

UTAH FLORA: APIACEAE (UMBELLIFERAE)

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ABSTRACT.—Eighty-four taxa in 30 genera of the parsley family, Apiaceae (Umbelliferae) are treated for Utah. Four of the genera with one species each that escape from cultivation are included in the key but not in the text. Keys to genera, species and infraspecific taxa are provided, along with detailed descriptions, distributional data, and pertinent comments. Proposed new taxa are *Cymopterus acaulis* (Pursh) Raf. var. *parvus* Goodrich and *Lomatium scabrum* (Coul. & Rose) Mathias var. *tripinnatus* Goodrich. New combinations include: *Cymopterus acaulis* (Pursh) Raf. var. *fendleri* (Gray) Goodrich and var. *higginsii* (Welsh) Goodrich; *Cymopterus purpureus* Wats. var. *jonesii* (Coul. & Rose) Goodrich and var. *rosei* (Jones) Goodrich; *Cymopterus terebinthinus* (Hook.) T. & G. var. *petraeus* (Jones) Goodrich.

This paper is another in a series leading to a definitive treatment of the flora of Utah. Previous papers have dealt with the Brassicaceae (Cruciferae), Fabaceae (Leguminosae), Rosaceae, Asteraceae (Compositae), Salicaceae, Cactaceae, Chenopodiaceae, and miscellaneous smaller families.

The parsley family presents a formidable challenge to students of plant taxonomy and to others who need to identify its members. The family itself is well marked, but some generic lines within it are fraught with difficulty. It is interwoven with look-alikes often of different and sometimes distantly related genera. Floral structures are reduced and uniform. The calyx is lacking or reduced to mere teeth. Petals are only about 1–2 mm long in our taxa except in *Heracleum*. Color variation of petals is basically restricted to yellow and white, and occasionally purple. Yellow petals very often turn white or cream when dried, and a number of taxa described from dried specimens as having white petals have been proven by field studies to have fresh petals that are yellow. The reduction and uniformity of floral parts requires the use of fruiting and vegetative features for separation of taxa. The features of the mature fruit are quite diagnostic, but this does not help in identification of specimens collected in flowering condition. Vegetative features are used extensively in the keys of this work, but these features are extremely variable. The size of the family (30 genera and 84 taxa in Utah and about 300 genera and

about 3,000 species worldwide) also contributes to difficulty in identification.

Among those of the Old World introduced, cultivated members of the family are caraway (*Carum carvi*), carrot (*Daucus carota* ssp. *sativus*), celery (*Apium graveolens*), dill (*Anethum graveolens*), ground elder (*Aegopodium podagraria*), parsley (*Petroselinum crispum*), and parsnip (*Pastinaca sativa* ssp. *sylvestris*). Other introductions from the Old World include: hedge parsley (*Torilis arvensis*), poison hemlock (*Conium maculatum*), sweet fennel (*Foeniculum vulgare*), wild carrot (*Daucus carota* ssp. *carota*), and wild parsnip (*Pastinaca sativa* ssp. *sativa*). The toxic nature of poison hemlock has long been known, and water hemlock (*Cicuta maculata*) is probably the most violently poisonous plant of our native flora. Many other members of the family such as western sweet cicely (*Osmorhiza occidentalis*) and spring parsley (*Cymopterus* spp.) are used extensively by livestock and wildlife without apparent harm.

Measurements of rays, pedicels, and fruit were taken from specimens with mature fruits. At the end of the discussion of each taxon there are two numbers. The first, in Arabic numerals, indicates the number of Utah specimens examined for the taxon. The second, in Roman numerals, indicates the number collected in Utah by the author.

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APIACEAE (UMBELLIFERAE)

Parsley Family

Annual, biennial, or perennial acaulescent or caulescent herbaceous plants from tap-roots, rhizomes, fibrous or tuberous roots, or caudices; leaves simple to decompound, petioles often dilated and partly sheathing at the base or the upper leaves reduced to dilated sheaths; inflorescence mostly of compound umbels, the primary umbels with or without a subtending involucre of bracts, the secondary umbels (umbellets) with or without a subtending involucre of bractlets; flowers mostly regular, perfect, or some of them staminate or sterile; calyx of 5 teeth or lobes, or obsolete, or lacking; petals 5, small, usually inflexed at the tip, mostly white or yellow, occasionally purple; stamens 5, small, alternate with the petals; ovary inferior, bicarpellate, 2-loculed, with 1 ovule per locule, the two styles with or without a conical base (stylopodium); fruit a dry schizocarp of 2 mericarps united by their faces (the commissure) nearly terete, dorsally compressed (compression parallel to a broad commissure), or laterally compressed (compression, contrary to a narrow commissure); mericarps separating at maturity and apically attached to and pendulous from a fine

wirelike entire or bifid divided carpophore or remaining adherent and then the carpophore usually lacking or poorly developed and usually adnate to the commissural faces, each mericarp usually 5-nerved, 3 of the nerves dorsal and 2 on the lateral margins, the nerves filiform to winged, or obscure or lacking, the intervals between the nerves commonly with 1 or more oil-tubes, the commissural faces often with 2 or more oil-tubes.

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 MATHIAS, M. E., AND L. CONSTANCE. 1944-1945. Umbelliferae. N. Am. Fl. 25B:43-297.

- 1. Leaves peltate, simple, orbicular; flowers in a verticillate spikelike inflorescence; plants rhizomatous, of Washington County *Hydrocotyle*
- Leaves not as above; flowers in compound umbels, or globose heads (in a few taxa of *Cymopterus*); plants rarely rhizomatous 2
- 2(1). Plants caulescent; pseudoscape lacking; the few to several peduncles mostly shorter than the leafy stem on which they are borne; styles rarely over 1 mm long; stylopodium present and petals white in native taxa except *Zizia* and in a few taxa keyed both ways 3
- Plants acaulescent, the leaves sometimes whorled atop a pseudoscape, or if subcaulescent then the usually solitary peduncle longer than the short, leafy stem on which it is borne, and lateral umbels if any mostly borne on the lower 1/3 of the plant; styles often over 1 mm long; stylopodium lacking in all but *Podisteria* and in taxa keyed both ways; petals yellow, white, or purple 4
- 3(2). Leaves simple, pinnate or ternate; leaflets mostly sessile. Key I
- Primary leaflets usually petiolulate Key II
- 4(2). Leaves ternate or biternate with 3-9 leaflets or rarely a few simple, usually only 2-3 per plant; leaflets 1.5-7 (11.5) cm long, entire, linear or nearly so; plants 5-10 cm tall, from a globose or fusiform tuber; petals white *Orogenia*
- Leaves and leaflets not as above or if so then plants mostly taller and/or petals yellow 5

- 5(4). Stylopodium low conic; plants of the Raft River and Uinta mountains, mostly above 2,440 m, sometimes with a lateral umbel in the axil of a bract or leaf on the upper 1/2 of the stem, glabrous; involuclcs lacking or of 1-2 linear bractlets; fruit 3-6 mm long; petals white *Ligusticum*
- Stylopodium lacking except in *Podistera*; plants not as above in all features; involuclcs mostly present; fruit mostly longer or petals yellow 6
- 6(5). Key to plants with mature fruits Key III
- Key to plants in flower or with young fruits Alternate Key III

Key I

Plants caulescent; the few to several peduncles and umbels mostly shorter than the leafy stem; stylopodium present in all but *Zizia* and two other taxa that are keyed both ways; leaves simple, pinnate, or ternate; leaflets sessile.

- 1. Leaflets entire, linear or linear-elliptic 2
- Leaflets toothed and/or lobed, not linear 4
- 2(1). Leaves soon withering, some usually deciduous shortly after anthesis, some leaflets often more than 1.5 cm long; plants from a tuberos root or fascicle of tuberous roots, the stem readily detached from the tuberos base, from northern Utah; stylopodium present *Perideridia*
- Leaves more persistent, the leaflets not more than 1.5 cm long or plants of San Juan and Wayne counties; plants from a taproot with a branched crown or caudex; stylopodium lacking 3
- 3(2). Petals and stamens yellow when fresh; leaflets mostly 2-5 cm long; fruit 6-8 mm long; plants of San Juan and Wayne counties *Cymopterus beckii*
- Petals and stamens white; leaflets 0.3-2 cm long; fruit 2-4 mm long; plants of Cache County *Musineon lineare*
- 4(1). Basal leaves mostly simple, shallowly toothed, cordate at the base; stem leaves usually ternate, not over 3 cm long; petals bright yellow *Zizia*
- Leaves pinnate, or if ternate or upper ones simple then over 3 cm long; petals white or yellow 5
- 5(4). Leaves ternate, the upper ones sometimes simple, the 3 leaflets 8-36 cm long, about as wide; plants 1-2 m tall or taller, villous-woolly at least on some of the nodes; the larger petals 4-8.5 mm long *Heracleum*
- Leaves pinnate, the leaflets less than 8 cm long and much narrower; plants shorter or not villous-woolly; petals smaller 6

- 6(5). Umbels sessile or nearly so; leaflets ovate to suborbicular, 3-lobed to near the middle; fruit about 1.5 mm long; plants cultivated and rarely escaping except in Washington County (celery) *Apium graveolens* L.
- Umbels not sessile except sometimes the terminal one; leaflets variously shaped, but not ovate to suborbicular and lobed to near the middle; fruit more than 1.5 mm long except in *Berula*, plants various 7
- 7(6). Involucre and involuclcs well developed, sometimes spreading or deflexed, the bracts 1-6, the bractlets (2) 4-12; fruit 1.5-3 mm long, the ribs not winged; plants of very wet places, often growing in water, from fibrous roots 8
- Involucre lacking or infrequently of 1 or 2 bracts; involuclcs often lacking; fruit over 3 mm long or else the ribs winged; plants of various habitats, from a taproot or tuberous roots 9
- 8(7). Stems often sprawling, sometimes stoloniferous; leaves with (3) 5-15 opposite pairs of leaflets, these 0.3-4 (6.5) cm long; rays 4-16; ribs of the fruit obscure *Berula*
- Stems erect, not stoloniferous; leaves with 4-6 opposite pairs of leaflets, these 2-8 (15) cm long; rays 11-24; ribs of the fruit prominently corky *Sium*
- 9(7). Umbels often more than 7 per stem; fruit strongly flattened dorsally, 5-8 mm long, 3-6 mm wide, the lateral ribs slightly winged, the dorsal ones filiform; petals greenish yellow or reddish; plants introduced, cultivated and wild *Pastinaca*
- Umbels mostly less than 7 per stem; fruit not strongly flattened dorsally or if so only 3-5 mm long; petals white or greenish; plants native 10
- 10(9). Fruit over 1 cm long; leaves rarely all pinnate; peduncles mostly not subtended by dilated, bladeless sheaths or these greatly reduced *Osmorhiza*
- Fruit 3-5 mm long, leaves mostly all once pinnate; peduncles often with subtending dilated sheaths 11
- 11(10). Fruit strongly flattened, the dorsal ribs filiform, the lateral ribs conspicuously winged; plants from fascicles of tuberous roots, of the Abajo and La Sal mountains *Oxypolis*
- Fruit rounded in cross section, the dorsal and lateral ribs with small wings; plants from a taproot, widespread *Angelica*

Key II

Plants caulescent; the few to several peduncles and umbels mostly shorter than the leafy stems; stylopodium present or plants also keyed in Key III; leaves more than once-compound; primary leaflets not sessile.

- 1. At least some of the ultimate leaf segments over 2 cm long, toothed or lobed, but not entire or pinnatifid 2
- Ultimate leaf segments less than 2 cm long or if longer then entire or pinnatifid 5
- 2(1). Plants from creeping rhizomes, cultivated and rarely escaping; lower leaves long-petioled, often biternate with 9 leaflets but sometimes irregularly compound (ground elder) *Aegopodium podagraria* L.
- Plants not from creeping rhizomes, seldom cultivated; leaves various 3
- 3(2). Involucels of about 6 bractlets, 1–4 mm long; umbels 6–20 or more per stem, the rays 15–26, 1.5–4 cm long; fruit 2–4 mm long, the ribs corky *Cicuta*
- Involucels mostly lacking; umbels often fewer than 6 per stem and/or the rays either fewer or longer than above or both; fruit 4–25 mm long, the ribs various 4
- 4(3). Fruit (10) 12–25 mm long, bristly pubescent in 2 of 3 species, the dorsal ribs not prominent; leaflets often hirtellous; dilated sheaths seldom subtending the peduncles .. *Osmorhiza*
- Fruit 4–5 mm long, not bristly pubescent, the dorsal ribs with small wings; leaflets glabrous; peduncles often subtended by dilated bladeless (or nearly so) sheaths *Angelica*
- 5(1). Fruits and ovaries with bristly hairs; involucre often of pinnatifid or compound bracts; plants annual or biennial 6
- Fruits and ovaries without bristly hairs; involucre mostly of entire bracts; plants mostly biennial or perennial 8
- 6(5). Involucre lacking or of 1 entire bract; plants with appressed hispid hairs, from Washington County *Torilis*
- Involucre of few to several pinnatifid to compound bracts; plants glabrous or with spreading hairs 7
- 7(6). Bracts of the involucre leaflike, pinnately compound; rays 1–7 (9), 1.5–10 cm long, some much longer than the involucre, some often nearly as long as the peduncles; inflorescence open; bristly hairs of the fruit hooked; plants annual, of Washington County *Yabea*
- Bracts of the involucre pinnatifid; rays mostly 10–60 or more, seldom over 3 cm long or if longer then plants biennial, often not much exceeding the involucre, rarely longer than the peduncles; inflorescence congested; bristly hairs of the fruit glochidiate at apex; plants widespread *Daucus*
- 8(5). Involucel and involucre lacking 9
- Involucel and sometimes involucre present .. 13
- 9(8). Petals yellow; plants introduced, cultivated and adventive, ultimate segments of leaves filiform, 0.1–4 cm long, about 0.5 mm wide 10
- Petals white, or yellow in *Lomatium* and then plants native; ultimate segments various but often over 0.5 mm wide 11
- 10(9). Plants annual, not glaucous, widely cultivated; leaves not especially crowded toward the base of the plant, the petiolules of the lowest pair of primary leaflets mostly less than 2 cm long, the ultimate segments 4–20 mm long (dill) *Anethum graveolens* L.
- Plants perennial, glaucous, occasionally adventive; leaves sometimes crowded toward the base of the stem, the petiolules of the lowest pair of primary leaflets often over 2 cm long, the ultimate segments 4–40 mm long *Foeniculum*
- 11(9). Plants biennial from taproots, introduced; umbels often 6–12, or more per stem; fruit 3–4 mm long, the ribs filiform, not at all winged *Carum*
- Plants perennial from taproots or caudices, native; umbels rarely more than 8 per stem; fruit 3–14 mm long, the lateral and sometimes the dorsal ribs winged 12
- 12(11). Petals white; fruit 3–8 mm long, rounded, the dorsal and lateral ribs narrowly winged; stylopodium low conic; ultimate leaflets over 50 per leaf, 0.1–1 (1.5) cm long *Ligusticum*
- Petals yellow when fresh; fruit 8–14 mm long, dorsally flattened, the dorsal ribs filiform, the lateral ribs winged; stylopodium lacking; ultimate leaflets usually 3–45 per leaf, 0.3–9 cm long *Lomatium*
- 13(8). Petals yellow or greenish yellow; plants cultivated, rarely escaping (Parsley) *Petroselinum crispum* (Mill.) A. W. Hill
- Petals white; plants not cultivated 14
- 14(13). Stems often purple-spotted, usually much branched, mostly with 10–30 or more umbels; plants 5–30 dm tall, naturalized, weedy in moist or wet places in valleys and foothills, occasionally montane; involucre of 2–6 bracts, 2–6 (15) mm long *Conium*
- Stems not purple-spotted with few branches, with (1) 3–7 (12) umbels; plants to 10 dm tall, native, often montane, involucre lacking or seldom as above 15
- 15(14). At least some of the ultimate leaflets 2–6 cm long and entire; leaves often withering shortly after anthesis; plants from a tuberous root or fascicle of tuberous roots, these easily detached from the stem, and often missing in herbarium specimens *Perideridia*
- Ultimate leaflets not over 2 cm long or if so not entire; leaves more persistent than above; plants from a taproot or a cluster of fleshy-fibrous roots 16
- 16(15). Involucels usually with more than 3 bractlets; fruit slightly compressed dorsally; root-crown mostly simple, without old long-persisting petiole-bases; plants rather rare in the eastern half of the state *Conioselinum*

— Involucels lacking or rarely with more than 3 bractlets; fruit terete or slightly compressed laterally; root-crown simple or branched, usually with fibrous long-persisting petiole-bases; plants common, widespread . *Ligusticum*

Key III

Plants acaulescent, sometimes with a pseudoscape, or if subcaulescent then the mostly solitary peduncle longer than the short, leafy stem on which it is borne and lateral umbels if any mostly borne on the lower 1/3 of the plant; styles often over 1 mm long; stylopodium mostly lacking.

1. Fruit strongly flattened dorsally, the dorsal ribs filiform, not winged, the lateral ribs more or less winged, the body 8–15 (20) mm long or if shorter than plants usually pubescent (note: *L. cous*, *L. minimum*, and *L. scabrum* have small fruits and glabrous herbage); involucre lacking *Lomatium*

— Fruit not strongly flattened or if so the dorsal ribs winged, the body usually less than 8 mm long, the wings sometimes to 12 (15) mm long especially in plants with an involucre; plants glabrous to hirtellous 2

2(1). Stylopodium conic; leaves once compound with palmatifid leaflets; bractlets of involucels with 2–3 or more teeth; plants known from high elevations of the La Sal Mountains where apparently rare *Podistera*

— Stylopodium lacking; leaves either more than once compound or leaflets not palmatifid; bractlets entire or plants not of high elevations of the La Sal Mountains (except *Oreoxis bakeri*) 3

3(2). Ribs of fruit not winged or at most with low corky wings; carpophore well developed; leaves pinnate, a few of the leaflets sometimes pinnatifid and nearly bipinnate; plants of Cache, Garfield, and San Juan counties 4

— Ribs of the fruit with papery wings or if with low, corky wings then the carpophore lacking; leaves usually more than once compound; plants of broad distribution 5

4(3). Ribs of fruit not winged; terminal umbel often subtended by a smaller umbel; petals and stamens white; plants often subcaulescent, of the Bear River Range, Cache County *Musineon*

— Ribs of fruit with low, corky wings; umbel solitary; petals and stamens yellow; plants strictly acaulescent, of Garfield and San Juan counties (note: our plants may not have a carpophore) *Aletes*

5(3). Fruit slightly compressed laterally, with low corky wings, 2–5 mm long and with rather conspicuous, persisting calyx teeth, the carpophore lacking; plants from branched caudices, strictly acaulescent, not strongly aromatic, mostly hirtellous or scabrous throughout or else the bractlets toothed, 1–10 (15) cm tall, montane, mostly above 2,440 m except in *O. trotteri*..... *Oreoxis*

— Fruit compressed dorsally with prominent, more or less papery or corky wings, the calyx teeth obsolete or not persisting or else the carpophore well developed; plants from fibrous often enlarged tuberlike taproots, or if from branched caudices then with one or more of the following features: with one or more cauline leaves and from lower elevations, strongly aromatic, glabrous, regularly over 10 cm tall; bractlets often not toothed *Cymopterus*

Alternate Key III

Plants with features of Key III but in flower or with immature fruits.

