

*Thompson 15034*) and the gametic number of  $n=7$  in a collection from the San Jacinto Mountains, Riverside County, California (*Davis 99*).

***Malacothrix similis* sp. nov.** (fig. 1, 2c). Herba annua; foliis ad radices linearo-lanceolatis, integris, dentatis, lobatis, vel pinnatifidis; capitulis anguste campanulatis, 6–10 mm. longis, 3–6 mm. latis, floribus 32–73; corollis flavis; achaeniis truncato-fusiformis, 1.4–1.7 mm. longis, subflexuosis, maximam partem purpureo-brunneis interdum stramineis, subtiliter 15-costatis, 5 costis prominulis, 5-angulatis in sectione transversa, parte superiore late dilata, ab annulo setarum circa 18 scabriosarum circumdata; seta perstata 1.

Annual herb 5–32 cm. tall, usually branched from the base, the stems 1–11; basal leaves linear-lanceolate, entire, dentate, lobed, or pinnatifid, the rachis oblong; cauline leaves subentire; heads narrowly campanulate, 5–50 (median, 14), 6–10 mm. high, 3–6 mm. broad, 32–73 flowered; ligules yellow; pollen grains 23–38 $\mu$  in diameter (mean=30 $\mu$ ); achenes truncate-fusiform, 1.4–1.7 mm. long, 0.26–0.31 mm. wide, slightly curved, dark purplish-brown, sometimes straw-colored, finely 15-ribbed, with 5 ribs more prominent, the achenes pentagonal in transverse section, the apex flared, bordered by a ring of about 18 white-scarious irregular teeth, of which the basal portions extend above the achene lip, the teeth curved outward, lance-deltoid, the persistent seta 1. Gametic chromosome number,  $n=14$ .

Type. With *Idria*, *Yucca*, *Salvia*, and *Solanum hindsianum*, 16.0 kilometers southeast of El Rosario, Baja California, Mexico, altitude 210 meters, 18 April 1958, *Raven, Mathias & Turner 12475* (RSA).

Specimens examined. CALIFORNIA. Santa Barbara County: Santa Cruz Island, *T. S. Brandege* in 1888. Ventura County: Hueneme, *Peirson 5772*; Hueneme Beach, *Munz 9390*. BAJA CALIFORNIA, MEXICO. South Todos Santos Island, *Moran 2804*; San Quintín, *Bacigalupi 3020*, *Epling & Stewart* in 1936, *Raven et al. 12355*; Rosario wash, *Wiggins 5427*; 3.5 miles east of Rancho San José, *Wiggins 9783*; Arroyo el Agua Marga, *Wiggins 9935, 9935B*; El Rancho Viejo, *T. S. Brandege* in 1889; Cedros Island, *Anthony 434*, *Palmer 762*.

The chromosome number of *M. similis* has been determined as  $n=14$  at meiosis in microsporocytes of the type collection. This species is variable and puzzling, separable only with difficulty from *M. clevelandii*, but measurements of the pollen from the collections cited consistently have fallen within the tetraploid-size range. Furthermore, with the exception of two outlying stations in California, this species occupies a coherent area in Baja California south of the range of the diploid *M. clevelandii*. Much of the difficulty with respect to the delimiting of *M. similis* is due to the three collections from California. The dune habitat at Hueneme Beach (Ventura County), however, would be highly anomalous for *M. clevelandii*, and the collections cited are morphologically distinguishable from that species. Plants of *M. similis* from similar beach and coastal plain habitats in Baja California have smaller and darker achenes than the Hueneme collections. Additional collections and chromosome number determinations from Hueneme Beach and from Santa Cruz Island, the

