG, K). Fifteen km. W. of Karbala, 3 March 1962, *Barkley et al.* 416 (BUA, K). Five km N. of Karbala, 19 April 1962, *Barkley & Abbas* 1828 (BUA). Loamy soil, Ukhaidhir, alt. 350 m, 24 March 1965, *Rawi & Hamada* 33504 (BAG). KIRKUK LIWA: Sandy and clayey soil, 40 km N. of Kirkuk, 6 April 1962, *Barkley & Brahim* 1391 (BUA, BUH, K). Sand stone, Jabal Hamrin, 27 March 1964, *Barkley et al.* 6857 (BUA). KUT LIWA: Gypseous hills, south aspect, Zurbatiya, alt. 200 m, 19 March 1947, *Gillett* 6700 (BAG, K). From 15-20 km S. E. of Badra, alt. 100 m, 20 March 1947, *Gillett* 6725 (BAG). Sandstone and conglomerate, 30 km S. E. of Badra, 12 April 1957, *Rechinger* 9148 (BUH). RAMADI LIWA: 10 km E. of Falluja, alt. 50 m, 23 March 1947, *Gillett & Rawi* 6756 (BAG). Gypseous soil, 15 km W. of Ramadi, alt. 100 m, 24 April 1947, *Gillett & Rawi* 6785 (BAG). Haswa plains, 20 km E. of Falluja, alt. 40 m, 15 Nov. 1954, *Guest, Rawi, & Nuri* 13517 (BAG). Stony soil, Nukhaib, alt. 250 m, 13 March 1955, *Rawi* 14802 (BAG, K). Five km S. of Shanana, alt. 200 m, 15 March 1955, *Rawi* 15609 (BAG). Falluja desert, 16 April 1955,

*Haines* 286 (BUNH). E. of Falluja, 31 Oct. 1956, *Rechinger* 8135 (BUH). Between Rahhaliya and Shithatha, alt. 50 m, 12 Nov. 1956, *Rawi & Alkim* 16318 (BAG). From 8-9 km S. W. of Falluja, 18 Nov. 1956, *Rechinger* 8301 (BUH). About 23 km S. W. of Ramadi, alt. 120 m, 21 Nov. 1956, *Guest, Rawi, & Rechinger* 15947 (BAG, K). Near S. shore of Habbaniya Lake, alt. 50 m, 4 April 1957, *Guest* 15194 (BAG). About 102 km W. of Ramadi, 6 June 1957, *Rechinger* 9795 (BUH). About 102 km W. of Ramadi, alt. 320 m, 20 April 1959, *Rawi & Nuri* 27015 (BAG, K). From 170-190 km W. of Ramadi, alt. 390 m, 21 April 1959, *Rawi & Nuri* 27037 (BAG). Three km S. of Rahhaliya, alt. 70 m, 27 Feb. 1961, *Chakravarty & Rawi* 29805 (BAG, K). Seventy km N. W. of Falluja, 7 April 1961, *Chakravarty & Rawi* 30366 (BAG, K). Southern border of Tharthar lake, alt. 70 m, 8 April 1961, *Bhuracha & Abbas* 30432 (BAG, BUH, BUA). Between Karbala and Nukhaib, 17 April 1961, *Bhuracha* 953 (BUA). Rocky hill, 75 km N. of Rutba, alt. 500 m, 2 March 1962, *Rawi & Khatib* 32297 (K). About 102 km W. of Ramadi-Rutba, alt. 310 m, 6 June 1953, *Rawi* 21272 (K). Syrian desert, c. 15 km W. of Ramadi, alt. c. 40 m, 9 March 1955, *Guest & Rawi* 13931 (K). Between, Rutba and Syrian border, 22 April 1961, *Bhuracha* 4663 (BUH, BUA). Twenty km E. of Rutba, 28 Nov. 1961, *Agnew et al.* 131 (BUH, BUA). H1, alt. 440 m, 29 March 1962, *Chakravarty et al.* 31582 (BAG). Forty km. E. of Rutba, 7 May 1962, *Barkley & Palmatier* 2272 (BUH, BUA, K). Ninety km E. of Rutba, 3 May 1963, *Agnew et al.* 5283 (BUA). Gravelly soil, 10-15 km W. of Ramadi, 5 April 1964, *Rawi et al.* 32820 (BAG). Five km S. E. of Rutba, 9 March 1965, *J. Al-Mokhtar* 33357 (BAG). Sandy gravelly soil, Habbaniya, 15 June 1966, *Rawi & Alizzi* 34451 (BAG). Habbaniya, sandy soil, 15 June 1966, *Rawi & Alizzi* 34457 (K).

**3. *Helianthemum ledifolium* (L.) Mill., Gard.**  
Dict. ed. 8, no. 20 (1768).

Annual herb, 10-15 cm tall. STEMS: branched from base, with erect and ascending branches, stellate hairy. LEAVES: cauline, opposite, simple; stipules 3-9 (-15) mm long, linear-lanceolate, stellate-hairy; petiole 3-5 (-8) mm long; blade (10-) 30-40 (-50) mm long, (2-) 5-8 (-13) mm wide,  $\pm$  elliptic-oblong; both surfaces stellate-hairy intermixed with long simple hairs on veins; base obtuse-cuneate, apex obtuse to subacute; margin entire. INFLORESCENCE: scorpioid cymes, 6-9 flowered; bracts leafy 7-12 mm long, 1.2-2.5 mm wide, linear-lanceolate, stellate hairy. FLOWERS: chasmogamous; pedicel (3-)

5-7 (-14) mm long, densely hairy. CALYX: sepals 5, twisted in bud; outer 2 sepals bract-like, 4-7 mm long, linear-oblong; inner sepals 8-12 mm long, 3-5 (-8) mm wide, ovate, 2-4 prominently nerved, stellate hairy intermixed with simple pilose hairs on back. COROLLA: petals 5, twisted in bud, 5-7 mm long, 2-3 mm wide, obovate, apex abtuse. STAMENS: 20-30, all fertile, free. PISTIL: one, 2-3 mm long; ovary superior, 3-carpelled; ovules many; style one, 1.0-1.5 mm long; stigma one, capitate. FRUIT: capsule, (5) 6-8 (-13) mm long, 4-5 (-7) mm wide, ovoid, stellate hairy all over or on the valves margins only. SEEDS: 0.5-0.7 mm long, somewhat wrinkled, brown, glabrous. FLOWERING: March - April.

KEY TO THE VARIETIES OF  
HELIANTHEMUM LEDIFOLIUM

1. Pedicel 3-5 (-7) mm long, shorter or nearly as long as calyx; capsule ciliate on valves margins and apices. ... .. var. *ledifolium*.
1. Pedicel 7-10 (-14) mm long, longer or nearly as long as calyx; capsule hairy all over. ... .. var. *lasiocarpum*.

**var. ledifolium.**

Type: "Habitat in Monspele" (Hb. Linn. 689/47 !). Plate: No. 3A.

*Cistus ledifolius* L., Sp. Pl. 1: 527 (1753).  
*Cistus niloticus* L., Mant. Alt. 2: 246 (1771).

*H. niloticum* (L.) Pers., Syn. Pl. 2: 78 (1806), non Moench, Meth. 233 (1794).

*H. ledifolium* (L.) Mill. var. *macrocarpum* Willk., Icon. Descr. Pl. Eur. aust.-occ. 2: 86, tab. 120 (1859).

*H. ledifolium* (L.) Mill. var. *microcarpum*\* Coss. ex Willk., Icon. Descr. Pl. Eur. aust.-occ. 2: 87, tab. 121 (1859).

*H. niloticum* sensu Boiss., Fl. Orient. 1: 441 (1867).

*H. niloticum* (L.) Pers. var. *microcarpum* (Coss. ex Willk.) Boiss., Fl. Orient. 1: 441 (1867).

HABITAT: common in dry calcareous places, rocky slopes, sandy-haswa, silty or clayey soil, and scrub; often collected with *H. salicifolium* (L.) Mill. DISTRIBUTION: Iraq -- from eastern Alluvial district to Persian foothills, and Western and Southern Desert districts. Map No. 3A; Egypt, Palestine, Jordan, Syria, Cyprus, Turkey, Armenia, Kuwait, Saudi Arabia, Bahrain, and Iran. AREA: Mediterranean - Irano - Turanian. REPRESENTATIVE SPECIMENS: AMARA LIWA: Wadi Tib, alt. c. 40 m, 27 March 1957, *Guest, Rawi, & Rechinger* 17473A (BAG). Mud flat, 60 km N. of Amara, 27 March 1957, *Rechinger* 8870 (BUH). ARBIL LIWA: igneous rock, Haji Umran, alt. 1750 m, 3 June 1948, *Chapman* 11944 (BAG). Dry river side, mixed with *H. salicifolium*, Shaqlawa, alt. 2500 ft, 11 May 1956, *Haines* 284 (BUNH). Rocky slopes, Haji Umran, 8 June 1956, *G. M. Wiltshir* 2322 (BUH). Muddy stony soil, between Rowanduz and Akoyan, alt. 800 m, 8 June 1959, *Kass & Nuri* 27262 (BAG). Stony muddy soil, Karokh Mt., alt. 2000 m, 9 June 1959, *Al-Kass, Nuri, & Serhang* 27387 (BAG). Muddy soil between slope of Karokh and Pergala village, alt. 800-1500 m, 12 June 1959, *Kass, Nuri, & Serhang* 27696 (BAG). N. of Shirwan Mazin, alt. 4000 ft, 22 June 1961, *Agnew et al.* 6241 (BUH). BAGHDAD LIWA: 4 km E. of Samarra, alt. c. 65 m, 5 May 1957, *Rawi* 20349 (BAG). Jabal Hamrin, 8 March 1961, *Agnew* 5159 (BUH). Near Samarra, 12 March 1961, *Agnew* 5084 (BUH). Gypsy soil, 70 km N.E. of Falluja, 7 April 1961, *Rawi & Chakravarty* 30367A (BAG). BASRA LIWA: 5 km S. E. by E. of Zubair, alt. 4 m, 23 March 1957, *Guest, Rawi, & Rechinger* 16801 (BAG, K). Sandy haswa, 10 km S. E. by S. of Jiraibiyat, alt. c. 175 m, 24 March 1957, *Guest, Rawi, & Rechinger* 17160A (BAG, K). Near Nukhaib station, c. 40 km W. by N. of Basra, alt. c. 10 m, 25 March 1957, *Guest, Rawi, & Rechinger* 17350 (BAG, K). Along the railway, W. of Basra, 25 March 1957, *Rechinger* 8844 (BUH). Khadhar Al-Mai, alt. 190 m, 21 March 1960, *Rawi et al.* 29110 (BAG). Sandy clay, 75 km S. of Khadhar Al-Mai, 25 March 1966, *Alizzi* 34428 (BAG, K). Chawaibah wells near Zubair on sandy soil, 8 April 1933, *Guest & Zohary* 5046 (K). DIWANIYA LIWA: irrigated field, Salman, alt. 200 m, 14 April 1955, *Guest & Rawi* 14107 (BAG). E. of Salman, alt. c. 190 m, 22 April 1957, *Guest, Rawi, & Rechinger* 18810 (BAG).