1. Leaves pinnate or pinnatifid, rarely trifid with linear entire segments 2

— Leaves either more than once-compound or else ternate or ternately divided with toothed to lobed leaflets 7

2(1). Petals and stamens white; terminal umbel sometimes subtended by a smaller axillary umbel; plants of Cache County *Musineon*

— Petals and stamens yellow when fresh; umbel solitary; plants of the southern 1/2 of the state 3

3(2). Bractlets of the involucre usually with 3 or more teeth or lobes linear-elliptic or oval to obovate; stylopodium present or lacking; plants of the La Sal Mountains 4

— Bractlets of the involucre mostly entire, linear or narrowly elliptic; stylopodium lacking; plants not known from the La Sal Mountains 5

4(3). Leaflets more or less palmatifid, the major segments again trilobate to palmatifid; stylopodium conspicuous; base of plant with few if any persisting leaf bases *Podistera*

— Leaflets pinnatifid or trifid; stylopodium lacking; base of plant clothed with persisting leaf bases *Oreoxis bakeri*

5(3). Leaflets entire, 0.5–2 mm wide, linear-filiform to very narrowly elliptic; plants of Emery, Garfield, Iron, Sevier, and Wayne counties..... *Lomatium*

— At least some of the leaflets lobed, or if all entire then some over 2 mm wide and elliptic; distribution various 6

- 6(5). Leaflets 0.3–1.2 cm long; rays 4–8, 2–10 mm long; involuclcs 4–5 mm long; plants of Garfield and central San Juan counties . . . *Aletes*
- Some of the leaflets regularly over 1.2 cm long; rays (4) 6–13, 5–20 mm long; involuclcs 2–15 mm long; plants of Grand and extreme northern San Juan counties . *Lomatium latilobum*
- 7(1). Plants pubescent, not more so just below the umbel than elsewhere (see also *Oreoxis alpina*) *Lomatium*
- Plants glabrous or scabrous, sometimes hirtellous just below the umbel and then with glabrous leaves 8
- 8(7). At least some of the ultimate leaflets over 2 cm long and entire or at most toothed 9
- Ultimate leaflets less than 2 cm long or if longer then lobed 10
- 9(8). Peduncles hirtellous just below the umbel, glabrous below; leaves glabrous, lowest pair of primary leaflets sessile or on petiolules less than 2 cm long, the ultimate leaflets to 2.5 cm long, 1–3 (4) mm wide; plants not aromatic, from the southern 1/2 of the state *Cymopterus lemmonii*
- Plants glabrous or if scabrous then not more so just below the umbel than elsewhere; lowest pair of primary leaflets either with petiolules longer than above or some of the ultimate leaflets mostly longer or wider than above; plants of the northern 1/2 of the state or else strongly aromatic *Lomatium*
- 10(8). Plants from a taproot, this sometimes enlarged and tuberlike, the crown simple or few-branched, with few if any long-persisting leaf bases; pseudoscape (at least a subterranean one) often conspicuous; leaf blades sometimes with confluent portions that are wider than the ultimate teeth or lobes 11
- Plants from a simple or more often branched often woody caudex, this often clothed with long-persisting leaf bases; pseudoscape lacking; leaf blades finely and completely dissected so that the ultimate segments are the widest undivided portions of the blade 12
- 11(10). Taproot very slender, with 1 or more abruptly expanded globose or ovoid tuberlike segments; plants strongly aromatic and from Salt Lake County north to Cache County or if not aromatic then of northwestern Box Elder County (*L. ambiguum* and *L. cous*) . . . *Lomatium*
- Taproot slender or enlarged, if with a tuberlike enlargement then this gradually expanded from a narrow portion; plants not aromatic, distribution various (note: rare glabrous specimens of *Lomatium juniperinum* will key here) *Cymopterus*
- 12(10). Leaves with only about 2–4 opposite pairs of primary leaflets; plants of mountains, mildly if at all aromatic 13
- At least some of the leaves with 5–11 opposite pairs of primary leaflets; plants of mountains and deserts, aromatic or not 14
- 13(12). Primary leaflets 4–14 mm long, sessile; leaf blades 1–3.5 cm long; plants to about 12 cm tall, scabrous-hirtellous throughout or else bractlets of the involuclc toothed *Oreoxis*
- At least the lowest pair of primary leaflets usually 15–35 mm long, sessile or on petiolules to 15 mm long; plants 8–50 cm tall, glabrous except hirtellous on the peduncle just below the umbel and sometimes scabrous or hirtellous in the umbel, bractlets of the involuclc entire *Cymopterus lemmonii*
- 14(12). Lowest pair of primary leaflets seldom over 1/4 as long as the leaf blade, sessile or on petiolules to 18 mm long; leaves pinnately compound, the blades more or less oblong in outline 15
- Lowest pair of primary leaflets (1/4) 1/3–3/4 as long as the leaf blade, on petiolules over 18 mm long; leaves more or less ternate-pinnately compound, the blades often ovate in outline 16
- 15(14). Segments of leaves 1–12 mm long; some bractlets of the involuclcs usually exceeding the flowers; plants widespread, mostly of high elevations *Cymopterus hendersonii*
- Plants growing 792–2,320 m, or if of higher elevations then scabrous and ultimate segments of leaves 1–4 mm long; bractlets of the involuclc rarely exceeding the flowers; plants of the southern 1/2 of the state, mostly of low to moderate elevations (*L. parryi* and *L. scabrum*) *Lomatium*
- 16(14). Calyx teeth lacking or to 0.3 mm long; ultimate segments of leaves 0.2–0.3 mm wide *Lomatium grayi*
- Calyx teeth 0.5–0.9 mm long; ultimate segments of leaves 0.5–1 (1.5) mm wide *Cymopterus terebinthus*

Aletes Coult. & Rose

Perennial, acaulescent, glabrous to pubescent herbs; leaves pinnate or bipinnate, petiolate, the leaflets distinct or confluent, often lobed and spinulose-dentate or entire; umbels compound; involucre lacking; rays few to several, spreading to reflexed; involuclc of free or united bractlets; calyx teeth conspicuous, deltoid-ovate; stylopodium lacking; carpophore divided to the base, sometimes readily deciduous; fruit oblong to ovoid-oblong, slightly compressed laterally or subterete, the ribs subequal, prominently corky-winged or obscure.

Aletes macdougallii Coult. & Rose Plants 7–20 cm tall, acaulescent, glabrous or scabrous, from a branched caudex, this more or less clothed with persistent leaf bases; leaves pinnate or some of the leaflets pinnatifid and nearly bipinnate, with 2–6 opposite pairs of lateral leaflets or lobes, petioles 1.5–7 cm long, blades 1–5 cm long; leaflets 0.3–1.2 cm long, sessile, narrowly elliptic and entire or obovate and with 1–3(5) teeth or lobes; peduncles 5–15 cm long; umbel solitary; rays 4–8, 0.2–1 cm long; bractlets of the involucre about 4–6, 4–5 mm long, linear or linear-elliptic, more or less united at the base; pedicels 1–2 mm long; calyx teeth about 1–1.5 mm long, narrowly to broadly deltoid; petals yellow when fresh; styles 1.5–2.5 mm long; fruit 4–6 mm long, the ribs with small, more or less corky wings, the lateral ones about 1 mm wide, the dorsal ones smaller. Rock crevices, rocky slopes, and sandy ground, in pinyon-juniper and limber pine-bristlecone pine communities at 1,280 to 2,740 m in Garfield and San Juan counties; Arizona, Colorado, and Utah; 8(0). Our plants are referable to ssp. *breviradiatus* Theobald & Tseng. They could reasonably be included in the genus *Cymopterus*.

Angelica L.

Perennial, caulescent, single-stemmed herbs from a stout taproot; leaves pinnately to ternately 1–3 times compound, with broad leaflets; the lower blades on elongate petioles, the middle ones often arising directly from a dilated sheath, the upper ones often much reduced or lacking and the leaves reduced to a dilated sheath; umbels compound; involucre and involucre lacking or of narrow scarious or foliaceous bracts or bractlets; calyx teeth minute or obsolete; petals white, seldom pink or yellow; stylopodium broadly conic; carpophore divided to the base; fruit elliptic-oblong to orbicular strongly compressed dorsally, the lateral and dorsal ribs with small but obvious wings, or the ribs sometimes all corky-thickened and scarcely winged.

- 1. Leaflets mostly lanceolate to nearly linear, mostly over 3 times as long as wide; leaf blades oblong in outline; umbels 2–7, with 7–20 rays 2
- Leaflets ovate or broader, or if lanceolate and over 3 times as long as wide then umbels mostly more than 7, and rays 20–40 3

- 2(1). Leaves ternate-pinnate, the lowest pair of primary leaflets on petiolules 3.5–12 cm long; leaflets coarsely toothed to lobed, the margins with about 1–3 teeth or lobes per cm; plants of the Deep Creek Mountains *A. kingii*
- Leaves pinnate or scarcely ternate-pinnate, the lowest pair of primary leaflets sessile or on petiolules to 1.5 cm long; leaflets finely to rather coarsely toothed, the margins with about 3–7 teeth per cm; plants not known from the Deep Creek Mountains ... *A. pinnata*
- 3(1). Plants not over 1 m tall, mostly of rocky places above 3,050 m; umbels 1–3; leaflets 1–5 cm long, serrate-dentate, rarely lobed; involucre of 1–3 or more linear bractlets about 3–10 mm long; ovaries and fruit glabrous or at most scabrous *A. roseana*
- Plants mostly 1–2 m tall, mostly of wet places below 3,050 m; umbels several; leaflets 3–16 cm long, some usually lobed as well as toothed; involucre lacking; ovaries and young fruit hispid to hirsute *A. wheeleri*

Angelica kingii (Wats.) Coult. & Rose Great Basin Angelica. [*Selinum kingii* Wats.]. Plants (3) 4–12 dm tall, glabrous except scabrous to short-hispid in the inflorescence, from a taproot, without persisting leaf bases; leaves ternate-pinnate with 4–5 (6) opposite pairs of lateral primary leaflets, the lower pairs mostly pinnate, lower petioles to 25 cm long, dilated at the base, the upper ones reduced, lower blades to 40 cm long, oblong in outline, the upper ones reduced; lowest pair of primary leaflets about 2/3–3/4 as long as the leaf blade, ascending and more or less parallel to the primary rachis, on petiolules 3.5–12 cm long; leaflets 2–14 cm long, 4–15 (40) mm wide, lanceolate to nearly linear, coarsely toothed or lobed, the margins with 1–3 teeth or lobes per cm or rarely entire; peduncles mostly 4–17 cm long; umbels 3–7; involucre lacking; rays 11–20, 1.5–9.5 cm long, scabrous; involucre lacking; pedicels 1–6 mm long, scabrous or short-hispid; petals white, sometimes marked with purple in age; stamens white; styles to about 1.5 mm long; fruit 4–5 mm long, densely hispid, the ribs slightly winged, the lateral wings a little wider than the dorsal ones. Aspen-fir and streamside communities at 2,130 to 2,380 m in the Deep Creek Mountains, Juab County; Nevada, eastern California, and southern Idaho; 5(0).

Angelica pinnata Wats. Small-leaved Angelica [*A. leporina* Wats.]. Plants 4.5–10 (15) dm tall, glabrous or nearly so except scabrous to hirtellous in the inflorescence, without per-

sistent leaf bases, from a taproot and sometimes branched crown; leaves pinnate or partly bipinnate with 3 (4) opposite pairs of leaflets, the lowest pair sometimes bipinnate or partly bipinnate, the upper pairs pinnate, lower petioles 5–26 cm long, gradually expanded into a dilated, partly sheathing base, the upper ones reduced and the blades sometimes sessile on the dilated sheath, blades (5) 9–21 cm long, more or less oblong in outline; leaflets 1.5–13 cm long, 4–37 mm wide, sessile, mostly lanceolate, occasionally elliptic, rarely ovate, finely to coarsely serrate, the margins with about 3–7 teeth per cm; peduncles 3.5–14 cm long; umbels (1) 2–5; involucre lacking; rays 7–14, 2–8.5 cm long, usually scabrous to hirtellous; involucels lacking or very rarely of 1 or more green to scarious linear or nearly linear bractlets to 3 (13) mm long; pedicels 3–7 mm long, glabrous or scabrous; petals white; styles to about 1 mm long; ovary glabrous to hirtellous; fruit 4–5 mm long, glabrous or sparsely hirtellous, the lateral wings about 1 mm wide, the dorsal wings about 0.5 mm wide. Tall forb, oak, maple, aspen, Douglas-fir, spruce-fir, willow, and wet meadow communities, very often along streams or around seeps and springs at 1,520 to 3,290 m in all Utah counties except Box Elder, Carbon, Millard, Morgan, and Rich; eastern Idaho to western Montana, south to Utah and Colorado; 65 (xv).

Angelica roseana Henderson Rock Angelica. Plants 30–75 cm tall, strongly aromatic, glabrous or scabrous in the inflorescence, from stout taproots; stems stout, hollow, often 1–2 cm in diameter; leaves ternate-pinnate with 3–4 opposite pairs of lateral primary leaflets, the lower pairs bipinnate or ternate and petiolulate, the upper pairs pinnate and sessile; petioles to 8 cm long or lacking on the upper leaves and then blades sessile on a dilated sheath; blades 5–17 cm long, ovate in outline, the upper ones reduced to lacking and leaves reduced to dilated sheaths; lowest pair of primary leaflets about 3/4 as long as the leaf blade, on petiolules 2.5–5.2 cm long, blades of leaflets (1) 2–5 cm long, ovate to orbicular, sharply serrate-dentate, rarely lobed; peduncles 4–17 cm long, the terminal one often about as thick as the stem, the lateral ones often partly enveloped in bladeless, dilated sheaths; umbels 1–3; involucre lack-

ing or occasionally of 1–2 linear bracts to 1.5 cm long; rays 15–30, 3.5–12 cm long, scabrous; bractlets of the involucre 1–3 (rarely more), 3–10 mm long, 0.2–0.5 mm wide, separate, linear; pedicels 4–9 mm long, glabrous or scabrous; petals white; stamens whitish; styles about 2 mm long; ovary glabrous or at most scabrous; fruit ca 5 mm long, the ribs with wings about 1 mm wide. Talus slopes, boulder fields, rock stripes, and rocky ground, above timberline or upper spruce zone at (3,050) 3,200 to 3,570 m across the Uinta Mountains and Mount Timpanogos of the Wasatch Range in Daggett, Duchesne, Summit, Uintah, and Utah counties, Montana to Idaho, south to Colorado and Utah; 14 (iii).

Angelica wheeleri Wats. Utah Angelica. [*A. dilatata* A. Nels. in Coult. & Rose]. Robust plants 1–2 m tall or taller, glabrous except in the inflorescence, mildly if at all aromatic, from stout rootcrowns with large fibrous roots; stems hollow, to 3 cm in diameter; lower leaves ternate-pinnately compound, with 3–5 opposite pairs of lateral primary leaflets, the lower pairs bipinnate or tripinnate and petiolulate, the upper pairs often pinnate and sessile, petioles to 45 cm long, often dilated, blades to 40 cm long, ovate in outline; lowest pair of primary leaflets to 21 cm long, about 1/2 as long as the leaf blade, on petiolules to 5 cm long, blades of leaflets 3–16 cm long, 2–8 cm wide, lanceolate to ovate, serrate and some usually lobed; peduncles 2–29 cm long, often subtended by bladeless or nearly bladeless, dilated sheaths 2–20 cm long; umbels several; involucre lacking or occasionally of 1–2 linear bracts to 2 cm long; rays 20–45, 5–10 cm long, scabrous; involucels none; pedicels 5–12 mm long, glabrate to scabrous-hirsute; petals white; stamens whitish; styles about 1 mm long; ovary and young fruit scattered to densely hispid to hirsute, mature fruit 4–5 mm long, densely hispid, the dorsal and lateral ribs conspicuously winged. Boggy or very wet areas often in riparian communities or in seeps and springs at 1,950 to 3,050 m in Cache, Juab, Piute, Salt Lake, Sevier, and Utah counties; endemic to Utah; 7 (ii). *A. arguta* Nutt. in T. & G. has been reported for Utah, but I have not seen a specimen and suspect that reports are based on *A. wheeleri*. It is apparently different from *A. wheeleri* only in the glabrous ovaries and fruit.

Berula Hoffm.

Perennial, caulescent, glabrous herbs from fibrous roots, often stoloniferous; leaves pinnately compound or the submerged ones sometimes with filiform-dissected blades; umbels compound; involucre and involucel usually well developed; calyx teeth minute or obsolete; stylopodium conic; carpophore divided to the base, inconspicuous, adnate to the mericarps; fruit elliptic to orbicular, somewhat compressed laterally, glabrous, the ribs inconspicuous.

Berula erecta (Huds.) Cov. Cutleaf Waterparsnip. [*Sium erectum* Huds.]. Stems 5–10 dm long or longer, from numerous fibrous roots; leaves pinnate with (3) 5–15 opposite pairs of lateral leaflets, or the submerged leaves (if present) often with filiform-dissected blades, petioles to 32 cm long or upper blades sessile on a dilated sheath, blades 2–31 cm long; leaflets 0.3–4 (6.5) cm long, sessile, nearly linear to lanceolate or ovate in outline, toothed to incised or occasionally a few entire; peduncles 1.5–8 cm long; umbels 3–20 or more; bracts of the involucre 1–6, 2–15 (25) mm long, linear or elliptic, entire, toothed, or rarely pinnatifid; rays 4–16, 0.5–2.5 (4) cm long; bractlets of the involucels ca 4–7, 1–7 mm long, linear or elliptic, entire; pedicels 2–7 mm long; petals white; stamens white; styles less than 1 mm long; fruit ca 2 mm long, the ribs obscure. In mud and water of streams, seeps, springs, marshes, swamps, margins of ponds and lakes, and in wet hanging gardens at 850 to 2,130 m in all counties of the state except Daggett, Emery, Grand, Iron, Morgan, San Juan, Summit, and Wayne; widespread in Europe, Mediterranean regions, and North America. The American plants are referable to var. *incisa* (Torr.) Cronq.; 64 (vi).

