ANNOTATION OF NORTH AMERICAN POLYCARPAEA[1]

OLGA LAKELA

Polycarpaea nebulosa spec. nov. Annua herbacea erecta. Radix tenuis ad 25 cm. longa. Caulis 6-18 cm. altus corymbose ramosus pilosus vel glabrescens ad nodos incrassatus. Folia radicalia 8-12 mm. longa petiolata laminis oblongo-ovatis vel suborbicularibus; caulina 1.0-2.5 cm. longa linearia carnosula glabra subrevoluta mucronata; axillaria fasciculata similia breviora. Stipulae scariosae plus minusve bifidae. Inflorescentia dichotomo-cymosa decomposita. Bracteae florales scariosae. Flores 2.8-3.1 mm. longi perigynici. Hypanthium breve crateriforme. Sepala glabra scariosa nitida ovata vel lanceolata acuta. Petala ovata erosa vel integra sub anthesi incarnata cum staminum basibus connata. Filamenta subulata; antherae albae. Pistillum stipitatum; ovula plerumque 7; stigmata 3 subsessilia. Capsula trivalvis; semina reniforma pallide brunnea obscure transverse striata.

Erect annual herb. Taproot slender to 25 cm. long. Stem 6-18 cm. high, corymbosely branched, pilose or glabrate, becoming enlarged at nodes. Radical leaves 8-12 mm. long, petioled, blades oblong-ovate or suborbicular; cauline leaves 1-2.5 cm. long, linear, fleshy, glabrous, somewhat revolute, nerve excurrent. Fascicular leaves similar, shorter. Stipules scarious, more or less cleft. Inflorescence a compound dichasial cyme. Floral bracts scarious. Flowers 2.8-3.1 mm. long, perigynous. Hypanthium short, crater-like. Sepals glabrous, scarious, lustrous, ovate, or lanceolate, acute. Petals ovate, erose or entire, pink in anthesis, connate with stamen bases. Filaments subulate; anthers white. Pistil stiped; ovules usually 7; stigmas 3, nearly sessile. Capsule 3-valved; seeds reniform, pale brown, with obscure tranverse striae. (Name derived from L. *nebula*, mist for cloud-like luster of the flowers). TYPE: FLORIDA, Temple Terrace, adjoining Tampa. South-facing slope of sandhill west of 56th St., east of Overlook Drive. *O. Lakela 25565*, 7 Nov. 1962. Pl. 1280 & 1281. HOLOTYPE: (USF). ISOTYPES: GH, SMU, US, F).

ANNOTATION OF LIVING PLANT

Subsequent to the discovery of *Polycarpaea* in North America, the Florida plant has been studied in the greenhouse and in the field in large numbers. Ripe seeds found in capsules of a mature plant, coll. *24893A*, 26 Jan. 1962,

[1]Contribution No. 2. Botanical Laboratories, University of South Florida.

