

NOTES ON STREPTANTHUS AND ERYSIMUM (CRUCIFERAE)

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The preparation of a taxonomic treatment of the *Cruciferae* for the projected manual of the flora of Texas by Donovan S. Correll and Marshall C. Johnston has required the careful examination of species identities in all genera known to occur in the state. Material of an undescribed species of *Streptanthus* was provided among the specimens collected by Correll and his associates during the past few years. A key to the species of *Streptanthus* of Texas is followed by a description of the new species.

Upper cauline leaves petiolate or at least cuneate at base.

Cauline leaves entire, cuneate at base to short-petioled; petals equally developed *S. hyacinthoides*.

Cauline leaves runcinate, long-petioled; petals unequal, lower petals with blades absent or poorly developed *S. cutleri*.

Upper cauline leaves auriculate and clasping the stem.

Petal blades well developed, showy, at least twice as wide as the claw.

Lower cauline leaves auriculate.

Siliques less than 2.5 mm. wide; lower cauline leaves entire or at most shallowly sinuate-dentate *S. maculatus*.

Siliques 5-6 mm. wide; lower cauline leaves pinnatifid to somewhat lobed *S. sparsiflorus*.

Lower cauline leaves petiolate.

Infructescences fully bracteate; mature pedicels terete; siliques less than 3 mm. wide *S. bracteatus*.

Infructescences ebracteate or the lower pedicels infrequently subtended by bracts; mature pedicels angular, striated; siliques 4-6 mm. wide *S. platycarpus*.

Petal blades poorly developed, not showy, about the same width as the claw *S. carinatus*.

Streptanthus sparsiflorus Rollins sp. nov.

Herba annua; caulibus erectis ramosis 3-6 dm. altis; foliis inferne sessilibus auriculatis pinnatifidis 8-12 cm. longis, 2-4 cm. latis; foliis caulinis superne ovatis amplexicaulibus glaucis integris vel sinuatis; floribus sparsis purpureis; pedicellis divaricatis vel adscendentibus glabris 5-10 mm. longis; siliquis adscendentibus vel erectis glabris subsessilibus 4-7 cm. longis, 5-7 mm. latis; seminibus orbicularibus alatis ca. 5 mm. latis; cotyledonibus accumbentibus.

Holotype in the Gray Herbarium: south fork of McKittrick Canyon, Guadalupe Mts., Culberson County, Tex., June 21, 1964, *D. S. Correll* 29805 and *Craig Hanson*. Isotype in the Lundell Herbarium, Texas Research Foundation.

Annual herb, glabrous throughout, stems and leaves glaucous, somewhat fleshy; leaves greenish and minutely punctulate above, slate-colored and

non-puncticulate below, strictly radical leaves absent; stems 3–6 dm. tall, simple below, branched from about 1 dm. upward; lower cauline leaves sessile, auriculate, repand-toothed, lyrate-pinnatifid to nearly runcinate, 8–12 cm. long, 2–4 cm. wide, leaves gradually reduced upward; upper cauline leaves mostly entire, occasionally sinuate-dentate, ovate to broadly oblong, obtuse, auriculate and clasping the stem; flowers usually fewer than 10 per raceme, slightly irregular; sepals straw-colored to pale purplish, non-saccate, narrowly ovate, 9–11 mm. long, ca. 2 mm. wide, lateral sepals more tapering and thicker at tip than upper and lower sepals; petals showy, purplish 15–18 mm. long, blades 3–5 mm. wide, reflexed at anthesis; upper paired stamens protruding beyond sepals, filaments 7–9 mm. long, anthers 2.5–3 mm. long; lower paired anthers included within calyx, filaments 4–5 mm. long, anthers 3–4 mm. long; single stamens often with anthers longer than filament; fruiting pedicels stout, terete, divaricately ascending, 5–10 mm. long, strongly expanded at summit; siliques subsessile, divaricately ascending, linear, obtuse to nearly acute above and below, strongly flattened parallel to septum, 4–7 cm. long, 5–7 mm. wide; valves with a central nerve from base to apex; septum translucent, entire; funiculi winged; seeds flattened, widely wing-margined, orbicular, about 5 mm. across, wing uniform, 1–1.2 mm. wide, crest bilobed, primary cleft short, less than 0.5 mm. long; cotyledons accumbent.

OTHER SPECIMENS STUDIED: Pine Springs Canyon, Guadalupe Mts., June 20, 1964, *Correll* 29793 and *Hanson* (GH, LL); same locality *Correll* 24270 and *M. C. Johnston* (GH); same locality, *Correll* 26088 and *H. B. Correll* (LL).

