

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

REVISION OF THE GENUS WISLIZENIA.

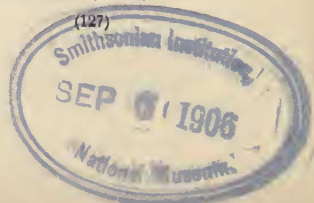
BY EDWARD L. GREENE.

Having had occasion to examine minutely the reticulation of the silicles in certain genera of the Cruciferae, I passed to the comparison of these with those of two anomalous members of the family of Capparidaceae, namely *Oxystylis* and *Wislizenia*, the former a rare, the latter a not very common type, both indigenous to the desert regions of the remote Southwest.

One of the generic characters of *Wislizenia*, according to authors, is the reticulate and tuberculate superficies of the nutlet-like one-seeded twin valves of the fruit.

In the process of examining the valves, as they appear in a long series of specimens in the National Museum and in my own herbarium, I found those of the original *Wislizenia refracta* to be in truth, and very beautifully, reticulate as well as slightly tuberculate, this description of valve, or rather nutlet, occurring however in no specimens except such as had come from western Texas and adjacent New Mexico, the peculiar climatic region whence this type species had been derived. These specimens, assorted and separated from the others, left a much more considerable bundle of mounted sheets that were a medley of things not in any way reconcilable with the species *W. refracta*, the name of which was on almost all the labels.

Out of this medley I gathered first a series of sheets, all from a very different climatic region in northern Arizona, in every specimen of which the valves are devoid of any kind of either reticulation or tuberculation and almost smooth; this plant in habit and aspect also very unlike the real *W. refracta*. A third series of sheets differing clearly from both the aforementioned as to foliage as well as fruit seemed as clearly to illustrate a species confined, as it would seem, to the low and heated district of the



Gila Valley in southern Arizona. From another region remote from this and more remote still from Texas and northern Arizona were a series of specimens all with valves strongly ribbed but not reticulate; while again, and from very far to the northward of what had been regarded as the range of *Wislizenia* there appeared a member of the genus exhibiting almost the valves of the original Texan species, but in foliage and habit extremely different from all; so that it became manifest that the genus must needs be revised, and a fair number of excellent geographic species given recognition on characters of the fruit chiefly; though each species seems to have its own particular area, and is thus rather perfectly isolated, topographically and climatically, from every other.

While pursuing this line of research, Mr. J. N. Rose pleasantly surprised me by bringing forth a series of specimens of his own gathering in Sonora and Lower California, upon which he had undertaken a critical study long since, which study had been interrupted, and these, together with the manuscript on them, he generously submitted to me, as an aid to this general revision. His own Sonoran species, both of them well marked in character, conclude the subjoined list of species mostly new.

Out of the ten species here recognized, all seem true to the original account of the group as a genus of annuals, except one inhabiting the Lower Californian peninsula which seems to be not only of perennial duration, but is even suffruticose, if not indeed altogether shrubby.

In the course of this study, no modification of fruit, such as might tend in any degree to the weakening of the generic character of *Wislizenia* has been observed; neither does their appear in any of the seven new species, the least habitual leaning towards *Oxystylis*; which genus, still monotypical, might in almost any event be rested on its strange habit, with lateral and densely glomerate inflorescence; in both which particulars it is most unlike any and every other genus of the family.

KEY TO THE SPECIES BY THE VALVES.

Valves obovoid or pyriform, rounded at apex, either not tuberculate or the tubercles few and low.

Valves short pyriform, with few lines, a well defined reticulation, and a few low tubercles at summit.

1. *W. refracta*.

Valves pyriform, neither obviously lineolate nor at all tuberculate, usually quite smooth. 2. **W. melilotoides.**

Valves shorter, obovoid, with few low ribs, an obscure reticulation, and a few low tubercles at summit.

3. **W. Californica.**

Valves pyriform, closely and sharply lineolate, and with a crown of more prominent but low tubercles.

4. **W. divaricata.**

Valves round-obovoid, with 5 prominent ribs and some reticulation, the summit with a few low tubercles.

5. **W. pacalis.**

Valves short, almost subcylindric, prominently both ribbed and reticulate and with a low tuberculation.

6. **W. scabrida.**

Valves mostly subpyriform, but summit less rounded, usually quite truncate, in most species conspicuously mamillate-tuberculate.

Valves pyriform, closely and sharply lineolate and with some elongated reticulation, the summit crowned with a circle of 5 spreading mammiform tubercles.

7. **W. fruticosa.**

Valves long, subturbinate-pyriform, strongly striate, near the summit fenestrate-reticulate, the summit with a circle of long connivent tubercles.

8. **W. Palmeri.**

Valves short subquadrate-obovate, the lower half strongly ribbed and closely striate, the broad summit traversed by a few elevated ridges.