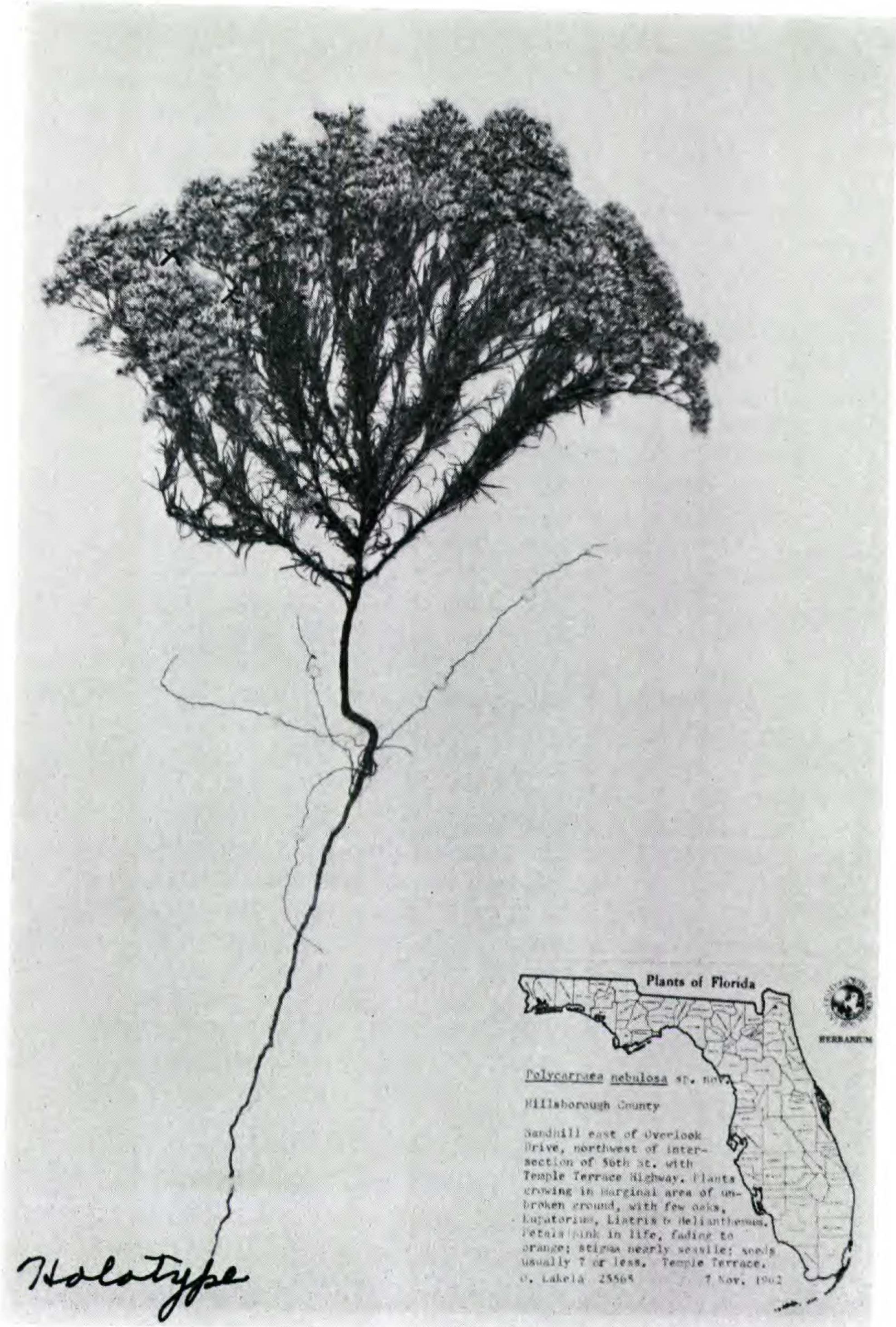
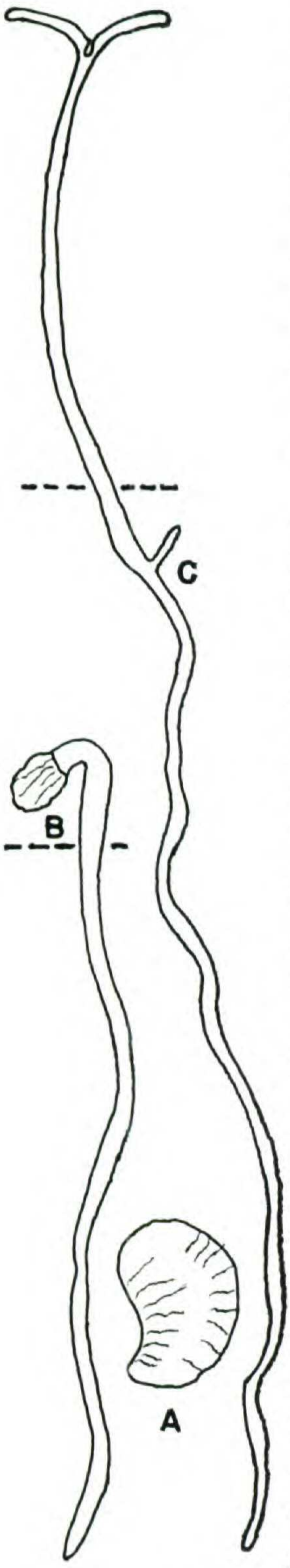


Plate 1280. *Polycarpaea nebulosa*. Photograph of Holotype.

