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HIGH-ELEVATION *DRABA* (CRUCIFERAE) OF THE
WHITE MOUNTAINS OF CALIFORNIA AND NEVADA

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ABSTRACT

Accurate identification of the species of *Draba* at high elevations in the White Mountains of eastern California and adjacent Nevada has been impossible because of frequent misinterpretations in the literature and the lack of a coherent source of information. A preliminary investigation of newly collected material suggested that several species of *Draba*, endemic or nearly so to these mountains, had not been recognized. Descriptions and relevant comparisons are given for a new combination, *D. californica*, and two new species, *D. monoensis* and *D. subumbellata*. Specimen citations for all taxa of *Draba* occurring at high elevations, roughly above 3000 m, are provided as a basis for our taxonomic decisions and to aid others in the interpretation of the taxonomy of the genus as it occurs in the White Mountains.

Key words: Cruciferae, *Draba*, California, White Mountains.

INTRODUCTION

The number of *Draba* taxa in the higher reaches of the White Mountains is not unusual when compared to many other mountain ranges of similar size in western North America. What is unusual is the number of taxa that have heretofore been unrecognized or undescribed. When working on the White Mountain *Draba* collections of Victor Duran in 1966, one of us (Rollins) separated from a mixture that included *D. oligosperma* Hook., a species thought to be undescribed. But the material was only in flower and not suitable for making a definitive identification. More recently, a substantial number of new collections have been made from the White Mountain area. These have helped to clarify identities of the taxa previously reported to occur there and have brought to light two new species and the need to elevate a variety to the rank of species. Aside from the endemics present, some of the interest in White Mountain *Draba* lies in the absence of a number of taxa that on geographic grounds would be expected to be there: for example, the Sierra Nevada species *D. lemmonii* S. Wats. and *D. sierrae* Sharsmith, the latter sometimes attributed to the White Mountains on the basis of misidentified specimens. Why is *D. breweri* there and not these two species?

Previous identifications of *Draba* from the White Mountains have often been very misleading. As an example, Hitchcock (1941), although he had not seen the

type, placed *D. cuneifolia* Nutt. var. *californica* Jeps. in synonymy under *D. reptans* (Lam.) Fern. var. *stellifera* (Schulz) C. L. Hitchc., a taxon with which it has very little in common. Misapplications of other names have stemmed largely from the fact that the literature simply did not supply the needed information and names to accommodate the plants of *Draba* growing at high elevations in the White Mountains. Our account seeks to provide a remedy.

We have purposely not included the low-elevation annual taxa because there is no particular taxonomic problem concerning them and they will be treated in more detail in later publications.

TAXONOMY

KEY TO THE SPECIES

- A. Siliques ovate to broadly elliptical, less than twice as long as broad; plants pulvinate and flowering stems leafless except in *D. monoensis* B
- B. Petals yellow; ovules six or fewer per locule; plants pulvinate with closely packed caudex branches each with densely imbricated leaves; flowering stems leafless; trichomes simple or highly branched C
- C. Leaves prominently ciliate with long simple trichomes, upper and lower surfaces usually glabrous 5. *D. densifolia*
- C. Leaves not prominently ciliate with long simple trichomes, surfaces (especially lower) with many-branched trichomes D
- D. Leaves sparsely to densely covered below with mostly pectinately branched trichomes that are usually appressed; fruits and stems sparsely pubescent with simple, branched, or sometimes pectinate trichomes or glabrous; infructescences usually elongated 6. *D. oligosperma*
- D. Leaves, stems, and fruits densely covered with a tangle of dendritically branched nonappressed trichomes; infructescences subumbellate or slightly elongated 7. *D. subumbellata*
- B. Petals white; ovules six or more per locule; plants not pulvinate (basal leaves only loosely imbricated near the flowering stems); cauline leaves usually present; trichomes simple or forked, rarely with a few branches 4. *D. monoensis*
- A. Siliques oblong to lanceolate, more than two times as long as broad; plants not pulvinate; flowering stems usually with several leaves (sometimes leafless in small individuals) E
- E. Styles evident, more than 0.1 mm; infructescences dense; pedicels stout, divaricately ascending to erect; petals white F
- F. Leaves and lower stems densely pubescent with minute dendritic trichomes, whitish gray; mature siliques densely stellate-pubescent, usually twisted; cauline leaves oblong, entire 1. *D. breweri*
- F. Leaves and lower stems pubescent with coarse four- to seven-rayed stellate trichomes, grayish green; mature siliques sparsely pubescent with simple and forked trichomes or glabrous, usually plane; cauline leaves ovate to broadly oblong, often dentate 2. *D. californica*
- E. Styles very short (0.1 mm or less); infructescences lax; pedicels slender, widely spreading to somewhat ascending; petals yellow 3. *D. albertina*

1. *DRABA BREWERI* S. Wats., Proc. Amer. Acad. Arts 23:260. 1888.

White Mountain specimens.—CALIFORNIA. Mono Co.: summit, 13,000 ft, Jul 1886, *Shockley 439* (GH); White Mt. road and surrounding fellfield, just above Barcroft Lab., 12,400 ft, 13 Jul 1985, *Price 818a* (GH); N fork of Perry Aiken Creek, ca. 1 mi ENE of White Mt. Peak summit, T3S, R34E, Sect. 32, S-facing talus wall of cirque, *Morefield & Ross 4707* (Morefield, RSA).

