

A REMARKABLE NEW CRUCIFER FROM MEXICO

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For over sixty years, the monotypic genus *Ornithocarpa* (*Cruciferae*) has been known from a single collection made in the state of Jalisco by C. G. Pringle in 1902. That collection was an ample one, and specimens were adequately disseminated so that the uniqueness of *Ornithocarpa fimbriata* Rose has been fully recognized and the authenticity of the species has never been questioned. But the only published information on this unusual species is the rather terse description by Rose (1905) and the somewhat more expanded account in *Die Pflanzenfamilien* by Schulz (1936). No really new knowledge could be gained without either new collections or from observations on the growing plants in the field.

From time to time, I have encouraged collectors working in Mexico to look for *O. fimbriata* and several attempts have been made to find the plants at the original locality near Constanca Station, east of Guadalajara. The most recent, unsuccessful attempt was that of Dr. Rogers McVaugh of the University of Michigan, who reported that much of the area where the plants might be expected to be found is now under cultivation. Because of the destruction of the original habitat, we had resigned ourselves to the possibility that this highly distinctive and most remarkable genus might never be more adequately known than was possible from the single collection made many years ago.

Fortunately for those of us interested in the *Cruciferae*, a specimen of *Ornithocarpa* showed up in a collection sent for identification by Dr. Peter H. Raven. The specimen, collected by Dr. Dennis E. Breedlove, was in early flower but the unmistakable fimbriate petals and the close match in over-all characteristics to specimens of *O. fimbriata* clearly placed it in the genus *Ornithocarpa*. However, the young ovaries of the flowers had several ovules present instead of two, as in *O. fimbriata*, and the shapes of the very young siliques suggested a fruit quite unlike that of *O. fimbriata* as well. Even with flowering material only, we were nearly certain that an undescribed species was represented by the new collection, which came from the state of Durango. It was added good luck that Dr. Breedlove was returning to Mexico in the summer of 1967, and that he was willing to cooperate to