Carum L.

Biennial, caulescent, glabrous herbs from taproots; leaves pinnately compound; inflorescence of compound umbels; involucre and involucel lacking or of a few inconspicuous bracts or bractlets; calyx teeth obsolete; stylopodium low conic; carpophore divided to the base; fruit oblong to broadly elliptic-oblong, somewhat compressed laterally, evidently ribbed.

Carum carvi L. Caraway. Plants 3–6 (10) dm tall; leaves 2–3 times pinnate and then often pinnatifid, with about 6–11 opposite or offset pairs of lateral primary leaflets, petioles to 15 cm long, the upper ones reduced and the blades sometimes sessile on a dilated sheath, the blades 5–16 cm long, oblong in outline; primary leaflets from less than 1/4 to about 1/2 as long as the leaf blade, sessile, the ultimate segments 2–8 (15) mm long, 0.5–2 mm wide, linear and entire or obovate and toothed to lobed; peduncles 4–12 cm long, usually subtended by a dilated sheath; umbels 6–12 or more; involucre lacking or inconspicuous; rays 6–12 (14), 1.5–8 cm long; involucels lacking or of minute scarios teeth; pedicels (5) 8–20 mm long; petals white; filaments white, the anthers pale green or whitish; styles about 0.5–0.85 mm long; fruit 3–4 mm long, the ribs filiform. Introduced, cultivated, the fruits used in flavoring, escaping, and occasionally persisting in mountain brush, meadow and aspen communities, at 1,375 to 2,640 m in Box Elder, Cache, Daggett, Davis, Duchesne, Salt Lake, Sanpete, Sevier, and Summit counties; native to Eurasia, now widespread across the United States; 10 (iv).

Cicuta L.

Perennial, caulescent, glabrous, violently poisonous herbs, from clusters of fibrous roots, some of these generally tuberous-thickened; base of stem thickened, with hollow chambers separated by transverse septa; internodes of stems hollow; leaves 1–3 times pinnate or ternate-pinnate, with well developed leaflets (ours); umbels several, compound; involucre wanting or of a few inconspicuous narrow bracts; involucel of several narrow bractlets or rarely lacking; petals white or greenish; calyx teeth evident; stylopodium depressed or low-conic; carpophore divided to the base, deciduous; fruit ovate or orbicular, compressed laterally, the ribs usually prominent and corky.

Cicuta maculata L. Water Hemlock. [*C. douglasii* (DC.) Coult. & Rose, misapplied - the name belongs to plants north and west of Utah]. Plants, 6–21 dm tall or taller, with clusters of fibrous roots surmounted by a thickened crown; stems 5–15 mm or more in diameter; leaves pinnate or ternate-pinnate with 4–7 opposite pairs of lateral primary

leaflets, the lower pairs again pinnate, the upper pairs once pinnate and sessile, lower petioles about 5–40 cm long, the upper ones reduced and the blades often sessile on dilated sheaths, lowest pair of petiolules 1–3 cm long, leaflets 2–11 cm long, 3–25 mm wide, narrowly lanceolate to lanceolate or occasionally linear, finely to coarsely serrate; peduncles (2) 4–15 cm long; umbels 6–30 or more; involucre lacking or of 1 or few linear bracts to 1 cm long; rays 15–26, 1.5–4 cm long; bractlets of the involucre about 6, 1–4 mm long, linear or narrowly deltoid, pale yellow-green or purplish, scarious-margined; pedicels 3–10 mm long; calyx teeth about 0.5 mm long, often pale green with whitish margins; petals white; stamens white; styles 0.5–1 mm long; fruit 2–4 mm long, oval to globose, the ribs prominent, more or less corky, green, often wider than the darker (often purple) intervals. Along streams, rivers, ditches, canals, margins of pond and lakes, in wet meadows and marshes at 1,370 to 2,320 m in Beaver, Cache, Daggett, Duchesne, Kane, Millard, Piute, Salt Lake, San Juan, Sanpete, Summit, Tooele, Uintah, Utah, Wasatch, Washington, Wayne, and Weber counties; widespread in North America; 46 (v.) Some of our plants have leaflets less than 5 times as long as wide (a feature of var. *maculata*, which is found mostly east of Utah), but in these specimens, as well as others from the state, the styles are not more than 1 mm long. All Utah specimens I have seen belong to var. *angustifolia* Hook., the common phase in western North America.

Conioselinum Hoffm.

Perennial more or less caulescent herbs from a taproot or cluster of fleshy-fibrous roots, sometimes with a caudex; leaves pinnately or ternate-pinnately decomposed; inflorescence of compound umbels; involucre lacking or of a few narrow or leafy bracts; involucre of well-developed, narrow, often scarious bractlets; calyx teeth obsolete; petals white; stylopodium conic; carpophore divided to the base or nearly so; fruit elliptic or elliptic-oblong, slightly dorsally compressed, glabrous, the lateral ribs evidently thin-winged, the dorsal ribs less so and corky.

Conioselinum scopulorum (Gray) Coult. & Rose [*Ligusticum scopulorum* Gray]. Plants

perennial 3–10 dm tall, glabrous except in the inflorescence, from a fusiform taproot with simple or sparingly branched crown, without persisting leaf bases or these few and weakly persisting; leaves pinnate or ternate-pinnate with (3) 4–5 opposite pairs of lateral primary leaflets, the lower pairs 2–3 times pinnate and petiolulate, the upper pairs pinnate and pinatifid and sessile or nearly so, petioles 3–23 cm long, blades 3.5–19 cm long, ovate in outline, lowest pair of primary leaflets 1/2–2/3 as long as the leaf blade; on petiolules (0.5) 1–3.5 cm long, ultimate segments 2–15 mm long, 1–5 mm wide; peduncles 3–21 cm long, often subtended by a dilated sheath, this usually with a reduced sessile blade; umbels 1–3; involucre lacking or of 1 or few linear bracts to 1 cm long; rays 9–15, 1.5–5 cm long; involucre of 3–6 linear or linear-filiform bractlets 2–8 mm long; pedicels 4–12 mm long; petals white; stamens white; styles to about 1.3 mm long; fruit 4–6 mm long, lateral ribs narrowly corky winged, the dorsal ones not winged. Apparently rare, along streams at 2,550 to 3,200 m in Daggett, Grand, Garfield, Piute, San Juan, Summit, and Wayne counties; Wyoming to Arizona and New Mexico; 18 (iii). Plants of *C. scopulorum* are often confused with those of *Ligusticum porteri*. The two taxa differ in the following subtle ways, with features of *L. porteri* in parentheses; fruit dorsally flattened (nearly terete); bractlets of the involucre often 3 or more (0–2, rarely more); terminal umbel solitary or subtended by alternate lateral umbels (often subtended by opposite or whorled umbels); and plants from a taproot, with a mostly simple crown and with few if any persisting fibrous leaf bases (the crown simple or branched and often with numerous, persistent, fibrous leaf bases). In addition, the rays average shorter and the ultimate segments of the leaves are less conspicuously veined than in those of *L. porteri*.

Conium L.

Biennial caulescent glabrous herbs from stout taproots with purple-spotted, freely branching hollow stems; leaves pinnately or ternate-pinnately dissected; umbels compound, several or numerous; involucre and involucre of small, lanceolate to ovate bracts or bractlets; calyx teeth obsolete; petals white;

stylopodium depressed conic; carpophore entire; fruit broadly ovoid, somewhat laterally compressed, with prominent, raised, often wavy slightly winged ribs.

Conium maculatum L. Poison Hemlock. Plants 5-30 dm tall, glabrous, violently poisonous; leaves pinnate or ternate-pinnately decomposed with 6-9 opposite pairs of lateral primary leaflets, the lower pairs usually twice or more pinnate and then pinnatifid, petiolulate, the upper pairs once pinnate and pinnatifid and sessile, petioles of larger leaves 4-18 cm long; larger leaf blades to 30 cm long, reduced upward and sessile on dilated sheaths, ovate in outline; lowest pair of primary leaflets less than 1/2 to 2/3 as long as the leaf blade, on petiolules 1-5.5 mm long or those of upper leaves shorter; ultimate leaflets pinnatifid, the lobes entire or toothed, the widest confluent portions 2-5 (10) mm wide; peduncles 2-7.5 cm long; umbels many; involucre bracts 2-6, 2-6 (15) mm long, entire and ovate or ovate-caudate or ovate-cuspidate to deltoid, green with scarious margins, or rarely pinnatifid; rays 9-16, 1-4 cm long; bractlets of the involucre 4-6, 1-3 mm long, shaped like the involucre bracts; pedicels 2-6 mm long; petals white; stamens white; styles about 0.5 mm long; fruit 2-2.5 mm long, the ribs prominently ridged, narrower than the intervals. Along ditches, streams, rivers, roadsides, and fence lines, in wet and boggy meadows and moist waste places at 1,400 to 2,135 (2,990) m in Box Elder, Cache, Davis, Duchesne, Juab, Rich, Salt Lake, Sanpete, Summit, Tooele, Uintah, Utah, and Weber counties; introduced from Eurasia, now widespread in North America; 34 (iv).

Cymopterus Raf.

Perennial, acaulescent or subcaulescent, glabrous or scabrous herbs from slender to greatly enlarged and tuberlike taproots to branching woody caudices; leaves all basal (these sometimes elevated on an aerial pseudoscape) or basal and 1-few cauline mostly on the lower 1/2 of the stems, ternate to pinnate or ternate-pinnately compound, rarely simple and ternately cleft; umbels solitary to several, open or reduced to globose heads; involucre lacking or well developed; involucre of separate or united bractlets; pedicels obsolete to well developed; calyx teeth obsolete to con-

spicuous; petals white, yellow, or purple; stylopodium lacking; carpophore lacking, inconspicuous and adhering to the inner faces (commissure) of the mericarps, or well developed and persistent on the pedicel and divided to the base; fruit ovoid to oblong, somewhat flattened dorsally, the lateral and usually 1 or more of the dorsal ribs prominently winged. The strongly aromatic members of the group with woody branched caudices and greenish acute conspicuous calyx teeth have been included in the genus *Pteryxia*. These plants typically have leaves with 6-10 opposite pairs of lateral primary leaflets. Most of those in *Cymopterus* are ternate or have only 2-6 opposite pairs of lateral primary leaflets. However, the caudex and sometimes the number of primary leaflets are repeated in *C. bipinnatus* Wats., *C. aboriginum* Jones, and in other taxa long included in *Cymopterus*. If high volatile oil content is unique to taxa of the *Pteryxia* group, this feature, in combination with others might warrant generic segregation. Chemical studies might prove useful in resolving this problem.

- 1. Leaves 1 or 2 times pinnate or a few merely ternate, with entire (rarely bifid) linear or linear-elliptic leaflets 0.5-4 (5.5) cm long and 1-2 (3) mm wide; plants caulescent, of Wayne and San Juan counties, rare *C. beckii*
- Leaves not as above in all features; plants acaulescent or subcaulescent with 1-3 leaves mostly on the lower 1/3 of the stem 2
- 2(1). Peduncles rather densely hirtellous just below the umbel, mostly glabrous elsewhere; leaves mostly twice pinnate with 2-4 opposite pairs of mostly trifid or pinnatifid primary leaflets, the primary leaflets all sessile or the lower pairs on petiolules to 15 mm long; plants not aromatic, sometimes with 1 or 2 cauline leaves, montane, mostly above 2,400 m *C. lemmonii*
- Peduncles not hirtellous just below the umbel, sometimes scabrous but then not more so just below the umbel than elsewhere; leaves various but seldom with the above combination of features; plants various 3
- 3(2). Plants strongly aromatic, from a branched more or less woody caudex, mostly clothed at the base with long-persisting leaf bases and sometimes stem bases, often of rocky places; leaves with (4) 6-10 opposite or offset pairs of lateral primary leaflets, completely and finely dissected so that the ultimate segments (0.3-1.5 mm wide) are the widest undivided parts of the blade; calyx teeth rather prominent, about 0.5-1 mm long, acute, greenish (*Pteryxia* group) 4

- Plants not strongly aromatic, from fibrous tap-roots with simple or sparingly branched crowns, without or with few persisting leaf bases, not specific for rocky places; leaves once ternate to pinnately decomposed with 2-6 opposite or offset pairs of lateral primary leaflets, sometimes not completely dissected, confluent portions of blades sometimes broader than the ultimate teeth or lobes; calyx teeth to about 0.5 mm long, rarely acute . . . 5
- 4(3). Lowest pair of primary leaflets (1/5) 1/2-3/4 or more the length of the leaf blade, mostly 3-9 cm long, several times longer than the upper pairs, on petiolules 2-4 cm long; stems frequently with 1 or 2 cauline leaves on the lower 1/3; fruiting styles (2.5) 3-4 mm long, mostly curved or coiled; involucels 2-5 mm long, not exerted beyond the flowers; plants growing 1,400-2,320 (2,560) m *C. terebinthinus*
- Lowest pair of primary leaflets 1/4 or less the length of the leaf blade, to 2.7 cm long, often not more than twice as long as some of the upper pairs, sessile or on petiolules to 1 cm long; leaves strictly basal; fruiting styles to 2 (2.5) mm long, straight or nearly so, bractlets of involucels 2-10 mm long, some often exerted beyond the flowers; plants growing at (very rarely 2,285) 2,740-3,660 m *C. hendersonii*
- 5(3). Involucels scarious, purplish or whitish with purple nerves, the bractlets mostly over 3 mm wide, sometimes united to midlength; involucre like the involucels but larger or sometimes reduced or lacking; broadest wings of the fruit (2) 3-7 mm wide 6
- Involucels greenish or the bractlets very narrow and divided to the base or nearly so; involucre lacking; broadest wings of the fruit to 2.5 mm wide or to 5.5 in *C. purpureus* 8
- 6(5). Rays 1-3.5 cm long, usually at least some exceeding the well-developed to obsolete involucre through all stages of phenology, not obscured by the dense mature fruits; lobes of the involucre and involucrel not multinerved; carpophore well developed, tending to persist on the pedicels after the mericarps have fallen; fruit often oblong in outline, the wings 1.7-3(4) mm wide; plants of the Colorado drainage *C. bulbosus*
- Rays 0.3-1 cm long, rarely longer, not exerted beyond the always well-developed involucre, or if exerted then the lobes of the involucre and involucrel multinerved, obscured by the dense mature fruits; carpophore lacking or hairlike and more or less adhering to the faces of the mericarps and not persistent on the pedicels; fruit ovate to orbicular in outline, the wings 3-7 mm wide; plants of the Great Basin and Colorado drainage 7
- 7(6). Lobes of the involucels and usually of the involucre with more than 3 parallel purplish nerves that extend to or near the tip; involucre sometimes reduced to a ring; plants of Kane and Washington counties *C. multinervatus*
- Lobes of the involucels and involucre with a midnerve extending to the tip and sometimes 1 or 2 lateral shorter nerves extending to about midlength or less; involucre well developed; plants widespread *C. purpurascens*
- 8(5). Involucels green and of the same texture as the leaves, seldom scarious-margined, the bractlets mostly 1.5-4 mm wide, plants mostly obscurely viscid and dotted with numerous adhering grains of sand especially on the scapes and petioles, growing at 850-1,890 m 9
- Involucels rarely wholly green, not of the same texture as the leaves, often scarious-margined and/or the bractlets linear or narrowly elliptic and not over 1.5 mm wide; plants not viscid, rarely with numerous adhering grains of sand, sometimes growing above 1,890 m 10
- 9(8). Leaves once ternate, the 3 leaflets ternately lobed or cleft, the blades with confluent portions 5-35 mm wide; outer rays 1-3.3 cm long; bractlets of involucrel entire or rarely tridentate; pseudoscape lacking; plants of the southern 1/2 of the state *C. newberryi*
- Leaves 2-3 times pinnate with 2 (3) opposite pairs of lateral primary leaflets, some rarely ternate, the blades with confluent portions 1-7 (12) mm wide, rays to 1.3 cm long; bractlets of the involucrel often with 2-3 teeth; pseudoscape often present; plants widespread *C. acaulis*
- 10(8). Carpophore lacking; pedicels obsolete or to 1 mm long; rays obsolete or short and concealed in the very dense fruits of a globose headlike inflorescence; styles less than 1 mm long, or if rays evident (to 17 mm long) and styles to 2 mm long then leaves ternate without a rachis and with lobes sharply dentate-serrate; plants endemic to the Great Basin, not found above 1,980 m 11
- Carpophore well developed, divided to the base; pedicels mostly over 1 mm long; rays short or rather long, not concealed in the dense inflorescence; styles mostly 1-3 mm long; leaves 2-3 times pinnate or if ternate then usually with a rachis and lobes not dentate-serrate; plants of broad distribution, those with rays less than 17 mm long often found above 1,980 m 13
- 11(10). Leaves pinnate with 2-3 pairs of lateral primary leaflets, rarely some ternate, the blades narrowly ovate to oblong in outline; rays and pedicels obsolete; inflorescence a dense globose head; wings of fruit more or less spongy thickened; styles 0.5-0.8 mm long; anthers white *C. globosus*

- Leaves ternate or occasionally simple and ternately cleft, the blades reniform, orbicular, to ovate in outline; rays and sometimes pedicels more or less evident when young, inflorescence various; wings of fruit papery; styles various; anthers yellowish or purplish 12
- 12(11). Leaves 2 and opposite, rarely 3, the ultimate lobes crenate; pseudoscape solitary, subterranean; peduncles solitary; rays 3–10 mm long, hidden at maturity in the very dense globose headlike umbel; styles about 0.4 mm long; plants of Juab, Sanpete, and Sevier counties *C. coulteri*
- Leaves often more than 2, the ultimate lobes dentate; pseudoscapes or stems rarely solitary; peduncles 1–4 (6); rays 8–17 mm long, not hidden as above, the umbel not globose and headlike; styles 1.5–2 mm long; plants of Beaver and southwestern Millard counties *C. basalticus*
- 13(10). An aerial pseudoscape rather quickly developing, (3.5) 5–24 cm long; leaf blades with 4–6 opposite or offset pairs of lateral primary leaflets; umbels sometimes nodding on recurved peduncles; petals white or yellow, seldom turning light purple; plants mostly montane in central and western Utah 14
- Pseudoscape lacking or mostly subterranean, the aerial portion not over 3 cm long; leaf blades with 2–4 opposite pairs of lateral primary leaflets, or ternate; umbels not nodding; petals white or yellow, often turning dark purple 15
- 14(13). Leaves 3 times pinnate, finely and completely dissected, with the ultimate segments the widest undivided portions of the blades, these to 2 mm long and to 1 mm wide; upper primary leaflets not tending to be confluent with the rachis; petals white; anthers purple; plants of western Utah *C. ibapensis*
- Leaves 2 (3) times pinnate, the ultimate lobes or teeth 1–5 mm long, 0.5–3 mm wide, these often not as wide as the confluent portions of the blade that are up to 12 mm wide; upper primary leaflets tending to be confluent with the rachis, and pinnatifid or only lobed; petals yellow or white; anthers yellow or white; plants of northern and central Utah *C. longipes*
- 15(13). Leaves once pinnately compound with 2 opposite pairs of lateral primary leaflets, or a few ternate or rarely biternate, glaucous, confluent portions of the blades (3) 6–25 (40) mm wide; petals and stamens bright yellow when fresh, fading to cream or white in herbarium specimens; plants of the Uinta Basin at 1,430–1,800 m *C. duchesmensis*
- Leaves ternate or 2–3 times pinnately compound with up to 4 opposite pairs of lateral primary leaflets, glaucous or not, the confluent portions mostly 1–4 mm wide or if wider than the leaves ternate; petals yellow, purple, or white when fresh, if yellow then turning dark purple in herbarium specimens; plants of broad distribution 16