The Shockley collection was part of the material used by Watson to found *Draba breweri*, but it is not the type.

2. *Draba californica* (Jepson) Rollins & Price, comb. nov.

Fig. 1a-e, 2

Draba cuneifolia Nutt. var. *californica* Jepson, Man. Fl. Pl. Calif., p. 443. 1925 (basonym). Type. — UNITED STATES. CALIFORNIA: Mono Co., N fork Crooked Creek, 10,200 ft., 24 Jul 1917, *Jepson 7261* (holotype: JEPS!, photo GH!; isotype: JEPS!).

Perennial, caudex simple or closely branched; stems usually several to many, erect, simple or rarely with a branch or two, 4–12 cm tall, densely pubescent throughout with mostly dendritic trichomes, leafless or usually with 1–3 leaves; basal leaves ample, erect, entire or nearly so, cuneate or with a short petiole, 1–2(–5) cm long, 3–5(–10) mm wide, pubescent on lower surfaces and margins with 4–8 rayed stellate trichomes, upper surfaces with stellate trichomes or a mixture including a few simple and forked ones, a few simple trichomes sometimes present in petiolar area; cauline leaves when present ovate to oblong, entire to obscurely dentate; sepals broadly oblong, nonsaccate, ca. 2 mm long, scarious margined; petals white, spatulate, ca. 3 mm long; infructescences elongated, occupying more than half of the fertile stems; pedicels divaricately ascending, densely pubescent, lower shorter than siliques, 2–6(–8) mm long; siliques narrowly elliptical, tapered both above and below, 5–8(–12) mm long, 2–2.5 mm wide, pubescent with mostly once-forked trichomes, often with recurved tips, or glabrous; styles less than 0.5 mm long; seeds ca. 20 per silique, 0.8–1.2 mm long, usually apiculate.

Representative collections. — CALIFORNIA. Mono Co.: slope W of White Mt. road, opposite Patriarch Grove, amid dolomite boulders, 26 Aug 1985, *Price 849* (GH, UC); vicinity of Barcroft Lab. in area of White Mt. road, fellfield and amid rocks, 5 Sep 1982, *Price 593* (GH, UC); same locality, 27 Aug 1985, *Price 853* (GH, UC); same locality, 13 Jul 1985, *Price 818* (GH, UC); same locality, 24 Jul 1960, *DeDecker 1258* (GH); same locality, 12 Aug 1951, *Tucker 2263* (UC); same locality, 30 Jul 1961, *Bacigalupi et al. 8122* (JEPS); rocky, dry plateau on road to White Mt. Peak, 13,100 ft, 7 Jul 1958, *Pawek 58-19* (UC); E slope Mt. Barcroft, 11 Jul 1985, *Price 812* (UC); meadow of alpine fellfields, McAfee Meadow, 15 Aug 1963, *Lloyd 3304* (GH, RSA, UC); same locality, 26 Jul 1930, *Duran 2820* (GH, UC); same locality, 10 Aug 1951, *J. & L. Roos 5136* (GH); alpine fellfields, below Barcroft Lab., NE of Piute Mt., 13 Aug 1963, *Lloyd 3290* (GH, UC); Campito sandstone, E of Sheep Mt. Peak, 12,000 ft, 8-9-61, *Mooney et al. 580* (DS); Sheep Mt., 12,000 ft, 27 Jul 1917, *Jepson 7322* (JEPS); about spring, head of Crooked Creek, 7 Aug 1945, *Maguire & Holmgren 26142* (GH, RSA, UC); streambank, vicinity of Crooked Creek Research Station, 10,200 ft, 28 Jun 1958, *Tucker 3425* (RSA, UC); grassy meadow, Pellisier Flats, 20 Jul 1964, *Mitchell 2207* (GH, UC).

Specimens of *Draba californica* have most often been determined as *D. breweri*, but some were also treated under *D. crassifolia* Grah. var. *nevadensis* C. L. Hitchc. in Lloyd and Mitchell (1973). Jepson (loc. cit.) assigned the earliest material collected to the quite unrelated annual species *D. cuneifolia* as var. *californica*. Hitchcock (1941) placed this name in synonymy under *D. reptans* without having seen the type, and the name was then ignored until Hartman, Bacon, and Bonstedt (1975) noted that it represented a misplaced perennial taxon in need of further study.

The species is abundant and widespread in the White Mountains, but we have not seen it from elsewhere. It appears to be most similar to *D. breweri* and *D. praealta* E. L. Greene. Besides the items emphasized in the key above, it should be pointed out that *D. californica* has longer and more spreading pedicels (the lower 3–6 mm long) than *D. breweri*, where they are <3 mm and tend to be strictly erect. Both species have dense elongated infructescences and in this respect differ from all other species of *Draba* in the White Mountains.