Specimens of *Streptanthus sparsiflorus* were at first identified as *S. platycarpus* primarily because of the presence of broad-bladed petals. However, in most respects, this species is more similar to *S. carinatus* than it is to *S. platycarpus*. All three species have similar broad siliques borne on stout pedicels, but the pedicels of *S. sparsiflorus* and *S. carinatus* are short, more nearly terete and they are always glabrous, whereas those of *S. platycarpus* are long, less definitely terete and almost always possess at least a few simple trichomes.

Aside from the broad flat petal blades present in *Streptanthus sparsiflorus* as compared with narrow linear and undulate-cripsed blades of *S. carinatus*, the most striking difference between these two species is in the lower leaves. The lower leaves of *S. carinatus* are definitely petioled and non-auriculate, while in *S. sparsiflorus*, the lower leaves are sessile and auriculate. Also, there are differences between the two species in flower and bud color. The buds of *S. carinatus* are a very dark purple, almost blackish in some plants, and the petal blades are usually dirty white streaked with purple veins, only very rarely purplish. On the other hand, the buds of *S. sparsiflorus* are mostly straw-colored, rarely somewhat purplish

and the blades are definitely purple-violet. The calyx in the newly opened flower of *S. carinatus* is urn-shaped and very definitely asymmetrical with the upper and lower sepals gibbous below the middle. The calyx and sepals of *S. sparsiflorus* do not appear to be urn-shaped and gibbous, but we have not seen growing material of this species and we do not have a sufficient range of stages in our specimens to be certain about these points.

Streptanthus carinatus and *S. sparsiflorus* are similar in possessing protruding upper stamens which have short anthers, and with the lower paired stamens having longer anthers nearly included (cf., Rollins, 1963, Fig. 3 and 4). In contrast to this, both the upper and the lower pair of stamens in *S. platycarpus* are about of equal length and are nearly included. In the latter species, the anthers are very long, usually exceeding the filaments in length. Other interesting differences between *S. platycarpus* and the other two species are seen in the seed and funiculus. The funiculus in *S. platycarpus* is embedded in the septum and the attachment point on the seed is oriented toward the cotyledons rather than the primary groove. In *S. sparsiflorus* and *S. carinatus*, the funiculus is nearly free of the septum but is winged with tissue similar to that of the septum. In these species, the orientation of the funicular attachment is toward the primary groove of the seed.

ERYSIMUM

The genus *Erysimum* is widespread in North America, especially if the adventive species are taken into account. Certain species, such as *E. capitatum*, are extremely abundant in the mountain and valley region which comprises much of the western half of the continent. However, the area of most active evolutionary differentiation in North America is very near the western coast especially from southern Oregon southward to Baja California and on the offshore islands. This point was brought out by Rossbach (unpublished thesis, Stanford University) and may be inferred from his abbreviated presentation in *Aliso* (Vol. 4: 115-124, 1958) where five new taxa from the coastal area were described.

Species of *Erysimum* have become adapted to the specialized habitats of coastal dunes in a number of instances and to serpentine rock detritus in others. Sandy soils of hillsides and open areas of chaparral and woodland are favorite sites in this coastal

region. Although uncommon in the genus as a whole in North America, a suffrutescent habit is well developed in *E. insulare* and to a lesser extent in *E. suffrutescens*, but material of an undescribed species from Guadalupe Island off the coast of Baja California shows an even higher level of woodiness than either of these species and represents, in this respect, an evolutionary extreme in the North American species of the genus. This new species is described as follows.

Erysimum moranii Rollins, sp. nov.

Planta suffruticosa ramosa 2–4 dm. altis; foliis integris crassis imbricatis dense pubescentibus lineari-oblongatis vel anguste spatulatis obtusis 1.5–3.5 cm. longis; petalis spatulatis luteis 7–9 mm. longis; pedicellis rectis pubescentibus divaricatis 3–5 mm. longis; siliquis rectis divaricatis compressis dense pubescentibus 2–3 mm. longis; seminibus brunneis alatis compressis ca. 2.5 mm. longis, ca. 2 mm. latis; cotyledonibus accumbentibus.

Holotype in the Gray Herbarium: occasional on inner slopes of the crater, ca. 50 m., Outer Islet, near 28.51' N, 118.17' W., Guadalupe Island, Baja California, Mexico, 21 June 1968, *Reid Moran 15116*.

