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THLASPI, OREOCARYA, AND ERIGERON

BY

EDWIN BLAKE PAYSON, 1893-

1. The Genus *Thlaspi* in North America

The following revision of the North American species of *Thlaspi* is published in the hope that it may contribute toward a more discriminating knowledge of the plants concerned and that it may serve as a basis for future taxonomic work on the genus. The author has found it very difficult to determine the wisest course to follow in the matter of specific limitations. At one time it seemed best to group all of our plants under a single specific name; at another time it was thought that convenience would be served and a sane specific concept would be maintained if the more distinct units were recognized as worthy of specific rank and only the less aberrant groups were treated as varieties. Because of these difficulties and in the belief that more light would be thrown on the problem by further collections and field observations, very few nomenclatorial changes have been made. A conservative viewpoint has dominated the decisions in regard to what should constitute a species. Units that have been described as species are accepted as such for the present whenever the specimens at hand will at all allow of such an interpretation. It is quite probable that this course has resulted in a specific concept that is too small for convenience but the units recognized are believed to be real genetic groups of taxonomic size and no confusion should result from a desire to upset our present usages as little as possible.

In recent years there has been a conspicuous tendency to include all native American species of *Thlaspi* under *T. alpestre* of central Europe. The author is convinced that this is not a wise solution of our problem. *Thlaspi* is much better developed as to number

¹This publication should be cited as Univ. Wyo. Publ. Bot.

2. Oreocarya

For more than two years the author has been working, as time permitted, on an extensive monograph of *Oreocarya*. This study is not yet even approaching completion. Meanwhile much herbarium material is being borrowed for study and annotation labels with unpublished names are being attached to herbarium sheets. This is unsatisfactory for several reasons and the present opportunity is taken to publish new species and combinations that have been in manuscript for some time.

1. *Oreocarya tumulosa* Payson, new species.¹

Long-lived caespitose perennial from a woody root: stems few to many from a branching caudex, rather stout, 10-25 cm. high, hirsute and densely setose with divaricate bristles: leaves numerous near the base, oblanceolate, obtuse, 3-5 cm. long, blade gradually narrowed into a long, slender, scarcely hirsute petiole, lower leaves conspicuously tomentulose, rather sparsely setose with weak, appressed bristles, on the upper leaves the setae are spreading and somewhat more numerous, pustules conspicuous on both surfaces, slightly more numerous on the dorsal: inflorescence extending over one-half to three-fourths of the stem, floriferous, rather narrow, uninterrupted, upper bracts inconspicuous, reflexed, inflorescence densely setose with yellowish bristles (at least in age): calyx densely divaricate or retrorse-setose, hirsute; sepals in anthesis linear-lanceolate, acute, about 4 mm. long, in fruit 8-10 mm. long, exceeding the nutlets by 4-6 mm.; corolla white, fornice probably yellow; tube 3.5-4 mm. long, equalling or slightly shorter than the sepals; crests at the base of the tube evident but not conspicuous, tube not constricted at the line of crests; fornice conspicuous, inverted v-shaped, about 1 mm. long; limb 7 mm. broad, limb and tube subequal, lobes united for about one-third their length: fruit asymmetrical, 1-2 nutlets only

¹*Oreocarya tumulosa*, spec. nov., perennis caespitosa; caulibus 10-25 cm. altis paucis aut multis erectis hirsutis et setosis; foliis oblanceolatis obtusis 3-5 cm. longis basis in petiolas longas attenuatis tomentulosis et adpresse setosis supra et subter subaequaliter pustulosis, petiolis non ciliatis; thyraxis angustis floriferis hispidissimis non interruptis; sepalis lanceolato-linearibus acutis ca. 4 mm. longis, sepalis fructiferis 8-10 mm. longis, quam nuculae 4-6 mm. longioribus; corolla alba, tubo 3.5-4 mm. longo calycem non superante, limbo ca. 7 mm. lato; stylo nuculas 0.5 mm. superante; nuculis nitidulis ovato-lanceolatis obtusis 4 mm. longis, facie exteriore leviter carinata ambigue tuberculosa et rugosa, faciebus ventralibus fere laevibus aut obscure tuberculosis et rugosis, sulco triangula breve, margine leviter edito. Collected by T. S. Brandegee, Providence Mountains, San Bernardino County, California, May, 1902 (Univ. Calif. Herb. Type).

maturing; style exceeding nutlets by about 0.5 mm.; nutlet margins in contact (when more than one nutlet matures), margin acute, nutlet ovate-lanceolate in outline, obtuse, 4 mm. long, very pale in color, dull or slightly glossy, dorsal surface with a low but evident medial ridge, indefinitely tuberculate and sometimes indistinctly rugose; ventral surface roughened with indefinite tubercles and rugae, scar triangular, open, short, margin only slightly elevated.

