

1966

## Genetic and Taxonomic Studies in *Gilia*. XIII. The *Gilia Laciniata* group

Verne Grant

*Rancho Santa Ana Botanic Garden*

Follow this and additional works at: <http://scholarship.claremont.edu/aliso>



Part of the [Botany Commons](#)

---

### Recommended Citation

Grant, Verne (1966) "Genetic and Taxonomic Studies in *Gilia*. XIII. The *Gilia Laciniata* group," *Aliso: A Journal of Systematic and Evolutionary Botany*: Vol. 6: Iss. 2, Article 6.

Available at: <http://scholarship.claremont.edu/aliso/vol6/iss2/6>

## GENETIC AND TAXONOMIC STUDIES IN *GILIA*

### XIII. THE *GILIA LACINIATA* GROUP

VERNE GRANT

*Rancho Santa Ana Botanic Garden*  
*Claremont, California*

The *Gilia laciniata* group is a complex of species belonging to the section *Gilia*. The plants are small leafy annuals with small autogamous flowers. They occur on sandy soils along the Pacific coast of North America and again in temperate South America from Peru to Patagonia. The purpose of the present paper is to clarify the taxonomy of this group.

#### MATERIALS AND METHODS

The diagnostic characters and distribution ranges as given below have been worked out, in the first place, from a study of herbarium specimens. The following herbaria were consulted: University of California (Berkeley); California Academy of Sciences (San Francisco); Dudley Herbarium (Stanford); Pomona College (Claremont); Rancho Santa Ana Botanic Garden (Claremont); Chicago Natural History Museum (Chicago); Missouri Botanical Garden (St. Louis); New York Botanical Garden (New York); Gray Herbarium (Harvard); and U. S. National Museum (Washington D.C.).

A better understanding of the characteristics of the plants has been gained by growing representative local races in the experimental garden. The strains listed in table 1 with one exception have been studied from living cultures grown in Claremont. The South American strains were grown from seeds kindly furnished by several resident botanists, namely A. Garaventa, E. Barros, O. Velarde, and M. Reiche. Unfortunately seeds of *G. laciniata sens. str.* have not been available as yet; seed collections of this species are much desired to round out the picture.

Chromosome counts have provided additional valuable information. Table 1 shows that *G. millefoliata* and *G. valdiviensis* are diploid, and *G. clivorum*, *G. nevinii*, and *G. lomensis* tetraploid. The chromosome number of *G. laciniata sens. str.* is unknown. The taxonomic status of the latter entity cannot be clarified beyond the rather tentative treatment of it presented here until this important gap in information is filled. The difference in ploidy between the morphologically similar *G. millefoliata* (2x) and *G. clivorum* (4x) in North America made it possible to divide these two species in a biologically significant way; and a similar pattern may well come to light as between the morpho-

logically similar *G. valdiviensis* (2x) and *G. laciniata* in South America.

Field work has been possible only for the North American species. Field studies of the group in South America are very desirable. Meanwhile the ecological notes of Weberbauer (1945) and other authors and collectors have furnished invaluable information about habitats.

All of the species in the group except *G. laciniata* proper have been intercrossed in the experimental garden. The taxogenetic details will be presented elsewhere (Grant, 1965). The species are easy to cross but their hybrids are highly or completely sterile. This information was given much weight in the decision to treat the entities taxonomically as distinct species.

## TAXONOMY

The members of the *Gilia laciniata* group possess the general characters of their section of the genus (*Gilia* section *Gilia*). They are annual herbs; the leaves on the upper stems are well developed; and the pubescence on the herbage consists of coarse villous hairs and/or stipitate glandular hairs. In the *Gilia laciniata* group itself the flowers are blue-violet or white, small, and grouped in few-flowered terminal clusters. The diagnostic characters of the species are emphasized in the following descriptions.

### 1. *GILIA MILLEFOLIATA* Fischer & Meyer. (Fig. 1, 7)

*Gilia millefoliata* Fish. & Mey., Ind. Sem. Hort. Petrop. 5: 35, 1838. (Description transcribed in *Erythea* 2: 164, 1894.)

*Gilia millefoliata* var. *maritima* Brand. Pflzr. IV (250): 100, 1907.

*Gilia multicaulis* var. *millefoliata* Jepson, Man. Fl. Pl. Calif. 796, 1925. *Gilia multicaulis* subsp. *millefoliata* Mason & A. Grant, Madrono 9: 209, 1948.

Plants low, to 15 (20) cm high, with a basal rosette of leaves, a short central stem, and decumbent lateral stems. Herbage including lower stems densely glandular, and often somewhat succulent. Leaves unipinnately (or sometimes bipinnately) dissected, with rachis and segments of medium width. Calyx glandular. Corolla throat bearing 5 pairs of bright purple spots. Corolla tube short, included in calyx. Pollen white. Calyx in fruit 8–11 mm long. Diploid,  $2n = 18$ .

*Type*.—Plant grown in St. Petersburg Imperial Botanic Garden from seeds gathered by an unknown collector near the Russian colony at Bodega Bay, Sonoma Co., California.

