SYSTEMATIC STATUS OF AMMOPURSUS OHLINGERAE (COMPOSITAE)[1]

OLGA LAKELA

University of South Florida, Tampa

Lacinaria Ohlingerae was described by Dr. Blake (Bull. Torr. Bot. Club 50: 203-204, pl. 9, 1923) from sand-scrub of central Florida. Dr. Small, upholding the endemic as generically distinct, defined its limits under the binomial *Ammopursus Ohlingerae* (l. c. 51: 392-393, 1924). Dr. Robinson, following adoption of *Liatris* as a *nomen conservandum* under the International Code, reinstated sand-torch in the large genus of the blazing-stars as *Liatris Ohlingerae* (Contrib. Gray Herb. 104: 49, 1934). This treatment was followed by Dr. L. O. Gaiser in her scholarly work on the genus *Liatris* (Rhodora 48: 373-375, 1946).

The underground parts of *Liatris*, regardless of whether stems or roots, have been described without uniformity by different authors. Thickened underground stems characterize all species of *Liatris* as defined by Gaiser (Rhodora 48: 168-169). Contrary to this assertion (though it is correct), the term root appears in descriptions of *L. Ohlingerae* and *L. Garberi*. Since circumstances encouraged detailed study of these Florida species, it was deemed worth while to observe seedling growth.

Fruits of *Ammopursus Ohlingerae*, collected near Frostproof, Polk County, were planted in flats of white sand from the habitat of the parent plant on the 6th of November, 1961. They were freely watered and placed in the slath house of the university nursery. Seedlings in process of germination were noted on the 22nd of November. The fruit coat, cast off laterally between the ribs, free from the intervening tissue, appeared fusiform, with a firm attachment of the ribs to the stipe-like tapering base and the intact pappus. The seedlings with oblanceolate cotyledons and a single encircling band of roothairs just below the soil line, were potted in deeper sand and placed under glass without artificial heat.

The period of dormancy was surprisingly short. An effort was made to find some evidence of correlation in natural environment. On the 14th of January 1962, the white sand-scrub of Josephine Creek, Highlands Co., was thoroughly searched for viable fruits for a chromosome record. The tufts of faded florets clinging to receptacles were sterile; in the fallen ones caught in the lichens a few ripe achenes were found. During hours of search over a large area, three seedlings with expanded cotyledons were observed. They were somewhat younger than the ones under cultivation, in which the tip of the first radical leaf was appearing between the cotyledons.

[1] Contribution No. 9, Botanical Laboratories, University of South Florida.

SIDA 1 (4): 240--247. 1964.

The growth of the planted seedlings was continuous, without well defined cluster of radical leaves. Caulescence appeared early; the plants in May were returned to the slath house open to rains, but reduced light intensity. By September the tallest one had attained the height of 1.6 dm., including the panicle of 12 heads. The plants, six in all, flowered the first year.

Fruits of *Liatris Garberi* were discovered on the 4th of January 1962, in a colony of a few individuals, along margin of flat pineland and saw-palmetto, north of the International Airport, Tampa. They were promptly planted in pots of peaty sand and placed under glass with *Ammopursus*. Seven seedlings appeared in March. Each developed radical leaves at the crown of the taproot. Six became caulescent and flowered the first year; one remained in rosette stage developing a terminal bud in true *Liatris* fashion; its underground parts consisted of 9 thickened secondary roots. Cross sections revealed a pentarch xylem, and 2 rings of growth in the secondary xylem. The plants in each series, were transferred to the greenhouse garden, where they flowered through October.

Dr. Small described the root of *Ammopursus* as "long perpendicular, fleshy tap-root." (Man. S. E. Fl. 1933). Actually, it is a chain of segments formed by thickening of the secondary roots in succession, singly or in multiples. Two-three segments were formed during the first year of growth. The crisp, fleshy segments are fragile at joints. The root of an older plant with two flowering stems, as depicted in Pl. 1, is seldom seen intact; two scars indicate the places of chains of segments lost in collecting. One's groping fingers may feel the whole, suspended in the mesh of rootlets of *Sabal Etonia*, in porous, sun-heated sand, but on exposure only detached parts may be at hand.

The root featured in Pl. 1 was collected in white sand-scrub near Frostproof, Polk County, 23rd of November 1961. Dr. J. B. Carlson, University of Minnesota, Duluth, executed the illustrations with interpretation. The freehand sections were stained in safranin and traced under microprojector.

Section A represents an unthickened root with tetrarch primary xylem; in section B, the primary tissues become disorganized; the secondary phloem, mostly of parenchyma, includes patches of sieve tubes. Similarly, the secondary xylem consists mostly of parenchyma with isolated vessels. Except for a small increase in size, sections B-F are essentially the same as to structural content. No rings of growth are apparent. Section G is a stem, the base of the hypocotyl.