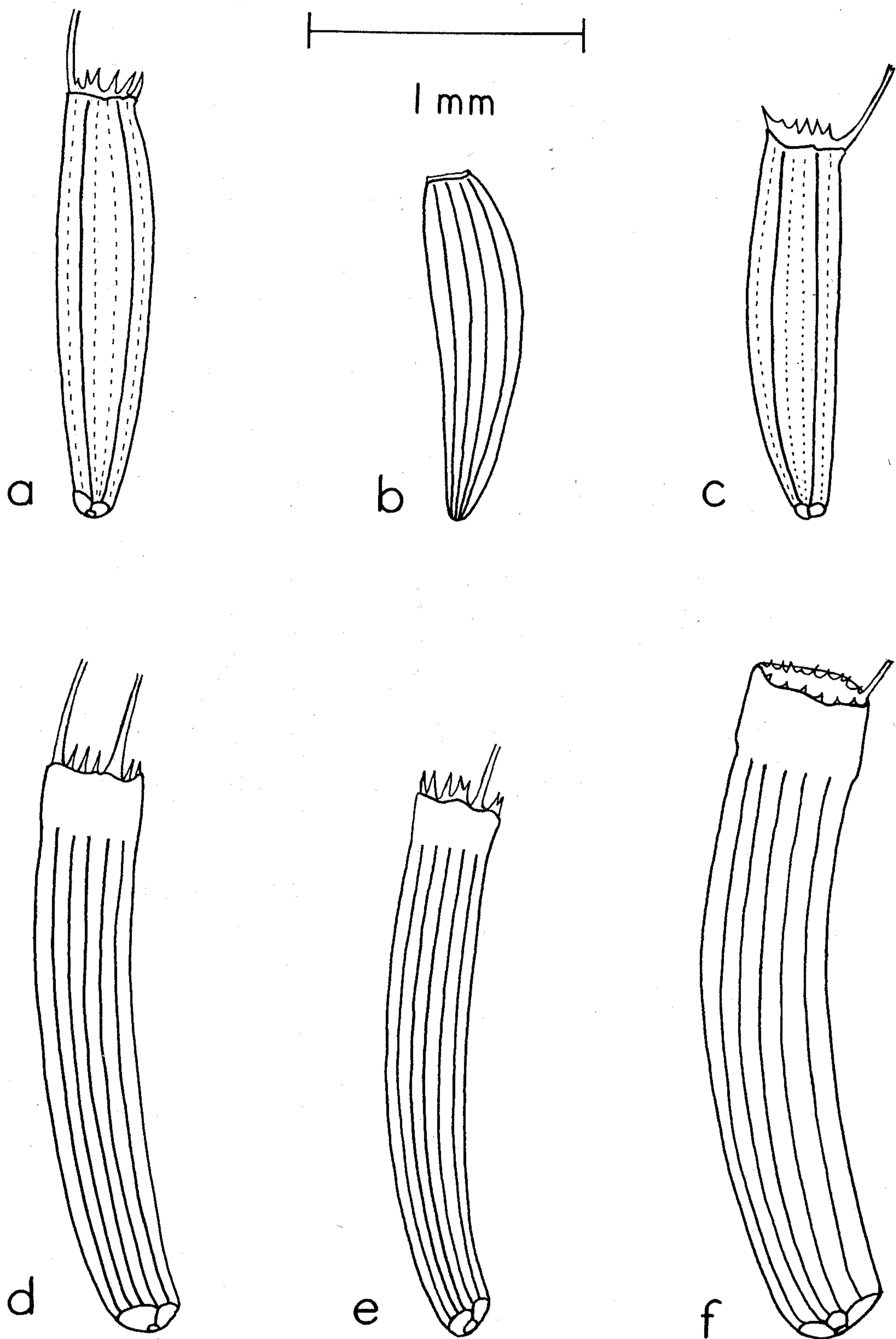


FIG. 2. Mature achenes of species of *Malacothrix*: a. *M. clevelandii*; b. *M. foliosa*; c. *M. similis*; d. *M. sonorae*; e. *M. stebbinsii*; f. *M. fendleri*.

other California station, are much to be desired. In both cases the pollen measurements are consistent with the range of size expected for the tetraploid. We suggest that an understanding of relationships in the complex

depends on a more thorough knowledge of *M. foliosa* and related species which inhabit the islands off the coast of California and Baja California, and which may have participated in the allopolyploid origin of the populations we have named *M. similis*. Measurements of the pollen of different collections of the *M. foliosa* complex suggest that it contains both diploids and tetraploids.