*Range*.—Coastal sand dunes. From Marin Co., California, to Lincoln Co., Oregon. Flowers in April and May.

### 2. *GILIA CLIVORUM* (Jepson) V. Grant (Fig. 2, 7)

*Gilia multicaulis* var. *clivorum* Jepson, Fl. Calif. 3 (2): 187, 1943 (type seen).

*Gilia clivorum* V. Grant, Aliso 3: 31, 1954.

Plants erect or spreading in habit, not decumbent, to 30 cm high. Herbage villous below and moderately glandular above; but not usually densely glandu-

TABLE 1. *List of Chromosome Counts*

SPECIES	POPULATION	CHROMOSOME NUMBER	HERBARIUM VOUCHER	LITERATURE REFERENCE
G. MILLEFOLIATA	Point Reyes, Marin Co., Calif.	2n=18	Grant 8419	Grant, 1954a
G. CLIVORUM	Botanic gardens	2n=36		Langlet, 1936, Flory, 1937
	Grizzly Peak, Berkeley, Calif.	2n=36	Grant 8536	Grant, 1954a
	Strawberry Canyon, Berkeley, Calif.	2n=36	Grant 8535	Grant, 1954a
	Moraga Canyon, Contra Costa Co., Calif.	2n=36	Grant 8647	Grant, 1954a
	Panoche Pass, San Benito Co., Calif.	2n=36	Grant 8435	Grant, 1954a
	San Miguel Island off Santa Barbara, Calif.	2n=36	Piehl 63-436	Alva Day, personal comm.
G. NEVINII	Whites Landing, Santa Catalina Island, Calif.	2n=36	Grant 9209	Grant, 1959
	Guadalupe Island, Mexico	2n=36	Moran 5958 Grant 3304	reported here
G. LOMENSIS	Cerro San Geronimo, Lima, Peru	2n=36	Grant 2244	Grant, 1954b (as "G. laciniata")
G. VALDIVIENSIS	La Higuera, Prov. Coquimbo, Chile	2n=18	Grant 3133	reported here
	Limache, Prov. Valparaiso, Chile	2n=18	Grant 2988	Grant, 1959
	Itahue, Prov. Talca, Chile	2n=18	Grant 2989	Grant, 1959

lar and not succulent. Leaves uni- to bi-pinnately dissected, with a narrow rachis and fine segments. Calyx villous or glandular. Corolla throat bearing 5 pairs of purple spots, these moderate to faint in intensity of coloration. Corolla tube short, included in calyx. Pollen blue (or rarely white). Calyx in fruit 5-7 mm long. Tetraploid,  $2n = 36$ .

*Type*.—Paso Robles, San Luis Obispo Co., California. J. H. Barber (1899). Jepson Herbarium, Univ. of California, Berkeley.

*Range*.—Grassy hillslopes and open fields. On the coast line in central California and on the Santa Barbara Channel Islands; but more widespread to the interior in the California Coast Ranges, where it ranges up to 3500 feet elevation. Flowers in March, April, and May.