\* After examining the whole material available of *H. ledifolium*, we feel it is dubious to distinguish var. *microcarpum* from the type variety. Many of the authors have reported it from this area. It is characterized by short pedicel; capsule smaller than calyx and straight floral axis. What we have observed is that most of the specimens collected before complete ripening of their capsules show the same characters as mentioned for the variety. However, it requires a good field and cytological studies for the confirmation of its status.

Rocky ridges, near Ansab, alt. c. 340 m, 24 April 1957, Guest, *Rawi*, & *Rechinger* 18944 (BAG, K). DIYALA LIWA: Between Mandali and Tursak, alt. 110 m, 28 March 1950, *Rawi* 12578 (BAG). Tursak, alt. 100 m, 28 March 1950, *Rawi* 12582 (BAG). HILLAH LIWA: Babylon, 2 May 1929, Rev. F. A. Rogers 295 (K). KARBALA LIWA: Sandy soil, 118 km W. of Karbala, alt. 70 m, 18 April 1961, *Rawi* 30914 (K). Road between Karbala and Shithatha, 27 April 1956, N. Polunin et al. 685 (BUH). Road side, 3 km S. of Rahhaliya, alt. 70 m, 27 Feb. 1961, *Chakravarty* & *Rawi* 29801 (BAG, K). Twelve km W. of Ukhaidhir, alt. 60 m, 17 April 1961, *Rawi* 30850A (BAG). MOSUL LIWA: cornfield, Duhuk, alt. 500 m, 25 April 1932, *Guest* 2319A (BAG). Limestone Mt. Karsi, alt. 800 m, 23 May 1948, *Gillett* 10961 (BAG). Matine, alt. 1500 m, 15 May 1957, *Rawi* 8748 (BAG). Clayey soil, 50 km S. W. of Hadhr, alt. 230 m, 12 April 1964, *Chakravarty* et al. 33057 (BAG). Forty km E. of Singar, 14 April 1964, *Chakravarty* et al. 33129 (BAG). RAMADI LIWA: Nukhaib, alt. 305 m, 16 March 1953, *Springfield* & *Jaf* 21356 (BAG). About 15 km W. of Ramadi, alt. 40 m, 9 March 1955, *Guest* & *Rawi* 13695 (BAG). Stony soil, Rutba, alt. 640 m, 10 March 1955, *Rawi* 15626 (BAG). Twenty km W. of Rutba, alt. 640 m, 11 March 1955, *Al-Kass* 14674 (BAG) & *Rawi* 15034 (BAG). Wadi Ghadaf, alt. 550 m, 11 March 1955, *Rawi* 15646 (BAG). Fifty km S. E. of Rutba, 7 March 1965, J. *Al-Mokhtar* 33363 (K). Nukhaib, alt. 250 m, 13 March 1955, *Rawi* 15684 (BAG). Clayey soil, Wadi Ghadaf, alt. 550 m, 16 March 1955, *Rawi* 14844A (BAG, K). Silty depression, 35 km W. N. W. of Rutba, alt. c. 600 m, 7 June 1957, *Rawi* 21150 (BAG). Seventy five km W. of Rutba, alt. c. 710 m, 7 June 1957, *Rawi* 21195 (BAG). Between shithatha and Ramadi, 27 Feb. 1961, *Bharucha* & H. *Abbas* 4662 (BUH). Fifteen km W. N. W. of Falluja, alt. 55 m, 1 April 1961, *Rawi* 30138A (BAG). Forty five km E. of Nukhaib, 15 April 1961, *Agnew* et al. 5634 (BUH). One hundred km S. W. S. of Ramadi, 118 km W. of Karbala, alt. 70 m, 18 April 1961, *Rawi* 30914 (BAG). Silty plain, 50 km W. of H3, alt. 600 m, 21 April 1961, *Rawi* 31176 (BAG). Nineteen km N. E. of Rutba, alt. 650 m, 22 April 1961, *Rawi* 31176A (K). Forty eight km N. E. of Rutba, alt. 620 m, 22 April 1961, *Rawi* 31207A (BAG, K). About 15 Km S. of Rutba, alt. 650 m, 1 March 1962, *Rawi* & *Khatib* 32190 (BAG). Sandy gravelly soil, 95 km N. E. of Rutba, alt. 450 m, 3 March 1962, *Rawi* & *Khatib* 32350 (BAG). Fifty km E. of Rawa, 9 March 1962, *Agnew* & *Al-Hashimi* 6564 (BUH). About 100 km S. W. of Qaim, 12 March 1962, *Barkley* & H. *Abbas* 860 (BUA).

Nukhaib-Karbala, 15 March 1962, *Hashimi* 1271 (BUE). About 35 km S. of Rutba, alt. 650 m, 29 March 1962, *Rawi* et al. 31427 (BAG, K). One hundred km N. E. of Rutba, alt. 440 m, 29 March 1962, *Chakravarty* et al. 31548 (BAG, K). Twelve km S. E. of H2, alt. 320 m, 30 March 1962, *Chakravarty* et al. 31603 (BAG). Loamy soil, 13 km S. of Ukhaidhir, alt. 230 m, 11 April 1964, *Chakravarty* et al. 33007 (BAG). About 120 km N. W. of Rutba, alt. 650 m, 10 April 1966, S. A. *Omar* 34242 (BAG, K). One hundred km N. E. of Rutba, alt. 500 m, 29 March 1962, *Chakravarty*, *Rawi*, *Khatib*, & *Alizzi* 31533 (K). Sandy clay soil, Almasad, 15 km S. of Rutba, alt. 650 m, 7 April 1964, *Chakravarty*, *Rawi*, *Khatib*, & *Alizzi* 32852 (K). Wheat field, 25 km N. of Rutba, alt. c. 600 m, 12 April 1966, *Omar* 34201 (BAG). Weed in wheat field, 40 km S. E. of Rutba, alt. 550 m, 13 April 1966, *Omar* 34209 (BAG). SULAIMANIYA LIWA: Open oak forest on northern slopes, Penjwin, alt. 1200-1300 m, 20 August 1953, *Guest* 12937 (BAG). Avroman Mt., N. of Halabja, alt. c. 1500-1830 m, 18 June 1957, *Rawi* 22057 (BAG). Kamarspa, alt. c. 1840 - 2000 m, 18 June 1957, *Rawi* 22191 (BAG). Kajan Mt. near Penjwin, alt. c. 1590 m, 21 June 1957, *Rawi* 22703 (BAG). Mt. slope, 35 km N. W. by N. of Rania, alt. 1300 m, 14 May 1959, *Rawi* et al. 28908 (BAG). Road side and field, Kopi Qaradagh, alt. 4000-4500 ft., 18 June 1959, *Agnew* 1857 (BUH).

**var. lasiocarpum** (Willk.) Bornm. in Bot. Jahrb. 59: 373 (1925). Type: many syntypes cited from Rumelia and Caucasia. Plate: No. 3B.

*H. lasiocarpum* Willk., Icon. Descr. Pl. Eur. aust.-occ. 2: 88, tab. 122 (1859).

*H. niloticum* (L.) Mill. var. *lasiocarpum* (Willk.) Boiss., Fl. Orient. 1: 441 (1859).