Plate 1281. *Polycarpaea nebulosa.* Enlarged portion of the inflorescence of Holotype.

were promptly planted in a greenhouse without artificial heat. Germination was evidenced on the 3rd of March. The spatulate cotyledons less than 1 mm. long and half as wide were more than tripled in size during the rosette development. They were fleshy, yellowish green and lustrous. The petioled radical leaves, 2-3(4) in number, 8-10 mm. long, with ovate, oblanceolate, or suborbicular blades, appeared singly. The blade appearing first became the largest. Fleshy in texture, and variegated with green and colorless tissue in pinnate fashion, they remained functional with tardily withering cotyledons through the growth of the lowest internodes. Flowering in April and May, the habit and floral structures of the plants compared well with those grown in a natural environment.

Meantime, the known sites of *Polycarpaea* were under close surveillance for signs of new growth. Summer rains were necessary to activate the heated sands. The first seedlings were located on the 7th of June. Prior study facilitated



the identification of the tiny seedlings appearing in masses in the openings of vegetation on grassy terraces and on sandhills. The young plants of other species, e.g., *Diodia* and *Siphonychia*, were far beyond the seedling stages, thus eliminating confusion in the identification of *Polycarpaea*. Progressive germination rendered it possible to obtain various stages of growth in a single colony, as well as seeds with promise of germination (Fig. 1). Seedlings with complete rosettes, some already with withering leaves (no. *25136*) were collected on the 23rd of June (Pl. 1282).

During anthesis the stems become denuded of foliage, excepting the fascicular leaves that may remain on branches below the inflorescences (Pl. 1283). The cauline leaves are best seen before flowering (Pl. 1283). The fleshy tissues of a living leaf appear striped or mottled with green and white. This pattern of variegation as seen under the microscope is effected by the distribution of chlorophyll-containing tissues over slightly elevated veins and the colorless parenchyma within interstices of the reticulum. The colorless cells reveal an abundance of white crystalline inclusions. Stomata occur on both surfaces. The midnerve, visible only on the lower surface, becomes an excurrent tip. It is soft and pliable, hardly a "bristle" in the true sense of the term. On drying, the leaf becomes longitudinally ridged or wrinkled with slightly revolute margins.

FLORAL STRUCTURES

Specialization in the genus is manifested by reduction of chlorophyll in stipules, floral bracts, and sepals. Structurally these organs have become translucent and scarious with reduced vascular supply. In stipules the recognizable midvein is produced to a filament; in floral bracts it is less prominent; in sepals the vascular trace entering into the somewhat incrassate, usually colored basal area, becomes obsolescent toward the apex. Isolated spiral elements may be seen along the median line with thicker-walled parenchymatous

Fig. 1 Figure 1. *Polycarpaea nebulosa*, A, Seed, 0.5 mm. long. B, Seedling above the ground, 6 mm. long. C, Cotyledons and branch root, 12 mm. long.