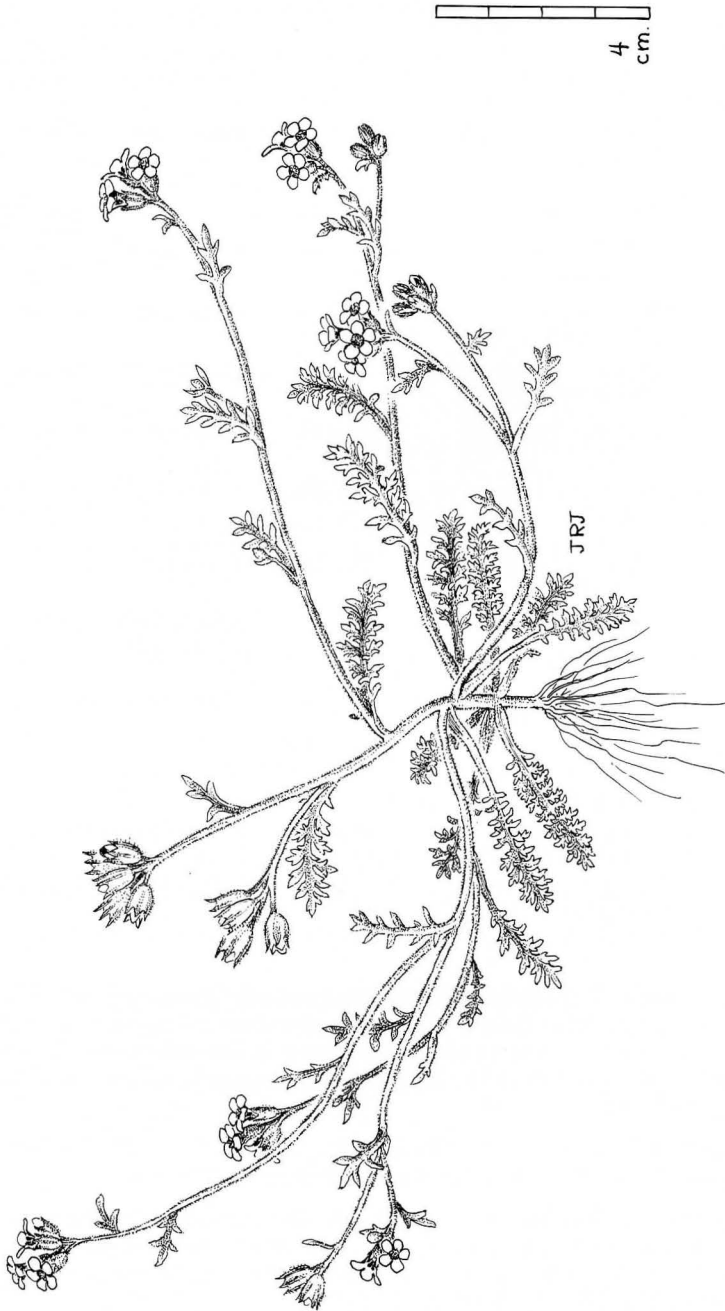


Fig. 1. *Gilia millefoliata*.

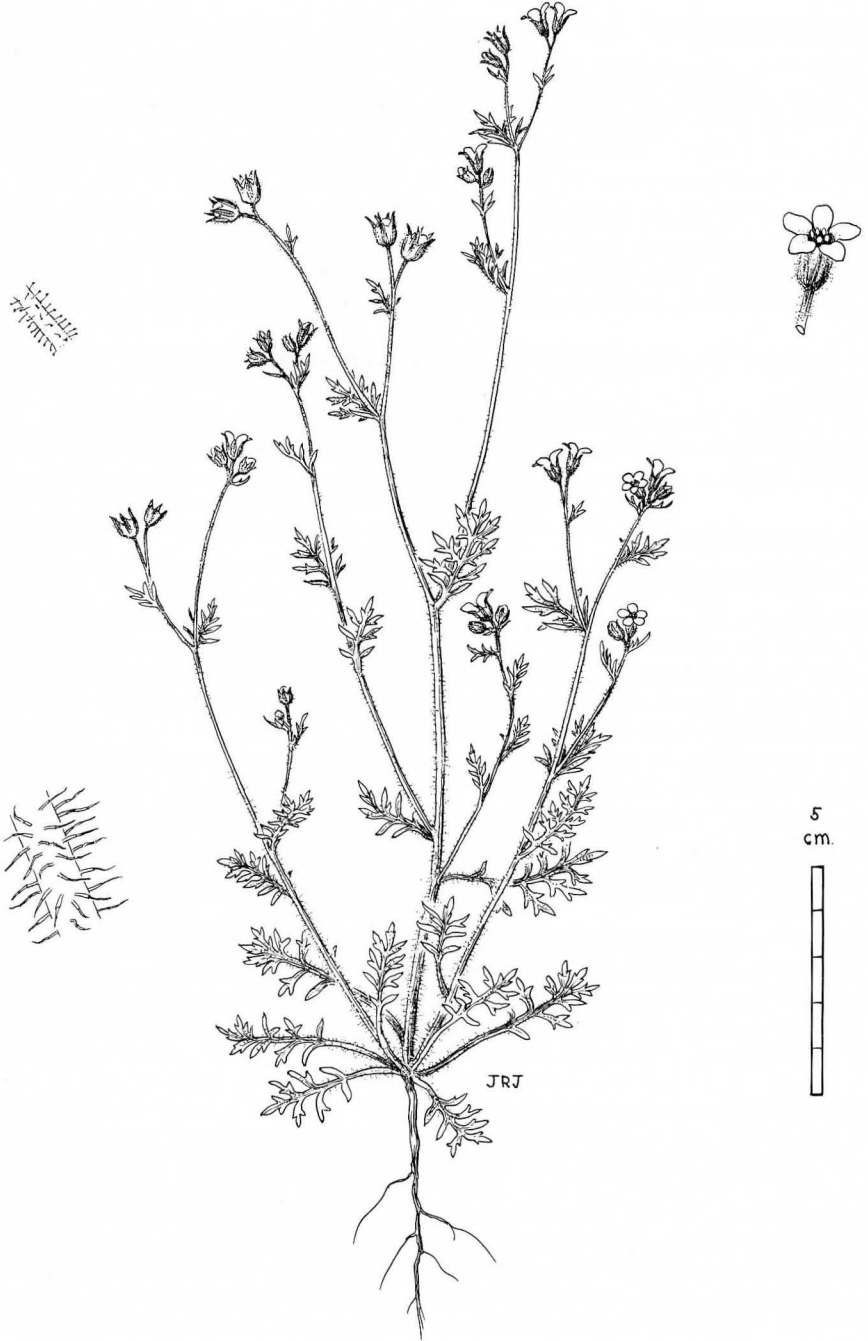


Fig. 2. *Gilia clivorum*.

3. *GILIA NEVINII* Gray

(Fig. 3, 7)

*Gilia Nevinii* Gray, Syn. Fl. N. Amer. 2: 411, 1886 (type seen).*Gilia multicaulis* var. *millefolia* Gray ex Watson, Proc. Amer. Acad. 11: 118, 1876. (type seen). Mason and A. Grant rejected this name in favor of the younger name *Nevinii* (Madrono 9: 209, 1948), and their decision is followed here.*Gilia multicaulis* subsp. *Nevinii* Mason & A. Grant Madrono 9: 209, 1948.