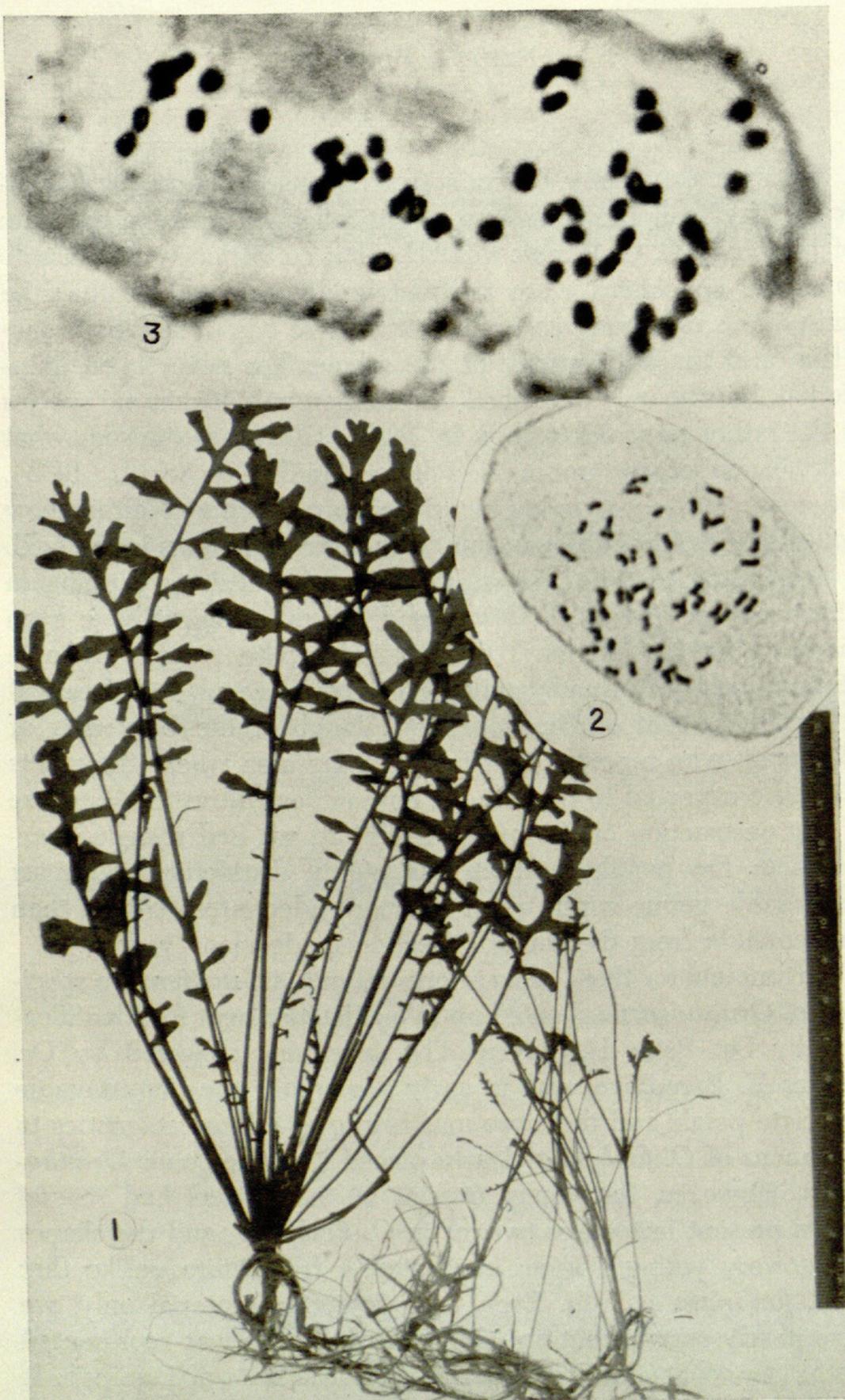


FIG. 1-3. *Ornithocarpa torulosa*. Breedlove 15888 from Durango, Mex. FIG. 1, greenhouse grown plant showing rhizomes with young plantlets attached. FIG. 2, chromosomes of root-tip cell, no pre-treatment, $\times 2000$. FIG. 3, chromosomes of pre-treated cell, $\times 2500$.

obtain better developed material for study. From Dr. Breedlove's efforts, we now have two additional collections from the Durango locality, one with immature seeds, the other with mature siliques and seeds.

In many respects, *Ornithocarpa torulosa* is a more orthodox crucifer than *O. fimbriata*. At the very least, the silique is like that of many species in other genera of the family, and on that basis alone the presently described species appears to be the more primitive and less specialized of the two species. As in *O. fimbriata*, the siliques of *O. torulosa* are virtually indehiscent. The intact seeds are buoyant in water and readily float. If forcibly submerged and then released, they immediately rise to the water surface. This suggests that seed dispersal is by water transport, at least to some extent. The valves of the siliques are very tightly fused to the replum. When dry, the silique will not dehisce the seeds, even with considerable pressure. However, after 24 hours of soaking in water, the valves do release and the seeds may float away.

We have been successful in germinating the seeds from Breedlove's collection no. 15888 and in growing plants in the greenhouse. The leaves are dark green and quite fleshy. Under conditions of vigorous growth, offset young plants arise from underground rhizomes (Fig. 1) when a plant has reached the 10-15 leaf stage. Proliferation of the plants takes place at a very rapid rate, and in less than two months a six-inch pot is completely filled with the parent plant and its offshoots. Growth is very vigorous, and it is obvious that under natural conditions, the species spreads by these underground rhizomes to form dense patches.

Considerable effort has been expended by Mrs. Lily Rüdénberg¹ in attempts to make satisfactory preparations of the chromosomes of *O. torulosa*. The somatic tissues of the plants have proved to be very difficult to handle, and as yet bud material has not been utilized. The best results were obtained from very young leaves and root-tips. In some figures, there was some uncertainty as to whether one large chromosome or two chromosomes of usual size were present. We have interpreted these as two chromo-

¹ It is a pleasure to thank Mrs. Rüdénberg and to acknowledge her voluntary contribution to our research activity. Also, I want to thank Mrs. Tantravahi for her valuable assistance.

somes, based on our general experience with chromosomes of the *Cruciferae*. A photograph of the chromosomes in a pre-treated root-tip cell is reproduced as Fig. 3.

Mrs. Rüdénberg, after much study, concluded that there were $2n=48$ chromosomes in *O. torulosa*. In several figures, we confirmed her interpretations. However, because of the intractability of the material of *O. torulosa*, and a desire to have a wholly new second approach made, we asked Mrs. Ramana Tantravahi to work on the problem. After a number of attempts using several different techniques, she produced excellent preparations from root-tips. A photograph of a root-tip cell without pre-treatment provided by Mrs. Tantravahi is reproduced as Fig. 2. Her preparations confirm the count as $2n=48$.