- 16(15). Petals cream-pink to pale purple when fresh, with light or moderate purple markings in herbarium specimens; rays of the umbel 2–18 mm long; pedicels to 3 mm long; blades of leaves 1–3 cm long, pinnately dissected, the confluent portions rarely over 3 mm wide, plants scabrous, of Garfield, Iron, and Kane counties, at moderate to high elevations *C. minimus*
- Petals yellow or purplish when fresh, turning dark purple in herbarium specimens; rays, pedicels, and leaves mostly longer than above or the leaves mostly ternate with confluent portions often 5–21 mm wide; plants widespread *C. purpureus*

***Cymopterus acaulis* (Pursh) Raf.** Plains Spring-parsley. [*Selinum acaule* Pursh]. Plants 5–18 (27) cm tall, from a simple or rarely branched, deep seated, nearly linear or slightly to much enlarged fibrous taproot; herbage often more or less viscid and dotted with sand grains; pseudoscapes 1–2 (3) per plant, 0.5–5.5 cm long, often partly or wholly subterranean; leaves basal or more often whorled with the peduncles atop the pseudoscape, occasionally 1 or 2 on a pseudoscape-like stem, 2–3 times pinnate, with (1) 2 (3) opposite pairs of lateral primary leaflets; petioles 2–8 (11) cm long, blades (1)2–5.5 (7) cm long, the confluent portions 1–7(12) mm wide, oblong, ovate, to nearly linear in outline; primary leaflets 5–35 mm long, gradually reduced upward, pinnate to bipinnatifid with few to several rounded to narrow lobes, the ultimate teeth or lobes to 10 (16) mm long, to 2 mm wide; peduncles 1–14, (1.5)3–14 (19) cm long; involucre lacking; rays about 6–9, about 1–13 mm long; bractlets of the involucre 3–8 (11) mm long, ca 1.5–4 mm wide, more or less united at the base, entire or with 2–3 teeth or lobes, green or purple in age, of the texture of the leaves; pedicels to 2 mm long; calyx teeth ca 0.2 mm long, greenish; petals white, yellow, or purple; stamens the color of the petals; styles ca 2.5 mm long; carpophore lacking; fruit 5–10 mm long, the wings slightly longer than the body, to 2 mm wide, slightly corky, some of the dorsal ones sometimes obsolete. With 4 more or less intergrading varieties in the state.

- 1. Petals and stamens yellow when fresh, sooner or later fading to white or cream when dried 2
- Petals and stamens white or purple when fresh 3

- 2(1). Peduncles mostly shorter than the leaves, to ca 4 cm long; wings of the fruit mostly strongly wavy and often erose, to 7 mm long; leaf blades to about 4 cm long; plants seldom over 7 cm tall, of the Great Basin *C. acaulis* var. *parvus*
- Peduncles equaling or exceeding the leaves, to 14 (19) cm long; wings of the fruit straight or slightly wavy, mostly entire or obscurely erose, to 10 mm long; leaf blades to 7 cm long; plants often over 7 cm tall, of the Colorado Basin *C. acaulis* var. *fendleri*
- 3(1). Petals and stamens purple; peduncles mostly exceeding the leaves; plants of Kane County *C. acaulis* var. *higginsii*
- Petals and stamens white; peduncles mostly shorter than or equalling the leaves; plants of Daggett County and the Uinta Basin *C. acaulis* var. *acaulis*

Var. *acaulis* Desert shrub, sagebrush, and juniper communities at 1,432 to 1,980 m in Daggett, Duchesne, and Uintah counties; Saskatchewan and Minnesota west to Oregon and south to Texas and northern Utah; 21 (vi). Plants with white flowers grow among those with yellow flowers in the Uinta Basin, where it is difficult if not impossible to recognize two taxa. Even when fresh the white flowers do not seem as bright as those of Wyoming, and the Uinta Basin materials seem transitional to var. *fendleri*.

Var. *fendleri* (Gray) Goodrich, comb. nov. [based on: *C. fendleri* Gray Mem. Amer. Acad. II. 4: 56. 1849; *C. decipiens* Jones, type from Cisco]. Desert shrub, blackbrush, sagebrush, and pinyon-juniper communities often on sandy soil at 1,885 to 1,890 m in Duchesne, Carbon, Emery, Garfield, Grand, Kane, San Juan, Uintah, and Wayne counties; Utah and Arizona; 74 (v). This taxon has long been separated at the species level from *C. acaulis*. The rather recent discovery of intermediate plants in the Uinta Basin and of other yellow-flowered varieties (var. *parvus* from the Great Basin and var. *greeleyorum* Grimes & Packard of Oregon) greatly weaken the case for such separation.

Var. *higginsii* (Welsh) Goodrich, comb. nov. [based on: *C. higginsii* Welsh Great Basin Nat. 35: 377. 1976]. Desert shrub communities, often on sandy alluvium of Tropic Shale at about 1,525 m in Kane County; endemic; 4 (0). The color of the petals persists as a bright purple long following collection, and the color marks this variety as distinct from any in the complex.

Var. *parvus* Goodrich, var. nov. Similis *Cymopterus acaulis* var. *acaulis* sed parvioribus saepe, petalis flavis et alis fructus undulatis et erosio valde differt, sed similis var. *fendleri* in floribus flavis et var. *acaulis* in scapis brevis. HOLOTYPE: Utah. Tooele Co., 32.7 km 326 degrees NW of Vernon. Skull Valley-Stansbury Mtns., T6S, R7W, Sec 32, near 1/4 corner with Sec 33, 1,585 m. Juniper-big sagebrush community, stabilized aeolian sand, 7 June 1984, S. Goodrich 20458 (BRY); isotypes UC, NY, RM, CAS, POM, UTC, UT, US. Additional specimens: Tooele Co., Ibid., 7 May 1984, S. Goodrich 20251 (BRY; UT, RM, NY, UTC). Desert shrub, sagebrush, and juniper communities, often on aeolian sand, at 1,400 to 1,585 m in Millard and Tooele counties; endemic; 15 (xii). This variety is similar to var. *acaulis* in the short scape, but differs in the yellow flowers. It is similar to var. *fendleri* in the yellow flowers but differs in the short scapes, and it is similar to the extralimital var. *greeleyorum* Grimes & Packard in the short scape and yellow flowers but apparently most closely related to the latter taxon. It differs from var. *greeleyorum* in the strongly undulate, erose wings of the smaller fruit. Fruiting material of var. *greeleyorum* was loaned through the kindness of Dr. Patricia Packard.

***Cymopterus basalticus* Jones** Dolomite Spring-parsley. Plants 4–15 cm tall, from a taproot with simple or branched crown, glabrous, glaucous, with 1–few mostly etiolated, subterranean, short pseudoscapelike stems; pseudoscape mostly lacking, if present short and enveloped in bladeless sheaths, the crown sometimes with a few long-persisting leaf bases; leaves basal, (2) 3–9 per plant, ternately divided without a rachis, or occasionally simple and ternately cleft, petioles 1.5–5 cm long, blades 1–3.5 cm long, orbicular to reniform, confluent portions 4–32 mm wide; leaflets 5–30 mm long, sessile, orbicular, ternately lobed, the major lobes again lobed, mostly ternately so, the ultimate lobes coarsely dentate; peduncles 1–4 (6) per plant, 3.5–8 (14) cm long; involucre lacking; rays 6–14, 8–17 mm long, usually evident in fruit; bractlets of the involucre 6–8, 2–5 mm long, more or less united at the base, white, pink, or purplish with white scarious margins; pedicels obsolete or nearly so; petals white or purplish; stamens yellowish or purplish;

styles 1.5–2 mm long; carpophore lacking; body of fruit 3–6 mm long, the wings 4–7 mm long, 1–2 mm wide, whitish, papery, some of the dorsal ones often reduced. Desert shrub communities, gravelly hills and alluvial fans mostly of dolomite substrate, at 1,705 to 1,985 m in western Beaver and Millard counties; Utah and adjacent White Pine County; Nevada, a rather narrow Great Basin endemic; 21 (v). The orbicular to reniform leaf blades without a rachis are unique in the genus.

Cymopterus beckii Welsh & Goodrich Pinate Spring-parsley. Plants 20–40 cm tall, glabrous, weakly if at all aromatic, caulescent with leaves extending well up the stem, from a taproot with a simple or sparingly branched crown, often clothed at the base with long-persisting leaf bases; leaves 1 or 2 times pinnate, with 2–3 opposite pairs of lateral leaflets, or the upper ones sometimes ternate, petioles 2–13 cm long, blades 2–10 cm long; leaflets 3–7, 0.5–4 cm long, or the terminal one to 5.5 cm long, 1–2 (3) mm wide, sessile, linear or linear-elliptic, entire or rarely a few bifid; peduncles 4–8 (19) cm long; umbels 1–3 per stem; involucre lacking; rays 6–11, 0.6–1.4 cm long; bractlets of the involucre about 5, 1–5 mm long, to 1 mm wide, greenish or with narrow scarious margins, mostly separate; pedicels 1–3 mm long; petals and stamens bright yellow when fresh, fading whitish when dried (whitish within 2 years in herbarium specimens); styles 1.2–2.2 mm long; carpophore weak, adhering to the mericarps; fruit 6–8 mm long, oblong, the lateral wings to about 1 mm wide, the dorsal ones narrower, some often obsolete. Sandy or stoney places, pinyon-juniper-mountain brush communities at 1,700 to 2,150 m in San Juan and Wayne counties; endemic; 8 (iv). Apparently closely allied to *C. lemmonii*, but differing in entire leaflets, glabrous peduncles and rays, and the slightly longer fruit.

Cymopterus bulbosus A. Nels. Onion Spring-parsley. Plants 8–27 cm tall, glabrous, glaucous, from a stout, thickened, often bulbous, fibrous taproot with a simple or sparingly branched crown; pseudoscapae obsolete or 1–2 (3), to 6.5 cm long and often partly or wholly subterranean, enveloped in dilated bladeless sheaths; leaves few to several, basal or whorled atop the pseudoscape with the peduncles, rarely 1 or 2 cauline, (1) 2–3 times

pinnate, with (2) 3–6 opposite or offset pairs of lateral primary leaflets, the upper pairs often once-pinnate and more or less confluent, blades 2–10 cm long, ovate to oblong or nearly linear, confluent portions 1–5 mm wide, lowest pair of primary leaflets to 4 cm long, sessile or on petiolules to 2(5) mm long, the other primary leaflets progressively reduced upward, ultimate lobes and teeth 1–8 (12) mm long, about 1–4 mm wide, more or less rounded; peduncles (1) 3–8 (11) per pseudoscape, 4–18 cm long; involucre obsolete or reduced to a ring or cup, or the bracts well developed, to 13 mm long, translucent, white, more or less united, with a green midrib and occasionally 1 or 2 lateral nerves that extend to about 1/3 the length of the bract; rays 5–15, 1–3.5 cm long, usually exceeding the involucre at all stages of phenology; involucels 3–10 mm long, the bractlets more or less united at the base, similar in texture and color to the involucre, with a green center and midrib or the midrib sometimes purple, rarely with 1 or 2 lateral nerves extending to about midlength; pedicels 3–9 mm long; calyx teeth about 0.5–1 mm long, scarious, white, like the involucel, with a green midrib to about midlength; petals white, sometimes purplish in age; stamens white, or purple especially in age; styles about 2–4 mm long; carpophore divided to the base, more or less persistent on the pedicel after the mericarps have fallen; body of the fruit 6–11 mm long, to 2 (3) mm wide, the wings (7) 9–13 mm long, 1.7–3 (4) mm wide. Desert shrub and juniper communities at 1,220 to 2,005 m in the Colorado drainage in Carbon, Duchesne, Emery, Garfield, Grand, San Juan, Uintah, and Wayne counties; Wyoming to New Mexico and Arizona; 95 (xi). See *C. purpurascens*.

Cymopterus coulteri (Jones) Mathias Two-leaf Spring-parsley. [*C. corrugatus* var. *scopulicola* Jones; *C. corrugatus* var. *coulteri* Jones; *Rhysopterus jonesii* Coult. & Rose]. Plants 4–11 cm tall, glabrous from a slightly to much enlarged fibrous taproot with simple crown, this giving rise to a solitary, mostly subterranean pseudoscape 2–6 cm long; leaves 2 (rarely 3 or 4 and the third and fourth ones usually smaller), opposite, borne at or near ground level, ternate or rarely simple and ternately cleft, petioles 1–3 cm long,

blades 2–4 cm long, ovate to nearly orbicular in outline, confluent portions (5) 8–38 mm wide; leaflets 7–35 mm long, the lateral ones sessile mostly ternately lobed, the terminal on a winged more or less confluent rachis to 1 cm long, ternately cleft, the main lobes again lobed or crenate-toothed; peduncle solitary, 2–7 cm long; umbel globose, headlike, 1.5–5 cm across in pressed fruiting specimens; involucre lacking; rays 7–14 or perhaps more, 3–10 mm long, somewhat evident at anthesis, but hidden by the dense mature fruits; bractlets of the involucre 2–4 mm long, linear to narrowly ovate, green or purplish in age, often 3-nerved, with whitish or purplish scarious margins; pedicels shorter than the bractlets; calyx teeth minute but white and of the texture of the petals, deciduous; petals white; filaments white, anthers purple; styles (including the stigmas) ca 0.4 mm long; carpophore lacking; body of fruit 5–7 mm long, the wings 7–10 mm long, to about 2 mm wide, papery. Desert shrub, black sagebrush, and juniper communities, often on Arapien shale and other clayey and gravelly barrens or semibarrens at 1,540 to 1,700 m in Juab, Sanpete, Sevier, and Tooele counties; endemic; 28 (vii). The strong tendency for plants to have but 2 leaves is unique in the genus.

Cymopterus duchesnensis Jones Uinta Basin Spring-parsley. Plants 7–23 cm tall, from a slender or more often enlarged bulbous taproot with simple or branched crown, glabrous and glaucous, not or weakly aromatic; stems short, often branched; pseudoscape lacking; leaves basal or 1–3 or more cauline, pinnate with 2 pairs of lateral leaflets, or occasionally a few ternate, or rarely biternate, petioles 2.2–11 cm long, blades (2) 3–10.5 mm long, ovate to oblong in outline, the confluent portions (3) 6–25 (40) mm wide; leaflets 1–5, on petiolules 2–32 mm long, ternately cleft or divided, the major lobes to 3 cm long, (3) 5–15 (20) mm wide, often again toothed or lobed and mostly ternately so, the ultimate teeth or lobes 1–8 mm wide; peduncles 1–3 per stem, 7–17 cm long; involucre lacking; rays 6–17, 1.5–4.4 cm long; bractlets of the involucre lacking or more often 1–7, 1–5 mm long, more or less united at the base, linear; pedicels (2) 4–9 mm long; petals and stamens bright yellow when fresh, fading to cream or greenish in herbarium specimens,

not turning purple; styles 2–2.2 mm long; carpophore divided to the base, more or less persistent on the pedicel; body of fruit 5–9 mm long, the wings to 11 mm long, 2–2.5 mm wide, undulate to corrugated, more or less papery and not corky. Desert shrub, sagebrush, and juniper communities, sandy clay and clay semibarrens of Duchesne River, Mancos Shale, Morrison, Uinta, and Wasatch formations at 1,430 to 1,860 m, centered in Uintah County and also in eastern Duchesne County, Utah, and extreme western Moffat and Rio Blanco counties, Colorado; 47 (xiii).

Cymopterus globosus (Wats.) Wats. Golf-ball Spring-parsley. [*C. montanus* var. *globosus* Wats.]. Plants 4–10 cm tall, from a slender or thickened fibrous taproot; pseudoscape (1) 2–6 cm long, all or nearly all subterranean, often loosely enveloped in dilated bladeless sheaths; leaves 1 or 2 atop the pseudoscape and some usually arising directly from the fibrous root and then with etiolated subterranean petioles, pinnate or bipinnate and then trifold or pinnatifid, with 2–3 opposite pairs of sessile lateral primary leaflets, or rarely ternate, petioles 1.5–6 cm long, blades 2–5 cm long, narrowly ovate to oblong, confluent portions 5–10 mm wide, lowest pair of primary leaflets 10–18 mm long, the ultimate lobes to 4 mm long, to 2 mm wide, mostly toothed; peduncles 1 or 2, 3–6 cm long; involucre lacking; umbel a globose head, the rays and pedicels obsolete; involucre concealed in the dense flowers and fruits; petals white; stamens white; styles 0.5–0.8 mm long; carpophore lacking; body of the fruit about 6 mm long, the wings ca 9 mm long, to ca 2.8 mm wide, wider toward the outside of the head, spongy thickened. Desert shrub communities at 1,400 to 1,525 m in Box Elder, Juab, Millard and Tooele counties; eastern California, Nevada, and western Utah; a Great Basin endemic; 6 (0).