The floral structures have been adequately described in previous works. Annotations with photographs may emphasize differentiating characters. Up to 25 florets are borne on the truncate, clavate receptacle. The 4-5 -seriate inner phyllaries are crowded on an axis barely 2 mm. long, between the glandular, deeply alveolate apex and the persistent

outer phyllaries (Pl. 2 A & B). Plane and thin, barely thickened at the base, they readily spread and dissever from the slender connections with the axis. The loose-appearing head is in sharp contrast with compact heads of *L. cymosa* and *L. cylindracea*. In these the outer phyllaries are convex on the back, thick and gibbous at base with broad rhomboidal attachment. They are persistent, strongly imbricated and appressed against the axis, 4-5 mm. long. The receptacle is convex with florets on more than one plane. The two above species with *L. Ohlingerae* constitute Series Cylindraceae as defined by Gaiser. In character of the receptacle, they are fundamentally unlike. So is *L. scariosa* with a broadly convex receptacle which in Dr. Blake's concept is closely related to *L. Ohlingerae*.

The generic limits as defined by Dr. Small include floral characteristics. The photographs (Pl. 3 and Pl. 4A) bring out clearly zygomorphy of the urceolate corolla and included stamens. The blue-violet anthers, only 2 mm. long on subulate filaments about the same length, are exceedingly short for a floret up to 30 mm. long in life. The pale apices of anther connectives are 0.1 mm. long. The proportionately longer anthers, often with conspicuous connectives, exsert in *Liatris*, or at least come close to the sinus level of the corolla throat. The stipe-like base of mature fusiform achene disarticulates from the connecting bundle at the bottom of an alveolus (Pl. 4B). The fruit coat with ribs tapers to the point and remains attached through germination. In *Liatris* the achene base tapers less with looser attachment of the fruit coat. The dorsiventrally compressed bristles of the pappus to 30 in number, attenuate from the 0.1-0.2 mm. wide base, to filiform apices. The lateral cilia of variable length are not more than 2-5 times the diameter of the setae, as measured under micro-projector. Thus, the pappus is barbellate, as described by Dr. Small. Moreover, fleshiness or succulence of the roots and the foliage were manifestly conclusive characters of *Ammopursus;* he regarded the genus on a par with *Garberia* and *Carphephorus*. Short period of dormancy, continuous growth of the seedling without notable formation of rosette leaves and the distinctive structure of the achene are herewith added as delimiting characters for upholding the systematic status of *Ammopursus*.

The chromosome pattern, $2n=20$ is recorded in a root tip cell. (Pl. 4C). The same number has been recorded for species of *Trilisa*, *Eupatorium* and *Liatris*.

ACKNOWLEDGEMENTS

The author wishes to extend thanks to Dr. J. B. Carlson for preparing the figures in Pl. 1, and to Dr. Peter Raven for determining the chromosome record, which appear here through their courtesy.

PLATES

I. Root of *Ammopursus Ohlingerae*. All cross sections are X 4.44. (See text, p. 239.)

II. Head of *Ammopursus Ohlingerae*. A Receptacle and phyllaries. B. Flowering head. (Slightly enlarged.)

III. Flowers of *Ammopursus Ohlingerae*. (Slightly enlarged.)

IV. Ammopursus Ohlingerae. A. Single corolla and stamens. B. Achene. (About four times natural size.) C. Chromosomes, from root-tip cell.