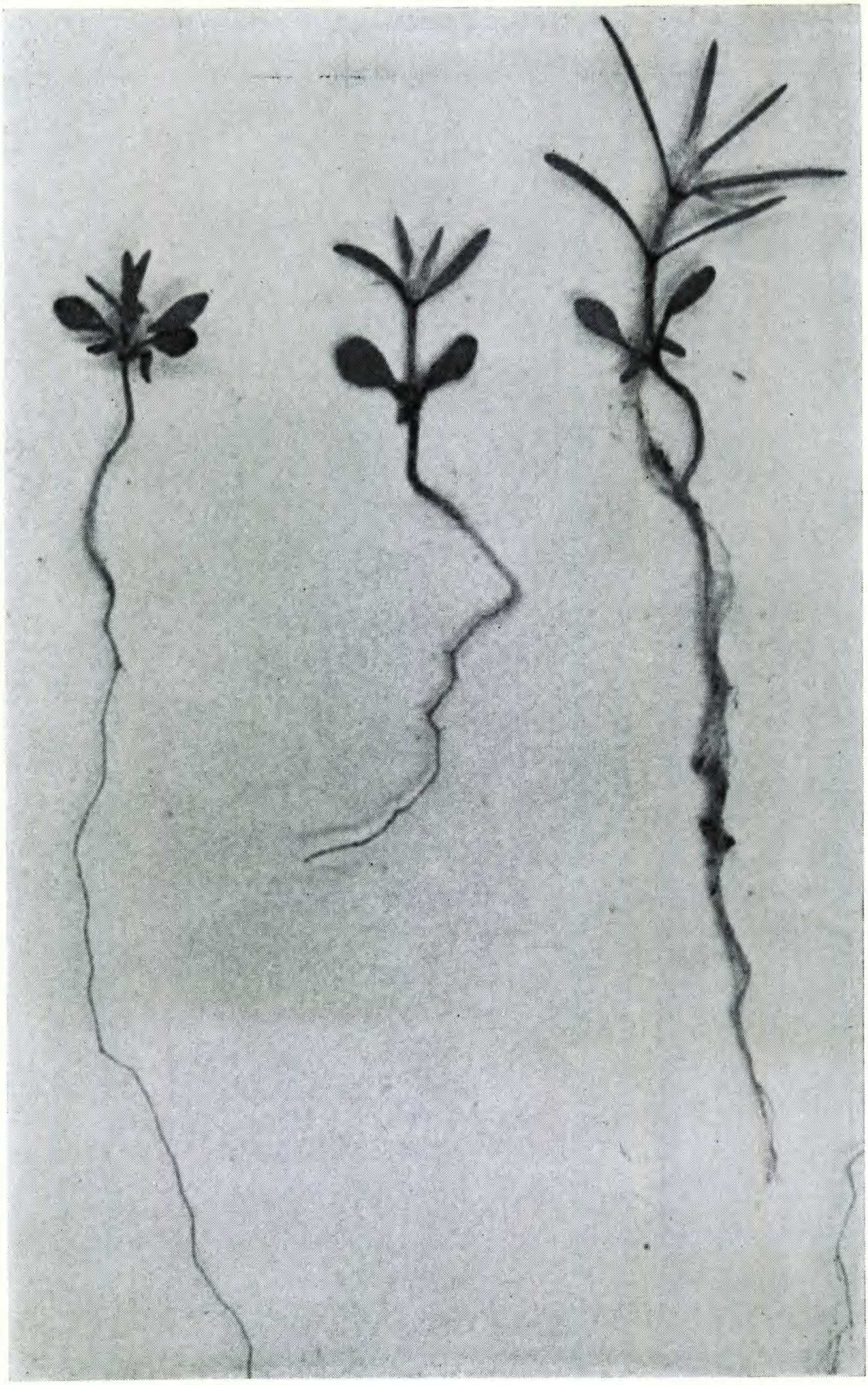


Plate 1282. *Polycarpaea nebulosa*. Seedlings with rosettes.