9. **W. costellata.**

Valves subturbinate above a short cylindric base, the whole ribbed and lineolate, hardly reticulate, the summit with large mammiform tubercles.

10. **W. mamillata.**

1. *Wislizenia refracta* Engelm.

Wislizenia refracta, Engelm. Wisliz. Mem. 99.

——— ———, Gray, Pl. Wright. 1. 11, t. 2.

——— ———, Gray, Syn. Fl. 1. 186 in part.

Tall and rather lax not stout glabrous annual: leaflets elliptic or oblong-elliptic, acute at both ends, mostly 2.5–3 cm. long; fruiting racemes slender, 5–10 cm. long: carpels pyriform, marked with a few low ribs or striae and much intervening reticulation, especially toward the rounded summit, this part sometimes with a few low tubercles by no means conspicuous.

Originally from the valley of the Rio Grande about El Paso, Texas, and in adjacent New Mexico; and no specimens yet seen from more westerly stations, to which it might be expected to migrate after the advent of the railways, and where it may yet be found; but, I apprehend, only as a migrant; all western plants at present known exhibiting characters as distinct.

2. *Wislizenia melilotoides* sp. nov.

Glabrous, stout and low, freely and somewhat fastigiately branched, all the branches short, very leafy, ending each in a short sessile raceme: leaflets cuneate-obovate, very obtuse, almost truncate, mucronulate, 1-2 cm. long: fruiting racemes narrow, the oldest only 5-7 cm. long; fruit 4 mm. wide; carpels long-pyriform, remarkably smooth and rounded, at most only obscurely lineolate and with traces of two or three tubercles, more usually with none at all.

Vicinity of Holbrook, northern Arizona, apparently first collected by H. H. Rusby, August 20, 1883, No. 581 as in U. S. Herb.; again at Hardy Tank in the same region, by E. O. Wooton, 1892; the most perfect specimens by Miss Myrtle Zuck, at Holbrook, August 4, 1896.

In habit, form and hue of the very copious foliage, and short racemes, this species strongly recalls a yellow-flowered Sweet Clover. Its fruit characters are very strong, the carpels being usually quite smooth, and with a shallow elongated pit or hollow on the sides marking the form of the seed within.

3. *Wislizenia Californica* sp. nov.

Wislizenia refracta, Greene, Fl. Fr. 247, not of Engelm.

Stout, much branched, the branches elongated, sparingly leafy, copiously floriferous, minutely scaberulous in lines: leaflets commonly oval, obtuse or subtruncate, mucronulate, sometimes narrower and acute, scaberulous along the midvein beneath: carpels short, usually obovoid rather than pyriform, the longitudinal lines or ribs coarse but low and not very salient, somewhat broken into an obscure reticulation at summit and there, as it were, angled by 4 or 5 coarse and low tubercles.

Interior of California, in dry sandy soil from about Tulare northward to Sacramento; abundant about Lathrop; totally distinct from the Texan *W. refracta*.

4. *Wislizenia divaricata* sp. nov.

Glabrous, very widely and loosely branched, the branches from strongly divergent to quite divaricate, stout, rigid, uncommonly naked-looking, the scattered foliage small for the plant and all but the proper cauline leaves unifoliolate, the leaflets cuneate-oblong, almost pungently acute, 1.5-2 cm. long: racemes many and elongated: fruit 5 mm. wide, the carpels elongated pyriform, being constricted just above the base, marked longitudinally by a prominent narrow reticulation rather than by crowded and unbroken lines, the summit crowned with a circle of about 5 low tubercles.

Southern part of the Colorado Desert in San Diego County, California, collected only by C. R. Orcutt, June 23, 1888, at Bonego Springs; distributed to National Herbarium under No. 1492.

5. *Wislizenia pacalis* sp. nov.

Wislizenia Palmeri, Brandg. Proc. Calif. Acad. 2 ser. 2: 128 in part, not of Gray.

Branches stout, often tortuous or flexuous, not quite glabrous, red-dotted or purplish: leaflets always 3, oblong, usually very obtuse or even retuse or emarginate, 2-3 cm. long: racemes remarkably short, sessile: fruit short, only 3-4 mm. wide; carpels mostly round-obovate, in some specimens longer and subpyriform, the prominent striae 5 only, ending in a more or less distinct low tubercle, the intervening spaces conspicuously reticulate.

La Paz, Lower California, 1890, Edw. Palmer, his No. 88 as in U. S. Herb. the type; but collected earlier, namely in 1889 at San Juanico by Brandegee, and at the same place by Anthony in 1897. Also in 1897 it was collected at La Paz by Mr. Rose, No. 1311 as in U. S. Herb.; but these specimens have longer and even acutish leaflets; but the peculiarly reticulate carpels are about the same in all and are far more like those of the Texan and original *W. refracta* than like those of *W. Palmeri*; and Mr. Rose found himself unable to refer them to either species; his label bearing, in his hand, nothing but the name of the genus.