There is some evidence that hybridization between *Draba breweri* and *D. cal-*

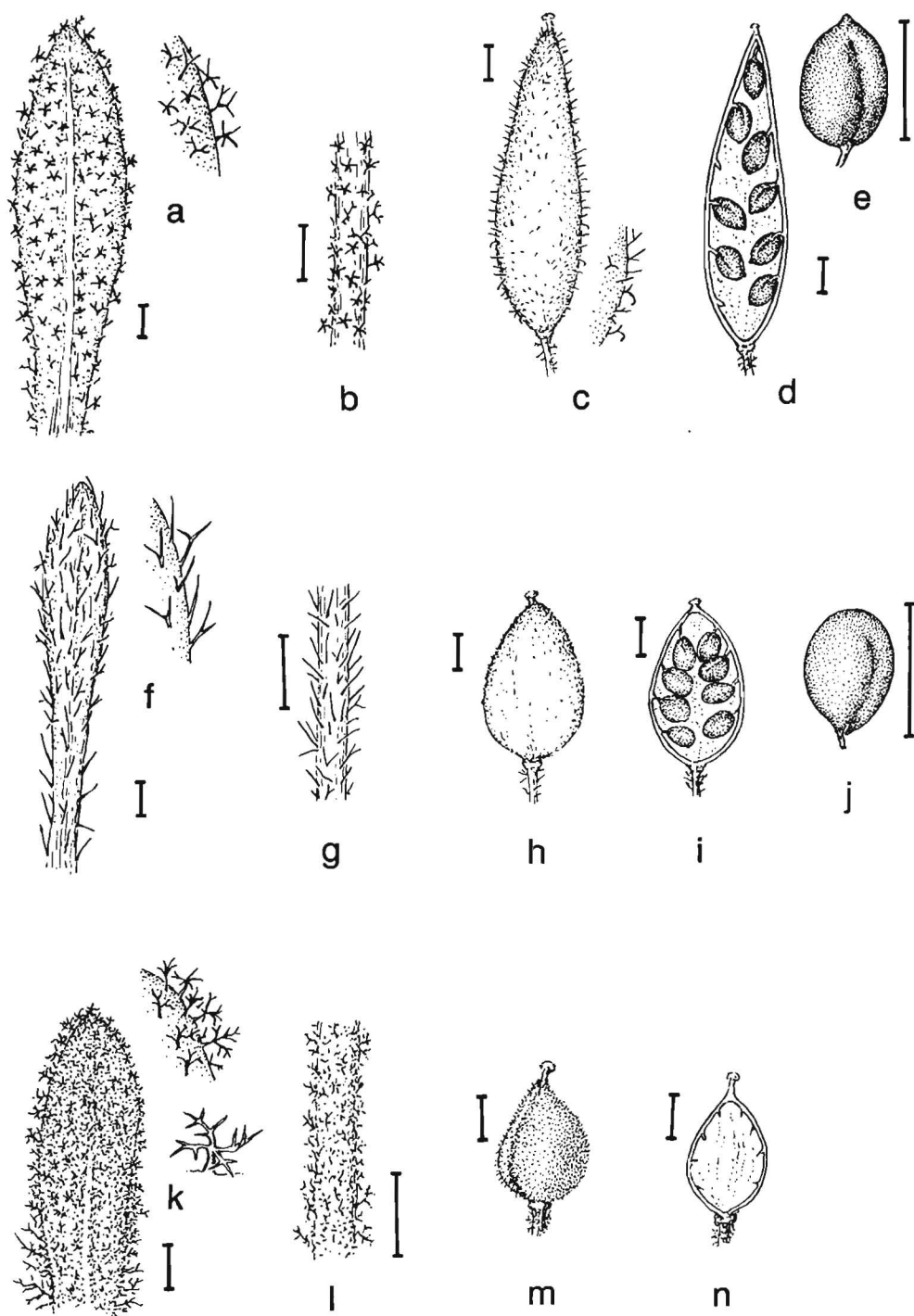


Fig. 1. a-e. *Draba californica* (Price 835).—a. Abaxial surface of basal leaf.—b. Lower portion of flowering stem.—c. Fruit.—d. Dehiscent fruit.—e. Seed, showing apiculate tip.—f-j. *Draba monoensis* (Price 854).—f. Abaxial surface of basal leaf.—g. Lower portion of flowering stem.—h. Fruit.—i. Dehiscent fruit.—j. Seed.—k-n. *Draba subumbellata* (Price 851)—k. Abaxial surface of basal leaf.—l. Lower portion of flowering stem.—m. Fruit.—n. Dehiscent fruit without seeds. (Scale bars = 1 mm.)

ifornica occurs in limited areas. The trichomes on individuals putatively of hybrid origin are somewhat intermediate between those of the two species.

Draba californica has many features in common with *D. praealta*, a species common in the northern Rocky Mountains, north to the Yukon and Alaska, and less common through Washington and Oregon to California. As expected over such a wide geographic area, there is considerable variation in *D. praealta*. This species, as it occurs in California, trends in a direction that brings it closer to *D. californica* than other phases from elsewhere. In the following comparison, California material, in particular, is taken into account. *Draba californica* is low growing (4–12 cm), caespitose, and usually has numerous slender stems with dense fruiting racemes that occupy over half the total stem length, whereas *D. praealta* has only one or a few stems that range from 1.5 to 4 dm tall, with a lax fruiting raceme occupying approximately the upper third of the stem. In the latter, the cauline leaves are remote along the stems, with the upper leaves subtending branches, while in *D. californica* the cauline leaves are overlapping and concentrated near the mostly unbranched stem bases. Flowers, or their persisting parts, extend down the raceme for as much as 2 cm in *D. californica*, while flowers at anthesis are found only at the apex of the raceme in *D. praealta*, and the sepals and petals do not persist. Trichomes in the two species are fairly similar, both as to type and to distribution on the plants, but there are usually more large simple trichomes, along with the smaller stellate or dendritic ones, on the stems and basal portions of the leaves in *D. praealta* than in *D. californica*.