Cymopterus hendersonii (Coul. & Rose) Cronq. Mountain Rock-parsley [*Pseudoteryx longiloba* Rydb.; *Pterxia hendersonii* (Coul. & Rose) Mathias & Const.; *Pseudocymopterus hendersonii* Coul. & Rose]. Plants (3) 5–34 cm tall, glabrous, strongly aromatic, from a branched woody caudex, clothed at the base with old petiole and peduncle bases, these sometimes persisting for a few or several years without shredding; leaves

basal, bipinnate or occasionally partly tripinnate with 5–10 opposite or offset pairs of lateral primary leaflets, petioles (1) 2–14 cm long, blades (1) 1.5–10 cm long, oblong in outline, finely dissected so that the ultimate segments are the widest undivided parts of the blade, lowest pair of primary leaflets about 1/4 or less the length of the leaf blade, 5–27 mm long, sessile or on petiolules to 1 cm long, upper primary leaflets gradually reduced, the ultimate segments 1–12 mm long, 0.3–1.4 mm wide, acute, with a usually whitish tiny mucro; peduncles 7–30 cm long; umbels compact; involucre lacking; rays 6–16, 0.5–2.4 cm long, the inner ones shorter than the outer ones and often abortive; bractlets of the involucre 2–6, 2–10 mm long, linear, acute; pedicels 1–5 mm long; calyx teeth about 1 mm long, persisting in fruit, greenish, often reddish tinged, acute; petals and stamens bright yellow when fresh, fading whitish in herbarium specimens; styles to 2 (2.5) mm long; carpophore divided to the base; fruit 4–8 mm long, the wings to about 1 mm wide, some of the dorsal ones sometimes obsolete. Talus, cliffs, ledges, rocky spruce-fir, limber pine, and alpine communities at (2,285) 2,740 to 3,660 m in Beaver, Box Elder, Cache, Daggett, Duchesne, Grand, Juab, Piute, Salt Lake, San Juan, Sevier, Summit, Tooele, Uintah, and Utah counties; southwestern Montana and central Idaho, south to New Mexico; 66 (x).

Cymopterus ibapensis Jones Ibapah Springparsley. [*C. watsonii* (Coul. & Rose) Jones]. Plants 7–25 cm tall, glabrous or granular-scabrous, not or weakly aromatic, from a linear taproot, this hardly if at all swollen, with a simple or occasionally branched crown; pseudoscapas 1–2 (5) per root, the aboveground portion 3.5–10 cm long, commonly enveloped at the base by scarios dilated bladeless sheaths; leaves whorled atop the pseudoscape, rarely some arising directly from the root, tripinnate, with 5–6 opposite or offset pairs of lateral primary leaflets, petioles (1) 1.5–3.5 cm long, blades (2.5) 4–11 cm long, ovate in outline, completely dissected so that the ultimate segments are the widest undivided portions of the blade; lowest pair of primary leaflets about 1/2 to over 3/4 as long as the leaf blade, sessile or on petiolules to 2 cm long, with 4–6 (8) opposite or offset pairs of

secondary leaflets, the ultimate segments to 2 mm long, to about 1 mm wide; peduncles (2) 4–8 per pseudoscape, 2–15 cm long; umbels sometimes nodding on the sometimes recurved peduncles; involucre lacking; rays 10–18, 5–20 mm long; bractlets of the involucre to 4 mm long, to 0.5 mm wide, separate or nearly so, green with a purple midrib and narrow scarios margins; pedicels 4–6 mm long; calyx teeth to 1 mm long, greenish; petals white; filaments white, anthers purple; styles 1–2 mm long; carpophore divided to the base; body of fruit 5–8 mm long, the wings 6–9 mm long, to 2 mm wide, some of the dorsal ones sometimes reduced. Greasewood-sagebrush, sagebrush-grass, and pinyon-juniper communities at 1,520 to 2,755 m in Beaver, Box Elder, Iron, Millard, Piute, either or perhaps both Juab and Tooele, and Washington counties; southeastern Oregon, and Nevada; 30 (viii).

Cymopterus lemmonii (Coul. & Rose) Dorn Springparsley. [*Pseudocymopterus lemmonii* (Gray) Coul. & Rose; *P. tidestromii* Coul. & Rose; *P. versicolor* Rydb.; *P. montanus* (Gray) Coul. & Rose; *Thaspium montanum* Gray; *Ligusticum montanum* (Gray) Gray]. Plants 8–50 cm tall, glabrous except on the peduncle and in the inflorescence, not or weakly aromatic, from a taproot with simple or branched crown, more or less clothed at the base with shredded persisting leaf bases; pseudoscape lacking; leaves basal and sometimes 1 or 2 cauline ones on the lower 1/3 of the stem and occasionally 1 on the upper 3/4, mostly bipinnate and then often bifid or pinatifid in the lower part, with 2–4 opposite or offset pairs of lateral primary leaflets, rarely pinnate in part with entire leaflets; petioles 1–13 cm long, with a dilated base, blades (1) 2–8 cm long, confluent portions to 4 mm wide; lowest pair of primary leaflets 1/4–2/3 as long as the leaf blade, sessile, or on petiolules to 15 mm long, the ultimate segments 2–20 mm long, linear or narrowly elliptic; peduncles 1–9 per plant, (4) 9–28 cm long, rather densely hirtellous just below the umbel; involucre lacking, or rarely of 1 or 2 small bracts; rays (5) 9–18, 0.8–2.5 cm long, glabrous, scabrous or hirtellous; bractlets of the involucre 5–11, to 5.5 mm long, linear or narrowly elliptic, separate or united at the very base, green or sometimes with a scarios or

purplish margin; pedicels obsolete or to 2 mm long; calyx teeth less than 0.5 mm long, deciduous; petals and stamens bright yellow when fresh, pale or purplish in age; styles about 2 mm long; carpophore apparently lacking to well developed and divided to the base; fruit mostly 3–6 mm long, the wings ca 1.5 mm wide, some of the dorsal ones sometimes obsolete. Grass-forb, aspen, Douglas fir, and spruce-fir communities, and windswept ridges and raw escarpments especially in limestone, at 2,375 to 3,600 m in Beaver, Emery, Garfield, Grand, Iron, Piute, San Juan, Sanpete, Sevier, Washington, and Wayne counties; southeastern Wyoming to Arizona and Durango, Mexico; 138 (vii). Occasional specimens have been confused with *Lomatium juniperinum*. The following key should aid in separating the two.

1. Peduncles hirtellous just below the umbel; rays 0.8–2 cm long, sometimes scabrous; plants otherwise glabrous, of Sanpete County and southward; petals yellow when fresh, but turning whitish in herbarium specimens; pedicels obsolete or to 2 mm long; lowest pair of primary petiolules to 1.5 cm long
 *Cymopterus lemmonii*
- Peduncles glabrous or not any more pubescent than the rest of the plant; rays 1–8 cm long; plants rarely with glabrous herbage, and then with cream or white petals, from Sanpete County and northward; pedicels 3–16 mm long; lowest pair of primary petiolules 1–3 cm long *Lomatium juniperinum*

***Cymopterus longipes* Wats.** Long-stalk Spring-parsley [*Peucedanum lapidosum* Jones, type from Echo, Summit County; *C. lapidosus* (Jones) Jones; *Lomatium lapidosum* (Jones) Garrett]. Plants 7–30 (50) cm tall, glabrous, not aromatic, from a thickened fibrous taproot with a simple or sparingly branched crown; pseudoscares 1–3, 4–24 cm long, mostly aerial, rarely a small portion of it subterranean, more or less enveloped by dilated bladeless sheaths; leaves whorled atop the pseudoscape, rarely any rising from the fibrous root, (1) 2 (3) times pinnately compound, with mostly 4–6 opposite or offset pairs of lateral primary leaflets, the upper pairs often more or less confluent and merely pinnatifid, petioles 1–5 cm long, blades 3–8.5 cm long, oblong to ovate in outline, the confluent portions 2–12 mm wide; lowest pair of primary leaflets 1–5 cm long, sessile, or on

petiolules to 5 mm long, the ultimate lobes or teeth about 1–5 mm long, about 0.5–3 mm wide; peduncles 3–18 per pseudoscape, 4–24 cm long; umbels sometimes nodding, on the sometimes recurved peduncles; involucre lacking; rays 4–11, 0.5–3.3 cm long; bractlets of the involucre to 7 mm long, mostly less than 1 mm wide, mostly separate, green with very narrow scarious margins; pedicels 1–12 mm long; calyx teeth 0.2–0.5 mm long; petals yellow or white when fresh, when yellow fading to white in herbarium specimens; stamens the color of the petals; styles about 2 mm long; carpophore divided to the base; body of the fruit 4–6 mm long, the wings 5–8 mm long, 1–2 mm wide. Mostly in sagebrush-grass communities, but also in pinyon-juniper and mountain brush communities at 1,340 to 3,155 m in Box Elder, Cache, Carbon, Daggett, Davis, Duchesne, Juab, Morgan, Rich, Salt Lake, Sanpete, Summit, Tooele, Uintah, Utah, Wasatch, and Weber counties; southeastern Idaho and northcentral Utah to northwestern Colorado; 160 (xxi). White-flowered specimens are common in the Bear River Range and occasional to the central part of the Wasatch Range. The yellow petals of more southern specimens turn whitish in the herbarium, and the ranges of the two color variants are difficult to determine from herbarium specimens. Other than the color difference, there seems to be no way to tell the phases apart. A third phase, in which the fruits are *Lomatium*-like (dorsal ribs not or scarcely winged), apparently has white flowers. This phase, known from Summit County and adjacent Wyoming, is referable to *C. lapidosum* (Jones) Jones, which may be worthy of the specific status given it by Jones.

***Cymopterus minimus* (Mathias) Mathias** Least Spring-parsley. [*Aulospermum minimum* Mathias]. Plants 3–10 (10) cm tall, acaulescent, scabrous, from a slender to much enlarged often deep-seated taproot, with few to several often sloboliferous branches; stems mostly subterranean and etiolated; pseudoscares lacking or short and subterranean; leaves mostly 2–3 times pinnately dissected, with 3–4 opposite pairs of lateral primary leaflets, petioles 0.5–2 cm long or sometimes much longer with etiolated subterranean portions, blades 1–3 cm long, the confluent portions 1–6 (10) mm wide, the primary leaflets

sessile or the lowest pair on petiolules to 0.5 cm long, the ultimate segments to 3 mm long, to ca 2 mm wide; peduncles 1.5–14 cm long; rays of the umbel mostly 5–10, 0.2–1.8 cm long; bractlets of the involucre about 3–4, 2–4 mm wide; pedicels nearly obsolete or to 3 mm long; calyx teeth minute or lacking; petals cream-pink or pale purple (reputedly white) with whitish margins or with moderately purple markings in herbarium specimens; stamens whitish; styles about 2 mm long; carpophore divided to the base; fruit 4–8 mm long, the wings to 1 mm wide. Ponderosa pine, bristlecone pine, spruce-fir, and perhaps pinyon-juniper communities, at (2,190) 2,440 to 3,170 m, in Garfield, Iron, and Kane counties; endemic; 23 (i). Occasional specimens are intermediate to *C. purpureus*, and more work is needed to establish the range of the small plants with cream-pink or pale purple petals. These plants have been confused with *C. purpureus* var. *rosei*, and they are similar in the short rays, short pedicels, small fruit, small leaves, and scabrosity, but the leaves are not ternate, and they are more finely dissected than those of *C. purpureus* var. *rosei*. In some features of the leaves and in distribution this taxon is more closely allied with *C. purpureus* var. *purpureus*. At the extreme (Cedar Breaks) these plants are very different, but through a series of recent collections from the Markagunt, Paunsaugunt, and Table Cliff plateaus and Escalante Mountains, a rather close relationship to *C. purpureus* var. *purpureus* is evident. Perhaps this is only a part of the *C. purpureus* complex and could be treated as a variety, but no such combination is proposed herein. The color of the petals seems to be diagnostic.

Cymopterus multinervatus (Coul. & Rose) Tidestr. Purple-nerved Spring-parsley. [*Phellopterus multinervatus* Coul. & Rose]. Plants 10–15 cm tall, glabrous and glaucous, from a linear or slightly to much enlarged fibrous taproot; pseudoscape lacking or solitary, to 7.5 cm long, partly or mostly subterranean, often enveloped by dilated, scarious bladeless sheaths; leaves basal or whorled, with the peduncles atop the pseudoscape, 2–3 times pinnately compound, with 3–5 opposite pairs of lateral primary leaflets; petioles 1–7.5 cm long; blades 1–7 cm long, ovate in outline, lowest pair of primary leaflets to 4.5

cm long, sessile or on petiolules to 5 mm long, the ultimate lobes to 4 (7) mm long, to 2 mm wide, sometimes with small rounded teeth; peduncles 1–8, 4–10 cm long; involucre to 1 (1.5) cm long, the bracts more or less united, sometimes forming a cup or reduced to a ring, greenish basally and centrally, with broad, white scarious margins, multinerved, the nerves purplish, more or less parallel; rays (3) 5–11, 0.3–1 cm long, obscured by the dense fruits, included in or exerted beyond the involucre; involucels 5–10 mm long, like the involucre in color, texture, and venation, but never reduced to a ring; pedicels to about 4 mm long, included in the involucre; calyx teeth 0.5–1 mm long or somewhat enlarged and simulating the involucre; petals white or purple; stamens white or purple; styles about 2–3 (4) mm long; carpophore lacking; body of the fruit 7–10 mm long, the wings 12–13 mm long, 5–7 mm wide. Desert shrub and sagebrush communities at 1,220 to 1,525 m in Kane and Washington counties; southern Utah to southern California and to southwestern Texas and northern Mexico; 7 (0).

Cymopterus newberryi (Wats.) Jones Sweetroot Spring-parsley. [*Peucedanum newberryi* Wats.]. Plants 7–18 cm tall, more or less slightly viscid and often dotted with adhering sand grains, from a slender or slightly to much enlarged fibrous taproot with simple or rarely branched crown; pseudoscape lacking; leaves arising directly from the fibrous root, ternate, rarely simple and ternately cleft; petioles 3.5–10.5 cm long, (1.6) 2.5–5 times as long as the blades, often partly subterranean, blades 1–4(5.5) cm long, confluent portions 5–35 mm wide; leaflets 1–3.5 cm long, cleft or divided and mostly ternately so, the major lobes again lobed or toothed and often ternately so, the ultimate lobes or teeth to 6 mm long, to 5 mm wide; peduncles 1–10, 5–17 cm long, often partly subterranean; involucre lacking; rays 5–16, the central ones often greatly reduced or obsolete, the outer ones 1–3.3 cm long; bractlets of the involucels 3–12 mm long, to 3 mm wide, entire, green, or sometimes purplish in age, with texture of the leaves; pedicels about 1 mm long; calyx teeth about 0.5 mm long, deciduous; petals and stamens yellow when fresh, fading to cream or greenish cream in herbarium specimens; styles about 2–3 mm long; carpophore

lacking; body of fruit 5–8 mm long, the wings 6–10 mm long and 1–1.5 mm wide, more or less corky, some of the dorsal ones obsolete. Desert shrub, blackbrush, sand sagebrush, desert grassland, and juniper communities, mostly on very sandy soil, at 850 to 1,830 m in Beaver, Garfield, Grand, Kane, Millard, San Juan, Washington, and Wayne counties; southern Utah and northern Arizona; 47 (x).

Cymopterus purpurascens (Gray) Jones Widewing Spring-parsley [*C. montanum* var. *purpurascens* Gray]. Plants 5–15 cm tall, glabrous and glaucous, from a mostly enlarged tuberlike fibrous taproot with simple or sparingly branched crown, the crown usually with few to several persistent shredded leaf bases; pseudoscapae lacking or to 3 per plant and to 6 cm long, mostly subterranean, usually enveloped by scarios dilated bladeless sheaths; leaves basal or more or less whorled atop the pseudoscape, 2–3 times pinnately compound, with 3–6 opposite pairs of lateral primary leaflets, the pairs gradually reduced upward, petioles 0.6–5 cm long, sometimes longer including etiolated subterranean portions, blades 1.2–7 cm long, oblong to ovate in outline, confluent portions to 3 (5) mm wide, lowest pair of primary leaflets (0.4) 1–2 (4) cm long, sessile or on petiolules to 3 mm long, the ultimate lobes or teeth rounded, mostly with narrow-scarious margins; peduncles 1–3 per pseudoscape, 3–9 cm long; involucre 8–14 mm long, more or less united at the base and sometimes to about midlength, whitish, scarios, the lobes with a greenish or purplish midnerve extending to the tip, and usually 1 or 2 parallel lateral, much shorter nerves; rays about 4–7, rarely longer than 1 cm, mostly shorter than the involucre, hidden in the dense broadly winged fruits; involucels like the involucre but shorter (about 5–7 mm) and usually with the lateral nerves over 1/2 as long as the midnerve, the nerves occasionally branched; pedicels to 5 mm long, mostly concealed in the involucels and in the dense fruits; calyx teeth less than 0.5 mm long, rounded; petals white or purplish with a green or purplish midvein; filaments white, anthers purple; styles about 2 mm long; carpophore lacking or hairlike and less than 0.02 mm wide, not persisting on the pedicel; body of fruit 6–11 mm long, the wings 9–16 mm long and 3–6.5 mm wide. Desert shrub, sage-

brush, pinyon-juniper, bullgrass, and ponderosa pine communities, on aeolian sand to heavy clay at 1,065 to 2,745 m in all Utah counties except Daggett, Davis, Grand, Morgan, Rich, Summit, Wasatch, and Weber; southeastern Idaho to southeastern California and northwestern New Mexico; 106 (xxi). *Cymopterus purpurascens* is often confused with *C. bulbosus*, but it is distinguished by a number of features. In addition to those listed in the key, the lobes of the involucre and involucel of *C. bulbosus* mostly are only 1-nerved, this occasionally with 1 or 2 short lateral nerves. The involucre is sometimes reduced to a ring or cup in *C. bulbosus*, but it is always well developed in *C. purpurascens*; *C. bulbosus* also flowers later (often a month or so) than does *C. purpurascens*, and it is confined to lowlands mostly of heavy soil, whereas *C. purpurascens* is found on a wide range of sites and soils. However, rare specimens (Neese 7169 and Thorne et al. 1707) show the broad wings of fruit typical of *C. purpurascens*, but they have rays well over 1 cm long that are exerted beyond the involucre, and at least some of the fruits have a well-developed carpophore. Perhaps these specimens indicate rare hybridization of these two taxa.

Cymopterus purpureus Wats. Variable Spring-parsley. Plants 5–26 cm tall, from a slender to much thickened fibrous taproot with a simple or branched crown; stems solitary to several, arising at or just below ground level; pseudoscape mostly lacking, mostly less than 2 cm long when present and then usually mostly subterranean; leaves basal or nearly so, ternate or (1) 2–3 times pinnately compound, with up to 4 opposite pairs of lateral primary leaflets, petioles 1–7 cm long, blades 1.5–13 cm long, mostly ovate in outline, lowest pair of primary leaflets mostly over 1/2 and to 3/4 as long as the leaf blade, sessile or on petiolules to 32 mm long, the ultimate lobes or teeth acute or rounded; peduncles 1–5, 3–21 cm long; involucre lacking; rays 5–22, 0.2–9.5 cm long; bractlets of the involucel 4–8, 2–4 mm long, separate or united at the base, acute to acuminate, entire; pedicels 1–10 mm long; calyx teeth less than 0.5 mm long, deciduous; petals yellow when fresh, drying dark purple in the field or within a year or 2 in herbarium specimens; stamens yellow

when fresh, remaining yellowish or cream or at least pale in herbarium specimens; styles about 2–3 mm long; carpophore divided to the base; body of the fruit about 4–8 mm long, the wings 5–10 (12) mm long, 1.5–4 mm wide, often marked with purple. With 3 more or less integrading varieties in the state.