**HABITAT:** clayey soil, in field, on stony or limestone hillside slopes; among *Quercus aegilops* forest. **DISTRIBUTION:** Iraq - common in the north and northeastern parts of the country. **REPRESENTATIVE SPECIMENS:** ARBIL LIWA: Limestone, *Quercus aegilops* forest, Shaqlawa, alt. 1000 m, 1 June 1948, *Gillett* 11555 (BAG). Clayey soil on low depression, Koi Sanjak, alt. 590 m, 7 May 1959, *Rawi* et al. 28105 (BAG). Between Rawanduz and Agoyan village, alt. 800 m, 8 June 1959, *Kass* & *Nuri* 27262 (K). Hillside slope, Darband, 20 km to Haji Umran, 6 June 1960, Z. *Chalabi* 3558 & 3360 (BUH). Haji Umran alt. 1750 m, 3 June 1948, G. *Chapman* 11944 (K). KIRKUK LIWA: Clayey soil on hillside with small stones, 31 km N. of Kirkuk on road to Koi Sanjak, alt. 740 m,

6 May 1959, *Rawi et al.* 28017 (BAG, K). MOSUL LIWA: In corn field on stony soil, Dohuk, alt. 500 m, 24 April 1932, *Guest* 2319B (BAG). Near Dohuk, 8 May 1932, *Mekki Beg* 5245 (BAG) and 3268 (K). Limestone with remnants of *Q. aegilops* forest, Jabal Singar, alt. 800 m, 28 May 1948, *Gillett* 10962 (BAG, K). Aqra, 31 May 1948, *Rawi* 11492 (BAG, K). On slope, Jabal Bekhar, near Zakho, alt. c. 700-800 m, 2 July 1957, *Rawi* 23027 (BAG). SULAIMANIYA LIWA: Clayey hillside, 2 km N. of Chinaruk, alt. 1000 m, 8 May 1959, *Rawi, Nuri, & Kass* 28156 (BAG). Dry stony hillside, 2 km N. of Chiarock, N. of Haibat Sultan Dagh, alt. 700 m, *Rawi, Nuri, and Kass* 28374 (K). On hillside, 17 km N. W. of Rania, alt. 900 m, 12 May 1959, *Rawi et al.* 28637 (BAG). Avraman mountain N. of Halabja, alt. c. 1500-1830 m, 18 June 1957, *Rawi* 22052 & 22053 (K). Kamarspa, on road between Halabja and Tawela, alt. c. 1840-2000 m, 18 June 1957, *Rawi* 22191 (K). Khajan Mountain near Penjwin, alt. c. 1590 m, 21 June 1957, *Rawi* 22703 (K).

#### 4. *Helianthemum salicifolium* (L.) Mill. Gard.

Dict. ed. 8, no. 21 (1768). Plate: No. 4.

*Cistus salicifolius* L., Sp. Pl. 1: 527 (1753). Type: "Habitat in Lusitania, Hispania." (Hb. Linn. 689/48 !).

Annual herb, 5-36 cm tall. STEMS: branched from the base with ascending and erect branches, covered with stellate hairs. LEAVES: cauline, opposite, simple; stipules 3-8 (-15) mm long, linear-lanceolate; petiole 1-3 (-5) mm long; blade 10-15 (-30) mm long, 4-6 (-12) mm wide, oblong-obovate; both surfaces stellate hairy, becoming dense on veins; midvein and secondary veins distinct and elevated beneath; base  $\pm$  cuneate, apex obtuse; margin entire. INFLORESCENCE scorpioid cyme, 6-17-flowered; bracts leafy, 3-7 (-13) mm long, elliptic-lanceolate, stellate hairy. FLOWERS: chasmogamous; pedicel 4-8 (-15) mm long, spreading in fruit. CALYX: sepals 5, twisted in bud; outer two sepals bract-like, 2.5-3.0 mm long, c. 1 mm wide, lanceolate; inner sepals 4.0-4.5 (-6) mm long, 3.0-3.5 (-4) mm wide, broadly ovate, 2-3 nerved, nerves prominent and elevated; outer sepals stellate hairy intermixed with simple pilose hairs specially on veins. COROLLA: yellow, petals 5, twisted in bud, 4.0-4.5 (-5.5) mm long, 2.5-3.0 (-3.5) mm wide, obovate, with many dull veins (forking in upper half), apex obtuse. STAMENS: 10-12, all fertile, free, PISTIL: one, c. 2.0-2.5 mm long; ovary superior, 3-carpelled, one-celled; ovules many; style one, 1.0-1.5 mm long; stigma one, capitate.

FRUIT: capsule, 5-6 mm long, 4-5 mm in diameter, globose-ovoid, glabrous. SEEDS: many, 0.6-1.0 mm long, conical-ovoid. FLOWERING February-April. HABITAT: dry hills and cultivated haswa plains. DISTRIBUTION: Iraq throughout the districts Arbil, Amadiya, Rawanduz, Mosul, Jabal Sinjar, Kirkuk, Persian foothills, Eastern Alluvial region, Lower Jazera, and Western and Southern Deserts, map No. 4; W. & C. Europe, Egypt, Sinai, Palestina, Jordan, Syria, Lebanon, Cyprus, Turkey, Caucasus, Kuwait, Saudi Arabia, Bahrain, and Iran; South Africa. AREA: Mediterranean, Euro-Siberian and W. Irano-Turanian. The most common species of *Helianthemum* in the region. DISTINGUISHING CHARACTERS: it can be readily distinguished by the spreading pedicel (in fruit) longer than calyx, and by the glabrous capsule. REPRESENTATIVE SPECIMENS: AMARA LIWA: Conglomerate hills, Jabal Muwaila, alt. 70 m, 27 March 1957, *Guest, Rawi, & Rechinger* 17557 (BAG, K). Well-drained alluvium, 60 km N. of Amara, alt. 40 m, 27 March 1957, *Guest, Rawi & Rechinger* 17473 (BAG, K). Mud flat, 60 km N. of Amara, 27 March 1957, *Rechinger* 8869 (BUH). Near Tib police station, 28 March 1957, *Rechinger* 8931 (BUH). ARBIL LIWA: In cultivated field, alt. 1350 ft, 2 April 1931, *Guest* 1458 (BAG, K). Rawanduz, alt. 2500 ft, *Guest* 2047. (BAG, K). Marshy area, Bastura Chai, 16 March 1958, *Polunin* 2099 (BUH). Gravelly waste, 8 km W. of Arbil, 20 March 1958, *Dept. of Botany* 168 (BUH). Gravel, 10-15 km E. of Arbil, alt. c. 470 m, 20 April 1958, *A. shahwani* 25289 (BAG). Hillside, 17 km N. W. of Rania, alt. 900 m, 12 May 1959, *Rawi, Nuri, & Kass* 28637 (BAG, K). Bastura Chai, 11 April 1960, *Lawand & Hashimi* 270 (BUE). Clayish gravel, below Salah ad-Din, 8 May 1963, *Barkley* 1364 & 1283 (BUE). Twelve km from Arbil-Shaqlawa highway, 30 April 1967, *Daoud & Khazir* (BUH). BAGHDAD LIWA: Fatha gorge, March 1930, *Guest* 1028 (BAG). Cultivated steppe, near Baiji, alt. 300 m, 10 May 1954, *Guest* 13384 (BAG). Seventy km S. W. of Samarra, alt. c. 110 m, 22 April 1957, *Guest, Rawi, & Rechinger* 18731A (BAG). Loamy soil, 4 km E. of Samarra, alt. c. 65 m, 5 May 1957, *Rawi* 20342 (BAG). River Underground gypseous (?), c. 40-50 km N.N. Underground gypseous alt. c. 40-50 km N.N. W. of Baghdad, 7 April 1961, *Chakravarty & Rawi* 30367 (BAG, K). Stony hill, Adhaim, Jabal Hamrin, 23 March 1963, *Agnew & Hashimi* 6843 (BUH). About 155 km N. E. of K3, alt. 315 m, 11 April 1964, *Chakravarty et al.* 32994 (BAG). Near Baiji, alt. 200 m, 6 April 1965, *Rawi & Hamada* 33583 (BAG). BASRA LIWA: Among