It is clear that *O. torulosa* is a polyploid. However, there is no basis as yet for any suggestion as to the possible origin of the species. It is difficult even to see connections between the genus *Ornithocarpa* and other genera of the family. Schulz (1936) associated it with *Dryopetalon* and *Schizopetalon* in the tribe *Schizopetaleae*, but aside from lobed or more deeply divided petals, these genera have very little else in common. I do not believe they represent a closely interrelated group of genera.

The flower form of *Ornithocarpa* is somewhat like that of *Romanschulzia* and *Thelypodium* in that the parts spread widely from the base and the filaments of all stamens are approximately equal. The white petals of *O. torulosa* spread nearly at right angles to the base of the gynoecium. There is no suggestion of an unguiculate shape to the petals as is so commonly found in the *Cruciferae*. These may be readily seen in Fig. 4.

The greatly elongated inflorescence, the gynophorate silique, and the flower form, including the coiled anthers, all suggest that *Ornithocarpa* is in a general way related to *Romanschulzia* and perhaps to *Thelypodium*. However, I am only willing to support the idea that these genera should be loosely associated together. Certainly, they are not phylogenetically closely related to each other.

***Ornithocarpa torulosa* Rollins, sp. nov.**

Perennial; rhizomatous, stems erect, several to many from an underground rootstalk, simple or branched above, glabrous, somewhat fleshy, 6-10 dm. tall; leaves monomorphic, fleshy, petiolate, pinnate with deeply to shallowly lobed oblong pinnae, glabrous; basal leaves 1-2 dm. long, 2-4 cm. wide,