- 1. Fruiting rays 5–8 (15), 0.2–2 (3) cm long; fruiting pedicels 1–5 (7) mm long; wings of fruit 5–8 mm long, to 2 mm wide; leaf blades 1–3.5 (4) cm long, mostly (not always) ternate, the leaflets with rounded lobes; plants glabrous, or more often scabrous, lower to midmontane, mostly of central Utah *C. purpureus* var. *rosei*
- Fruiting rays (8) 12–22, (2) 2.5–7 (9.5) cm long; fruiting pedicels 5–10 mm long; wings of fruit 8–10 (12) mm long, (2) 2.5–4 mm wide; leaf blades commonly 3–9 (13) cm long, pinnately compound, rarely ternate, often with acute ultimate segments, plants mostly glabrous, rarely scabrous, of deserts and lower montane, widespread 2
- 2(1). Plants conspicuously glaucous, of Washington, Iron, and Beaver counties; some wings of fruit apparently thickened and spongy; ultimate teeth of leaves acute *C. purpureus* var. *jonesii*
- Plants not conspicuously glaucous, not of the above counties except Washington; wings of fruit mostly thin and papery; ultimate teeth of leaves acute to rounded *C. purpureus* var. *purpureus*

Var. *jonesii* (Coul. & Rose) Goodrich, comb. nov. [based on: *Cymopterus jonesii* Coul. & Rose Rev. N. Amer. Umbell. 80, 1888; *Aulospermum jonesii* (Coul. & Rose) Coul. & Rose]. Sagebrush, pinyon-juniper, and mountain brush communities at 1,520 to 1,905 m in Beaver, Iron, and Washington counties; southwestern Utah and adjacent Nevada; 10 (i).

Var. *purpureus* Desert shrub, sagebrush, pinyon-juniper, mountain brush, ponderosa pine, and rarely aspen-fir communities in sandy to heavy clay soils at 1,100 to 2,375 (2,880) m in Carbon, Duchesne, Emery, Garfield, Grand, Kane, San Juan, Uintah, Washington, and Wayne counties; eastern and southern Utah, western Colorado, northern Arizona, and northwestern New Mexico; 134 (v). Specimens with rather broad leaflets from the Uinta Basin (Neese et al. 7273, and White and Neese 123) indicate a close relationship to and possible hybridization with *C. duchesnensis*.

Var. *rosei* (Jones) Goodrich, comb. nov. [based on: *Aulospermum rosei* Jones in Coul. & Rose. Contr. U.S. Nat. Herb. 7: 179. 1900; *C. rosei* (Jones) Jones]. Pinyon-juniper, sagebrush, mountain brush, bull grass, limber pine, white fir, and rarely desert shrub communities, in marly limestone, shaley slopes, and clay or sandy clay soils at (1,615) 1,760 to 2,290 (2,650) m in Duchesne, Juab, Millard, Sanpete, Sevier, and Wasatch counties; endemic to central Utah; 28 (x). The plants from the Sevier drainage are quite removed from plants of the rest of the complex. In this case the differences seem to be a function of isolation, but the Duchesne County materials are not so isolated from plants of var. *purpureus*. The differences in this case seem to be more a function of ecological stress than of isolation. An independent origin is suggested. Random plants of var. *purpureus* with features intermediate to those of var. *rosei* are found in other parts of the range of var. *purpureus* (Neese 5775; Foster 4380, 8338; and N. H. Holmgren et al. 1998). Most of the plants of the Sevier drainage are quite different from those of var. *purpureus*, but some would be difficult to place without location data (Welsh 12803; Neese & White 2925; and anonymous 1322a, UT 11951). Recognition at varital level seems appropriate.

***Cymopterus terebinthinus* (Hook.) T. & G.** Rock Parsley. [*Selinum terebinthinum* Hook.; *Pteryxia terebinthina* (Hook.) Coul. & Rose]. Plants (12) 15–35 (40) cm tall, glabrous, strongly aromatic, from a heavy, nearly woody root surmounted by a mostly branched caudex, the caudex clothed with leaf bases that often persist for a few years without shredding; pseudoscape lacking; leaves basal and often 1–3 on the lower 1/3 (1/2) of the stem, mostly 2–4 times pinnately or ternate-pinnately compound, with (4) 6–10 opposite or offset pairs of lateral primary leaflets, petioles 2–13 cm long, blades 1.5–14 cm long, finely and completely dissected so that the ultimate segments are the widest undivided part of the blade, lowest pair of primary leaflets mostly 3–9 cm long, (1/5) 1/2–3/4 as long as the leaf blade, on petiolules 2–4 cm long, the ultimate segments 1–5 (7) mm long, 0.5–1 (1.5) mm wide; peduncles 10–34 cm long; involucre lacking; rays 7–13, 0.7–5 (8) cm long; bractlets of the involucre (0) 1–5, 2–5

mm long, separate or united at the base, linear or linear-subulate; pedicels 2–5(10) mm long; calyx teeth 0.5–0.9 mm long, acute, rather persistent; petals and stamens bright yellow when fresh, fading whitish and rarely yellow for more than 2 years in herbarium specimens; fruiting styles (2–5) 3–4 mm long, mostly curved or coiled; carpophore divided to the base, persisting on the pedicel; body of fruit 5–8 mm long, the wings 6–9 mm long, 0.5–1.5 (2.5) mm wide, some of the dorsal ones sometimes reduced or obsolete. There are two varieties in Utah.

- 1. Lateral pairs of primary leaflets all longer than their internodes; lowest pair of primary leaflets various but often less than 4 times as long as wide, with the lower secondary leaflets sometimes petiolulate; leaf blades not skeletonlike, the ultimate segments appearing to be more numerous or longer or both than in the following variety; plants of the Uinta Basin and northern Utah.
 *C. terebinthinus* var. *calcareus*
- Upper 4–6 pairs of lateral primary leaflets equal or shorter than their internodes; lowest pair of primary leaflets 4–10 times longer than wide, with sessile secondary leaflets; leaf blades skeletonlike, the ultimate segments appearing to be fewer or shorter or both than in the preceding variety; plants of eastern Utah south of the Uinta Basin
 *C. terebinthinus* var. *petraeus*

Var. *calcareus* (Jones) Cronq. [*Cymopterus calcareus* Jones]. Desert shrub, sagebrush, pinyon-juniper, and mountain brush communities, often in talus, colluvium, and crevices of rock outcrops at 1,445 to 2,320 (2,560) m in Box Elder, Cache, Daggett, Juab, Rich, and Uintah counties; Montana to Colorado, and west to southern Idaho and northeastern Nevada; 36 (vii). Some of the Uintah County materials are transitional to plants of var. *petraeus*. Plants of var. *calcareus* are very similar to those of *C. terebinthinus* var. *albiflorus* (T. & G.) Jones, which was originally described as having white flowers. Dried flowers soon turn white or whitish in all of the *C. terebinthinus* complex, and the two varieties are both reported from the same regions of Montana and Wyoming. Unfortunately, the misnomer var. *albiflorus* has priority by many years, and our plants might belong to that taxon.

Var. *petraeus* (Jones) Goodrich, comb. nov. [based on: *C. petraeus* Jones' Contr. W. Bot.

8: 32. 1898]. Skeletonleaf Rock-parsley. Desert shrub, blackbrush, and pinyon-juniper communities, often in talus, colluvium, crevices of rock outcrops, and in sandy to clayey soil at 1,400 to 2,075 m in Emery, Grand, and San Juan counties; Great Basin in Nevada and southern Idaho, and Colorado drainage in Utah and northwestern Arizona; 16 (i). The disjunction from the Great Basin in Nevada to the Colorado Basin in Utah without occurrence in the Great Basin in Utah is most unusual. An independent origin is suggested for the Utah materials, which at present are known to be separated from plants of var. *calcareus* only by Desolation Canyon of the Green River. The Colorado drainage materials are as skeletonlike or more so than the Nevada materials but are not so distinct as to warrant separate status, even if from an independent origin. Neither the Nevada nor Utah materials are so distinct from plants of var. *calcareus* as to warrant recognition at the species level. They fit well into *C. terebinthinus* both morphologically and in volatile oils, and they are surrounded on 3 sides by other varieties of *C. terebinthinus*. Without distribution data some of the San Juan County specimens as well as some from central Nevada would be nearly if not wholly impossible to distinguish from some specimens of var. *calcareus* of the Uinta Basin.

Daucus L.

Annual or biennial caulescent herbs from taproots; leaves pinnately dissected; umbels compound; involucre of pinnatifid bracts or lacking; involucre of toothed or entire bracts or lacking; calyx teeth evident to obsolete; petals white or those of the central flower of the umbel or umbellet often purple or rarely all the flowers pink or yellow; stylopodium conic; carpophore entire or bifid at the apex; fruit oblong to ovoid, slightly compressed dorsally, evidently ribbed dorsally, with two ribs on the commissure, beset with stout spreading glochidiate or barbed ribs.

- 1. Plants biennial, introduced, cultivated and occasionally escaping and then somewhat weedy; widespread; bracts of the involucre mostly pinnatifid into mostly entire rather rigid elongate segments *D. carota*

— Plants annual, native, not cultivated, known from the Virgin Narrows in Arizona, to be expected in Washington County; bracts of the involucre pinnatifid into often lobed or toothed nonrigid segments . . . *D. pusillus* Michx.

Daucus carota L. Carrot. Plants 6–10 dm tall, from a taproot; herbage glabrous or hirsute; leaves in rosettes and cauline, mostly 1–2 times pinnate and then pinnatifid, with about 4–9 opposite or offset pairs of lateral primary leaflets, basal and lower cauline petioles to 15 cm long, basal and lower blades 5–15 cm long or more, the upper ones reduced and sessile on dilated sheaths, lowest pair of primary leaflets about 1/3–1/2 as long as the leaf blade, on petiolules 4–15 mm long, ultimate segments 1–10 mm long, 0.5–2 mm wide, elliptic, or narrowly deltoid, or linear, often acute; peduncles mostly 8–30 cm long; umbels 4–10 or more; involucre of pinnatifid bracts 1–5 cm long, the segments linear and narrow; rays about 15–60 or more, (0.5) 1–6 cm long; involucels similar to the involucre but smaller, or the bractlets entire, 2–16 mm long; fruit 3–4 mm long, bristly hirsute in rows, the hairs or bristles about 2 mm long, minutely glochidate at the apex, the intervals often with shorter simple hairs. Cultivated in all counties of the state, wild (mostly along ditchbanks and waste places) mostly in the more populated counties of the state; introduced from Eurasia; 16 (iv). The wild plants (ssp. *carota*) differ from the cultivated plants [ssp. *sativus* (Hoffm.) Arcangeli] primarily in the size and flavor of the root.

Foeniculum Adans.

Biennial or perennial, caulescent herbs with strong odor of anise, glabrous, glaucous, from a taproot; leaves pinnately dissected with filiform ultimate segments; umbels compound; involucre and involucel lacking; calyx teeth obsolete; petals yellow; stylopodium conic; carpophore divided to the base; fruit oblong, subterete, or slightly compressed laterally, with prominent ribs.

Foeniculum vulgare Mill. Sweet Fennel. Short-lived perennial herbs 1–2 m tall, from a taproot; leaves solitary, branched above; leaves to 3-times ternate-pinnately compound with about 6–9 opposite pairs of ateral primary leaflets; petioles to about 15 cm long rather abruptly expanded into a dilated

sheathing base or lacking and blades arising directly from the sheath; larger blades to 30 or 40 cm long, ovate in outline, finely and completely dissected, the elongated filiform ultimate segments 4–40 mm long and less than 1 mm wide, the lowest pair of primary leaflets on petiolules often over 2 cm long; peduncles 1.5–6.5 cm long; umbels several; rays 10–40, 2–8 cm long; petals yellow; styles 0.3–0.4 mm long; fruit 3.5–4 mm long. Roadsides and waste places at 850 to 1,465 m in Utah and Washington counties; native of the Mediterranean region, widely introduced elsewhere, and in much of the United States especially toward the south, perhaps not well adapted to much of Utah except Washington County; 3 (0).

Heracleum L.

Biennial or perennial herbs from a taproot or fascicle of fibrous roots, leaves ternately or pinnately compound, with broad toothed or cleft leaflets; umbels compound; involucre lacking or of a few deciduous bracts; involucel lacking or of slender bractlets; flowers of the marginal umbellets generally irregular, the outer petals enlarged and often deeply bilobed; calyx teeth obsolete or minute; stylopodium conic; carpophore divided to the base; fruit orbicular to obovate or elliptic, strongly flattened dorsally, usually pubescent, the dorsal ribs narrow, the lateral ribs broadly winged.

BRUMMIT, R. K. 1971. Relationship of *Heracleum lanatum* Michx. of North America to *H. sphondylium* of Europe. *Rhodora* 73:578–584.

Heracleum lanatum Michx. Cow parsnip. [*H. sphondylium* ssp. *lanatum* (Michx.) A. & D. Love]. Stout single-stemmed perennial herbs 8–25 dm tall, from a taproot or cluster of fibrous roots, glabrate or thinly to densely villous or villous-hirsute below to villous-woolly above, especially on the nodes; leaves ternate or the upper ones simple, petioles to 25 cm long or longer, or lacking on upper leaves with the petiolules and rachis arising directly from a dilated sheath, blades to 40 cm long or longer, ovate to orbicular; leaflets 8–36 cm long or longer, ovate to orbicular, usually with 3 major lobes that are again lobed and coarsely toothed; peduncles 5–24 cm long; involucre lacking or of few mostly linear

entire bracts to 2 cm long; rays 12–25, 3.5–12 cm long; involucels of 3–5 linear, subulate or caudate bractlets to 15 mm long; pedicels 6–26 mm long; petals white (2) 4–8.5 mm long, at least some deeply bilobed; filaments white, anthers whitish to dark green or yellow with pollen; styles about 1 mm long, the stigmas incurved; fruit 8–12 mm long, obovate to obcordate, strongly flattened, the lateral ribs with wings about 1–1.5 mm wide, the dorsal ribs filiform. Aspen, tall forb, fir, oak-maple, willow, streamside, and wet meadow communities and around seeps and springs at 1,430 to 2,930 m in Box Elder, Cache, Carbon, Davis, Duchesne, Juab, Salt Lake, Sanpete, Sevier, Summit, Tooele, Uintah, Utah, Wasatch, and Weber counties; Eurasia and across much of North America; 61 (iii).

Hydrocotyle L.

Perennial herbs; stems creeping or floating, rooting at the nodes; leaves petiolate, often peltate; inflorescences sessile, or borne on axillary peduncles; involucre small or lacking; petals white, greenish, or yellow; calyx minute or lacking; stylopodium conic to depressed; fruit orbicular to ellipsoid, more or less flattened laterally, the dorsal surfaces rounded or acute, the ribs obsolete or narrow and acute; carpophore lacking.

Hydrocotyle verticillata Thunb. Water Pennywort. Plants glabrous, with slender creeping stems; leaves peltate, suborbicular, 0.5–6 cm wide, shallowly lobed and often crenate; petioles slender, 3–20 cm long or longer; peduncles slender, axillary; flowers apparently verticillate in few to several well-separated whorls; petals pale, small; fruits subsessile, truncate at the base, 1.5–2 mm long, 2–3 mm wide. Moist ground or in water at 850 to 1,005 m in Washington County; South America north to Massachusetts and California; 4 (0).

Ligusticum L.

Perennial caulescent or acaulescent herbs from taproots; leaves ternately or ternate-pinnately compound or dissected, the lower ones with well-developed petioles, the upper ones with blades arising directly from dilated sheaths; umbels compound; involucre and involucel lacking or of a few narrow bracts or bractlets; calyx teeth evident or obscure;

petals white; stamens white; stylopodium low-conic; carpophore divided to the base; fruit oblong to ovate or suborbicular, subterete or slightly compressed laterally, the ribs evident, often winged.

- 1. Ultimate leaf segments more or less linear or very narrowly elliptic, mostly 0.5–3 mm wide, entire 2
- Ultimate leaf segments (at least some) elliptic or broader, some usually over 3 mm wide, sometimes toothed or lobed 3
- 2(1). Umbels mostly solitary; occasionally 2, rarely 3, never opposite; rays 0.5–3.6 cm long; petioles 1.2–13.5 cm long; leaf blades 3–19 cm long; plants 10–45 (64) cm tall, of the Uinta Mountains *L. tenuifolium*
- Umbels 2–5 or more, the lateral ones occasionally opposite or whorled; rays 2.5–6.5 (8) cm long; petioles 8–32 cm long; leaf blades (9) 12–30 cm long; plants (40) 60–100 cm tall, of central Utah and western Uinta Mountains *L. filicinum*
- 3(1). Umbels 2 or 3, the lateral 1 or 2 alternate, subtended by much reduced leaves; plants of the Raft River Mountains *L. grayi*
- Terminal umbel subtended by often opposite or whorled umbels and 1–3 or more alternate umbels from the axils of reduced or well developed leaves; plants widespread . . . *L. porteri*

Ligusticum filicinum Wats. Fernleaf Ligusticum. Plants (4.5) 6–13 dm tall, aromatic, glabrous, from a heavy taproot with a simple or branched crown, the crown clothed with fibrous persisting petiole bases; leaves basal and 1–3 cauline, ternate-pinnately 3 times dissected, with 5–6 (7) opposite pairs of lateral primary leaflets, basal petioles 8–32 cm long, blades (9) 12–30 cm long, ovate in outline, lowest pair of primary leaflets 1/2–3/4 as long as the leaf blade, on petiolules 2.5–10 cm long; ultimate leaf segments 1–18 mm long, 0.75–2.5 (3) mm wide, linear, very narrowly elliptic or narrowly deltoid, entire or bifid or trifid; peduncles (5) 10–17 (23) cm long; terminal umbel subtended by 1–3 smaller umbels, the lateral ones arising from axils of leaves and alternate or the upper ones not from leaf axils and opposite or rarely 3 per node; involucre lacking; rays 7–27, 2.5–6.5 (8) cm long; involucels of 1–3 linear separate usually deciduous bractlets to 5 mm long; pedicels 4–12 mm long; petals white; stamens whitish; styles ca 0.5 mm long; fruit 5–8 mm long. Tall forb, aspen, sagebrush-grass, forb-grass, Douglas fir, and spruce-fir communi-

ties at (1,920) 2,377 to 3,110 m in Cache, Duchesne, Juab, Morgan, Sanpete, Summit, Tooele, Utah, and Wasatch counties; Idaho, Montana, Utah and Wyoming; 46 (xx). This taxon is rather easily confused with *L. porteri* (q.v.).