- cultivation, Najmi, alt. 20 m, 13 Feb. 1947, *Gillett & Rawi* 6077 (BAG, K). Foot of Jabal Sanam, 18 March 1957, *Dept. of Botany* 8545 (BUH). Five km S. S. E. of Zubair, 23 March 1957, *Rechinger* 8665 (BUH). Sandy places, near Khadhar Al-Mai, 24 March 1957, *Rechinger* 8783 (BUH). Batin, alt. c. 70 m, 24 April 1957, *Guest, Rawi & Rechinger* 17073 (BAG, K). Fifteen km S. W. of Zubair, 17 April 1955, *Guest et al.* 14362 (BAG). DIWANIYA LIWA: on limestone, c. 60 km S. of Samara, alt. 100 m, 23 Feb. 1947, *Gillett & Rawi* 6166 (BAG, K). Shabicha, alt. 200 m, 25 Feb. 1947, *Gillett & Rawi* 6274 (BAG, K). About 125 km S. by E. of Salman, alt. c. 340 m, 24 April 1957, *Guest, Rawi, & Rechinger* 18945 (BAG, K). DIYALA LIWA: on gravel hill top, Jalaula, April 1929, *Rogers* 0221 (BAG). Tursaq, alt. c. 100 m, 28 March 1950, *Rawi* 12581 (BAG). Pilkhana, alt. 220 m, 2 April 1950, *Rawi* 12746 (BAG, K). N. E. slopes, Muqdadiya, alt. c. 160 m, 26 Feb. 1954, *Guest* 13157 (BAG). Near Persian frontier, Khanaqin, 5 April 1957, *Rechinger* 9041 (BUH). Jabal Hamrin, 8 March 1961, 5132 (BUH). Khanaqin, near Persian frontier, alt. c. 190 m, 22 March 1968, *Daoud, Sheikh, & Khazir* 144 (BUH). KARBALA LIWA: Sandy desert, 15 km from Karbala to Najaf, 18 March 1960, *Lawand & Hashimi* 1202 (BUE). Near Najaf, 21 March 1961, *Jafar al Wavid* 988 (BUE). 10 km W. of Karbala, 3 March 1962, *Barkley & Brahim* 389 (BUH, BUA). KIRKUK LIWA: Qara Tepa, March 1930, *Guest* 431 & 432 (BAG, K). In cultivated field, Tuz Khurmatu, alt. 700 ft, 6 April 1931, *Guest* 1396 (BAG). Jabal Hamrin, alt. 150 m, 19 March 1948, *Rawi & Gillett* 10238 (BAG, K). Near Injana, 15 March 1958, *N. Polunin* 2445 (BUH). Near Kirkuk, 9 April 1960, *Lawand & Hashimi* 900 (BUE). Altum Kopri, 10 April 1960, *Lawand & Hashimi* (BUE). Sandy and conglomerate hill top, 19 km S. of Darbandikhan, 9 April 1964, *Barkley & Haddad* 7397 (BUA). KUT LIWA: Stony hills, Badra, 18 March 1947, *Gillett* 6663 (BAG). MOSUL LIWA: In cultivated field on gravel soil, Dohuk, 1 April 1931, *Guest* 1315 (BAG, K). Tal Afar, alt. 1000-1500 ft, 1 April 1932, *Guest* 3136 (BAG). Zakho valley, 25 April 1932, *Guest* 2256 (BAG, K). Sinjar, 6 May 1932, *Guest* 5576 (BAG). Tal Kaif, alt. c. 1000-2000 ft, April-May 1932, *Mudir of Tal Kaif* 3203 (BAG). On tal, alt. 100 m, 28 August 1953, *Guest* 13139 (BAG). S. facing stony limestone hillside, Jabal Makhul, 17 March 1958, *Agnew* 1493 (BUH). Bashiqua, 12 April 1960, *Hashimi* 899 (BUE). Wooded hillsides, Qizil Khan, Jabal Sinjar, alt. 1500 ft, 18 March 1961, *Agnew, Hadac, & Hashimi* 5346 (BUH). S. facing wooded hills, 18 km S. of Zakho, 21 March 1961, *Agnew, Hadac, & Hashimi* 5694 (BUE). Thirty km N. W. of Hadhr, Jazira Desert, 9 March 1962, *Abbas, Palmatier, & Barkley* 447B (BUH) & 438B (BUA). Silty soil near runis, Hadhr, 9 March 1962, *Agnew & Al-Naib* 6540 (BUH). Loamy soil, 57 km S. of Mosul, 22 March 1963, *Barkley* 331 (BUH, BUA). Ruins of Hadhr, 11 March 1963, *Barkley & Brahim* 4148 (BUA). Wheat field, 50 km S. W. of Hadhr, 12 April 1964, *Chakravarty et al.* 33083 (BAG, K). Forty km E. of Sinjar, 14 April 1964, *Chakravarty et al.* 33125 (BAG, K). Five km E. of Sarsang, 24 April 1964, *Barkley* 8148 (BAU). Thirty km N. W. of Hadhr, 3 May 1965, *Alizzi & Hussain* 33923 (BAG, K). Sandy clayey soil, 33 km S. by E. of Bald Sinjar, 4 May 1965, *Alizzi & Hussain* 33932 (BAG, K). Steppe, near Zummar, alt. 400 m, *Sam* 9932 (BAG). About 20 km from Mosul on Mosul-Dohuk highway, 29 April 1967, *Daoud & Khazir* (BUH). Sandy clayey, Keramlais, alt. 350 m, 14 March 1968, *Daoud, Sheikh, & Khazir* 145 (BUH). RAMADI LIWA: Haswa soil, near Falluja, 6 March 1930, *Guest* 957 (BAG, K). Wadi Ubaiyidh, alt. 100 m, 9 March 1947, *Gillett & Rawi* 6412 (BAG). Dry steppe, opposite Rawa, alt. 120 m, 28 March 1947, *Gillett & Rawi* 7037 (BAG). Nukhaib, 180 km, W. S. W. of Karbala, alt. 250 m, 26 June 1953, 20076 (BAG). Near Rutba, 7 May 1954, *Aftan Rawi* 23725 (BAG). Twenty km N. W. of Falluja, alt. 60 m, 20 Feb. 1955, *Guest & Rawi* 13653 (BAG). Haswa plain, 25 km N. N. W. of Falluja, alt. c. 60 m, 20 Feb. 1955, *Guest & Rawi* 13663 (BAG). Calcareous hills, 10 km S. W. of Rutba, alt. 600 m, 7 June 1957, *Rawi* 21059 (BAG). Habbaniya hills, near Falluja, 16 Feb. 1958, *Agnew* 1320 (BUH). Falluja, 24 Feb. 1961, *Hashimi* 1203 (BUE). Between Khadhr Al-Mai and Basaiya, 9 March 1961, *Bharucha & Abbas* 961 & 966 (BUA). Rocky gravelly land, 20 km N. of Rutba, alt. 620 m, 2 March 1962, *Rawi & Khatib* 32213 (BAG). Gypsum land, 50 km E. of Rawa, 9 March 1962, *Agnew & Hashimi* 6563 (BUH). Hill side, 15 km E. of Ana, 10 March 1962, *Palmatier & Barkley* 587 (BUH, BUA). Plateau top, 35 km S. W. of Qaim, 12 March 1962, *Barkley & Elmer* 821 (BUH, BUA). Silty soil, 18 km N. of TI, alt. 200 m, 31 March 1962, *Chakravarty et al.* 31794 (BAG, K). Silty soil, 48 km from Baiji to Haditha road, alt. 290 m, 1 April 1962, *Chakravarty et al.* 31858 (BAG). Gravelly soil, 5 km S. W. of Rutba, 9 March 1965, *Al-Mokhtar* 33347 (BAG). Sandy desert, Wadi al-Ghadaf, 11 March 1965, *Rawi* 14733 (BAG, K). Gravelly soil, 50 km S. of Rutba, alt. 680 m, 6 April 1965, *Chakravarty et al.* 32985 (BAG, K). Weed in wheat field, 90 km S. E. of Rutba, alt. 550 m, 13 April

1966, *S. Omar* 34218 (BAG). Eighty km from N. N. W. of Nukhaib, alt. 400 m, *Rawi & Hamedia* 33509 (BAG). Sandy stony hill side, 5 km W. of Rutba, alt. 630 m, *Rawi & Nuri* 27074 (BAG, K).

5. *Helianthemum aegyptiacum* (L.) Mill., Gard, Dict. ed. 8, no. 23 (1768). Type: "Habitat in Aegypto" (Hb. Linn. 689/50!). Plate: No. 5.

*Cistus aegyptiacus* L., Sp. Pl. 1: 527 (1753).

Annual herb, 10-25 cm tall. STEMS: branched with erect and ascending branches, stellate hairy. LEAVES: cauline, opposite, simple; stipules 3-6 mm long, linear, stellate hairy; petiole 3-4 mm long, densely hairy; blade 10-25 (-33) mm long, 1.5-2.0 (-4) mm wide, linear-lanceolate, stellate hairy; base cuneate, apex obtuse; margin entire, nearly becoming revolute. INFLORESCENCE: loose scorpioid cymes, 6-9 flowered; bracts 5-6 mm long, 1.0-1.5 mm wide, linear-lanceolate, hairy. FLOWERS: chasmogamous; pedicel slender, deflexed in fruit, 5-15 mm long, densely hairy. CALYX: sepals 5; outer sepals 3-4 mm long, 1.0-1.3 mm wide, lanceolate, midnerve distinct, stellate hairy on back; inner sepals transparent, 7-10 mm long, 5-7 mm wide,  $\pm$  ovate, four prominently purple nerved with hispidous hairs on back. COROLLA: petals 5, twisted in bud, 4-5 mm long, 1.3-1.5 mm wide, lanceolate, 4-6 nerved (forking above), apex and base tapering. STAMENS: 9-12, all fertile, free. PISTIL: one with a small disc below the ovary, c. 2.5 mm long; ovary superior, 3-carpelled, one-celled with rudimentary divisional walls; ovules many; style one, 1.2 mm long; stigma one, capitate. FRUIT: capsule 5-6 mm long, 4.0-4.5 mm wide, globular-ovoid, all over pubescent hairy. SEEDS: many, 1.5 mm across,  $\pm$  suborbicular, concave-convex, brown, FLOWERING: February-April. HABITAT: dry sandy places and stony foot hills. DISTRIBUTION: Iraq - frequent in districts Arbil, Kirkuk, Persian Foothills, Eastern Alluvial region, Lower Jazira, Ghurfa, Western Desert and Southern Desert, map No. 5; North Africa, Egypt, Palestine, Syria, Turkey, Iran, and throughout Mediterranean region. AREA: Mediterranean and West Irano-Turanian. DISTINGUISHING CHARACTERS: can be readily distinguished from all other species of *Helianthemum* in Iraq by having lustrous and transparent inner sepals with brownish, prominent hairy veins. REPRESENTATIVE SPECIMENS: AMARA LIWA: stony foothills, c. 70 km N. N. W. of Amara, alt. c. 70 m, 27 March 1957, *Guest, Rawi, & Rechinger* 17506 (BAG). Barren conglomerate hills, Jabal al-Muwaila, c.