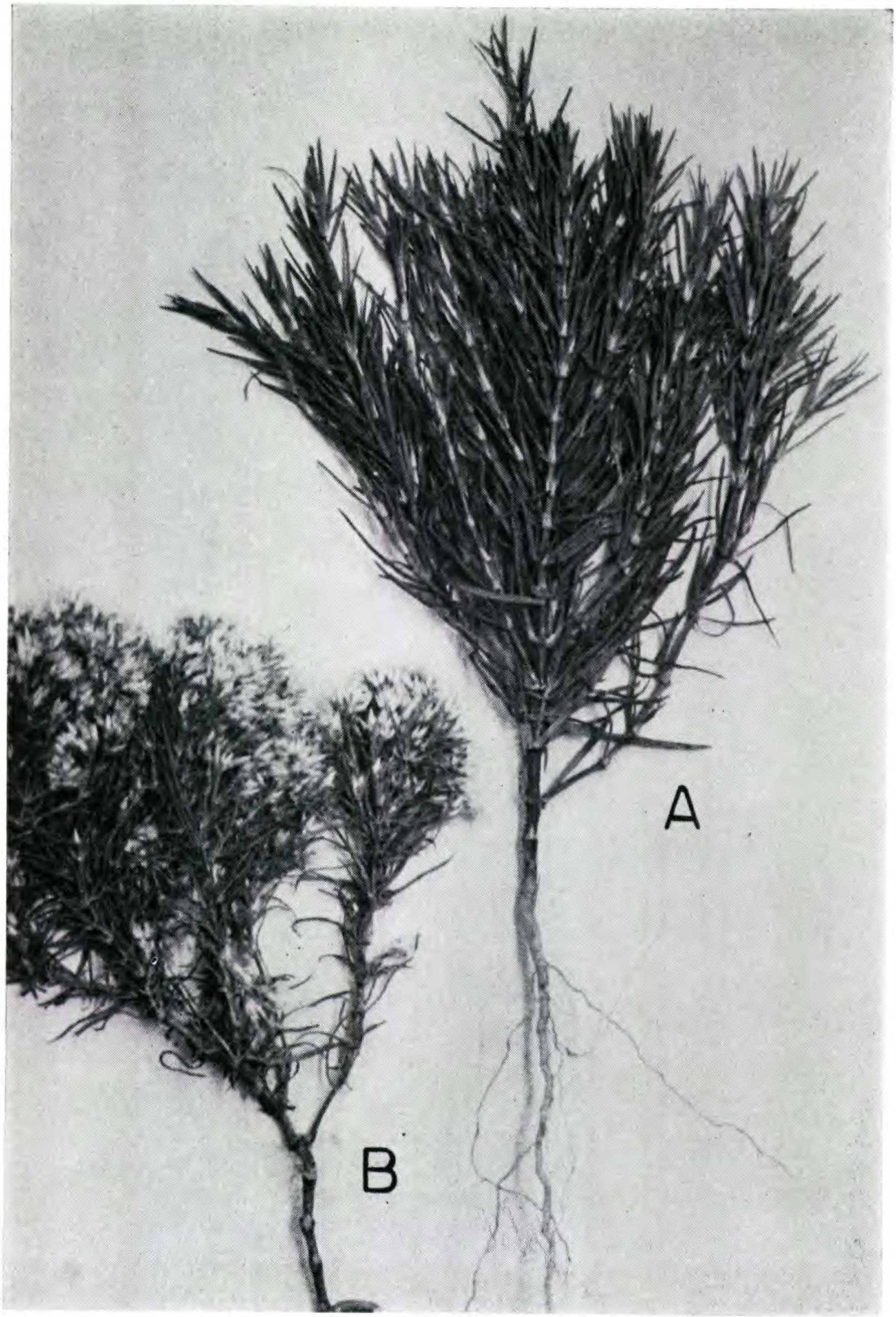


Plate 1283. *Polycarpaea nebulosa*. Appearance of plant A, preanthesis, B. anthesis.

cells. This remnant of the trace under a micro-projector casts a shadow which is more accented in Ceylon and South American plants than in those of Florida and Lucknow. Often the sepals along this line appear folded or conduplicate.

Allowing average variations, the small flowers, 2-3.5 mm. long, examined in representative specimens, show marked uniformity in structural pattern. Notwithstanding, differences are discernible. The Florida plant is similar to but not identical with South American and Old World plants passing under the epithet of *Polycarpaea corymbosa.*

Despite the limited availability of materials from the various regions of this amphigaean genus, it was deemed expedient to record diagrammatically characters of possible diagnostic value. Boiled, dissected flowers were mounted in water under a coverslip. Sepals, ovaries with ovules, or capsules with seeds, and tips of leaves, if available, were traced to the same scale under a micro-projector. The style measurements were estimated across the field of the microscope. The stigmas were included for added length to facilitate arriving at an approximate figure. (Fig. 2).