**Malacothrix sonorae** sp. nov. (fig. 1, 2d). Herba annua; foliis ad radices lanceolatis vel oblanceolatis, inaequaliter pinnatifidis; capitulis campanulatis, 6–9 mm. longis, 4–6.6 mm. latis, floribus 30–61; corollis flavis; achaeniis columnaris 1.7–2.00 mm. longis ad basim attenuatis, subflexuosis, praesertim fuscis nunc stramineis, subtiliter aequaliterque 15-costatis, in sectione transversa rotundis, parte superiore dilata, achaenii parte superiore ad 0.2–0.3 mm. nullomodo costata, ab annula setarum 16–18 scabrosarum circumdata; setis perstatis 2, per occasionem 1, raro 3 vel 4.

Annual herb 10–35 cm. tall, usually unbranched at the base but occasionally with up to 9 stems; basal leaves lanceolate to oblanceolate, irregularly and doubly dentate, the rachis broadest near the apex, narrowed below; heads campanulate, 5–109 (median, 10), 6–9 mm. high, 4–6.6 mm. broad, 30–61-flowered; ligules yellow; pollen grains 20–29  $\mu$  in diameter (mean=25  $\mu$ ); achenes cylindrical (1.6–) 1.7–2.0 mm. long, attenuate toward the base, slightly curved, grey-brown to straw-colored, finely 15-ribbed, all the ribs equal, the achene round in transverse section, the apex slightly expanded, the upper 0.2–0.3 mm. of the achene not ribbed, bordered by a ring of 16–18 white-scarious teeth, of which the basal portions do not extend above the achene lip, the teeth pectinate, straight, acicular, the persistent setae 2, occasionally 1, rarely 3 or 4.

Type. Tucson Mountains, altitude 2600 feet, Pima County, Arizona, 24 April 1903, *Thornber 362* (ARIZ 59,491; istotypes, DS, POM, UC).

Specimens examined. ARIZONA. Pima County: north base of Silver Bell Mountains, *Benson 10716*; Rosemont, *Thornber* in 1907; Sabino Canyon, Santa Catalina Mountains, *Thornber* in 1903; Tucson Mountains, *Thornber 428*, in 1903. Pinal County: between Oracle and Mammoth, *Gentry 6081*. SONORA, MEXICO. Distrito de Altar: Passo San Emeterio, *Keck 4135A*; 4 miles west of Caborca, *Keck 4040*.

The size and number of apertures of its pollen suggest that this distinctive and rather local species may be diploid ( $n=7$ ), but we have not yet been able to obtain living material from which to make chromosome counts. In achene shape (fig. 1d, a, f) it is intermediate between *M. clevelandii* and *M. fendleri* A. Gray (fig. 2), the latter a diploid<sup>3</sup> species with long-exserted ligules that occurs east of the range of the *Malacothrix clevelandii* complex. The range of *M. sonorae* likewise lies between that of the other two diploids.

<sup>3</sup> We have made two new gametic chromosome counts of *M. fendleri*,  $n=7$ , from the following collections: 1.9 miles north of Chambers, Apache County, Arizona, *Raven 13026*; 5 miles northeast of Bates Well, Pima County, Arizona, *Raven 11699*. Stebbins *et al.* (*op. cit.*) reported the same number for a collection from New Mexico.