3. DRABA ALBERTINA Greene, Pittonia 4:312. 1901.

Draba stenoloba Ledeb. var. *nana* (Schulz) C. L. Hitchc, Univ. Wash. Publ. Biol. 11:100. 1941.

Draba crassifolia Grah. var. *albertina* (Greene) Schulz, Pflanzenr. IV-105:327. 1927.

White Mountain specimens.—CALIFORNIA. Mono Co.: sandy spots near stream in dampish open areas, McAfee Meadow, ca. 11,500 ft, 26 Jul 1930, *Duran 2819* (GH, UC); same locality, 10 Aug 1951, *J. & L. Roos 5136* in part, [mixed with *D. californica*] (GH); White Mts., 12,500–13,000 ft, 22 Jul 1886, *Shockley 446* (JEPS); along streamside in meadow approaching the gate below the Barcroft Lab., 5 Sep 1972, *Price 595* (UC); Campito Meadow, 10,800 ft, 27 Jul 1917, *Jepson 7333* (JEPS); meadow ca. 150 m N of main building at Crooked Creek Lab., 10,140 ft, 17 Jun 1963, *Lloyd 2634* (UC); seep on SW spur of hill 11513 on Montgomery-Marble Creek divide 2.4 mi S, 44 deg W of Montgomery Peak, 11,200 ft, 14 Jul 1986, *J. D. Morefield et al. 4128* (GH, Morefield, RSA); Tres Plumas Meadow 1.2 mi S, 30 deg E of bench mark 11107, *Morefield 2266* (Morefield); 1.8 mi S, 25 deg E of Mt. Barcroft summit near gate to the Nello Pace Lab., 11,650 ft, 8 Jul 1984, *Morefield 2314* (Morefield, RSA); headwaters of easternmost branch of southern fork of upper Middle Creek (T2S, R33E, Sect. 4), 11,200 ft, 23 Aug 1986, *Taylor 8855* (RSA).

Plants of *Draba albertina* from upper elevations in the White Mountains are reduced in size and tend to be similar in habit and fruit length to *D. crassifolia*, which is not known from the White Mountains and is only doubtfully recorded from the state of California. Collections from lower altitudes in the White Mountains (e.g., *Lloyd 2634*) are more typical of *D. albertina* in having more elongated flowering stems with well-developed cauline leaves. *Draba albertina* has previously been placed under either *D. crassifolia* or *D. stenoloba*, but Mulligan (1975) has shown that the latter two species (both with $2n = 40$) and *D. albertina* ($2n = 24$) show consistent differences in their trichome types and produce only infertile hybrids when they are crossed. *Draba albertina* has simple and bifid trichomes on its stems and adaxial leaf surfaces and cruciform and forked trichomes on its

abaxial leaf surfaces. *Draba crassifolia* has only sparse simple to forked hairs on its leaves and lower stems, while the Canadian *D. stenoloba* has cruciform trichomes present on the lower stem and both the adaxial and abaxial leaf surfaces.

4. *Draba monoensis* Rollins & Price, sp. nov.

Fig. 1f-j, 3

Herba perennis humilis caespitosa, caulibus simplicibus tenuis pubescentibus 1–4 cm altis, foliis caulinis integris 1–2 vel nullis, foliis basalibus congestis erectis petiolatis oblanceolatis acutis pubescentibus 6–15(–20) mm longis, 2–4 mm latis, inflorescentiis congestis, floribus infernis saepe bracteatis, sepalis late oblongis nonsaccatis ca. 1.5 mm longis, ca. 1 mm latis, petalis albis late spathulatis ca. 2–3 mm longis, infructescentiis subumbellatis congestis, siliquis ovatis pubescentibus vel glabris 3–4(–5) mm longis, stylis <0.3 mm longis, seminibus oblongis noncompressis 0.6–0.8 mm longis, cotyledonibus accumbentibus.

Low perennial; caudices simple or closely branched, tufted; flowering stems several to numerous, simple, slender, 1–4 cm tall, sometimes barely emergent from the leaf-cluster, densely to sparsely pubescent with coarse simple or once-forked stalked trichomes (rarely glabrous), leafless or more often with one or two cauline leaves, the upper often subtending the lowest flower; basal leaves erect, petiolate, oblanceolate, entire or rarely with one or two teeth, acute, 6–15(–20) mm long, 2–4 mm wide, pubescent below with coarse mostly stalked once-forked trichomes, pubescent above and margined with mostly simple trichomes, rarely nearly glabrous; cauline leaves (when present) sessile, ovate to oblong, usually pubescent; inflorescences congested; lower flowers usually bracteate; sepals nonsaccate, broadly oblong, ca. 1.5 mm long, ca. 1 mm wide, usually with a few large simple trichomes toward outer tip; petals white, broadly spatulate, entire or slightly emarginate, ca. 2–3 mm long, ca. 1 mm wide; stamens nearly equal, anthers small, less than 0.2 mm long; infructescences subumbellate; pedicels crowded, thick, mostly less than 2 mm long, densely pubescent to nearly glabrous; siliques ovate, usually crowded, 3–4(–5) mm long, ca. 2 mm wide, somewhat inflated, sparsely pubescent with short simple trichomes to glabrous; styles stout, short, less than 0.3 mm long; seeds 6–10 per locule, oblong, plump, 0.6–0.8 mm long; cotyledons accumbent.