Distribution: Upper Sonoran zone on or near the Providence Mountains, San Bernardino County, California.

Specimens examined:

California: Providence Mts., May, 1902, *T. S. Brandegee* (Calif. Type); Barnwell,, May 14, 1911, *K. Brandegee* (Calif., Pomona); east slope of Providence Mts., May 21-24, 1920, *Munz, Johnston and Harwood 4209* (R. Mt., Pomona, Calif.); Ivanpah Mts., San Bernardino County, June 4, 1915, *Parish 10243* (Calif.).

This species, of which four good collections are at hand, has been confused with *O. humilis* and *O. nubigena*. The nutlets are quite different from either of those species and indeed its nearest relationship is with neither of them but rather with *virginensis*, *insolita* or *depressa*. The slightly developed dorsal ridge of the new species is suggestive of *insolita* or *virginensis*. In habit *tumulosa* is similar to *depressa* but resembles *insolita* or *virginensis* not at all. The narrow inflorescence of the new species, as well as its distinctly perennial habit serves to distinguish it at once from *virginensis* with its broad inflorescence and biennial or short-lived perennial habit.

This species, of which four good collections are at hand, has been confused with *O. humilis* and *O. nubigena*. The nutlets are quite different from either of those species. Its nearest relatives are probably *O. virginensis*, *O. insolita* and *O. depressa*. The open inflorescences of the first two serve at once to distinguish the new species from them. *O. depressa* and *O. tumulosa* resemble one another more closely in habit but their nutlets are quite different. The prominent, elevated margin around the scar in *depressa* serves to distinguish it from *tumulosa* where no such margin is evident.

The specific name is given in allusion to the appearance of the dorsal surface of the nutlets. This surface, most difficult of de-

scription, resembles on a miniature scale, an eroded earth surface with low elevations and broad valleys between.

2. *Oreocarya rugulosa* Payson, new species.¹

Short-lived perennial: stems few to many, unbranched above the base, rather slender, 15-30 cm. high, rather sparsely but conspicuously setose: leaves narrowly oblanceolate or spatulate, obtuse, 2-4 cm. long; strigose-canescens and setose, pustulate hairs abundant on both surfaces, slightly more numerous on dorsal, petiole ciliate with long rather weak white hairs: inflorescence mostly confined to the upper one-half or one-fourth of the stem, cymes elongating, foliar bracts inconspicuous, inflorescence densely setose with long, white, slender hairs: calyx subtomentose and abundantly setose: sepals in anthesis lanceolate, acute, 4 mm. long, in fruit linear-lanceolate, 7-8 mm. long, exceeding the nutlets by about 5 mm.: corolla white, fornicis probably yellow; tube 3-4 mm. long, equalling the sepals in anthesis; crests at the base of the tube well developed and conspicuous; fornicis nearly closing the throat, well developed, not over 0.5 mm. long, distinctly papillose; limb about 6 mm. broad, tube and limb subequal or the tube slightly longer, lobes united for one-third their length: fruit ovoid, all four nutlets usually maturing; style exceeding the mature nutlets 1-1.5 mm.; margins of the nutlets in contact, acute; nutlets lanceolate, subacute, 3 mm. long; surfaces somewhat glossy, the dorsal distinctly rugose with rather distant, low rugae, somewhat tuberculate also, ventral surface only slightly uneven; scar straight, extending from near the base almost to the apex, closed above, slightly open near the base, no elevated margin present.

Distribution: Upper Sonoran zone, western Utah.

Specimen examined:

Utah: Fish Springs, June 4, 1891, Jones (R. Mt. Type; Pomona, California.)