70 km N. of Amara, alt. 80 m, 27 March 1957, *Guest, Rawi, & Rechinger* 17556 (BAG, K). ARBIL LIWA: in cultivated field, alt. 1250 ft 2 April 1931, *Guest* 1476 (BAG, K). BAGHDAD LIWA: Takrit, Feb. 1930, *Guest* 392 (BAG, K). Jabal Hamrin, alt. 200 m, 19 March 1949, *Rawi & Gillett* 10254 (BAG, K). Adhaim, 8 March 1961, *Agnew* 5144 (BUH). Alluvial soil, near Baiji, alt. 200 m, 6 April 1965, *Rawi & Hamad* 33592 (BAG). DIWANIYA LIWA: Sandy hill slopes, near Shabikha, 78 km S. of Sinjar, alt. c. 260 m, 3 April 1962, *Chakravarty et al.* 32026 (BAG, K). DIYALA LIWA: Plain land, Tursak, alt. 100 m, 28 March 1950, *Rawi* 12584 (BAG). Pilkhana, 10 km E. of Khanaqin, alt. 220 m, 2 April 1950, *Rawi* 12747 (BAG, K). Gravelly, N. E. slope of Jabal Hamrin, 26 Feb. 1954, *Guest* 13158 (BAG). Sandy-stony plain, 15 km S. of Khanaqin, 5 April 1957, *Rawi & Rechinger* 17885 (BAG). Hills near Persian frontier, Khanaqin, 5 April 1957, *Rechinger* 9068 (BUH). Thirty-seven miles W. of Khanaqin, 18 March 1929, *Cowan & Darlington* (K). Stony hillside, 30 km S. of Darbandi Khan, 29 Feb. 1963, *Agnew* 6828 (BUH). Qaraghan, 3 April 1929, *J. A. Rogers* 0221A (K). In m. Dchebel-Hamrin, 23 April 1893, *J. Bornmüller* 939 (K). KIRKUK LIWA: Qura Tepe, March 1930, *Guest* 1002 (BAG). On road side Tuz Khurmatu, 4 April 1931, *Guest* 1318 (BAG, K). In cultivated field, Tuz Khurmatu, 6 April 1931, *Guest* 1397 (BAG). Kani Dolman hills, Kirkuk, 1300 ft, 30 April 1933, *Guest* 4321 (K). Steppe oak forest, between Chemchemal and Darband-i-Bazian, 15 April 1947, *Gillett & Rawi* 7612 (BAG). KUT LIWA: Dry steppe, on stony hills, Badra, alt. 100 m, 18 March 1947, *Gillett* 6605 (BAG, K). MOSUL LIWA: 40 miles S. of Mosul, 17 March 1942, *T. W. J. Taylor* TT18 (K). Eighty km S. W. of Hadhr, 9 March 1962, *Barkley, Brahim, & Palmatier* 468B (BUA). Disintegrating marble, upland desert, ruins of Hadhr, 11 March 1963, *Barkley & Brahim* 4148 (BUA). Clayey loamy hilltop, 15 km S. of Mosul, 26 March 1964, *Mr. & Mrs. Barkley* 6768 (BUA). Sandy soil, 40 km S. W. of Hadhr, 7 April 1965, *Rawi & Hamada* 33673 (BAG). Balad Sinjar-Tel Afar, alt. 1100 ft, 28 April 1933, *Guest* 4174 (K). Clayey, roadside, 15 km from Mosul-Baghdad new highway, alt. 290 m, 15 March 1968, *Daoud, Sheikh, & Khazir* 72 (BUH). Qaiyarah near Mosul, alt. 640 ft, 20 Feb. 1939, *B. Bayliss* 19 (K). Qaiyarah, alt. 640 ft, 18 March 1939, *B. Bayliss* 37 (K). RAMADI LIWA: On haswa land, near Falluja, 6 March 1930, *Guest* 959 (BAG). Dry steppe sub-desert, Rawa, alt. 170 m, 27 March 1947, *Gillett & Rawi* 6980 (BAG). Haswa plains, c. 20 km N. W. of Falluja, alt. c. 60 m, 20 Feb. 1950,

*Guest & Rawi* 13652 (BAG). Haswa desert, Faluja, 25 March 1961, *Agnew* (BUH). Brown stony hillside, 48 km N. E. of Rutba, alt. 620 m, 22 April 1961, *Rawi* 31207 (BAG, K). Gravelly land, 45 km N. of Rutba, alt. 550 m, 2 March 1962, *Rawi & Khatib* 32236 (BAG, K). Gravelly soil, 12 km S. E. of H2, alt. 320 m, 30 March 1962, *Chakravarty et al.* 31626 (BAG). Silty loamy plain, halfway between Rutba and Nukhaib, 11 March 1965, *Rawi* 14720 (BAG, K). SULAIMANIYA LIWA: Near Sulaimaniya, 6 April 1962, *Amir-al Shit* 1392 (BUE).

II. FUMANA Spach, in *Ann. Sci. Nat. Ser. 2*, 6: 359 (1836).

*Helianthemum* Mill. Sect. *Fumana* Dun. in *DC. Prod.* 1: 274 (1824).

Suffruticose perennial, often glandular hairy. LEAVES: alternate, stipulate or exstipulate, linear-lanceolate, sessile or petiolate. FLOWERS: either solitary and terminating the branches or the branches with lax 3-6 flowered inflorescence. SEPALs: 5, distinct; 2 outer linear bract like; and 3 inner ovate, imbricate. PETALS: 5, distinct, yellow. STAMENS: numerous, the outer stamens sterile; the inner fertile. OVARY: 3-carpelled, almost completely 3-celled each with few ovules; style one, curved at base; stigma one. FRUIT: capsule, 3-celled, with 3 valves. SEEDS: 3-12 per capsule.

#### KEY TO THE SPECIES OF FUMANA IN IRAQ.

1. Leaves petiolate, stipulate; blades lanceolate to ovate-lanceolate, 2-4 mm wide. ... .. 1. *F. arabica*
  1. Leaves sessile, exstipulate; blades linear 1 - 2 mm wide. ... .. 2. *F. procumbens*.
1. ***Fumana arabica*** (L.) Spach, in *Ann. Sci. Nat. Ser. 2*, 6: 359 (1836). Plate: No. 6. *Cistus arabicus* L., *Sp. Pl.* ed. 2, 745 (1762). Type: "Described from Arabia" (Hb. Linn. 689/67!).  
*Helianthemum arabicum* (L.) Pers., *Synops. Pl.* 2: 80 (1807).  
*Fumana viscidulum* (Stev.) Juz. in *Fl. URSS* 15: 681 (1949).

Undershrub, 15-40 cm tall. STEMS: with ascending branches; branchlets glandular hairy. LEAVES: cauline, alternate, simple; stipules

1.5-2.5 mm long, 0.6-0.8 mm wide, lanceolate, glandular hairy; petiole 1.0-1.5 (-2) mm long, glandular hairy; blade 5-8 (-15) mm long, 2-3 (-4) mm wide, lanceolate to ovate-lanceolate; both surfaces glandular hairy; midvein and secondary veins distinct beneath; base obtuse to slightly cuneate, apex obtuse to subacute; margin entire or slightly revolute. INFLORESCENCE: 5-6 flowered; bracts 1.5-4.0 mm long, ± lanceolate, glandular hairy. Pedicel 5-8 (-12) mm long, ascending, hairy. CALYX: sepals 5, twisted in bud, glandular hairy, outer 2 sepals bract-like, 3-5 mm long, 1.0-1.3 mm wide, lanceolate; inner sepals 7-8 mm long, 4-5 mm wide, ± ovate, 5-6 nerved, nerves somewhat elevated. COROLLA: petals 5, twisted in bud, 5-6 (-8) mm long, obovate, 8-9 nerved. STAMENS: outer ring sterile without anthers; inner stamens 25-40, all fertile. PISTIL: one, 3-5 mm long; ovary superior, 3-carpelled; ovules few in each cell; style curved at base, 1.5-2.0 mm long; stigma one, somewhat capitate; a small disc present below the ovary. FRUIT: capsule, 4.5-6.0 mm long, 4-5 mm in diameter, globular, glabrous except the pubescent beak. SEEDS: c. 12 per capsule, 2.0-2.5 mm in diameter, ± suborbicular, surface reticulate. FLOWERING: April-July. HABITAT: dry limestone slopes of clayey, rocky places. DISTRIBUTION: Iraq-common in districts Amadiya and Rawanduz, map No. 6; North Africa, Palestine, Syria, Cyprus, Lebanon, Turkey, Transcaucasia, and Iran. AREA: Sub-Mediterranean (penetrating Irano-Turanian). REPRESENTATIVE SPECIMENS: ARBIL LIWA: Mt. side, Shaqlawa, May 1930, *D. Patterson* 835 (K) and 5245 (BAG). In montis Kuh-Sefin reg., alt. 1000 m. infer ad pagum Schaklava, 16 May 1893, *J. Bornmüller* (K). Limestone, *Quercus* forest, Bekhma gorge, alt. 500 m, 14 May 1947, *Gillett* 8260 (BAG). *Quercus* forest, Salah ad-Din, alt. 900 m, 31 May 1948, *Gillett* 11282 (BAG, K). Salah ad-Din, alt. 900 m, 21 August 1948, *Gillett* 12426 (BAG, K). Near Salah ad-Din, 26 August 1962, *Barkley* 321 (BUH) and 3400B (BUA). MOSUL LIWA: Zawita, alt. 3000 ft, 23 April 1932, *Guest* 2196 (BAG, K). Zawitah valley, 3100 ft, 25 July 1933, *Guest* 4446 (K). Zawitah gorge, 2600 ft, 26 July 1933, *Guest* 4466 (K). Zawitah, 3900 ft, 28 July 1933, *Guest* 4561 (K). Zawitah, pine forest steep slopes, 6 June 1955, *Hunting Aero Survey* 81 (K). Limestone slopes, Zawitah, alt. 3450 ft, 1 August 1933, *Guest* 4927 (BAG). Atrush, alt. 3000 ft, 13 June 1933, *Guest* 3651 (BAG, K). Jabal rubal, S. of Atrush, alt. 2500 ft, 14 July 1933, *Guest* 3657 (BAG, K). Bakurman, alt. 800 m, 9 May 1947, *A. Rawi* 8549

(BAG, K). Atrush, alt. c. 1200 m, 28 May 1947, *Chapman* 9339 (BAG, K). Zawitah, alt. 1100 m, 1-8 June 1955, *Robertson* 14493 (BAG). Jebel Baykhair near Zakho, 15-18 June ? *Henry Field & Y. Lazar* 792 (K). Bekher Mt., near Zakho, alt. c. 800-1200 m, 2 July 1957, *Rawi* 23058 (BAG, K). Limestone, *Q. brantii* forest, 8 km S. of Zakho, 2 July 1957, *Rechinger* 23200 (BAG, K). SULAIMANIYA LIWA: Amoret near Qaradagh 4500 ft, 21 June 1957, *R. Haines* W1140 (K). Stony clayey hillside, N. of Koi Sanjak, alt. 850 m, 7 May 1959, *Rawi et al.* 28162 (BAG, K). Brownish Mt. slope, Sultan Daga, N. of Koi Sanjak, alt. 950 m, 7 May 1959, *Rawi et al.* 28241 (BAG). Cliffs, Kopi Qaradagh, 16 June 1959, *Agnew* 1836 (BUH).