DISCUSSION

According to Martius (1872), styles in the genus vary greatly. In a large number of Florida plants studied, they have been found to be consistently short. The same cannot be reported for the Lucknow plant on the basis of a single available specimen with a few cymes in flower and without mature capsules. In habit the plant is lax, denuded of foliage at base, with spreading, linear, cauline leaves. Exchange specimens from the National Botanic Gardens, Lucknow, received at Tampa, 31 Oct. 1962, consist of a number of plants in preanthesis and seedlings; their habit is similar to the cited specimen. The radical leaves in seedlings compare well with those of the Florida seedlings. However, the lowest cauline leaves are somewhat wider. The long styles and lanceolate, attenuate sepals are in common with Ceylon and South American plants. Vegetatively they are

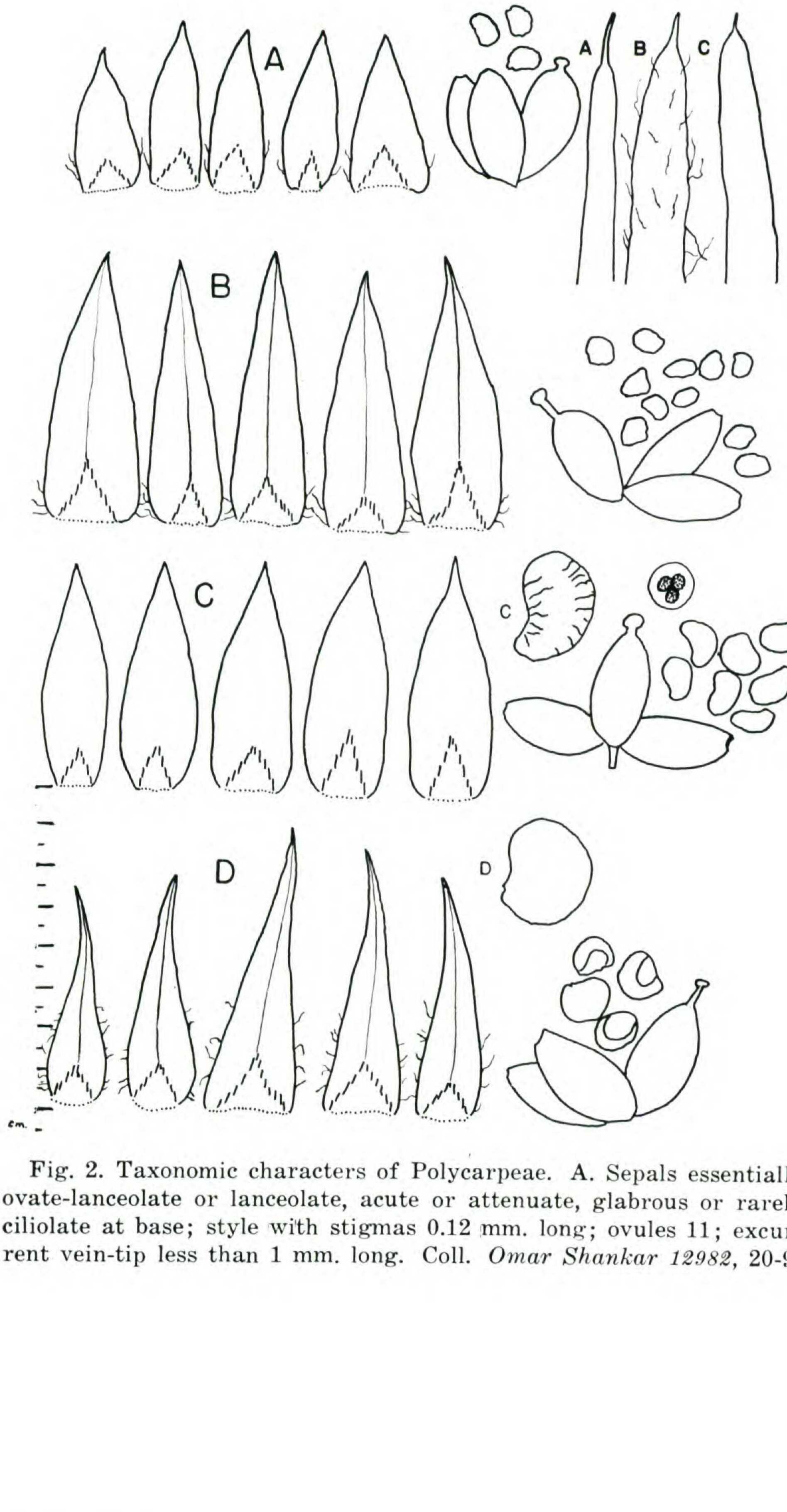


Fig. 2. Taxonomic characters of Polycarpeae. A. Sepals essentially ovate-lanceolate or lanceolate, acute or attenuate, glabrous or rarely ciliolate at base; style with stigmas 0.12 mm. long; ovules 11; excurrent vein-tip less than 1 mm. long. Coll. *Omar Shankar 12982*, 20-9-