Ligusticum grayi Coult. & Rose Grays Ligusticum. Plants 3–6 (9.5) dm tall, glabrous, aromatic, from a stout taproot with simple or branched crown, the crown clothed with fibrous persisting petiole bases; leaves basal and usually 1–3 much reduced cauline ones, ternate-pinnately twice compound and then pinnatifid with (2) 3–5 opposite pairs of lateral primary leaflets, petioles (2.5) 4–34 cm long, blades 4–26 cm long, ovate in outline, lowest pair of primary leaflets 1/2–3/4 as long as the blade, on petiolules 1–6.5 cm long, the larger secondary leaflets pinnatifid with the larger lobes again bilobate or trilobate; peduncles 2–55 (90) cm long; terminal umbel subtended by 1–2 alternate umbels arising from the axils of much reduced leaves; involucre lacking or rarely of 1 linear mostly deciduous bract to about 1 cm long; rays 8–18, 1.2–4 cm long; involucels lacking or of 1–5 linear bractlets to 4.5 mm long; pedicels 4–10 mm long; petals white; stamens whitish; styles 0.8–1.1 mm long; fruit 4–6 mm long. Forb-grass and fir communities and snowflush areas at 2,650 to 2,900 m in the Raft River Mountains, Box Elder County; Washington to California and east to Idaho and northwestern Utah; 3 (iii).

Ligusticum porteri Coult. & Rose Southern Ligusticum. [*L. brevilobum* Rydb., type from the Aquarius Plateau]. Similar to *L. filicinum*, but leaves with broader ultimate segments, these (1.5) 3–8 mm wide, and with the terminal umbel often subtended by a whorl of 3–8 lateral umbels, and occasionally with up to 12 or more umbels, but sometimes with the lateral umbels only 2 and opposite, but not alternate. Sagebrush, oak, aspen, Douglas-fir, spruce, fir, and occasionally in open forb-grass communities at 2,255 to 3,171 m in Beaver, Carbon, Duchesne, Garfield, Grand, Iron, Juab, Kane, Millard, Piute, San Juan, Sanpete, Sevier, Uintah, and Utah counties; southern Wyoming to northern Mexico, west to Idaho and Arizona; 58 (x). Plants of this taxon are sometimes mistaken for *Conioselinum scopulorum* (q.v.). The separation

of *L. porteri* from *L. filicinum* is made difficult by a rather extensive overlap in distribution and lack of definitive morphology from Utah County south to Sevier County. Otherwise the ranges of the two taxa are essentially discrete in Utah, but occasional specimens from scattered locations throughout the state would be difficult to place without location data.

Ligusticum tenuifolium Wats. Small Ligusticum; Slender-leaf Ligusticum. [*L. filicinum* var. *tenuifolium* (Wats.) Mathias & Const.]. Plants 11–64 cm tall, glabrous mildly aromatic from a taproot, the crown more or less covered by short shredded old leaf bases; leaves basal and sometimes 1 or 2 cauline, ternate and then 2–3 times pinnate with 5–7 pairs of lateral primary leaflets; petioles 1.2–13.5 cm long; blades 3–19 cm long, completely dissected, ovate in outline; lowest pair of primary leaflets about 1/2 to 2/3 as long as the blade, on petiolules (0.5) 1–4 cm long, the upper primary leaflets progressively reduced, the ultimate segments 2–9 mm long, 0.5–1.5 (2.5) mm wide; scapes or peduncles 10–45 (61) cm long; involucre lacking; umbel solitary or the terminal one sometimes subtended by a lateral 1 (very rarely 2) that usually arises from the axil of a reduced leaf; rays 6–15, 0.5–3.6 cm long; involucels lacking or of 1–3 filiform-linear bractlets to 3 mm long; pedicels 2–4 mm long; calyx obsolete; petals about 1 mm long, white, sometimes tinged with light purple in age; stylopodium evident, conic; styles 0.5–0.8 mm; fruit about 3–5 mm long. Moist and wet meadows, along streams in lodgepole pine and Engelmann spruce woods at 2,440 to 3,420 m, common across the Uinta Mountains, in Daggett, Duchesne, Summit, Uintah, and Wasatch counties; northeast Oregon to western Montana south to Colorado and Uinta Mountains of Utah; 37 (xviii). Through a series of features (none of which are exclusive), plants of *L. tenuifolium* are readily distinguished from those of *L. filicinum*. The two taxa are sympatric in the western Uinta Mountains, where somewhat intermediate specimens occur, but the range of overlap is small and few specimens seem intermediate.

Lomatium Raf.

Plants perennial, acaulescent or caulescent, occasionally with a short pseudostem, glab-

rous or pubescent, from a slender tap root that sometimes has 1 or more tuberlike segments, or from a thickened, woody branching caudex, sometimes clothed at the base with marcescent material; stems simple or rarely branched and thus peduncles and umbels mostly solitary; leaves pinnate or pinnately to ternate-pinnately compound, sheaths often dilated especially in lower leaves, petioles well developed and distinct or confluent with and poorly differentiated from the sheath, or lacking and the petiolules arising directly from the sheath, ultimate segments extremely variable; involucre lacking or inconspicuous; rays few to many, spreading to ascending, the central ones often shorter and sterile; involucre mostly of separate or partly united bractlets, rarely lacking; pedicels slender or stout, the central ones often shorter and sterile; petals small, yellow, white, greenish yellow or purplish; calyx teeth obsolete or small, or conspicuous in a very few species; styles slender, often curved or coiled; stylopodium lacking; carpophore divided to the base; fruit linear to orbicular or obovate, flattened dorsally, glabrous or pubescent, dorsal ribs filiform or obsolete or occasionally with rudimentary wings at base. **Note:** The genus is closely related to the genus *Cymopterus*, and the filiform, wingless, dorsal ribs of the fruit seem the only consistent difference from *Cymopterus*. The dependability of this separation is somewhat weakened by the tendency for lack of dorsal wings in some taxa of *Cymopterus*.

- 1. Leaves once-pinnate and/or the ultimate segments over 15 mm long and less than 50 per leaf; plants glabrous and/or petals yellow when fresh 2
- Leaves more than once-compound, the ultimate segments not over 15 mm long and mostly over 50 per leaf, or if a few ultimate segments over 15 mm long or less than 50 per leaf then plants pubescent and petals white 9
- 2(1). Leaves once-pinnate or partly bipinnate, the leaflets sessile and more or less confluent with the rachis; plants from stout, more or less woody caudices, clothed at the base with long-persisting leaf bases, from the southern 1/2 of the state. 3

- Leaves more than once-compound, the primary leaflets mostly with well-developed petiolules, not confluent with the rachis; (plants from taproots or small caudices, not much if at all clothed at the base with long-persisting leaf-bases, from the northern 1/2 of the state except in *L. nuttallii* and then plants keyed both ways) 6
- 3(2). Leaflets lanceolate to elliptic, 2–12 mm wide, some always over 5 mm wide; plants of Grand and northern San Juan counties ... *L. latilobum*
- Leaflets linear, not over 4 mm wide; distribution not as above 4
- 4(3). Leaves with 1–7 elongate, terete leaflets that simulate the rachis in diameter and shape, these 1–18 cm long, at least some commonly over 5 cm long in each leaf; calyx teeth greenish, acute, somewhat persistent, about 1 mm long; fruit 8–12 mm long; plants of Emery, Garfield, and eastern Sevier counties, mostly below 716 m *L. junceum*
- Leaves either with more than 7 leaflets and/or leaflets less than 5 cm long and more or less flattened and at least slightly wider than the rachis; calyx teeth not over 0.6 mm long, scarious or greenish; fruit various; distribution not as above, mostly of higher elevations 5
- 5(4). Plants 2–12 (17) cm tall, of Garfield and Iron counties; fruit 4–7 mm long, leaflets 3–13 per leaf, 0.2–1.5 (2) cm long *L. minimum*
- Plants 15–30 cm tall or taller, not known from the above counties; fruit 5–15 mm long; leaflets sometimes more than 13 per leaf, sometimes over 2 cm long *L. nuttallii*
- 6(2). Ultimate leaflets ovate to nearly orbicular or a few broadly elliptic, less than 3 times as long as wide, at least some dentate-toothed on the upper 1/4; rays (4) 8–19 cm long; peduncle often swollen just beneath the umbel; plants of the Deep Creek Mountains and western Box Elder County *L. nudicaule*
- Ultimate leaflets linear to elliptic, 3 or more times longer than wide, entire; rays 0.5–10 cm long; peduncle not swollen just beneath the umbel; distribution not as above 7
- 7(6). Plants caulescent, glabrous; peduncles to 13 cm long; involucre lacking; root very slender, sometimes with 1 or more globose or fusiform tuberous segments; ultimate leaflets and rays very unequal *L. ambiguum*
- Plants acaulescent or if caulescent then the peduncles mostly over 13 cm long and plants puberulent; involucre present, to 1 cm long; root not as above; ultimate leaflets and rays various 8

- 8(7). Plants from thickened woody branching caudices, glabrous, strongly aromatic, often of rocky places, escarpments, or semibarrens; caudex often clothed with old long-persisting leaf bases; leaves strictly basal, the ultimate leaflets 0.3–5(6.5) cm long; 0.5–2(4) mm wide; lateral wings of the fruit to 1 mm wide *L. nuttallii*
- Plants from taproots or small caudices, puberulent at least on the peduncle, not strongly aromatic, mostly growing in loamy soil; old leaf bases lacking or weakly persisting; leaves basal and sometimes 1–3 cauline, the ultimate leaflets 1–13 cm long, 1–6(15) mm wide; lateral wings of the fruit 1–2 mm wide *L. triternatum*
- 9(1). Larger mature leaves with blades (10) 15–30 cm long, ternate-pinnately compound, the larger ultimate segments 2–3 mm wide; plants 30–130 cm tall, peduncles fistulose, (3) 4–6 (10) mm thick at the base *L. dissectum*
- Blades of leaves 2–11 cm long or if longer then either not at all ternate or with ultimate segments not over 1 mm wide; plants rarely over 50 cm tall; peduncles fistulose or not, often less than 4 mm thick 10
- 10(9). Plants pubescent; petals white or yellow ... 11
- Plants glabrous or at most scabrous; petals yellow or if white then plants keyed both ways 15
- 11(10). Ovaries and fruit glabrous or occasionally somewhat scabrous; plants of the central part and the northern 1/2 of eastern Utah (rare specimens of *L. nevadense* from southern Utah will key here) 12
- Ovaries and young fruit rather densely pubescent older fruit sometimes glabrous but often retaining some hirtellous hairs; plants of the central, western, and southern parts of Utah 13
- 12(11). Bractlets of the involucl about 10, the longer ones 4–10 mm long, pubescent; herbage more or less villous; leaves with about 4 opposite pairs of primary lateral leaflets, the lowest pair sessile or on petiolules to 1 cm long; mature fruit 9–12 (15) mm long *L. macrocarpum*
- Bractlets of the involucl 1–5, 1–4.5 mm long, glabrous; herbage glabrate to puberulent; leaf blades with (3) 4–6 opposite pairs of lateral primary leaflets, the lowest pair on petiolules 1–3 cm long; mature fruit 5–8 (11) mm long (rare specimens of *L. nevadense* with glabrous ovaries will key here, but then the primary leaflets all sessile or nearly so) *L. juniperinum*
- 13(11). Longer ultimate segments of leaves 5–27 mm long, some often over 1 mm wide; leaves mostly with 4 opposite pairs of sessile or nearly sessile lateral primary leaflets; root slender, usually with a deep-seated globose or fusiform tuberous segment; bractlets of the involucl glabrous or sparingly pubescent; petals white *L. nevadense*
- Ultimate segments of leaves 1–5 mm long, to 1 mm wide; leaves mostly with 5–8 opposite pairs of sessile or petiolulate lateral primary leaflets; root not as above; bractlets of the involucl pubescent; petals yellow, rarely white 14
- 14(13). Petals and anthers yellow; leaves often conspicuously ternate-pinnately compound, the lowest pair of primary leaflets nearly sessile or on petiolules to 5 cm long, some of these often arising directly from a dilated sheath with the petiole lacking or only to 2.5 cm long; plants common *L. foeniculaceum*
- Petals white; anthers purple or whitish; leaves pinnately or scarcely ternate-pinnately compound, the lowest pair of primary leaflets sessile or on petiolules to 1.5 cm long, these rarely arising directly from a dilated sheath, but rather from a petiole 1–4 (6) cm long; plants apparently rare, known only from western Millard County *L. ravenii*
- 15(10). Lowest pair of primary leaflets less than 1/3 as long as the leaf blade, sessile or on petiolules to 1.2 cm long; leaves strictly basal, the blades never arising directly from dilated sheaths; plants clothed at the base with old long-persisting leaf bases, of the southern 1/2 of the state 16
- Lowest pair of primary leaflets 1/3 to 3/4 as long as the leaf blade, sessile or on petiolules to 7.5 cm long; leaves basal and sometimes a few on the lower part of stems, the blades often arising directly from dilated sheaths; (plants not clothed at the base with old leaf bases and of the northern 1/2 of the state except sometimes in distribution of *L. grayi*) 18
- 16(15). Mature pedicels 1–10 mm long; fruit 4–9 mm long; leaves and peduncles scabrous, the blades 2–7 cm long; plants of the Great Basin and Washington County *L. scabrum*
- The longer mature pedicels 10–20 mm long; fruit (6) 8–20 mm long; leaves and peduncles glabrous or plants of the Colorado Basin 17
- 17(16). Leaf blades 3–7 cm long, the ultimate segments 2–4 mm long; fruit 8–10 mm long; rays 4–6, 1–3 cm long; plants densely scabrous, 10–15 cm tall, of western Colorado, to be expected in Utah in extreme eastern Grand and San Juan counties *L. eastwoodeae* (Coult. & Rose) Macbr.

- Leaf blades 7–24 cm long, the ultimate segments 1–15 mm long; fruit to 20 mm long; plants glabrous, glaucous, 8–40 cm tall, of the Colorado Basin and Washington County *L. parryi*
- 18(15). Bractlets of the involucl broadly elliptic to obovate, to 3 mm wide; pedicels 1–2 mm long; ultimate segments of leaves 2–13 mm long, 0.5–4 mm wide, dimorphic, plants of northwestern Box Elder County *L. cous*
- Bractlets of the involucl linear to subulate, not over 1 mm wide; pedicels 2–18 mm long; ultimate segments of leaves 1–7 mm long, 0.2–1.5 mm wide, not much if at all dimorphic 19
- 19(18). Petals white or cream; ultimate segments of leaves 0.5–1.5 mm wide; plants not aromatic; pedicels 3–16 mm long; leaves with 3–6 opposite pairs of lateral primary leaflets; rare glabrous forms *L. juniperinum*
- Petals yellow when fresh; ultimate segments of leaves 0.6–0.2 mm wide; plants strongly aromatic, glabrous; pedicels various; leaves various 20
- 20(19). Fruit 2–4 mm wide, the wings 0.4–0.6 mm wide; pedicels 2–5 mm long; rays very unequal; inflorescence open during flowering; leaves with 5–6 opposite pairs of lateral primary leaflets; plants not clothed at the base with old leaf bases, from a slender root, this often with 1 or more tuberlike segment *L. bicolor*
- Fruit 5–8 mm wide, the wings about 1.5–2 mm wide; pedicels 5–18 mm long; rays subequal; inflorescence congested at flowering time; leaves with about 7–10 opposite pairs of lateral primary leaflets; plants often clothed at the base with old long-persisting leaf bases, from a more or less woody branched caudex *L. grayi*

***Lomatium ambiguum* (Nutt.) Coult. & Rose**
Wyeth Biscuitroot. [*Eulophus ambiguus* Nutt.]. Plants caulescent, 10–40 cm tall, glabrous without persisting leaf bases; root very slender, sometimes with 1 or more globose or elongate tuberlike segments; leaves ternately or ternate-pinnately compound, petioles to 2 cm long or lacking and blades arising from a dilated sheath 1.5–4 cm long, blades 4–15 cm long, ovate in outline, lowest pair of primary leaflets mostly over 1/2 as long as the blade with petiolules 1–4 cm long, ultimate segments about 15–45, 0.3–9 cm long, 1–4 mm wide, often very unequal in the same leaf; peduncle 2.5–13 cm long; involucre lacking; rays 0.5–6.5 cm long, very unequal in the same umbel; involucl lacking; pedicels 2–12 mm long; petals and stamens yellow, fading in herbarium specimens; styles about 1 mm long; fruit 8–10 mm long, 2–3 mm wide, lat-

eral wings about 0.5 mm wide, dorsal ribs filiform. Sagebrush and mountain brush communities at 1,525 to 1,980 m in Cache, Salt Lake, Utah, and Weber counties; Washington and adjacent British Columbia to Montana and south to Utah and Wyoming; 14 (0). The narrow fruits, unequal rays, and slender root with globose or elongate tuberlike segments are features also found in plants of *L. bicolor*, but the larger-leaf segments are conspicuously different from the very narrow and shorter ones of plants of *L. bicolor*.

***Lomatium bicolor* (Wats.) Coult. & Rose**
Wasatch Biscuitroot. [*Peucedanum bicolor* Wats.]. Plants 10–50 cm tall, acaulescent or caulescent, aromatic, glabrous, without persisting leaf bases or these few and weakly persisting; from a slender taproot, this often with one or more tuberlike segments; leaves ternate-pinnately decomposed, petioles mostly lacking and the blades arising directly from a dilated sheath, blades 4–12 cm long, ovate in outline, finely and completely dissected, the lowest pair of primary leaflets mostly over 1/2 as long as the leaf blade, with petiolules 2.5–6 cm long, each with 5–6 opposite or offset pairs of secondary leaflets, ultimate segments mostly over 300, 1–4 (6) mm long, 0.2–0.6 mm wide; peduncle 10–28 cm long; rays 3–12 (20), 1–8 (11) cm long, very unequal in the same umbel; involucl lacking or of 1–8 linear separate bractlets; pedicels 2–5 mm long; petals and stamens yellow; styles about 1 mm long; fruit 8–11 mm long, 2–4 mm wide, congested; lateral wings 0.4–0.6 mm wide, dorsal ribs filiform. Sagebrush, mountain brush, aspen, and meadow communities at 1,525 to 2,438 m in Cache, Morgan, Rich, Salt Lake, and Weber counties; southeastern Idaho and northern Utah; 25 (0). This taxon has been included in *L. leptocarpum* (T. & G.) Coult. & Rose. Plants of the two taxa differ only in size of ultimate segments of leaves. Perhaps they are not distinct at the species level. *L. bicolor* has priority at the species level.