2. *Fumana procumbens* (Dunal) Gren. & Godr., Fl. France 1; 173 (1848). Type: "Described from S. France." Plate: No. 7.

*Cistus fumana* L., Sp. Pl. 1: 525 (1753).

*Helianthemum fumana* (L.) Mill., Gard. Dict. no. 6 (1768).

*C. nudifolius* Lam., Fl. France 3: 163 (1788).

*H. procumbens* Dunal in DC. Prodr. 1: 275 (1824).

*F. vulgaris* Spach var. *minor* Spach in Ann. Sci. Nat. Ser. 2, 6: 359 (1836).

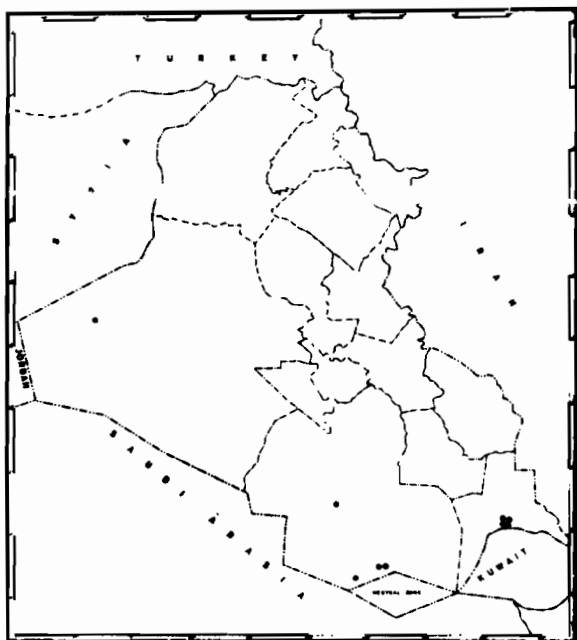
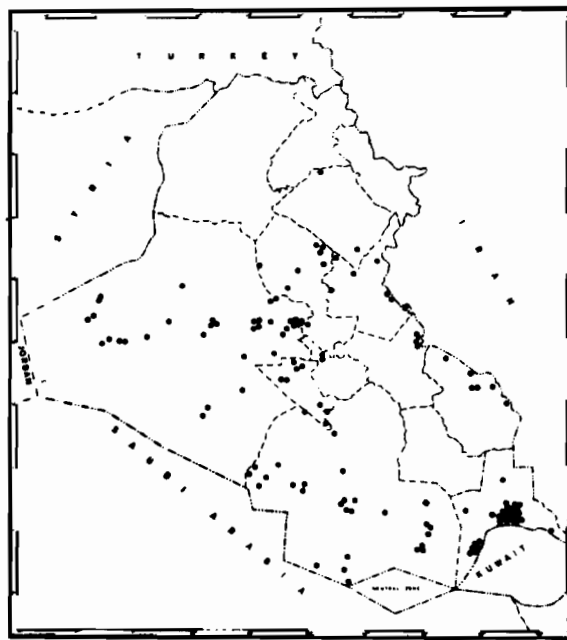
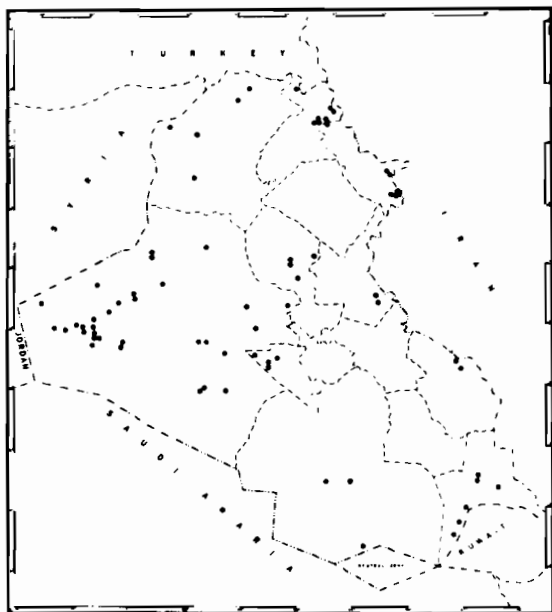
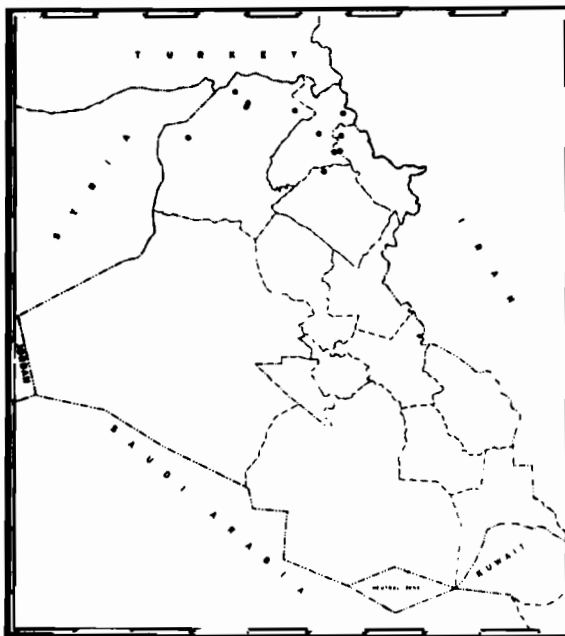
*F. nudifolius* (Lam.) Janch., in Öst. Bot. Zeitschr. 58: 396 (1908).

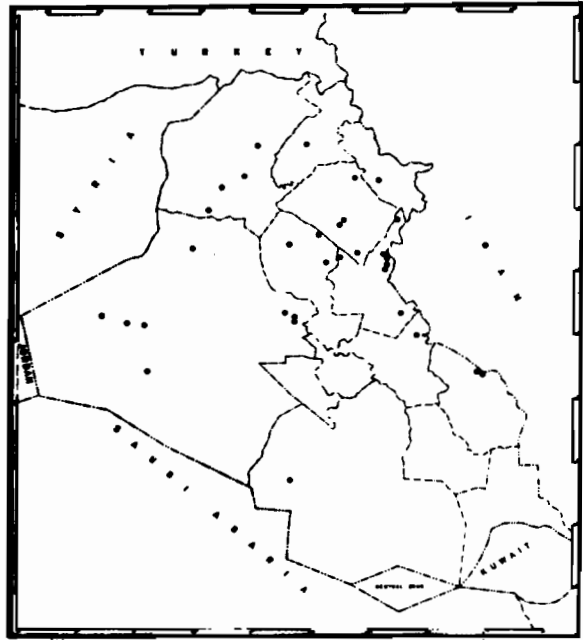
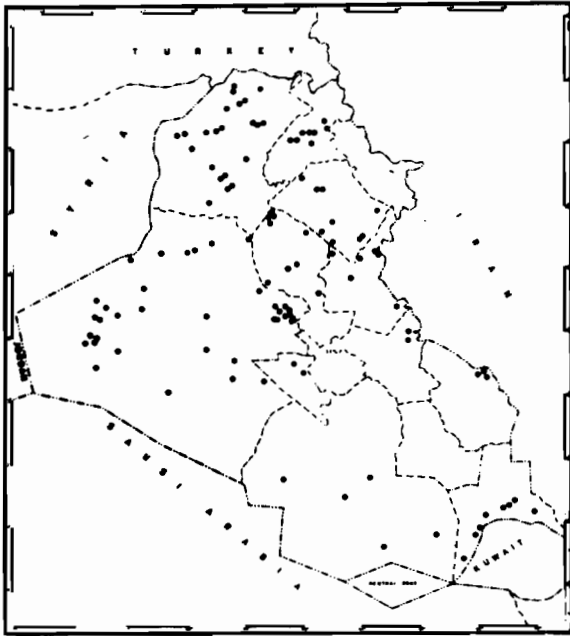
Suffruticose, 10-15 cm tall. STEMS: procumbent with woody root-stock, the grayish crustaceous cortex frequently peeling off from stems; branchlets shortly stellate-pubescent. LEAVES: cauline, alternate, simple, sessile, exstipulate; blade 7-15 (-20) mm long, 1.0-1.5 mm wide, linear, both surfaces  $\pm$  puberulent; only midvein distinct beneath; base confluent, apex spinulose; margin entire. FLOWERS: chasmogamous; solitary at the end of the branches; pedicel 5-7 mm long, stiff,  $\pm$  equal to the sepals, puberulent. CALYX: sepals 5, outer 2 sepals 3-4 mm long, 1.5-1.7 mm wide, lanceolate-elliptic; inner sepals twisted in bud, 6-7 mm long, c. 5 mm wide, ovate, 4-5 nerved, outside puberulent, intermixed with simple hairs on veins. COROLLA: petals 5, pink, imbricate-convolute, 5-6 mm long, 4-5 mm wide, obovate, with many dull nerves (forking above). STAMENS: outer ring sterile, without anthers; inner ring c. 30 stamens, fertile, free. PISTIL: one, 3-4 mm long; ovary superior, pubescent hairy in upper 1/3,

3-carpelled, incompletely 3-loculed; ovules few; style one, c. 2 mm long; stigma  $\pm$  capitate. FRUIT: capsule, 5-6 mm long, oboid-globular, glabrous except the pubescent beak, usually remaining closed with seeds retained. SEEDS: 4-8 per capsule, 2.0-2.5 mm long, dark brown. FLOWERING: May-July. HABITAT: on rocky limestone slopes and steppe, in *Quercus* forest. DISTRIBUTION: Iraq-Amadiya district, map No. 7; Mediterranean area, extending to S. Sweden; Crimea and Caucasus and E. to Khorasan. AREA: Irano-Turanian region. REPRESENTATIVE SPECIMENS: MOSUL LIWA: Gray soil with sandstone rocks, 23 km N. E. of Zakho, alt. 990 m, 4 July 1957, *Rawi* 23203 (BAG, K). Open *Quercus* forest shade, hill above Swara Tuka, alt. 1500 m, 11 July 1957, *Rechinger* 11559 (BUH).