Type. — UNITED STATES. CALIFORNIA: Mono Co., gravelly area cut from meadow along White Mt. road, beginning of saddle before ascent to the summit, elev. ca. 13,000 ft, 12 Jul 1985, *Robert A. Price 815*; (holotype: GH; isotype: UC).

Other collections. — CALIFORNIA. Mono Co.: in middle of White Mt. road in late snow melt area, saddle before ascent to summit, 12 Jul 1985, *Price 817* (GH, UC); same general area, 13,000 ft, 10 Jul 1986, *Morefield 4083* (GH, RSA); behind rocks in fellfield area, E-facing slope of Mt. Barcroft near White Mt. road, 11 July 1985, *Price 810* (GH, UC); open gravelly area amid rocks, along White Mt. road just before saddle, 27 Aug 1985, *Price 854* (GH, UC); common along road to Barcroft Lab., McAfee Meadow, 15 Aug 1963, *Lloyd 3306* (GH, UC); under rocks in meadow, road to White Mt. Peak above Barcroft Lab., 10 Aug 1963, *Lloyd 3255* (GH); same locality and date, *Lloyd 3244* (UC).

In the past, such material as was available of this species from the White Mountains was referred to *Draba fladnizensis* Wulf. One of us (Rollins) determined specimens as that species, which were reported as such by Lloyd and Mitchell (1973). However, as we interpret *D. fladnizensis*, the typical phase is circumpolar in the arctic and subarctic, and in North America, a separate infraspecific taxon extends from northern Wyoming to southeastern Utah, occurring most frequently in the high mountains of Colorado. Our species differs most conspicuously from