Plants erect, to 40 cm tall, with a central leader. Herbage villous below and glandular above. Leaves bipinnately dissected, with fine segments, having a lacy appearance. Calyx villous. Corolla throat without spots. Corolla tube long, exerted from calyx. Pollen blue. Calyx in fruit 6–8 mm long. Tetraploid,  $2n=36$ .

*Type*.—San Clemente Island, California. Nevin and Lyon, April 1885. Gray Herbarium.

*Range*.—Open slopes and headlands. Santa Catalina, San Clemente, and Guadalupe Islands, off the coast of California and Baja California. Flowers in March and April.

4. *Gilia lomensis*, sp. nov.

(Fig. 4, 8)

*Gilia laciniata*, of authors, in part.

Plants low, to 10 cm high, with a short central stem, and with decumbent lateral stems in well-developed individuals. Herbage villous, and glandular above. Leaves unipinnately cleft, with broad rachis and broad segments. Calyx villous. Corolla throat without spots. Corolla tube short, included in calyx. Calyx in fruit 6 mm long. Tetraploid,  $2n=36$ .

Differs from *Gilia laciniata* in the low decumbent habit and the pinnately cleft leaves with broad segments.

Caulis humilis, decumbens; folia unipinnatifida, lata; tetraploidea.

*Type*.—Cerro San Geronimo, Lima, Peru. V. and A. Grant 2244, grown from seeds collected by O. Velarde and M. Reiche. Rancho Santa Ana Botanic Garden Herbarium.

*Range*.—Sandy hills and lomas (whence the name) on the coast. Depto. Lima to Depto. Arequipa, Peru. Flowers from July to October.

*Representative specimens*.—H. E. Stork, A. A. Beetle and J. L. Morrison 9093, Barranca, Peru. C. R. Worth and J. L. Morrison 15650, Atiquipa, Peru. C. R. Worth and J. L. Morrison 15740, Mollendo, Peru.

5. *GILIA VALDIVIENSIS* Grisebach

(Fig. 5, 8)

*Gilia valdiviensis* Griesb., Goett. Abhandl. 6: 131, 1854 (photograph of type seen). (Description transcribed in Walpers, Ann. Bot. System. 5: 528, 1858.)

Plants erect, to 30 cm tall, with a central leader, and ascending branches. Herbage villous below and glandular above. Leaves bipinnately dissected with a narrow rachis and fine segments. Calyx glandular. Corolla throat without spots. Corolla tube short, included in calyx. Pollen white to light blue. Calyx in fruit 5–7 mm long. Diploid,  $2n=18$ .

*Type*.—Valdivia, Chile. Lechler, Berlin Herbarium; photograph of type distributed by Chicago Natural History Museum.

*Range*.—Sandy places along the coast. Prov. Antofagasta to Prov. Valdivia, Chile. Naturalized on Masafuera Island. Flowers from September to December.

## 6. *GILIA LACINIATA* Ruiz & Pavon

(Fig. 6, 8)

*Gilia laciniata* R. & P., Fl. Peruv. Chil. 2: 17 and t. 123, 1799 (photograph and drawing of type seen).

*Cantua laciniata* Poir., in Lamarck, Encycl. Meth. Bot. Suppl. 2: 81, 1811.

*Cantua breviflora* Jussieu, Ann. Mus. Paris 3: 119, 1804 (photograph of type seen). *Cantua brevifolia* Steudel, Nomenclator, ed. 2, 1: 275, 1840, as a misprint.

*Thouinia multifida* Domb. ex Juss., Ann. Mus. Paris 3: 119, 1804.

*Ipomeria albida* Nutt., Gen. N. Amer. Pl. 1: 125, 1818.

*Gilia laciniata* var. *alpina* Weddell, Chloris Andina 2: 81 and t. 58, 1859 (drawing of type seen).

*Gilia alpina* Brand, Pflzr. 4 (250): 107, 1907.

*Gilia erecta* Hieronymus, Bol. Acad. Nac. Corboda 3: 368, 1879 (drawing of type seen). (Description transcribed in Lilloa 8: 217, 1942.)

*Gilia laciniata* var. *erecta* Brand, Pflzr. 4 (250): 106, 1907.

Plants erect, to 20 cm tall, with a central leader. Leaves uni- or bi-pinnately dissected, the rachis and segments narrow or medium wide. Corolla throat without spots. Corolla tube short, included in calyx. Calyx in fruit 7–8 mm long. Chromosome number unknown.

On morphological grounds, *Gilia laciniata* is quite different from *G. lomensis* of the Peruvian coast, which has been going under the name *G. laciniata*, but is very close to *G. valdiviensis* of the Chilean coast. Living material of *G. laciniata* is needed for further analysis of its relationships.

*Type*.—Peru. H. Ruiz, probably in the period 1778–1781. Berlin Herbarium; photograph of type distributed by Chicago Natural History Museum.

