5. **Euphorbia granulata** Forsk., Fl. Aeg-Arab. : 94 (1775); Boiss., Fl. Orient. **4** : 1087 (1879); Aschers. & Schweinf., Mém. Inst. Egypt. **2** : 137 (1887); Sickenberger, Mém. Inst. Egypt. **4** : 275 (1901); Muschler, Man. Fl. Egypt : 600 (1912); N. E. Br. in Dyer, Fl. Trop. Afr. **6** (1) : 502 (1911); Ramis, Bestimmungstab. Fl. Aeg. : 129 (1929); Andrews, Fl. Pl. Anglo-Egypt. Sudan **2** : 72 (1952); Vindt, Trav. Inst. Sc. Chérif. **6** : 28 (1953); Täckholm, Stud. Fl. Egypt : 250 (1956).

E. fragilis Decne, Ann. Sc. Nat. ser. 2, **2** Bot. : 241 (1834).

E. forskaolii J. Gay var. *hirtula* J. Gay in Webb & Berthel., Hist. Nat. Iles Canaries 3 (2, sect. 3) : 240 (1847).

Anisophyllum forskaolii (Gay) Klotzsch & Garcke, Phys. Abhandl. Preuss. Akad. Wiss. 1859 : 31 (1860).

A. granulatum (Forsk.) Schweinf., Beitr. Fl. Aeth. : 34 (1867).

— var. **granulata.** — Fig. 1, c.

Annual or biennal, greyish velvety *herb*; branches spreading on the ground, up to 25 cm long, sometimes erect, up to 20 cm high; internodes yellowish, thickened at the nodes, brittle, covered with short spreading hairs. *Leaves* opposite, about 1 cm long and 2-4 mm broad, oblong to oblong-ovate, puberulous on both sides with adpressed or spreading hairs; base unequal; apex rounded or obtuse; margin entire; petiole short; stipules minute and inconspicuous. *Cyathia* in axillary racemes, each cyathium subtended by a pair of leaflets; involucre campanulate or funnel-shaped, up to 0.8 mm diam., covered with minute curved hairs; glands 4, rarely 3, transverse, with an entire or 2-3 lobed petal-like appendages; lobes 5, deltoid and ciliate. *Capsules* up 1.5 mm diam., covered with adpressed or spreading hairs. *Seeds* up to 1 mm long, 4-angled, slightly rugose, greyish to pale red.

Type : Lohajae, Hadie, 1763, *Forskål* (C).

Distribution : In Egypt, mainly in sandy plains of Da, particularly southwards in Wadis along Red Sea in Da mer. and GE : Cairo, June 1879, *Sickenberger* (K !); zwischen Kena und Kosseir, Juni 1867, *Schweinfurth* 890 (K !); Gebel Elba region, Feb. 1933, *Fahmy* & *Hassib* (CAI !). Less common in Dl, with few records along Cairo-Alexandria desert road : 85 km N. of Cairo, July 1970, *Ibrahim* & *Mahdi* (CAI !); and Jebel Uweinat : Vallée des coloquintes, Oct. 1968, *J. Léonard* 4794 (BR !); Wadi Abs El Malach, Nov. 1968, *J. Léonard* 4886 (BR !).

In Africa widely distributed in North African Sahara, Nubia, Somalia Eritrea and Ethiopia.

In Asia known from Arabia, Palestine, Iraq, Iran, Afghanistan, W. Pakistan and Punjab.

Note : Forskål's description (1775 : 94) and all the above mentioned citations and synonyms of *E. granulata* match this variety.

— var. **glabrata** Boiss. in A. DC., Prodr. Syst. Nat. **15** (2) : 34 (1862); Boiss., Fl. Orient. 4 : 1087 (1879); N. E. Br. in Dyer, Fl. Trop. Afr. 6 (1) : 503 (1911).

Annual greyish *herb*; branches prostrate or procumbent; internodes slender, non-brittle, longer than in var. *granulata*, giving a more lax appearance. *Leaves* glabrous on the upper surface, thinly pubescent beneath. *Involucre* and *capsule* thinly pubescent; appendages of glands more petaloid than in var. *granulata*.

Syntype : Mascat, *Aucher* 5304 (K !).

Distribution : In Egypt, along Cairo-Suez road and southwards in Da mer, also GE : Aegypto 1827, commun. *J. Radi* (W !); Red Sea coast, Wadi Ghadir, Feb. 1961, *V. Täckholm et al.* (CAI !).

In Africa with the type variety throughout the North African Sahara and Nubia.

In Asia only records from Arabia, including Hedjaz, Aden, Mascat, Bahrain and Kuwait (K !).

— var. **turcomanica** (Boiss.) Hadidi stat. nov.

E. turcomanica Boiss., Cent. Euphorb : 13 (1860); Boiss., Fl. Orient. 4 : 1087 (1879).

Perennial *shrublet*; branches woody, prostrate; internodes yellow, glabrous, not thickened at the nodes. *Leaves* more or less glabrous on both surfaces. *Involucre* sparingly hairy; glands with narrow, entire or lobed white appendages. *Capsules* glabrous.

Type : Turcomania, 1834, *Karelin* (G-DC).

Distribution : In Egypt, few records, restricted to Da : Mittelägyptische Wüste, Arabische Seite, 1877, *Schweinfurth* 260; bei Suez, 1868, *Schweinfurth* 143; prope Rhamses, 1877, *Ball* (K !); Gebel Angabia along Cairo-Suez road, 1945, *Davis* 8535 (K !); Upper Egypt, 1848, *Kralik* (G-BOISS !).

According to Rechinger & Schiman-Czeika (1964 : 17) this variety is known from Caucasus, Iran, Turcomania, Afghanistan, Kara-Korum, Tian-schan and Pamiro-alaj; it is likely to occur in Arabia but overlooked.

Note : Rechinger & Schiman-Czeika (1964 : 17) pointed out that *E. granulata* and *E. turcomanica* are closely allied species. According to these authors the differences between the 2 species as given by Boissier (1875-1879 : 1088 (1879)) are not satisfactory. They claimed that typical *E. granulata* has densely-hairy leaves, while typical *E. turcomanica* is more or less glabrous.

They assumed that var. *glabrata* is an intermediate form between these 2 extremes and recommended field and culture studies to draw a conclusion about the relationships between these 2 species.

I have had the opportunity to examine the authentic material in Boiss. and DC. herbaria in Genève, also those in Kew. The differences between these 2 species are in reality too little to consider them as distinct species. *E. turcomanica* is merely a perennial glabrous form of the more typical *E. granulata*. The character of the leaf apex being slightly denticulate in *E. turcomanica* and not in *E. granulata*, is not constant. Therefore, *E. turcomanica* is treated here as a variety of *E. granulata*.