Plants sub-shrubby, repeatedly branched, up to 4 dm. high, major stems up to 1 cm. in diameter; active leaves at the ends of branches or toward the base of the inflorescences, marcescent leaves extending well below the active ones; leaves entire, crowded, linear-oblongate to narrowly spatulate, gradually narrowing below, obtuse at apex, 1.5–3.5 cm. long, silvery from a dense covering of appressed bifurcate trichomes; flowering branches numerous, quadrangular, densely pubescent; fruiting pedicels slender, straight, widely spreading nearly at right angles to rachis or slightly ascending, densely pubescent, 3–5 mm. long; sepals densely pubescent, oblong, outer pair keeled on back and with a callus, at apex, enclosing inner pair; petals yellow, spatulate, 7–9 mm. long, gradually narrowing to a slender claw; siliques straight, flattened parallel to septum, widely spreading nearly at right angles to slightly divaricately ascending, 2.5–3.5 cm. long, ca. 3 mm. wide; valves densely pubescent, strongly nerved from base to apex; replum narrow, pubescent; styles capitate, sparsely pubescent, 2–3 mm. long; septum with areolae elongated parallel to long axis, obscure nerve narrow but extending full length of septum; seeds wing-margined all around, flattened, slightly longer than broad, ca. 2 mm. wide and 2.5 mm. long, lateral wing ca. 0.25, slightly wider on distal portion of seed; radicle exceeding cotyledons; cotyledons accumbent. $2n=36$.

OTHER SPECIMENS SEEN: occasional on inner slope, Outer Islet, Guadalupe Island, Baja California, Mexico, April 16, 1948, *Reid Moran 2935* (ds); floor of crater on Outer Islet, Guadalupe Island, July 18–19, 1937, *Peter J. Rempel s.n.* (ds).

The Outer Islet is also known as Islote Zapato and according to Moran (1969) it consists mostly of a seabound volcanic crater with steep inner slopes and sheer outer seacliffs on three sides.

It is noteworthy that Moran found and described a new species of *Eriogonum* (*E. zapatoense*) from the same location.

In its shrubby habit, *Erysimum moranii* is most like *E. insulare* and *E. suffrutescens*. However, it differs from each of these species in a number of significant ways, one of the most important being in the nature of the seeds. In *E. moranii*, the seeds are broad, flattened, winged all around and the cotyledons are accumbent while in *E. insulare* they are narrow, plump, wingless and the cotyledons are incumbent. These two species also differ in the length of the pedicels and siliques, the pedicels being 1.5–2 cm. and the siliques 3–5 cm. in *E. insulare* compared to 3–5 mm. and 2.5–3.5 cm. in *E. moranii*.

Actually, *Erysimum moranii* may be more closely related to *E. suffrutescens*, particularly var. *grandifolium*, than it is to *E. insulare*. However, these species differ considerably in growth habit, leaf disposition and leaf length. The pedicel length is somewhat comparable, although usually shorter in *E. moranii* and the silique length of var. *grandifolium* is about the same or slightly longer than in *E. moranii*. The siliques of var. *grandifolium* are definitely tetragonal in cross section whereas they are broader and flat in *E. moranii*. The seeds of these taxa are radically different being plump, angular, wingless and with mostly incumbent cotyledons in var. *grandifolium*, but flat, nonangular, winged and with accumbent cotyledons in *E. moranii*. Furthermore, the trichomes of *E. moranii* are consistently two parted while being three parted in all infraspecific taxa of *E. suffrutescens*.

Plants grown in a growth chamber from seeds of the type number began branching after a few weeks of growth and continued to ramify into a bush-like form as growth proceeded. This growth habit is substantially different from that of many species of *Erysimum* (e.g., *E. capitatum*, *E. asperum* et al.) where a single rosette of leaves is most common and if branching does occur it is usually in the upper part of the flowering stalk. Actually, the growth-form is more like that of some of the Aegean species of *Erysimum* (cf., Snogerup, 1967a) which are also island dwellers.

The chromosome number¹ of $2n=36$ in *Erysimum moranii* is the same as in a number of other North American species of the genus (Mulligan, 1966; Rollins, 1966). There are both large

¹ I am indebted to and wish to thank Mrs. Lily Rüdénberg for this count and for the privilege of examining preparations of root-tip smears of *E. moranii*.

and very small chromosomes in the complement of this species and in this respect the cytological picture is similar to that of other American species as well. The range of chromosome size is far greater than in any complement of the Aegean species of *Erysimum* as given by Snogerup (1967b).

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