Ruiz and Pavon (1799) list four localities in their original description: Lima, Arnedo (now Chancay), Huaura, and Huassahuassi. The first three of these are on the Peruvian coast, the last is northeast of Tarma in the central Andes (see Ruiz, 1940).

Several lines of evidence indicate that the name *Gilia laciniata* refers to the Andean rather than to the coastal plant which is here segregated as *G. lomensis*. (1) The original description and in fact the name itself emphasize erect stems and lacinate leaves (i.e., *caulis erectus. rami erecto-patuli. folia pinnatifido-laciniata; laciniis linearibus.*). These distinctive characteristics are found in the Andean populations but not in any specimens from the Peruvian coast that I have seen. (2) The drawing and photograph of the type agree with the description in showing an erect plant with bipinnately dissected leaves, such as is found today in the western Andes. (3) Ruiz and Pavon (1799) give the flowering season of *G. laciniata* as June, July, and August. Flowers bloom in these months in the Peruvian Andes but somewhat later on the coast.

*Range*.—Open slopes and plains. Western Andes of central Peru, through Bolivia, to Chubut and Santa Cruz territories, Argentina. Ranges up to 4000 m elevation. Flowers in the Peruvian Andes from June to August, later in the southern Andes, and in Patagonia from November to February.



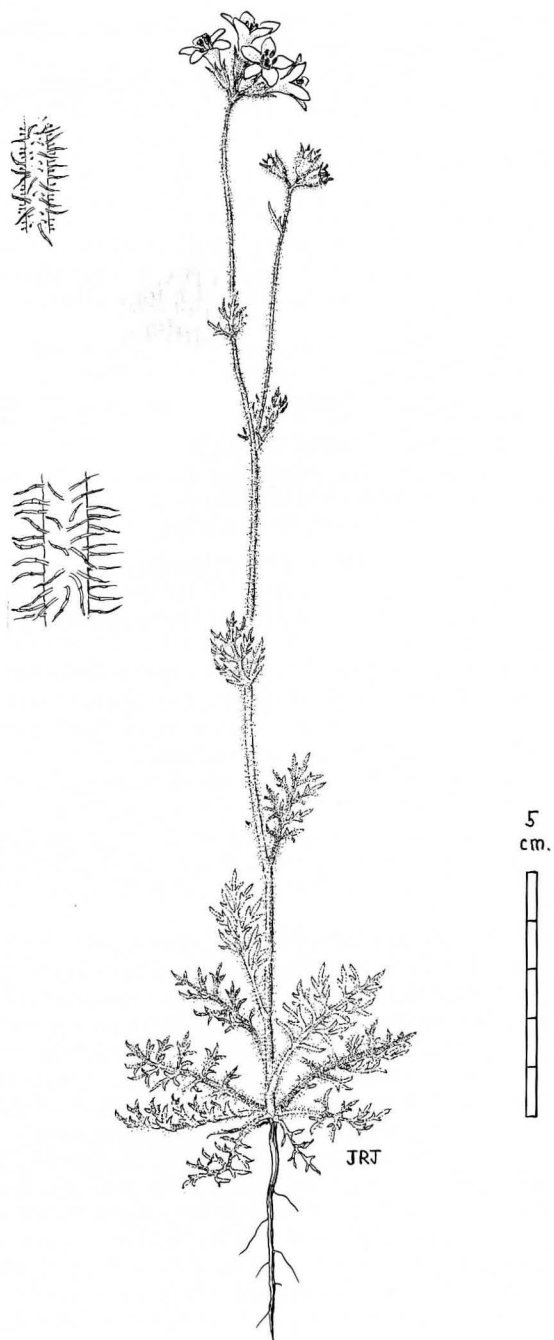


Fig. 3. *Gilia nevinii*.