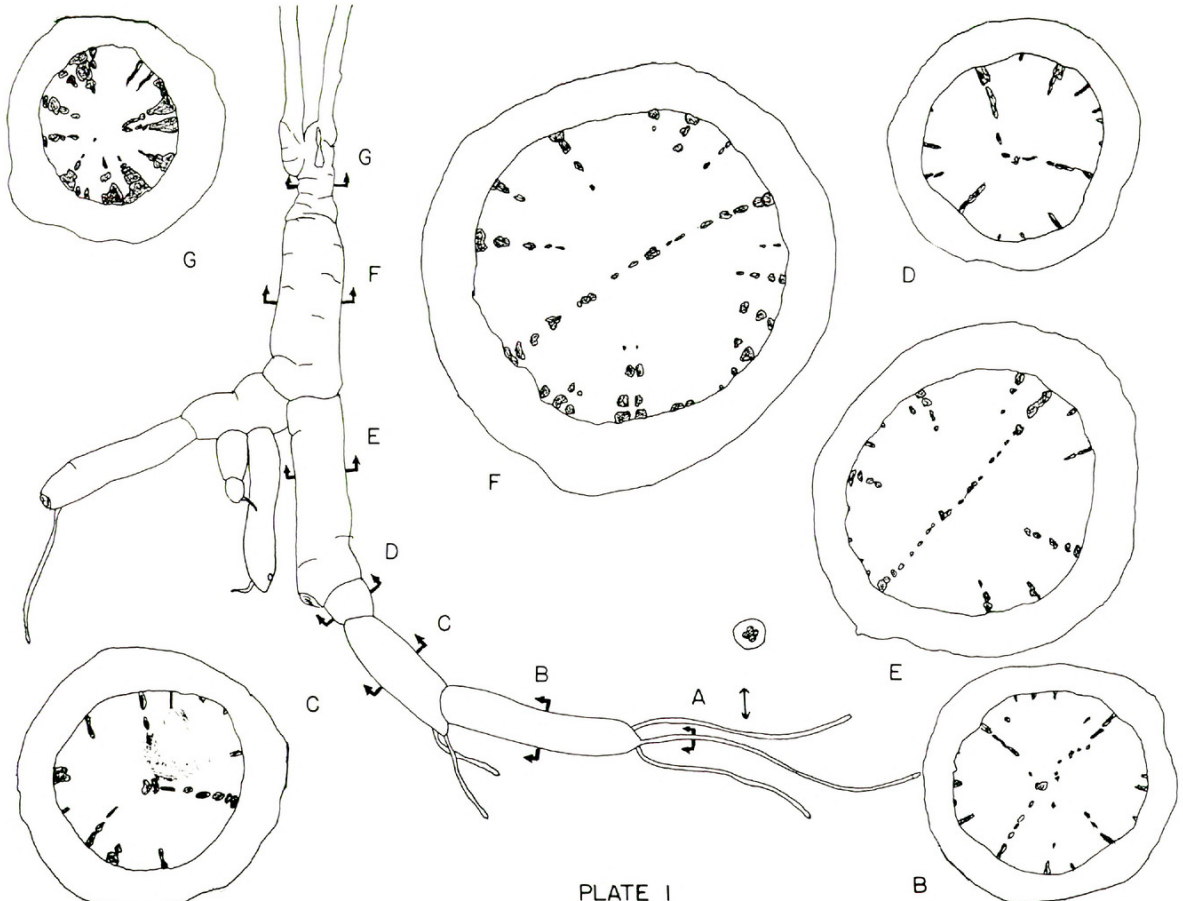

PLATE I

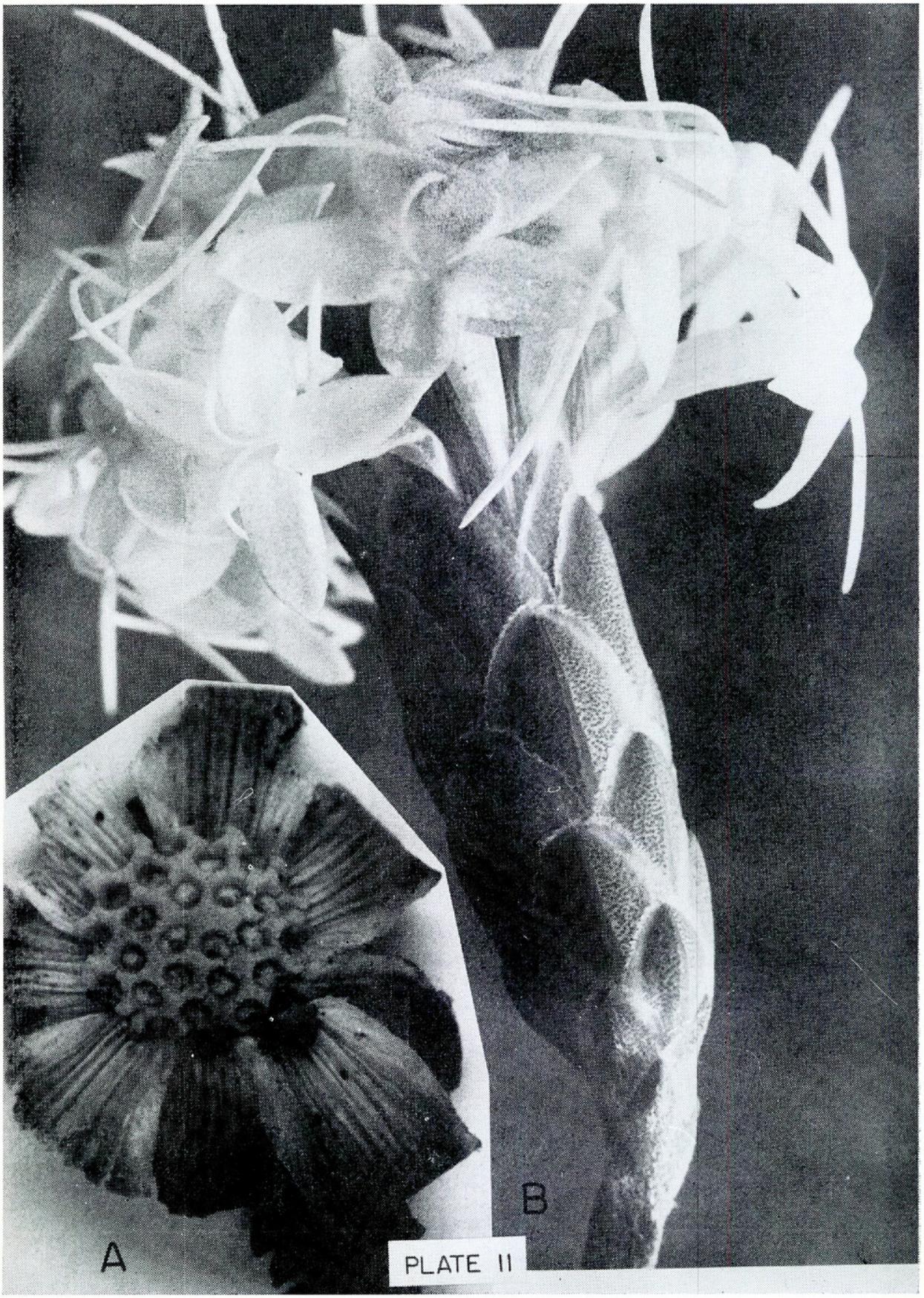