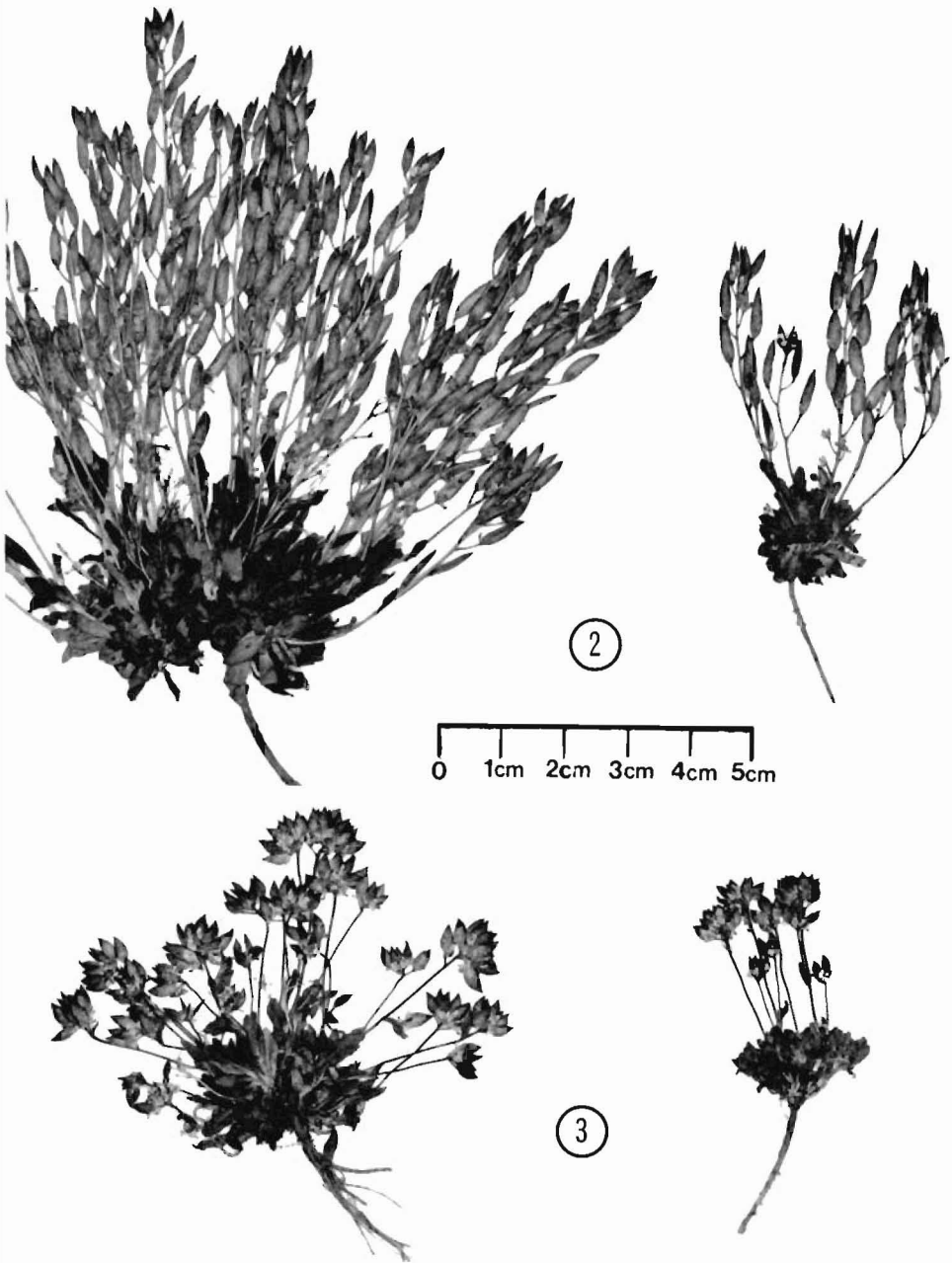


Fig. 2-3.—2. *Draba californica* (Price 813). Habit.—3. *D. monoensis* (Price 815). Habit.

D. fladnizensis by having crowded subumbellate infructescences rather than having them looser and somewhat elongated. But more fundamental is the inflated nature of the siliques due to the fully packed plump seeds in *D. monoensis* as compared to the flatter fruits and loosely spread, more compressed seeds in *D.*

fladnizensis. In general, the siliques of *D. fladnizensis* are more oblong than ovate although some exceptional plants show narrowly ovate siliques, but in *D. monoensis* the siliques are consistently ovate to broadly ovate. As expected, the amount of pubescence is inconsistent in both species; *D. monoensis* is nearly always rather densely pubescent, including the pedicels and sepals, while *D. fladnizensis* is sparsely pubescent at best and usually has the mostly simple trichomes confined to the leaf margins and lower stems. These leaf-margin trichomes are quite stiff and ciliate as a rule in contrast to those of *D. monoensis* where the marginal trichomes blend with those of the leaf surfaces and are not distinctive in themselves.

Draba monoensis shows the same kinds of variation that characterize other high-elevation species of *Draba* such as *D. oligosperma*. Variation in habit, where the plants are extremely condensed with short fertile stems or more lax with well-exserted fertile stems, is definitely associated with the type of site involved. The condensed habit is seen in the open windswept sites and the lax type in more protected places. Another variation, that of pubescent vs. glabrous upper stems and pedicels, is not correlated with site. The populations have a mixture of individuals. For example, in *Lloyd 3306* cited above, of 18 plants available for study, 11 were densely pubescent and seven were glabrous to very sparsely pubescent.

5. DRABA DENSIFOLIA Nutt. ex Torrey & Gray, Fl. N. Amer. 1:104. 1838.

For a list of synonyms see Hitchcock (1941). These are all based on collections made outside of California.

White Mountain specimens.—CALIFORNIA. Mono Co.: Indian Creek, scree in sun, widespread and common, 11,000 ft., 25 Jun 1965, *Lankester 84B* (UC); S saddle of hill 11513 on Montgomery-Marble Creek divide, 2.5 mi S, 43 deg W of Montgomery Peak, 11,200 ft, common matted perennials with yellow petals, 14 Jul 1986, *Morefield et al. 4129.0* (Morefield, RSA); N-facing wall of the cirque of the N fork of Perry Aiken Creek, ca. 1.5 mi ENE of White Mt. Peak summit, T3S, R34E, Sect. 33, 26 Jul 1987, *Morefield & Ross 4716* (Morefield, RSA).—NEVADA. Esmeralda Co.: SW spur of Mustang Mountain between Horseshoe Rock and Kennedy Pt., rhyolitic gravel, 10,200 ft, 5 Jul 1986, *Morefield & McCarty 4046.1* (Morefield, RSA); Mustang Peak, 5 Aug 1937, *Roos 1041* (RSA).

This species was not reported by Lloyd and Mitchell (1973), but was to be expected in the White Mountains as it occurs frequently in the Sierra Nevada and Sweetwater Mountains. It has recently also been reported from Pellisier Flats (Mono Co., California) and Boundary Peak (Esmeralda Co., Nevada) in the White Mountains by Morefield, Spira, Pinzl, Dedecker, and Taylor (1983). It has not been seen in the area from White Mt. Peak southward, but could be overlooked because of its similarity in habit to *D. oligosperma*. The latter and *D. densifolia* are often found growing together. The two species are readily distinguished as *D. densifolia* has stiffly ciliate leaves with few or no trichomes on the surfaces, while *D. oligosperma* has doubly pectinate trichomes on the leaf surfaces and lacks prominent simple cilia.

6. DRABA OLIGOSPERMA Hook., Fl. Bor. Amer. 1:51. 1833.

Draba subsessilis S. Wats., Proc. Amer. Acad. Arts 23:255. 1883.

Draba oligosperma Hook. var. *Subsessilis* (S. Wats.) Schulz, Pflanzenr. IV-105:100. 1927.