unlike. The cited Ceylon collection consists of ten plants in flower of which nine are strict, and mostly with persistent radical leaves. The cauline leaves at the lowest nodes are broadly linear or oblanceolate, 2-3.5 mm. wide, in sharp contrast to the narrower and shorter upper cauline leaves. Further study of the Lucknow and Ceylon material is recommended, especially since fruiting plants have not been seen. In the South American taxon, *P. corymbosa*, var. *brasiliensis*, the cauline leaves throughout are narrowly linear or subulate, of firm texture, with strongly revolute margin and terminal seta 2-3 mm. long. The stipules are deeply cleft with prolonged filaments. The mature seed is dark brown, smooth, and shiny.

In conclusion, *P. nebulosa* is distinguished by compact habit, reddish nodes, internodes and undersurfaces of leaves. The cauline leaves throughout, are narrowly linear. The ovate acute sepals are dorsally rounded. The petals are pink in contrast to the white and sordid yellow petals recorded for *P. corymbosa*. Mature seeds, comparable only with those of a Paraguayan plant, are of even light buff when fully cutinized, and the groove on the dorsal side disappears on soaking.

A preliminary study of microsporogenesis in *P. nebulosa* indicates that the chromosome number is probably $n = 3$. Further investigation is necessary before this number can be confirmed (unpubl. Long, R. W., Associate Professor, University of South Florida.)

DISTRIBUTION

The present known distribution of *Polycarpaea* in Florida

56, Lucknow, India. (USF). B. Sepals lanceolate, attenuate, often ciliolate below with median shadow line; style with stigmas 0.24 mm. long; ovules 11-13; excurrent vein tip 1 mm. long or less. Coll. *George R. Cooley*, 14-1-57. Dambulla, Ceylon. (USF). C. Sepals ovate, acute; style with stigmas 0.13 mm. long; seeds usually 7 (8), c. mature seed actual size 0.5 mm. 1.; excurrent vein tip 1 mm. long or less. Coll. *Lakela 24779*, 18-10-61. (USF). D. Sepals lanceolate, attenuate, pilose, with median shadow line; style with stigmas 0.26 mm. long; d. mature seed actual size 0.5 mm. long; ovules 6. Coll. *E. Hassler 9808*, 1907-08, Paraguay, S. A. (US).

is restricted to northeast Tampa and the western border of adjoining Temple Terrace. It occurs sporadically in an area approximating 12 square miles. It flowers from August to November.

The question of *Polycarpaea* occuring in other parts of North America was aroused by a record from Mexico, listed in *Index Kewensis*. In reply to an inquiry, Dr. R. Llamas, Director, Instituto de Biologia, Ciudad Universitaria, in a communique referred to the "note of Hemsley (*Biologia Centrali Americana* Vol. I, p. 77) where he says: . . . The following is probably not a true *Polycarpaea* (*P. cuspidata* Ehrenb. Real del Monte)." Further, Dr. Llamas notes that the climate of Real del Monte, "is . . . a cold one: 2781 metres above sea level, with mean temperature in summer of 14.5 degrees Centigrade, which drops to from 2 to 10 degrees below zero Centigrade. For these reasons we are inclined to believe in the nonexistence of this species or, at least it has not been collected up to the present time." Patently, the climate is unfavorable for survival of a tropical plant.

The genus embraces a global distribution in the warm parts of both hemispheres. On the northern limit of the range approximating the same parallel, North America fills in the gap between the Canary Islands, China and Lucknow.

Acknowledgements

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