¹*Oreocarya rugulosa*, spec. nov., perennis; caulibus aut paucis aut multis 15-30 cm. altis setosis; foliis oblanceolatis aut spathulatis obtusis 2-4 cm. longis strigoso-canescens et setosis, supra et subter subaequaliter pustulosis, petiolatis ciliatis; thyrsis latis albo-setosis sepalis subtomentosis setosis lanceolatis acutis 4 mm. longis, sepalis fructiferis lanceolato-linearibus 7-8 mm. longis quam nuculae ca. 5 mm. longioribus; corolla alba, tubo 3-4 mm. longo calycem non superante, fornicibus papillosis, limbo ca. 6 mm. lato; stylo nuculas 1-1.5 mm. superante; nuculis lanceolatis subacutis 3 mm. longis nitidulis, facie exteriore rugulosa leviter tuberculosa non muricata, faciebus ventralibus fere laevibus, sulco angusto recto, margine non edita. Collected by M. E. Jones, Fish Springs, Utah, June 4, 1891 (R. Mt. Type).

This species is perhaps most closely related to *O. spiculifera* Piper. From that plant it is most easily distinguished by the smoother nutlets that are scarcely roughened at all on the ventral surfaces.

3. *Oreocarya Osterhoutii* Payson, new species¹

Densely caespitose perennial: caudices much branched and clothed with the leaf-bases of previous years; stems slender, 2-6 cm. high, near the base covered with long, white, mostly appressed hairs, strigose and weakly setose upwards: leaves spatulate or oblanceolate, usually obtuse, 1-1.5 cm. long, strigose and appressed-setose on dorsal surface, almost uniformly strigose on ventral surface, pustulate hairs lacking on ventral surface, well developed on dorsal, petioles somewhat ciliate: inflorescence reduced but rather open, on upper three-fourths of the stem, foliar bracts inconspicuous, inflorescence rather softly and shortly setose: calyx strigose-hirsute and sparsely and weakly setose; sepals in anthesis linear-lanceolate, acute, 2-4 mm. long, in fruit 5-6 mm. long, exceeding the mature nutlets by 2-3 mm.; corolla white, probably with yellow fornicies; tube about 3 mm. long, equalling the sepals in anthesis; crests at the base of the tube usually evident, poorly developed; fornicies broad and low (0.5 mm. long), emarginate, distinctly papillose; limb 5-7 mm. broad, tube and limb subequal, lobes united for about one-third their length: fruit broadly ovoid, in the material examined only 1 or 2 nutlets have matured, style exceeding the mature nutlets by about 0.5 mm.; margins of the nutlets usually not in contact, obtuse; nutlets turgid, lanceolate in outline, acute, 3 mm. long, somewhat incurved; surfaces somewhat glossy, the dorsal indefinitely carinate, sharply tuberculate and somewhat rugose, the ventral tuberculate with fewer tubercles; scar open, extending at least one-half the length of the nutlet, evident elevated and tuberculate margin present.

Distribution: Upper Sonoran zone in western Colorado and eastern Utah.

¹*Oreocarya Osterhoutii*, spec. nov., perennis dense caespitosa; caulibus gracilibus 2-6 cm. altis ad basem adpresse albo-pilosis ad apicem strigosis et setulosis; foliis spathulatis aut oblanceolatis obtusis 1-1.5 cm. longis, subter strigosis adpresse setosis pustulosis, supra dense strigosis non pustulosis, petioliis leviter ciliatis; thyrsis parvis sed non congestis setulosis; sepalis lanceolato-linearibus acutis 2-4 mm. longis, sepalis fructiferis 5-6 mm. longis; corolla alba, tubo ca. 3 mm. longo calycem non superquam; limbo 5-7 mm. lato; stylo nuculas 0.5 mm. superante; nuculis turgidis lanceolatis acutis 3 mm. longis nitidulis, facie exteriore leviter carinata tuberculata rugosa, faciebus ventralibus tuberculatis, sulco lato basi, margine edita. Collected by George E. Osterhout, in Monument Park, near Grand Junction, Colorado, June 3, 1921, no. 6133 (R. Mt. Type).

Specimens examined:

Colorado: Monument Park, near Grand Junction, June 3, 1921, *Osterhout 6138* (R. Mt. Type; Colo. State Herb., Osterhout Herb.).

Utah: Courthouse Wash., June 16, 1913, *Jones* (Pomona).

This species is one of the most densely caespitose members of the genus and has unusually short stems. For this reason, and because of its range, it might be confused with *O. nana*. The resemblance, however, is only superficial. Its real relationship is probably with *O. paradoxo*, with which species it has many characteristics in common. The short, uniform corollas serve very definitely to separate *Osterhoutii* from the long flowered, dimorphic *paradoxo*. The nutlets of the two species are similar but easily distinguishable.

The author takes great pleasure in dedicating the species to his friend, Mr. George Osterhout, from whose collections it was first known.