Representative White Mountain specimens.—CALIFORNIA. Mono Co.: White Mts., without further locality, 22 Jul 1886, *W. H. Shockley 455* (holotype of *D. subsessilis*, GH; isotypes, JEPS, UC); vicinity

of White Mt. road near Barcroft Lab., fellfield and amid rocks, ca. 12,400 ft, 5 Sep 1982, *Price 592* (GH, UC); loose stony E slopes of White Mt. Peak, 13,000–14,230 ft, 5 Aug 1945, *Maguire & Holmgren 26077* (DS, GH, UC); E slope of White Mt. Peak, rocky shale soil, fellfield, ca. 13,500 ft, 15 Jul 1960 *Blakley & Muller 3712* (CAS, JEPS); hillsides and flats in drained open area, flats near White Mt. Peak, ca. 13,500 ft, 26 Jul 1930, *Duran 2821* (GH, UC); White Mt. Peak, metavolcanics, 13,700 ft, 8-8-61, *Mooney et al. 554* (DS); White Mt. Peak, granite, 13,800 ft, 7-30-61, *Mooney et al. 496* (DS); road to White Mt. Peak, alpine fellfields, 13,950 ft, 10 Aug 1963, *Lloyd 3242* (UC); E slope Mt. Barcroft, 11 Jul 1985, *Price 811* (GH, UC); 1 mi below gate to Barcroft Lab. along White Mt. Rd., 26 Aug 1985, *Price 844* (UC); hillside opposite Patriarch Grove, 26 Aug 1985, *Price 850* (UC); high rocky slope, Sheep Mt., 12,300 ft, 27 Jul 1917, *Jepson 7312* (JEPS); alpine meadow, on dolomite, S of Sheep Mt., 11,800 ft, 8-9-61, *Mooney et al. 571* (DS); dry flats in open, Cottonwood Creek, 11,000 ft, 28 Jun 1926, *Duran 1631* (UC); E of Campito Meadow on dolomite, 10,600 ft, 7-21-61, *Mooney et al. 474* (DS); rocky slope near old Indian cave by Crooked Creek, dolomitic soil, 9800 ft, 10 Jul 1963, *Mitchell & Lloyd 1708* (RSA, UC); marble, on hill W of Crooked Creek station, ca. 10,250 ft, 29 Jul 1961, *Bacigalupi & Hutchinson 8061* (JEPS); Crooked Creek Canyon at cave, ca. 1 mi E of Crooked Creek Lab., 9900 ft, 28 Jun 1963, *Lloyd 2887* (GH, UC).

Draba oligosperma occurs in abundance on a variety of substrates at upper elevations (3000 m and above) in the White Mountains. The collections referred to *D. sierrae* in Lloyd and Mitchell (1973) are all *D. oligosperma*, while actual *D. sierrae* is restricted to the southeastern Sierra Nevada. *Draba sierrae* differs from *D. oligosperma* in having a more uniformly distributed pubescence of dendritic rather than appressed pectinate trichomes and in having contorted fruits. The contrast in type of pubescence is most marked on the stems and pedicels, which have numerous dendritic trichomes in *D. sierrae* and few (or no) simple to pectinate trichomes in *D. oligosperma*. The fruits of *D. sierrae* are evenly pubescent with small cruciform or stellate trichomes, while those of *D. oligosperma* tend to have coarser simple or pectinate trichomes.

Plants of *D. oligosperma* in shaded, protected, or otherwise favorable places tend to have a lax growth form and well-separated trichomes, while those in open, windswept areas with a high desiccation factor tend to be compact and densely covered with trichomes, giving a whitish gray appearance to the leaves. The type of *D. subsessilis* is of the condensed type, which is found more or less throughout the range of the species in appropriate sites. The distinctive pectinate trichomes characteristic of *D. oligosperma* are present on plants of the type of *D. subsessilis* and there are no features of these plants that provide a sound basis for recognizing them as a distinct taxon.

7. *Draba subumbellata* Rollins & Price, sp. nov.

Fig. 1k–n, 4

Herba perennis pulvinatis, caudicibus ramosis congestis, ramis foliis dense imbricatis columniformes, foliis integris late oblongis vel obovatis 2–4(–8) mm longis, 1.2–2.5 mm latis dense pubescentibus, trichomatibus dendriticis, caulibus floribus scapiformibus tenuis dense pubescentibus 0.5–2 cm altis, sepalis oblongis nonsaccatis 2–3 mm longis, petalis luteis spathulatis, pedicellis fructiferis divaricatis 1–3 mm longis, siliquis ovatis dense pubescentibus 2–5 mm longis, stylis 0.2–0.7 mm longis, loculis ca. 4-ovulatis, seminibus late oblongis ca. 1.2–1.5 × 1 mm.

Perennial, pulvinate, scapose; caudex branches elongated, densely imbricated with old leaves, terminated by small densely imbricated gray to whitish leaves; leaves entire, blunt, broadly oblong to obovate, scarcely tapered below, 2–4(–8) mm long, 1.2–2.5 mm wide, thick, densely covered with dendritically branched long-rayed trichomes, especially on the under surfaces and margins; flowering stems simple, slender, 0.5–2 cm tall, densely pubescent with dendritic trichomes; inflorescences 2–5(–10) flowered; sepals nonsaccate, oblong, yellowish, sparsely