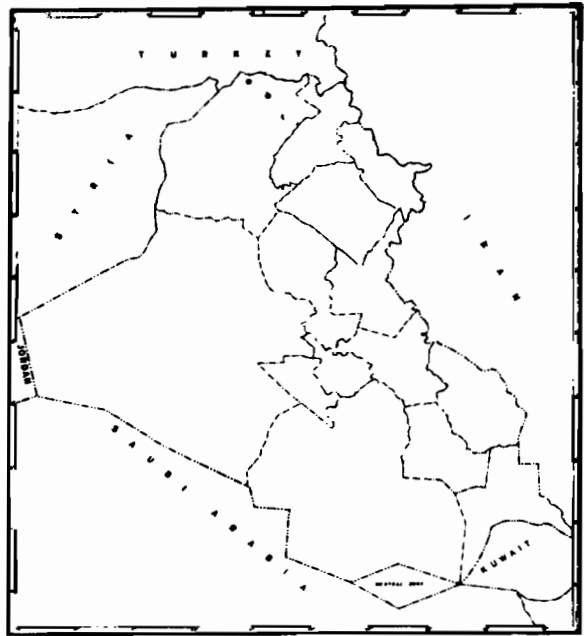
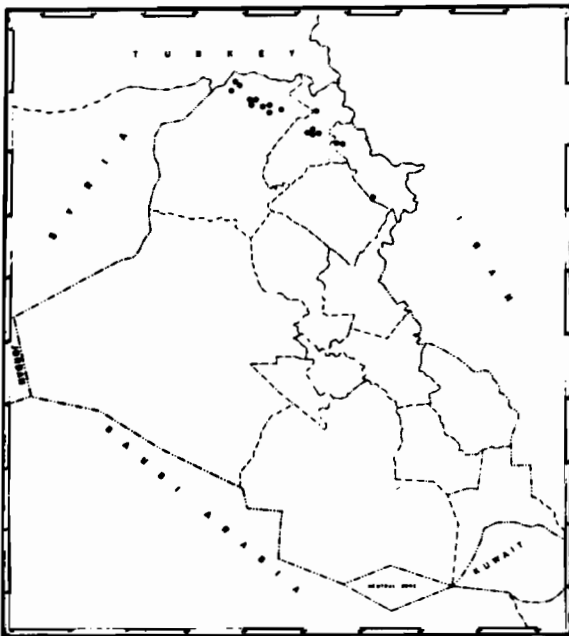
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Map: No. 1 - *Helianthemum kahircicum* Delile.Map: No. 2 - *Helianthemum lippii* (L.) Dum.-Cours.Map: No. 3A - *Helianthemum ledifolium* (L.)  
Mill. var. *ledifolium*.Map: No. 3B - *Helianthemum ledifolium* (L.)  
Mill. var. *lasiocarpum* (Willk.) Bornm.



Map: No. 4 - *Helianthemum salicifolium* (L.) Mill.      Map: No. 5 - *Helianthemum aegyptiacum* (L.) Mill.



Map: No. 6 - *Fumana arabica* (L.) Spach.

Map: No. 7 - *Fumana procumbens* (Dunal) Spach.

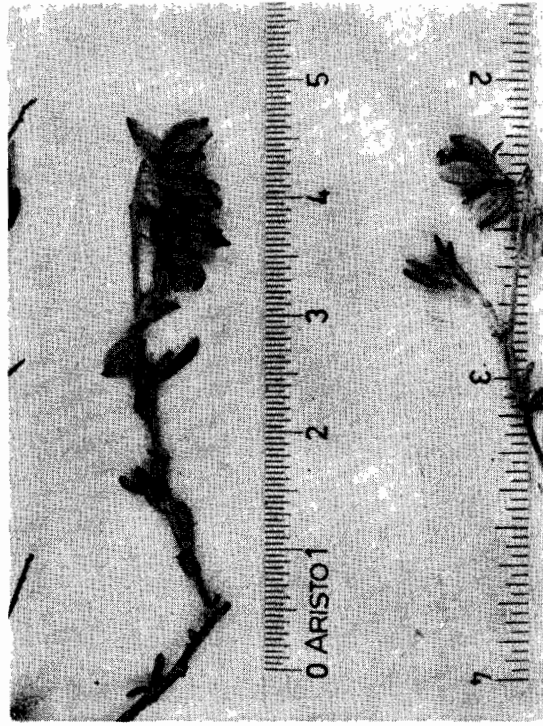


Plate: No. 1 - *Helianthemum kahircum* Delle.

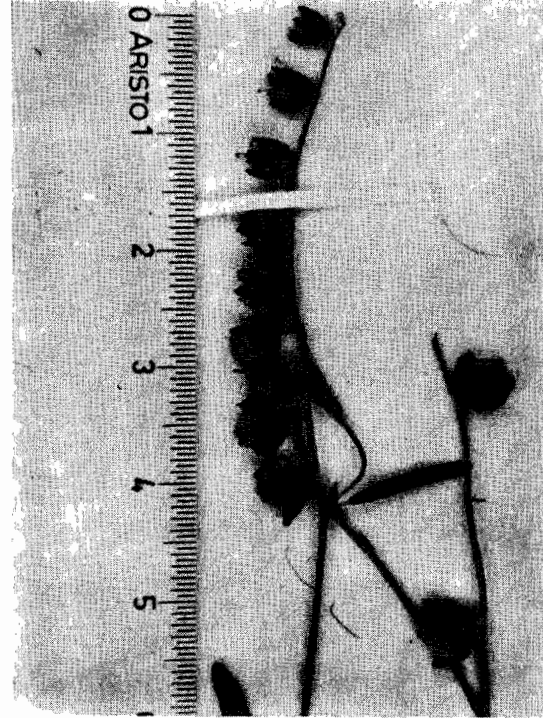
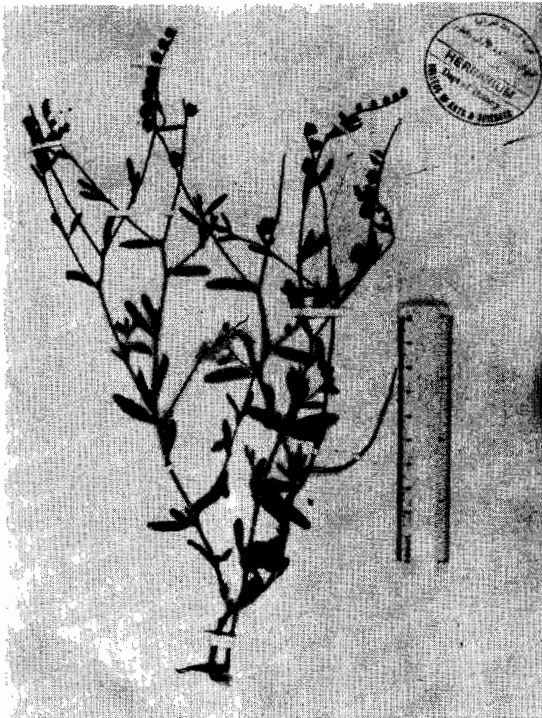


Plate: No. 2 - *Helianthemum lippii* (L.) Dum.-Cours.

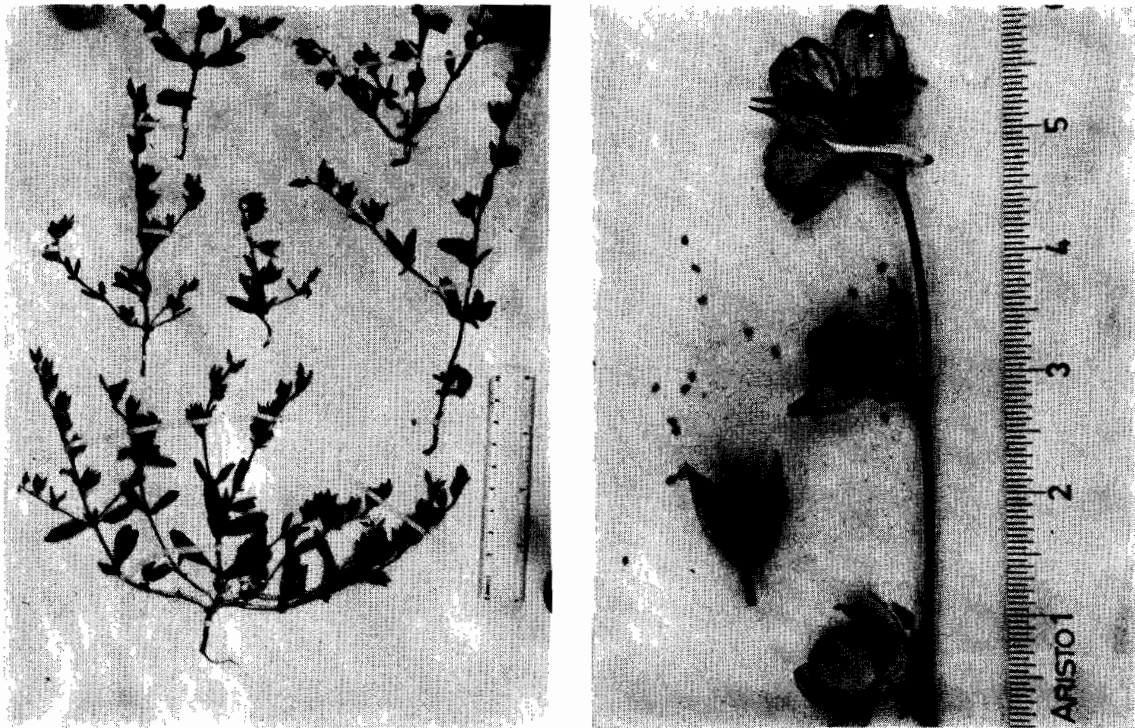


Plate: No. 3A - *Helianthemum ledifolium* (L.) Mill. var. *ledifolium*.