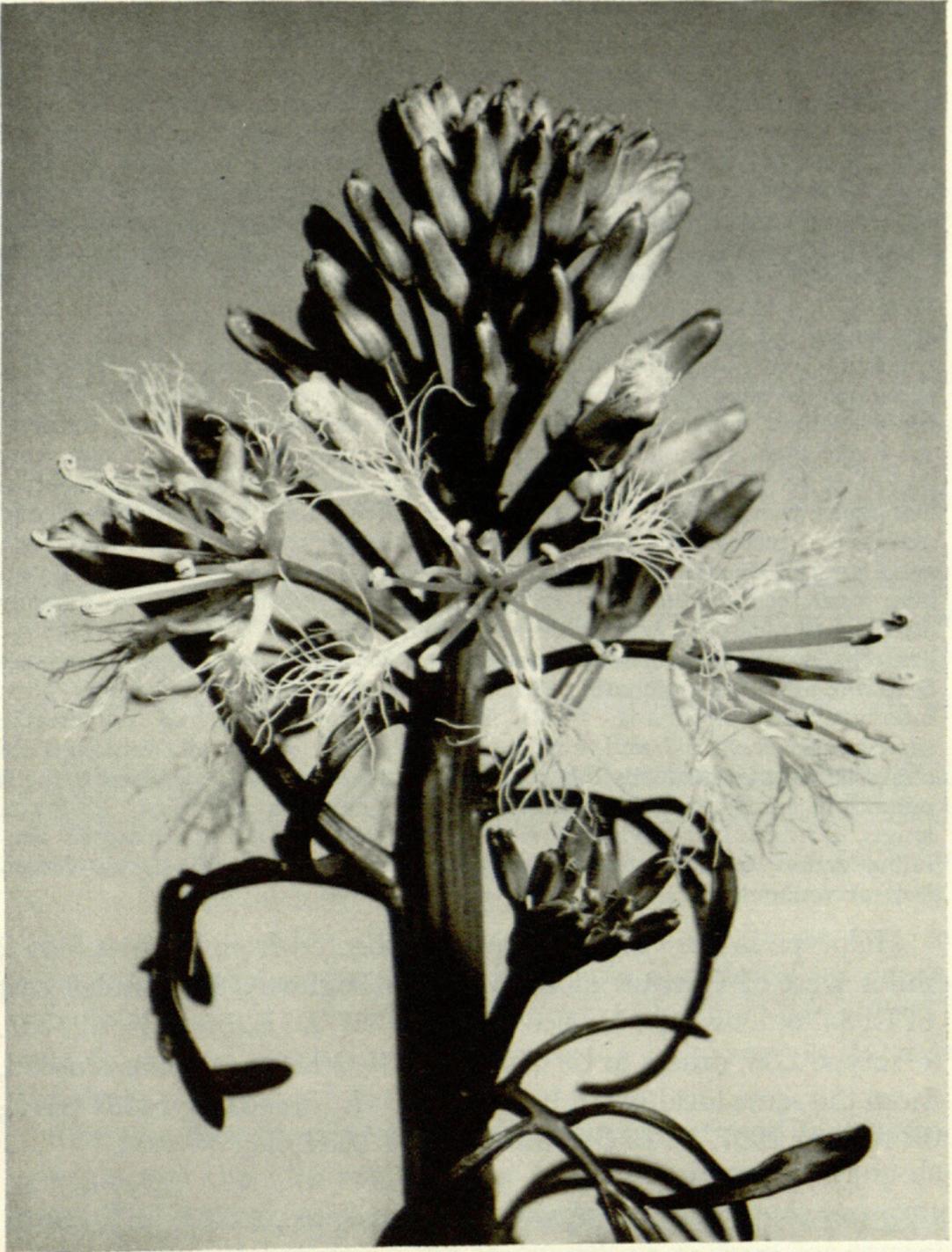


FIG. 4. Flowers and bud-clusters of *O. torulosa*, $\times 2$. Photo by Frank White.

pinnae up to 2 cm. long, 5 mm. wide, remote; upper cauline leaves reduced and less lobed; inflorescence corymbose, greatly elongating in fruit; lower flowers often bracteate; sepals narrowly oblong to linear, nonsaccate, whitish to light lavender, 5-7 mm. long, ca. 1 mm. wide, one pair with a low horn-like callus at apex of adaxial surface, callus with one to several nearly transparent blunt trichomes; petals white, broadly oblong to obovate in outline, 6-8 mm. long, 2-2.5 mm. wide, upper portion lacerate into slender filaments, margins of lower portion irregularly denticulate; stamens exerted, filaments nearly equal, whitish, 6-8 mm. long, anthers purplish, 2-3 mm. long; four large rounded divaricately ascending glands present on receptacle, each in front of petal insertion, nearly 1 mm. in diameter, persistent; ovary cylindrical, gynophore and style prominent, stigma small, entire; pedicels straight, widely spreading at right angles to rachis or usually slightly ascending, glabrous, expanded at summit, 1-1.5 cm. long; siliques nearly indehiscent, oblong, tapered above and below, flattened parallel to septum, irregularly torulose, 1.5-2 cm. long, 4-5 mm. wide; gynophore 2-3 mm. long, up to 5 mm. long including narrowed portion of lower silique; style 3-5 mm. long; septum complete, translucent; ovules 6-10 in each loculus; seeds wingless and marginless, pearly grey, elliptical to nearly orbicular, somewhat flattened, ca. 4 mm. in diameter, outer seed-coat horny, densely and minutely granulate, inner seed-coat soft and spongy, uneven in thickness; embryo scarcely attached to seed coat, cotyledons accumbent. $2n=48$.

Herba perennis glabris; caulibus erectis simplicibus vel superne ramosis 6-10 dm. altis; foliis pinnatis petiolatis inferne 1-2 dm. longis, 2-4 mm. latis; inflorescentiis corymbosis; floriis inferne bracteatis superne ebracteatis; sepalis nonsaccatis 5-7 mm. longis, ca. 1 mm. latis; petalis albis ablongis vel abovatis superne laciniatis 6-8 mm. longis, 2-2.5 mm. latis; pedicellis rectis patentibus 1-1.5 cm. longis; siliquis stipitatis oblongis compressis 1.5-2 cm. longis, 4-5 mm. latis; stylis 3-5 mm. longis; stigmatibus minutis integris; seminibus griseis immarginatis ellipticis vel orbicularibus compressis; cotyledonibus accumbentibus.

Holotype in the Gray Herbarium collected from a moist field 2 miles west of Coyotes along Mexican Highway 40, 5 miles east of El Salto, Durango, Mexico, 25 July 1967, *D. E. Breedlove 15757*. (Isotype DH; others to be distributed.) Other specimens studied, from the same locality, 16 June 1966, *D. E. Breedlove 14331* (GH); 13 August 1967, *D. E. Breedlove 15888* (GH).

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<https://doi.org/10.5962/p.336418>.

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