4. *Oreocarya Jonesiana* Payson, new species.¹

Densely caespitose perennial from a woody root: caudex much branched, the branches clothed with the remains of leaves of previous years; stems 6-8 cm. tall, rather slender, sparsely setose and coarsely strigose: basal leaves numerous, thick, spatulate to obovate-spatulate, 1.5-3.5 cm. long, obtuse, blade abruptly or gradually reduced to the slender petiole, cauline leaves few, spatulate, smaller, leaf surfaces appressed setose and coarsely strigose, the petioles not ciliate, pustulate hairs present and conspicuous on both surfaces, somewhat more numerous on dorsal: inflorescence mostly confined to upper half of stem, narrow, cymules nearly sessile, foliar bracts inconspicuous, inflorescence densely and coarsely fulvous-setose: calyx densely setose, sepals in anthesis linear, acute, about 7 mm. long, in fruit about 10 mm. long, exceeding the nutlets 4-5 mm.: corolla probably white with yellow fornicès; tube 13-15 mm. long, 6-8 mm. longer than the sepals, rather conspicuously flaring in the throat; crests at base of tube obsolete; fornicès very broad and low,

¹*Oreocarya Jonesiana*, spec. nov., perennis dense caespitosis; caulibus gracilibus 6-8 cm. longis, sparsim setosis strigosis; foliis radicalibus compluribus crassis spathulatis aut obovatis obtusis 1.5-3.5 cm. longis adpresse setosis et strigosis supra et subter pustulosis basis in petiolas longas abrupte aut molliter attenuatis, petiolis non ciliatis, foliis caulinis paucis spathulatis minoribus; thyrsis angustis fulvo-setosis; sepalis linearibus acutis ca. 7 mm. longis, fructiferis ca. 10 mm. longis quam nuculae 4-5 mm. longioribus; corolla alba, tubo 13-15 mm. longo, quam sepala 6-8 mm. longiore, limbo 10-12 mm. lato; stylo nuculas 4-5 mm. superante; nuculis lanceolatis acutis aut obtusis ca. 4 mm. longis dense muricatis interdum leviter rugosis, sulco recto angusto lato basi, margine non edita. Collected by M. E. Jones, San Rafael Swell, Utah, May 15, 1914 (Pomona, Type).

spreading, not over one-third as long as the tube, united for about one-fourth their length: fruit lance-ovoid, apparently only 2-3 nutlets usually maturing; style exceeding the mature nutlets 4-5 mm. (species apparently only slightly heterostyled); margins of the nutlets in contact, acute, apices scarcely spreading; nutlets lanceolate in outline, obtuse or acute, about 4 mm. long; surfaces dull, the dorsal muricate and sometimes distinctly rugose due to the confluence of the murications, slightly keeled, the elevations usually acute and often tipped with a distinct but short seta (and so reminiscent of *O. echinoides*), ventral surface similar to the dorsal but elevations somewhat fewer and lower; scar narrow, straight, open, extending from base four-fifths of distance to apex, no elevated margin.

Distribution: Upper Sonoran zone in south central Utah.

Specimens examined:

Utah: San Rafael Swell, May 15, 1914, Jones (Pomona, Type); San Rafael Swell, May 19, 1914, Jones (Pomona).

O. Jonesiana is closely allied to *O. fulvocanescens* (Gray) Greene. From that species it may be separated by the more densely caespitose habit, the lower stems, harsher pubescence, less conspicuously dimorphic flowers, and the slightly rugose nutlets with a much longer scar than in *fulvocanescens*.

It is a real pleasure for the author to name this species in honor of Professor Marcus E. Jones, who alone seems to have collected it. Mr. Jones has made more valuable collections in this genus than any other person and has described no less than eight species and varieties in the group. It is quite fitting, therefore, that his name should be definitely associated with a very interesting and attractive plant from the very heart of the region he has done so much to explore.