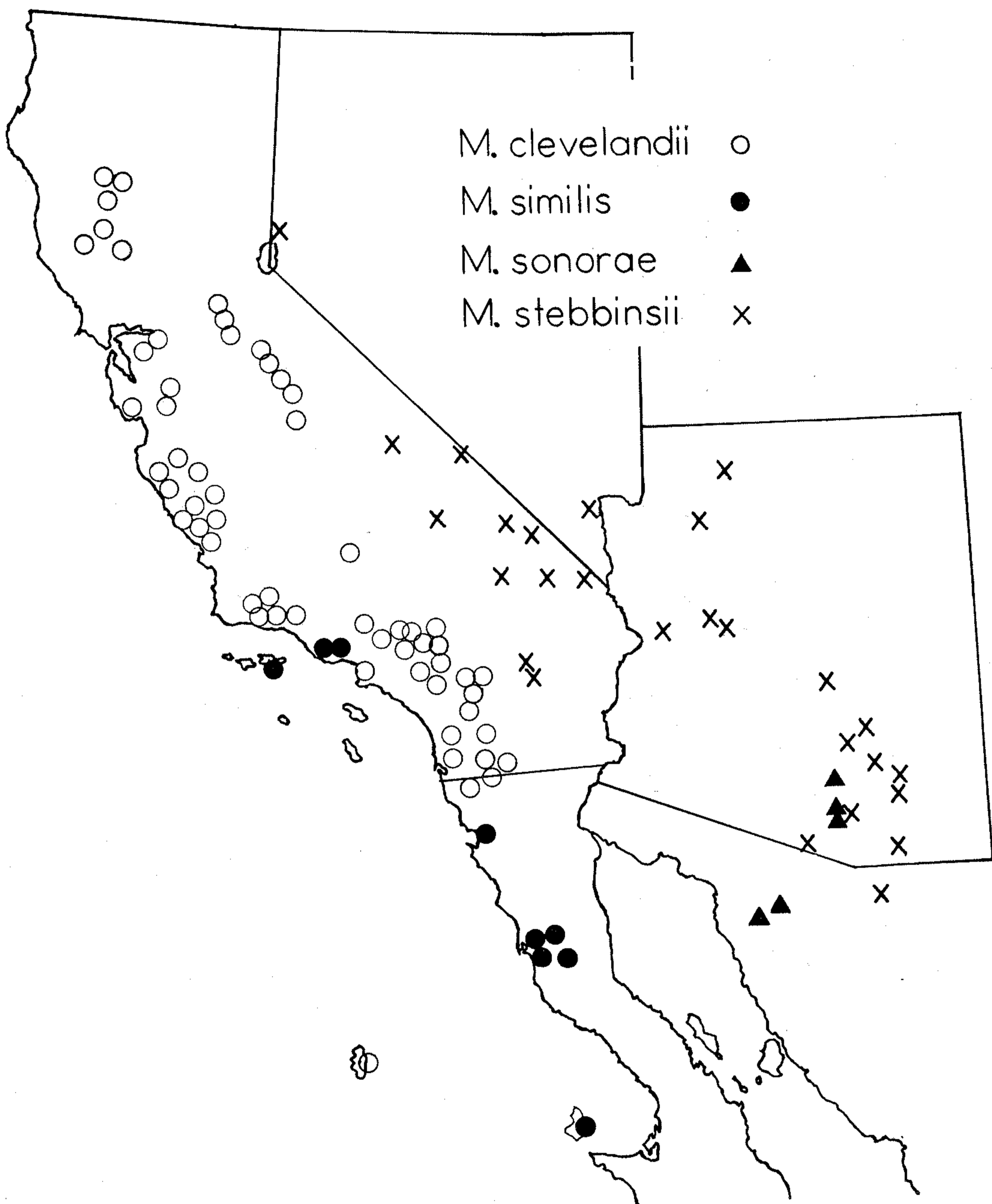


FIG. 1. Distribution of *Malacothrix clevelandii* and allied species in the southwestern United States and northwestern Mexico.

Drytown, *Hansen 401*. BAJA CALIFORNIA, MEXICO. Guadalupe Island, *Palmer 51*; 13 miles southeast of Tecate, *Munz 9520*.

As shown by the specimens cited above and by figure 1, this species occurs on the coastward slopes of the mountains of California and northernmost Baja California. Its occurrence on Guadalupe Island should be confirmed by additional material and by determination of chromosome number. In addition to the report of Stebbins *et al.* of a chromosome number of  $2n=14$  from the Sharsmith collection cited above from Santa Clara County, we have obtained this number in a collection from the Santa Monica Mountains, Los Angeles County, California (*Raven &*