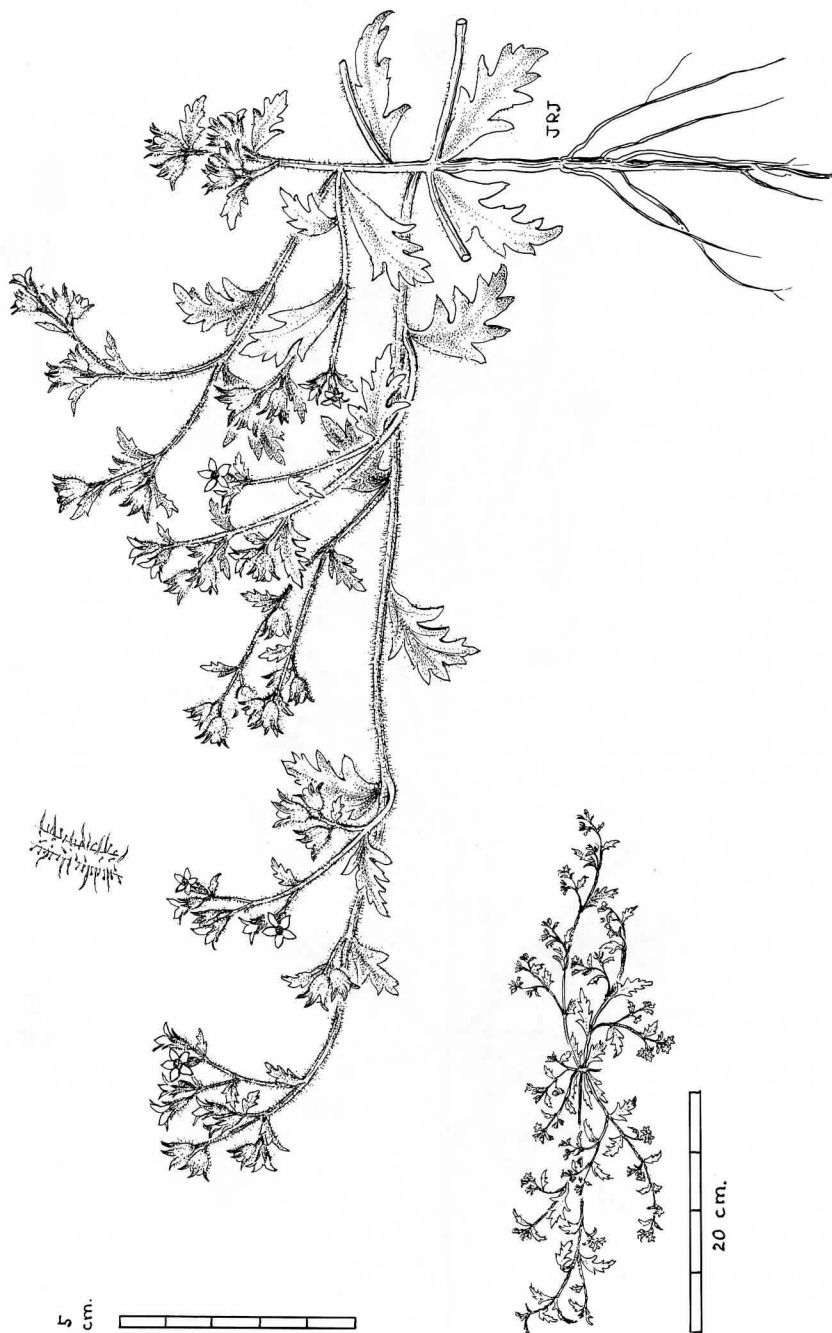


Fig. 4. *Gilia lomensis*.