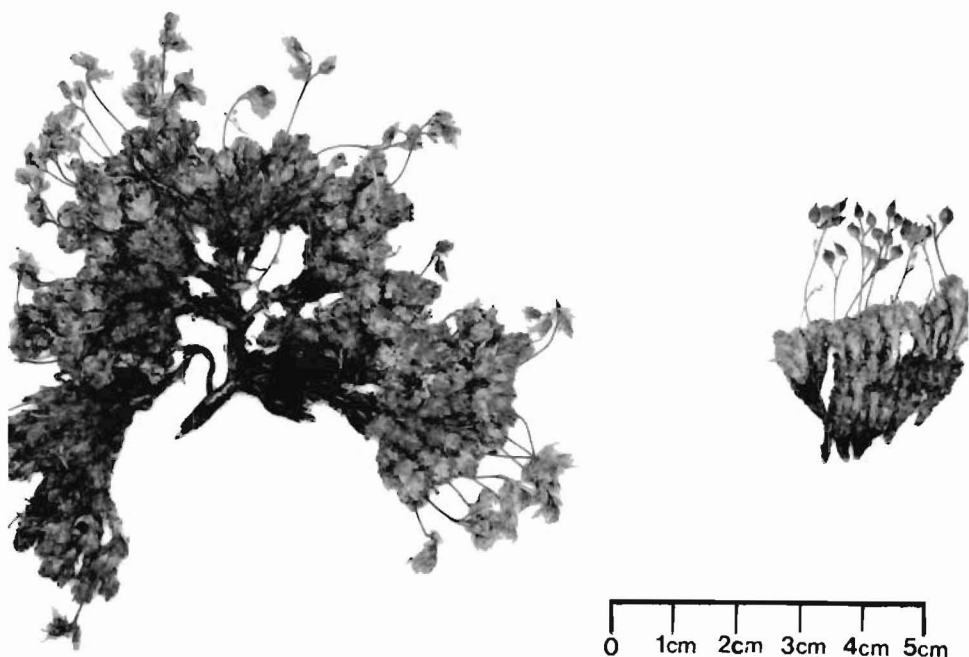


Fig. 4. *Draba subumbellata*. Portion of fruiting plant (right) (Raven & Stebbins 235); habit of flowering plant (left) (Price 814a).

pubescent with minute mostly dendritic trichomes, broadly oblong, scarious-margined, 2.5–3 mm long, 1.2–1.5 mm wide; petals yellow, spatulate, 3.5–5 mm long; stamens 6, tetradynamous, filaments 2–3 mm long; pedicels divaricate, 1–3 mm long, pubescent with dendritic trichomes; siliques ovate in outline, inflated toward base, 2–5 mm long, ca. 2 mm wide, valves densely pubescent with mostly dendritic trichomes; styles stout, 0.2–0.7 mm long; ovules ca. 4 in each locule; seeds broadly oblong to nearly elliptical, ca. 1.2–1.5 mm long, ca. 1 mm wide, slightly compressed; cotyledons accumbent, radicle equaling the cotyledons; pollen fully formed.

Type.—UNITED STATES. CALIFORNIA: Mono Co., hillsides and flats in drained open area, flats near White Mountain Peak, 13,500 ft, 26 Jul 1930, *Victor Duran 2821a*; (holotype, GH; isotype, UC). Originally mixed with *Duran 2821*, which is *Draba oligosperma* Hook.

Other collections.—CALIFORNIA. Mono Co.: White Mountains: “extremely abundant” on moist granitic soils, Pellisier Flats at 13,300 ft, 20 Jul 1964, *Mitchell 2193* (DS, GH, UC); along White Mt. road above Barcroft Lab., 12,400 ft, 27 Aug 1985, *Price 851* (GH, UC); same locality, 12 Jul 1985, *Price 814a* (UC); rocky alpine fellfield, 0.8 mi N, 45 deg E of Mt. Barcroft summit above Lab., 12,700 ft, 27 Jul 1984, *Morefield 2392* (Morefield, NY, RSA); protected rock crevices, around base of N-facing wall of cirque of N fork of Perry Aiken Creek, ca. 1.5 mi ENE of White Mt. Peak summit, T3S, R34E, Sect. 33, ca. 11,000–11,500 ft, 26 Jul 1987, *Morefield & Ross 4712* (Morefield, RSA); southernmost headwaters of southern Milner Creek, granitic substrates, common in wind-eroded sites, T3S, R34E, Sect. 17, 12,300 ft, *Taylor 9159* (UC).—Inyo Co.: Coyote Ridge, Sierra Nevada, 11,700 ft, 7 Aug 1950, *Raven & Stebbins 235* (UC).

In its indument, habit, and flowers, *Draba subumbellata* is similar to *D. sierrae*. The siliques are another matter and it is understandable that the White Mountain material could not be properly evaluated until fruiting specimens were available for study. Now we see that the fruits of the two species are widely different.

The siliques of *D. subumbellata* are ovate in shape without the slightest suggestion of any contortion and are considerably inflated toward the basal area, whereas those of *D. sierrae* are strongly compressed and contorted. The fruits of *D. sierrae* are generally longer and wider than those of *D. subumbellata*. Well-formed fruits of the former are 5–9 by 3–6 mm in size as compared to 2–5 by 2–3 mm in the latter.

The infructescences tend to be somewhat looser in *Draba sierrae* and the pedicels are often longer (2–6 mm versus 2–3 mm in *D. subumbellata*). *Draba sierrae* usually has six ovules per locule, several of which often abort. The seeds of this species are widely spaced in the mature fruit and are clearly compressed. Very little material of *D. subumbellata* is available with mature seeds, but it appears that the seeds are more closely packed and less compressed than those of *D. sierrae*. Four ovules are often found per locule in *D. subumbellata*.

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