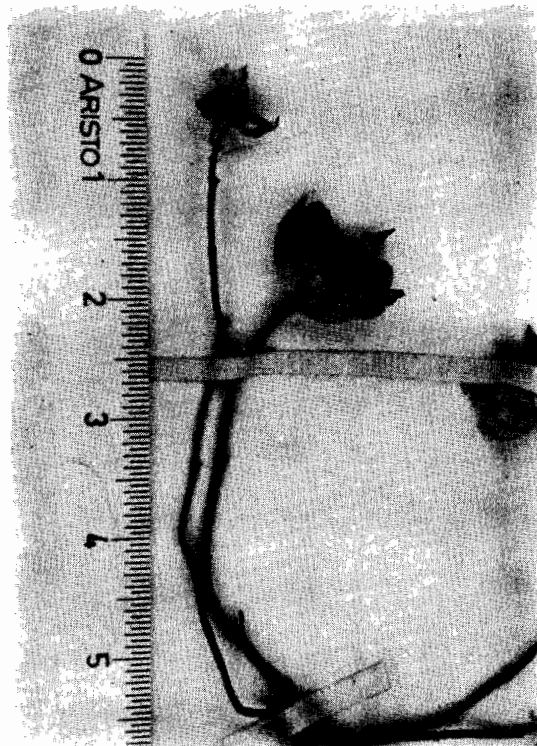


Plate: No. 3B - *Helianthemum ledifolium* (L.) Mill. var. *lasiocarpum* (Willk.) Bornm.



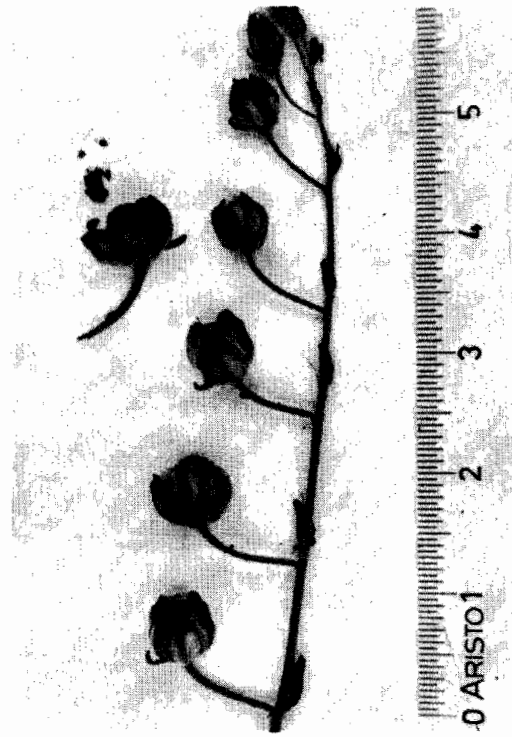


Plate: No. 4 - *Helianthemum salicifolium* (L.) Mill.

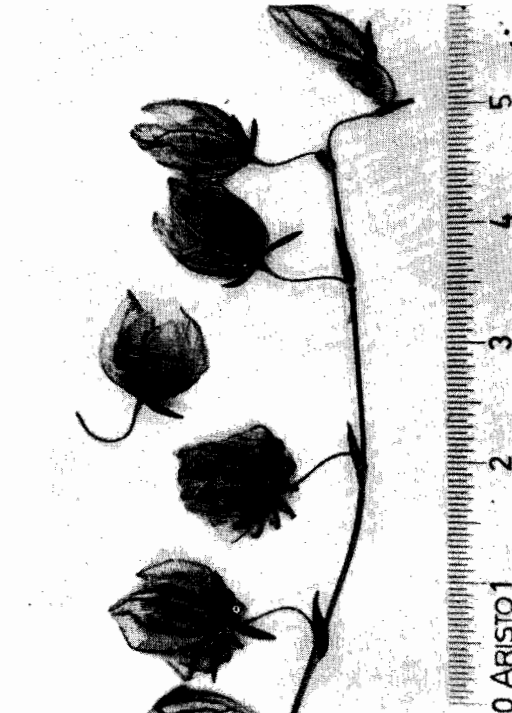
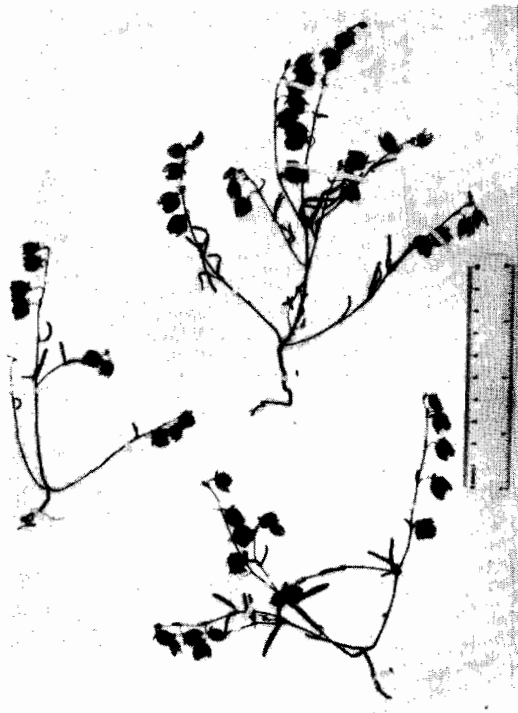


Plate: No. 5 - *Helianthemum aegyptiacum* (L.) Mill.

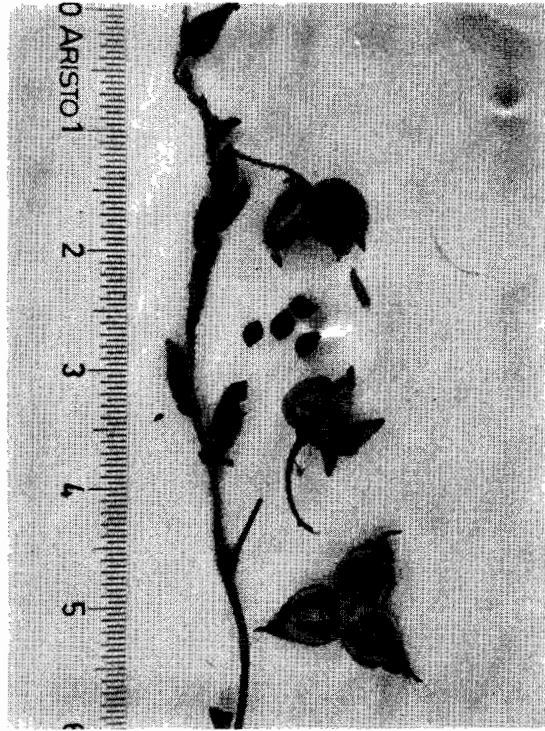


Plate: No. 6 - *Fumana arabica* (L.) Spach.

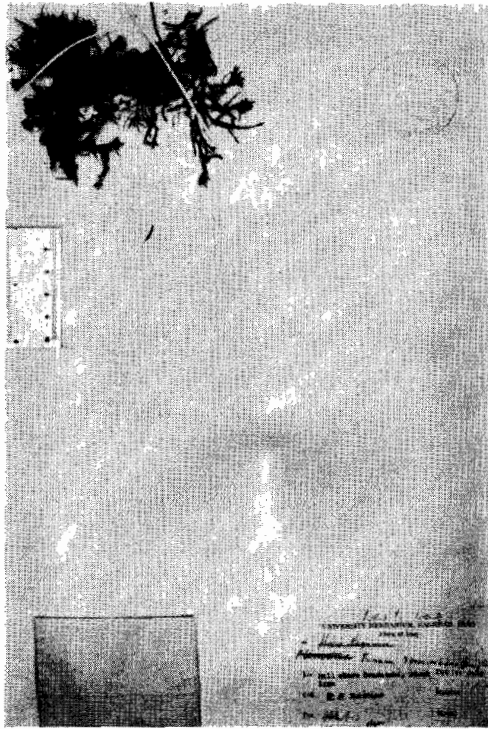


Plate: No. 7 - *Fumana procumbens* (Dunal) Spach.

## عائلة سستيسي في العراق

حازم سليمان داود ومحمد يوسف شيخ

قسم النبات بجامعة الكويت وقسم النبات بجامعة كاليفورنيا ،

بيركلي ، الولايات المتحدة الامريكية

### خلاصة

في هذا البحث أمكن التوصل الى تصنيف اجناس وأنواع وضروب عائلة سستيسي CISTACEAE النباتية الموجودة في العراق ، وتم تثبيت الاسماء العلمية الصحيحة لانواعها وضروبها كما أدرجت كافة اسمائها المرادفة . كذلك تم وضع مفاتيح للتعرف على هذه الاجناس والانواع والضروب ، وحدد وقت ازهارها وبيئاتها ومنطقت انتشارها داخل وخارج العراق موضحة بالخرائط والصور الفوتوغرافية المناسبة . كما وحصرت نماذجها النباتية التي سبق جمعها من قبل بعض المشتغلين بالتصنيف بالعراق والمودعة حاليا في المعاشب العراقية ومعشب كيو في لندن .