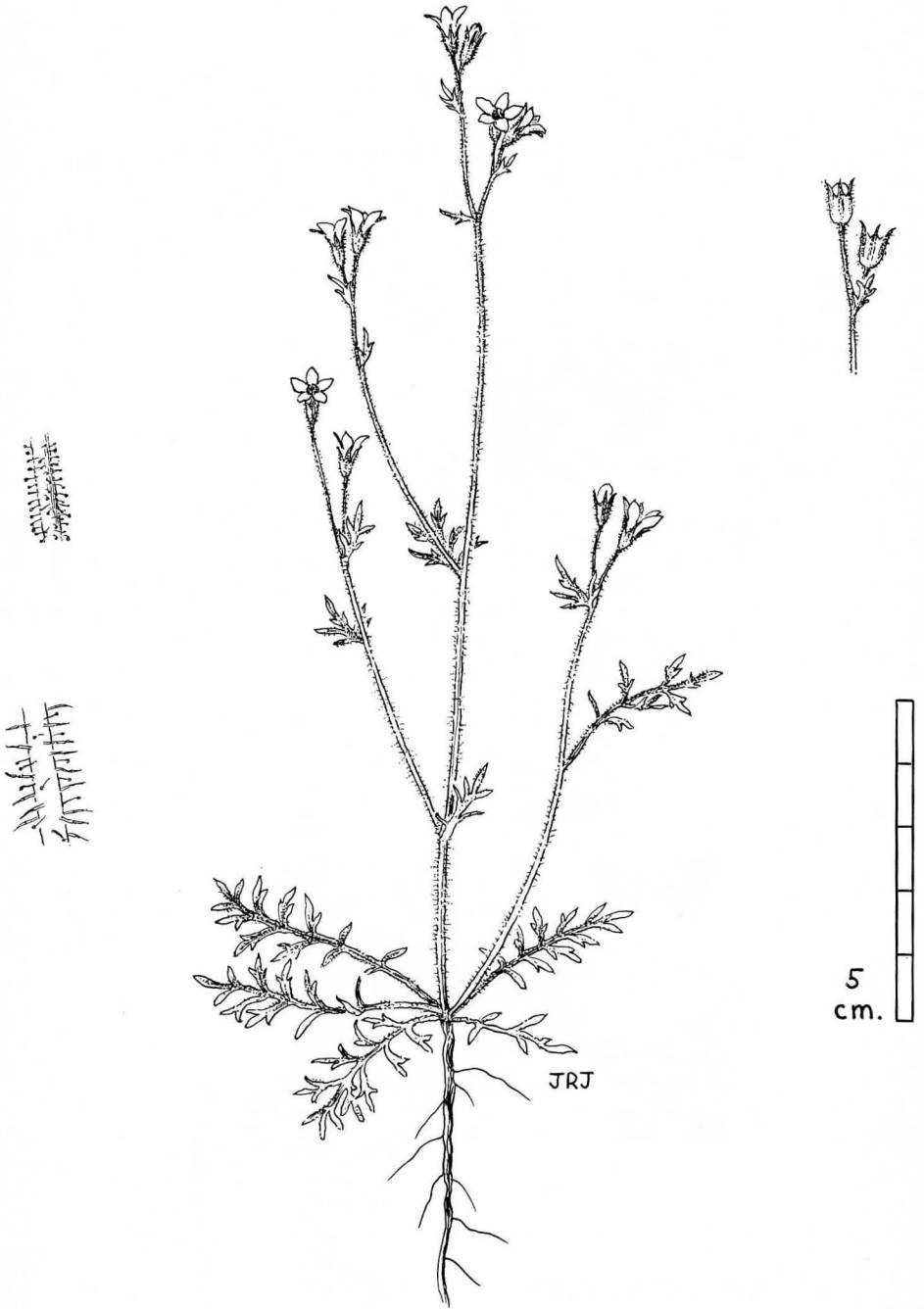


Fig. 5. *Gilia valdiviensis*.



Fig. 6. Drawing of the type specimen of *Gilia laciniata* from Ruiz and Pavon (1799).

- ▲ *G. millefoliata*
- *G. clivorum*
- + *G. nevinii*

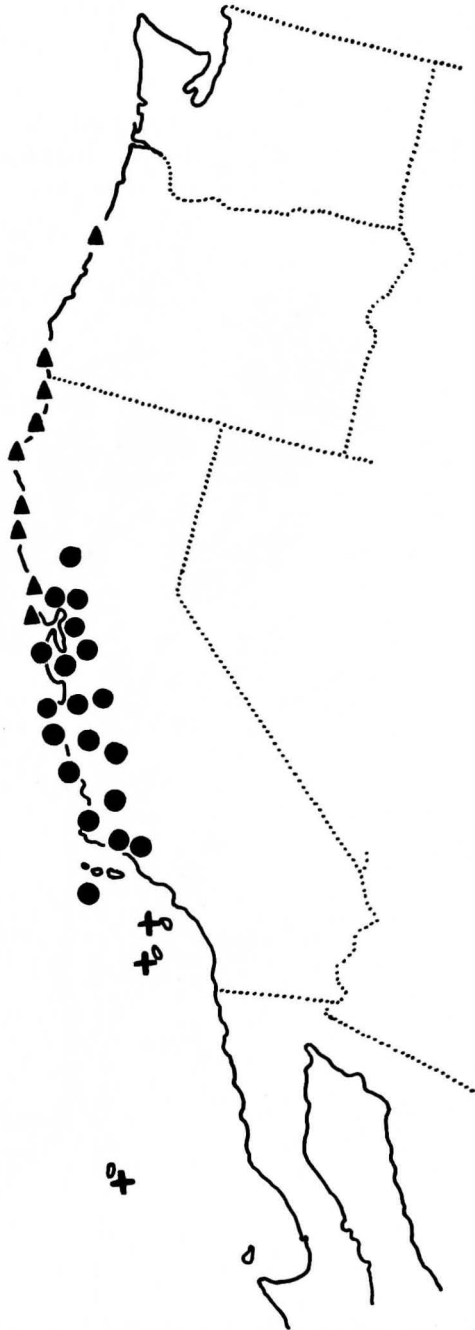


Fig. 7. Geographical distribution of the *Gilia laciniata* group in North America. (Grant, 1954a.)