PLATE 11

PLATE III

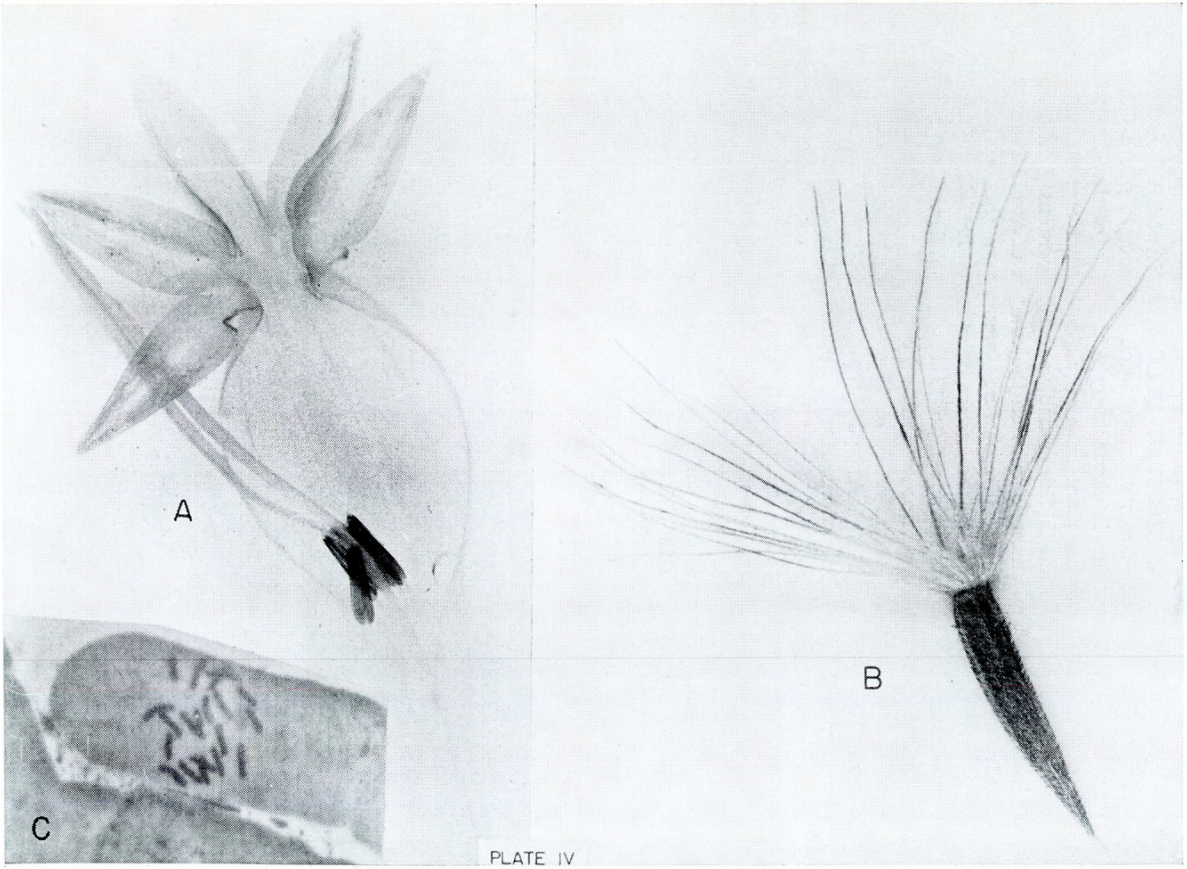

PLATE IV