6. *Wislizenia scabrida* Eastw.

Wislizenia scabrida, Eastw. Bull. Torr. Club, 30: 490.

Low leafy habit of *W. melilotoides*, and with like broad leaflets, but not fastigiata, the branches widely spreading, the basal rising with a curve, the whole plant even to the margins of the growing leaflets scaberulous: leaflets at apex usually truncate, or not rarely quite retuse: carpels short, not rounded or tapering, short-subcylindric, closely turgid-ribbed, the truncate summit coarsely low-tuberculate.

Apparently common in the vicinity of Tucson, southern Arizona, where it was collected by Lemmon in 1880, Pringle in 1881, and later by Toumey and others.

7. *Wislizenia fruticosa* sp. nov.

Wislizenia Palmeri, Brandg. Proc. Calif. Acad. 2 Ser. 2: 128 in part, not of Gray.

Low, compact, suffrutescent, with yellowish and shining bark on woody parts of stem, the flowering branches short, fastigiata, densely leafy, all parts glabrous, yellow-green; leaves with short stout petioles, the 3 leaflets notably unequal, oblong, acutish, the terminal one 3 cm. long, the laterals little more than 2 cm.; racemes short, sessile; pedicels much elongated: fruit about 5 mm. wide; carpels pyriform, but widened at summit into a broad crown of large somewhat spreading tubercles developed abruptly from the termini of the ribs, the intervening striae not crowded on the sides of the carpel, but running into some few distinct reticulations.

Lower Californian species, so far as known collected only by Mr. Brandegee, at Calamujuet, May 11, 1889; the type specimen being in U. S. Herbarium. I see nothing in this type from which one may infer even a

near affinity for *W. Palmeri*. Its leaves are all trifoliolate. Its carpels are short in comparison, and their terminal tubercles are spreading, not convergent as in that; while by its unmistakably suffrutescent or even fairly shrubby habit and duration, it stands alone in a genus all other known species of which are annuals.

8. *Wislizenia Palmeri* Gray.

Wislizenia Palmeri, Gray, Proc. Am. Acad. 8: 622.

Rather widely and rigidly branched, glabrous: leaves apparently all simple and greatly elongated, the outline linear-oblongate, the length 3-5 cm., base tapering, apex obtuse or subtruncate, texture firm, even apparently subsucculent: fruit 7-8 mm. wide; carpels subturbinate-pyriform, strongly but not closely nerved, the intervals as wider toward the summit fenestrate-reticulate, the summit crowned with very prominent mammiform tubercles, these somewhat connivent, or at least not at all spreading.

Maritime sand dunes of the shores of the Gulf of California northward, and about the mouth of the Colorado River; collected by Edw. Palmer, in 1865, and again by D. T. MacDougal in 1904; not otherwise known to me.

9. *Wislizenia costellata* Rose sp. nov.

Growing parts minutely and sparsely scaberulous; whole herbage more than usually glaucous, the branches very leafy, somewhat tortuous: leaves and their petioles of about equal length; leaflets cuneate-obovate, obtuse, only 1.5-2 cm. long: racemes sessile, 1-1.5 dm. long: fruit only 3 mm. wide, the carpels at summit almost as thick as long, truncate at both ends, marked longitudinally by 5 or 6 ribs and many intervening closely compacted striae, the main ribs gradually thicker toward the summit where each ends in a stout low tubercle.

Sonora, Mexico, between Nogales and Guaymas, June 4, 1897, J. N. Rose, No. 1294; type specimens in the U. S. National Herbarium. Easily distinct from *W. refracta* by the very short and thick strongly ribbed carpels, which are also truncate at the apex.

10. *Wislizenia mamillata* Rose sp. nov.

Glabrous; leaves on slender petioles nearly as long as the leaflets, the latter also conspicuously petiolulate, the blades narrowly oblong, acutish, 2-3 cm. long: fruiting raceme stout and elongated, 1-2 dm. long, short-peduncled: fruit about 6.5 mm. wide, the carpels shuttle-cock-shaped, coarsely and somewhat turgidly striate, not at all reticulate, somewhat constricted above the base, thence abruptly widening to a broad and strongly mamillate-tuberculate summit.

Guaymas, Sonora, Mexico, June, 1887, Edw. Palmer, No. 74, also by J. N. Rose at the same place, June, 1897, Dr. Palmers' specimens having been distributed for *W. Palmeri*; but in characters of fruit the plant is extremely different from *W. Palmeri*, and even the foliage is all trifoliolate, while in *W. Palmeri* all the leaves are simple, or unifoliolate.