5. *Oreocarya breviflora* Osterhout, new species.¹

Long-lived perennial from a woody root: stems rather slender, solitary (in the material at hand), 15-25 cm. high, white-hairy at the base with long, straight, appressed trichomes, strigose upwards and

¹*Oreocarya breviflora* Osterhout, spec. nov., perennis; caulibus 15-25 cm. alta, ad basem albo-pilosis, ad apicem strigosis et hirsutis; foliis oblanceolatis aut spatulatis obtusis 2.5-5 cm. longis, aequaliter sericeo-strigosis, subter pustulosis, supra non pustulosis aut minute pustulosis, thyraxis angustis non interruptis setosa-hispidis; sepalis linearibus acutis 4-5 mm. longis sepalis fructiferis 8-10 mm. longis, quam nuculae ca. 4 mm. longioribus carolla alba, fornicibus flavis, tubo 3-4 mm. longo calycem leviter superante, limbo 7-9 mm. lato; stylo nuculas 0.5 mm. superante; nuculis lanceolatis acutis aut obtusis 4 mm. longis non nitidis, muriculatis, sulco triangulo margine non edita. Collected by George E. Osterhout 6½ miles north of Jensen, Utah, June 19, 1925, no. 6414 (R. Mt. Type; Osterhout Herb.).

hirsute near the inflorescence: leaves conspicuously clustered near the base, oblanceolate or spatulate, obtuse, 2.5-5 cm. long, uniformly silky strigose, pustulate hairs scarcely distinguishable from the others and difficult of observation in dried material, pustules very numerous on dorsal surface, few and small on ventral surface: inflorescence rather narrow, nearly continuous, on upper one-half or three-fourths of stem, foliar bracts small, inconspicuous, inflorescence setose-hispid with divaricate bristles that (sometimes at least) become yellowish in age: calyx setose, sepals in anthesis linear or nearly so, acute, 4-5 mm. long, in fruit 8-10 mm. long, exceeding the nutlets by about 4 mm., corolla white with yellow fornices, tube 3-4 mm. long, slightly shorter than the sepals; crests evident at the base of the tube; fornices small, rounded, nearly closing the throat, 1 mm. or less long; limb 7-9 mm. in diameter, broad, limb and tube subequal, lobes united for about one-third their length: fruit ovoid, usually less than 4 nutlets maturing; style very slightly (0.5 mm.) exceeding the mature nutlets; margins of the nutlets in contact (when more than 1 nutlet matures), apices somewhat spreading, margins acute; nutlets lanceolate in outline, acute or obtuse, 4 mm. long, surfaces dull, the dorsal uniformly muriculate, very slightly keeled, the ventral similar, scar open, triangular, extending from the base to near the middle of the nutlet, margin not elevated.

Distribution: northeastern Utah, probably in the upper part of of the Upper Sonoran zone.

Specimens examined:

Utah: 6½ miles north of Jensen, June 19, 1925, *Osterhout 6414* (R. Mt. Type); Ft. Duchesne, May 22, 1908, *Jones* (Pomona).

O. breviflora is most closely related to *O. fulvocanescens* but may be at once separated from it by the short corolla tubes which do not exceed the sepals. *O. fulvocanescens* occurs farther south than does the new species, has conspicuously dimorphic flowers while the new species has uniform flowers. The fornices in the new species are small and tend to close the throat of the corolla tube; in *fulvocanescens* they are long and erect.

6. *Oreocarya suffruticosa* (Torr.) Greene, Pittonia 1: 57. 1887.

After studying a large series of specimens of this species it seems certain that Macbride (Contr. Gray Herb. 48: 33-34. 1916) did not go far enough in reducing proposed species in this group. The present author believes that only one species can be maintained because of the intermediate forms that occur in great numbers. The classification of this polymorphic species is outlined below.

6a. var. *typica*.

Myosotis suffruticosa Torr. Ann. Lyc. N. Y. 2: 225. 1827.

Eritrichium Jamesii Torr. in Marcy, Expl. Red River 262. 1854.

Krynitzkia Jamesii (Torr.) Gray, Proc. Am. Acad. 20: 278. 1885.

6b. var. *multicaulis* (Torr.) Payson, new status.

Eritrichium multicaule Torr. in Marcy, Expl. Red River 262.

1854.

Oreocarya multicaulis (Torr.) Greene, Pittonia 3: 114. 1896.

6c. var. *cinerea* (Greene) Payson, new status.

Oreocarya cinerea Greene, Pittonia 3: 113. 1896.

O. multicaulis var. *cinerea* (Greene) Macbr. Proc. Am. Acad.

51: 546. 1916.

6d. var. *abortiva* (Greene) Macbr. Proc. Am. Acad. 51: 547.

1916.

Oreocarya abortiva Greene, Pittonia 3: 114. 1896.

7. *Oreocarya mensana* (Jones) Payson, new transfer.

Krynitzkia mensana Jones, Contr. West. Bot. 13: 4. 1910.

After studying the type of this species the author is convinced that it is deserving of specific recognition.