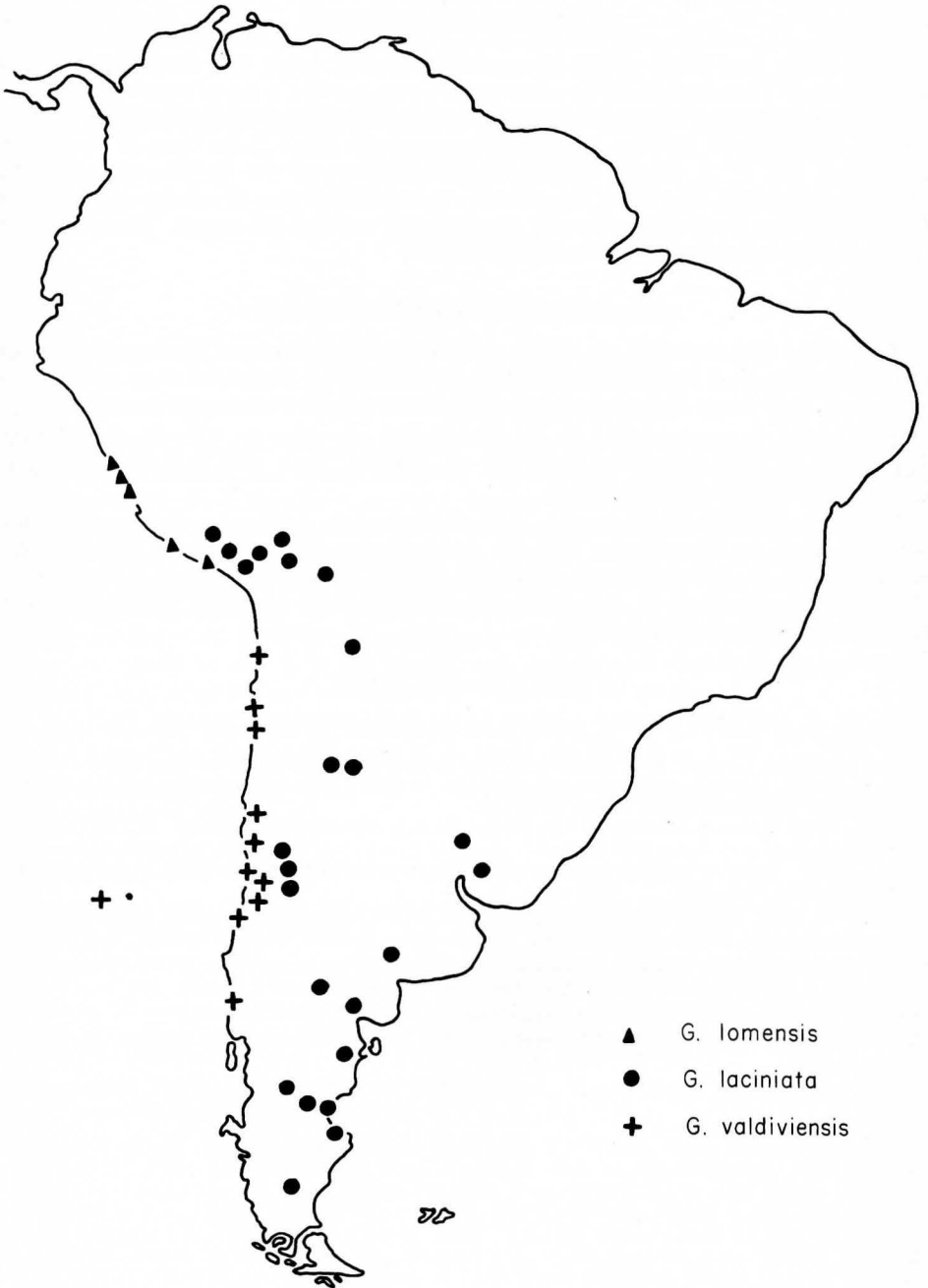


Fig. 8. Geographical distribution of the *Gilia laciniata* group in South America.

## ACKNOWLEDGMENTS

This work has been aided by research grants from the National Science Foundation. I am indebted to various curators for the loan of herbarium specimens. Seeds from wild populations were contributed by A. Garaventa, E. Barros, O. Velarde, M. Reiche, and R. Moran; these seeds have been of the greatest value. Dr. P. A. Munz discussed the problem of the typification of *Gilia laciniata* with me. Dr. Alva Day kindly furnished a new chromosome count of *Gilia clivorum* from a previously unexplored part of its range. The drawings of the plants were made by Jeanne R. Janish.

## SUMMARY

The *Gilia laciniata* group of the section *Gilia* consists of five species which have been studied biosystematically and a sixth, *G. laciniata sens. str.*, which is known only from taxonomic descriptions and herbarium specimens.

The group is represented in Pacific North America by (1) *G. millefoliata* (2x), (2) *G. clivorum* (4x) and (3) *G. nevini* (4x), which have strictly or partially maritime distributions.

In temperate South America, (4) *G. laciniata sens. str.* ranges from the Pacific slope to Patagonia. (5) *G. valdiviensis* (2x) on the Chilean coast resembles *G. laciniata* morphologically. (6) *G. lomensis* (4x) of coastal Peru differs markedly from *G. laciniata sens. str.* and is accordingly segregated from the latter and described as new.

## LITERATURE CITED

- Flory, W. S. 1937. Chromosome numbers in the Polemoniaceae. *Cytologia*, Fujii Jub. Vo., 171-180.
- Grant, V. 1954a. Genetic and taxonomic studies in *Gilia*. V. *Gilia clivorum*. *Aliso* 3: 19-34.
- . 1954b. Genetic and taxonomic studies in *Gilia*. VI. Interspecific relationships in the Leafy-stemmed *Gilias*. *Aliso* 3: 35-49.
- . 1959. Natural History of the Phlox Family. *Systematic Botany*. M. Nijhoff, The Hague.
- . 1965. Species hybrids and spontaneous amphiploids in the *Gilia laciniata* group. *Heredity* 20: 537-550.
- Langlet, O. 1936. Nagra bidrag till kannedomen om krososomtalen inom Nymphaeaceae, Ranunculaceae, Polemoniaceae och Compositae. *Svensk. Botan. Tidskr.* 30: 288-294.
- Ruiz, H. 1940. Travels of Ruiz, Pavon, and Dombey in Peru and Chile (1777-1788). Translated by B. E. Dahlgren. *Field Mus. Nat. Hist. (Botan. Ser.)* 21: 1-372.
- Ruiz, H. and Pavon, J. 1799. *Flora Peruviana et Chilensis*. vol. 2. Madrid.
- Weberbauer, A. 1945. *El Mundo Vegetal de los Andes Peruanos*. Ministeria de Agricultura, Lima.