***Lomatium cous* (Wats.) Coult. & Rose**
Cous Biscuitroot. [*Peucedanum cous* Wats.]. Plants 5–15 (25) cm tall, not or weakly aromatic, glabrous (ours), from a globose or fusiform tuberous root, this sometimes deep-seated and giving rise to a subterranean pseudoscape; leaves basal and sometimes 1–2 cauline on the lower 1/3 or rarely to midlength

of the stem, 2–3 times pinnately or ternate-pinnately compound, blades 4–8 (11) cm long, mostly borne on dilated sheaths with the petioles obsolete or short or some leaves originating from the deep-seated tuber and then with etiolated, mostly subterranean petioles to 11 cm long, lowest pair of primary leaflets about 1/2 to over 3/4 as long as the leaf blade, sessile or with petiolules to 42 mm long, ultimate segments or lobes 2–13 mm long, 0.5–4 mm wide, as many as 200 or more, linear to elliptic; peduncles 1–7, 3–18 cm long; involucre lacking or of a solitary bract to 7 (10) mm long; rays 6–15, 0.4–5 cm long, strongly dimorphic in the same umbel; bractlets of the involucre about 6–10, 3–5 mm long, to 3 mm wide, broadly elliptic, ovate or obovate, greenish, sometimes with yellowish or scarious margins; pedicels 1–2 mm long; calyx teeth obsolete; petals and stamens yellow when fresh, fading to white in herbarium specimens; styles about 1.5 mm long; fruit 6–9 mm long, the lateral wings to about 1 mm wide, the dorsal ribs filiform or very obscurely winged. Sagebrush-grass communities at 2,440 to 2,560 m, in the Grouse Creek and Raft River Mountains, Box Elder County; Oregon to Montana, south to northwestern Utah and northeastern Nevada; 2 (ii).

Lomatium dissectum (Nutt.) Mathias & Const. Giant Lomatium. [*Leptotaenia dissecta* Nutt.]. Plants 30–130 cm tall, mostly short caulescent, puberulent or rarely glabrous, from a woody thickened taproot or caudex, without old leaf bases or these short-persistent and soon shredding; leaves pinnately or ternate-pinnately decompose, with 5–9 opposite or offset pairs of primary leaflets, or the upper cauline leaves much reduced, petioles 3–20 cm long, often lacking on cauline leaves and then the blades sessile on a dilated sheath, blades 10–30 cm long or smaller on cauline leaves, ovate in outline, the lowest pair of primary leaflets usually over 1/2 as long as the leaf blade, with petiolules 2.5–12 cm long, ultimate segments numerous, 1–12 mm long, 0.5–3 mm wide; peduncles 15–50 (90) cm long; involucre lacking or rarely of 1–3 rather quickly deciduous bracts; rays 9–27, 2–7 (12) cm long; bractlets of the involucre 3–6 mm long, or occasionally much longer and foliaceous; pedicels 3–10 (15) mm long; petals and stamens yellow, yellow-

green, or purplish; styles about 1.5 mm long; fruit 9–15 (20) mm long, 6–10 mm wide, lateral wings about 1–2 mm wide, dorsal ribs filiform. Sagebrush, pinyon-juniper, oak-maple, aspen-fir, riparian, and rarely greasewood-desert shrub communities, from rock outcrops to deep loamy soil, at 1,280 to 2,650 (3,170) m in Beaver, Box Elder, Cache, Duchesne, Iron, Juab, Millard, Morgan, Rich, Salt Lake, Sanpete, Summit, Tooele, Uintah, Utah, Washington, and Weber counties; southern British Columbia and Alberta south to southern California, Arizona and Colorado; 91 (xiii). Utah materials are referable to *var. eatonii* (Coul. & Rose) Cronq. [*Leptotaenia eatonii* Coul. & Rose]. Sometimes the leaves are mistaken for those of *Ligusticum porteri*, but the mostly solitary umbel is strikingly different from the usually opposite or whorled lateral umbels in addition to the terminal one in the *Ligusticum*.

Lomatium foeniculaceum (Nutt.) Coul. & Rose Desert-parsley. [*Ferula foeniculacea* Nutt.]. Plants 5–25 (38) cm tall, acaulescent, densely pubescent throughout, from a more or less branching caudex and deep taproot, often clothed at the base with persisting leaf bases; leaves ternate-pinnately dissected, with 6–8 opposite pairs of lateral primary leaflets, petioles to 2.5 cm long or lacking and the blade arising from a dilated sheath, blades 2–13 cm long, completely and finely dissected, ovate in outline, the lowest pair of primary leaflets over 1/2 as long as the blade, sessile or with petiolules to 5 cm long, ultimate segments numerous, often more than 500, 1–3 (5) mm long, 0.5–1 (2.5) mm wide; peduncles 4–30 cm long; rays 5–20, 0.2–7 cm long; bractlets of the involucre 2–5 (6) mm long, separate or united at the very base, linear; pedicels 2–12 mm long; petals and anthers yellow (rarely white) when fresh and mostly remaining yellow for many years in herbarium specimens or occasionally turning purplish; styles about 1.5–2 mm long; fruit 5–10 mm long, 3–7 mm wide, lateral wings about 1–2 mm wide, dorsal ribs filiform. Sagebrush (mostly black sagebrush), pinyon-juniper, and mountain brush communities at 1,250 to 2,635 m in Beaver, Daggett, Box Elder, Emery, Juab, Kane, Millard, Sanpete, and Tooele counties; Manitoba to Missouri and Texas, west to southeastern Oregon and

California; 71 (xvi). Most Utah materials are referable to var. *macdougalii* (Coul. & Rose) Cronq. Some plants from western Utah with ciliolate petals are referable to var. *fimbriata* (Theobald) Boivin, but this feature seems variable in some populations.

***Lomatium grayi* (Coul. & Rose) Coul. & Rose** Milfoil Lomatium. [*L. millefolium* (Wats.) Macbr.]. Plants (8) 15–40 (80) cm tall, acaulescent or subcaulescent, strongly aromatic, glabrous, from a simple or branched caudex and thick taproot often clothed at the base with old, mostly shredded fibrous leaf bases; leaves ternate-pinnately dissected, with about 7–10 opposite pairs of lateral primary leaflets, petioles to 14 cm long or lacking and the blades arising from a dilated sheath 1–16 cm long, blades 7–16 (2) cm long, finely and completely dissected, ovate in outline, the lowest pair of primary leaflets from 1/2 to as long as the blade, with petiolules 1–7.5 cm long, ultimate segments several hundred or a thousand or more, extremely fine, 1–3 (6) mm long, 0.2–0.3 mm wide; peduncle 10–45 (70) cm tall; rays 10–26, 1.5–6 (8) cm long; bractlets of the involucre 3–5 mm long, linear, separate or united at the base; pedicels 5–13 (18) mm long; petals and stamens yellow when fresh, soon fading whitish when dried; styles 1.5–2.5 mm long; fruit 6–12 mm long, 5–8 mm wide, lateral wings about 2 mm wide, dorsal ribs filiform. With 2 intergrading but more or less geographically distinct varieties.

1. Fruit 6–9 (10) mm long, the lateral wings to about 1.5 mm wide; leaves rather openly dissected, with a few hundred ultimate segments; plants usually with greater buildup of old leaf bases that persist a little longer before shredding than in the following variety, averaging smaller, 8–20 (35) cm tall, of the western tier of counties from Box Elder County south to Beaver County *L. grayi* var. *depauperatum*
- Fruit 8–12 mm long, the lateral wings to about 2 mm wide; leaves with congested and numerous ultimate segments, these several hundred or a thousand or more; plants usually with less buildup of old persistent leaf bases, these usually shredding within a year, averaging larger, 15–40(80) cm tall, of more easterly distribution and only in the eastern 1/4 of the western tier of counties where more or less transitional with the preceding variety *L. grayii* var. *grayii*

Var. *depauperatum* (Jones) Mathias [*Cogswellia millefolia* var. *depauperata*

Jones]. Desert shrub, pinyon-juniper, and mountain brush communities at 1,525 to 2,835 m in Beaver, Box Elder, Juab, Millard, and Tooele counties; western Utah and adjacent Nevada; 58 (xiii).

Var. *grayi* Sagebrush, pinyon-juniper, mountainbrush, ponderosa pine, and Douglas-fir communities at 1,340 to 2,745 m in Box Elder, Cache, Daggett, Davis, Duchesne, Grand, Juab, Morgan, Rich, Salt Lake, San Juan, Sanpete, Summit, Tooele, Uintah, Utah, and Weber counties; Washington to northeastern Nevada and east to Idaho and southwestern Colorado; 121 (xxiii)

***Lomatium junceum* Barneby & N. Holmgren** Rush-lomatium. Plants (6) 10–37 cm tall, acaulescent, glabrous, from a simple to much branched woody caudex, clothed at the base with old petioles, some of which often persist for a few years before shredding; leaves rush-like, trifid or pinnatifid or rarely reduced to a petiole and a linear bladeless rachis, with 1–7 linear segments, petioles 3–15 mm long with a short sheath at the base, blades 3–17 cm long, the segments 1–18 cm long, about 1–2 mm wide, terete and similar to the rachis and petioles in diameter; peduncles 5–25 cm long; rays of umbels 6–13, 1.5–3 cm long; bractlets of the involucre 1.5–3 mm long, separate or united at the base, linear; pedicels 4–11 mm long; calyx teeth to about 1 mm long, acutish, somewhat persistent; petals and stamens bright yellow or cream, quickly fading to white when frozen or dried; styles about 2–3 mm long; fruit 8–12 mm long, 5–7 mm wide, lateral wings 1–2 mm wide, dorsal ribs filiform. Desert shrub, sagebrush, pinyon-juniper, ponderosa pine, and Douglas-fir communities at 1,615 to 2,485 m in Emery, Garfield, Sevier, and Wayne counties; endemic; 21 (iii).

***Lomatium juniperinum* (Jones) Coul. & Rose** Juniper Lomatium. [*Peucedanum juniperinum* Jones]. Plants 8–32 cm tall, acaulescent or with 1–3 leaves on the lower part of the stems, more or less hirtellous, occasionally glabrate and rarely glabrous, often with a short pseudostem, from a taproot with simple or sparingly branched crown, not clothed at the base with old leaf bases or these weakly persisting; leaves ternate-pinnately dissected, with (3)4–6 opposite or offset pairs of lateral primary leaflets, petioles to 8 cm

long or lacking and the blades arising directly from dilated sheaths 1–4 cm long, blades 2.5–8 (11) cm long, ovate in outline, the lowest pair of lateral primary leaflets 1/3 to about as long as the leaf blade, with petiolules to 3 cm long, the ultimate segments about 50–400, 1–7 mm long, 0.7–1.5 mm wide; peduncles 6–29 cm long; rays of the umbel 3–12, 1–8 cm long; bractlets of the involucrel about 1–5, 1–4.5 mm long, linear, separate or united at the base; pedicels 3–16 mm long; petals white, cream, or yellow; anthers white, ochroleucus, purple, or yellow; styles about 1–2 mm long; fruit 5–8 (11) mm long, 3–6 mm wide, glabrous, or scabrous to sparsely hirtellous especially when young; lateral wings 0.5–1.5 mm wide, the dorsal ribs filiform. Sagebrush, pinyon-juniper, forb-grass, aspen, Douglas-fir, and alpine (Mt. Nebo) communities at 1,830 to 3,230 m in Carbon, Daggett, Duchesne, Grand, Juab, Sanpete, Summit, Uintah, Utah, and Wasatch counties; southwestern Wyoming and adjacent Idaho to Utah and extreme northwestern Colorado; 50 (xviii). Quite variable as to color of petals and anthers. Plants with yellow petals and anthers are known only from the west and north side of the Uinta Mountains and West Tavaputs Plateau. Those with white petals and white to purplish anthers are found in the Wasatch Mountains, south slope of the Uinta Mountains, Tavaputs Plateau, and to the north end of the Wasatch Plateau. Plants are quite pubescent except a few specimens from the Wasatch Mountains and Wasatch Plateau. The plants are sometimes confused with those of *L. nevadense*. The following key and discussion should help separate the two taxa.

1. Leaves ternate-pinnately compound, the lowest pair of primary leaflets on petiolules mostly 1–3 cm long; plants of northern Sanpete County and northward and eastward *L. juniperinum*
- Leaves pinnately compound, the lowest pair of primary leaflets sessile or on petiolules mostly less than 1 cm long; plants of Millard County and southward and westward *L. nevadense*

In Utah the difference is more obvious because most of the Utah plants of *L. nevadense* have: usually densely hirtellous or puberulent ovaries and young fruits, with the pubescence often remaining in some of the mature fruits;

ultimate segments of leaves about 20–100, dimorphic, with the larger ones 7–27 mm long, and slender roots with fusiform tuberous enlargements. Plants of *L. juniperinum* have: glabrous or scabrous ovaries and young fruits, with the scabrouisity lacking or scattered in mature fruits; ultimate segments of leaves 50–400, 1–7 mm long, and the root does not have tuberous enlargements. Sometimes the plants are also confused with those of *Cymopterus lemmonii*. (q.v.)

***Lomatium latilobum* (Rydb.) Mathias**
Canyonlands Lomatium. [*Cynomarathrum latilobum* Rydb.]. Plants (6) 10–30 cm tall, acaulescent, glabrous, from a branched woody caudex, clothed at the base with old persistent leaf bases; leaves pinnate with 3–4 (5) pairs of lateral leaflets; petioles 2–16 cm long; blades 1–10 cm long, oblong in outline, leaflets 1–4 cm long, 2–12 mm wide, sessile, entire or a few bifid or trifid; peduncles 4–27 cm long; rays of the umbel 4–13, 0.5–2 cm long; bractlets of the involucrel 2–15 mm long, 0.5–2 mm wide, linear or elliptic, separate; pedicels 1–4 mm long; calyx teeth 1–1.5 mm long, acute; petals yellow when fresh, drying white; styles 2–3 mm long; fruit 8–12 mm long, 3–7 mm wide, the lateral wings about 1 mm wide, the dorsal ribs filiform. Pinyon-juniper communities, and in hanging gardens, sandstone ledges, and sandy soil, at ca 1,525 m, in southern Grand and adjacent San Juan counties, also Mesa County, Colorado; 17 (i).

***Lomatium macrocarpum* (H. & A.) Coult. & Rose**
Big-seed Lomatium. [*Ferula macrocarpa* H. & A.]. Plants 12–30 cm tall, acaulescent or subcaulescent with leaves mostly on the lower 1/4 of the stem, more or less tomentose-villous or glabrate, from a thickened taproot with a simple or sparingly branched crown with few or no persisting leaf bases; leaves pinnately or ternate-pinnately dissected, with about 4 opposite pairs of lateral primary leaflets, petioles often long tapering into a dilated sheath, the petiole and sheath about 3–6 cm long, blades 3–6 cm long, ovate in outline, the lowest pair of primary leaflets 1/2 to 3/4 as long as the leaf blade, sessile or with petiolules to 1 cm long, ultimate segments about 30–300 or more, 1.5–6 mm long, 0.5–2 mm wide, elliptic or linear; peduncles 8–26 cm long; rays of the umbel 6–18, 1–4 (6.5) cm long; bractlets of the involucrel about

10, 2–10 mm long, separate or united at the base, pubescent; pedicels 2–5 mm long; calyx teeth to about 0.5 mm long; petals white or purplish in age; anthers white; styles about 2–3 mm long; fruit 9–12 (15) mm long, 4–5 mm wide, glabrous, the lateral wings 1–1.5 mm wide, the dorsal ribs filiform. Desert shrub, sagebrush, and pinyon-juniper communities at 1,480 to 2,550 m in Daggett, Juab, Millard, Sanpete, Tooele, and Uintah counties; southern British Columbia to California and east to Manitoba and Colorado; 29 (xi).

Lomatium minimum (Mathias) Mathias Least Lomatium. [*Cogswellia minima* Mathias]. Plants 2–12 (17) cm tall, acaulescent, glabrous or scabrous, from a branched caudex, the caudex branches clothed with persisting leaf bases; leaves once-pinnatifid or rarely trifid, with (3) 5–9 (13) segments, petioles to 2 cm long, blades 1–2.5 cm long, the segments 2–15 (20) mm long, 0.5–2 mm wide; peduncles to 10 (16) cm long; rays of the umbel 3–6, 0.3–2.3 (3.2) cm long; bractlets of the involucrel 2–4 mm long, linear-subulate, separate; pedicels 1–3 mm long; calyx teeth to 0.6 mm long, acute, greenish or purplish in age with scarious margins; petals and stamens yellow, drying to cream; styles about 1.5–2 mm long; fruit 4–7 mm long, 3–4 mm wide, lateral wings 0.5–1 mm wide, dorsal ribs mostly filiform. Forb-grass, ponderosa pine, and bristlecone pine communities, often on exposed ridges and raw escarpments, often on limestone at 2,165 to 3,170 m in Garfield, Iron, and Kane counties; endemic; 20 (0). Appearing much like a diminutive form of *L. nuttallii* var. *alpinum*.

Lomatium nevadense (Wats.) Coult. & Rose Nevada Lomatium. [*Peucedanum nevadense* Wats.]. Plants 10–36 cm tall, acaulescent or with 1 or 2 leaves on the lower part of stems, more or less pubescent throughout, from a slender root frequently with a fusiform tuberous segment, with or without persisting leaf-bases; leaves 2–3 times pinnately compound, with about 4 opposite pairs of lateral primary leaflets, petioles to 7.5 cm long or often lacking and the blade sessile on a dilated sheath, blades 2.5–9 cm long, ovate in outline; the lowest pair of primary leaflets about 1/2 to nearly as long as the blade, sessile or on petioles to 5 mm long, the ultimate segments about 20–80, 1–27 mm long, 0.5–3 mm wide;

peduncles 7–33 cm long; rays of the umbel 7–12, sometimes with as few as 3 of them fertile, 1.5–4 cm long; bractlets of the involucrel 2–3 mm long, lanceolate, linear-elliptic, or narrowly obovate; pedicels 4–11 mm long; petals and stamens white; styles about 1–1.5 mm long; fruit 5–10 mm long, 3–7 mm wide, densely puberulent or rarely glabrous when young to glabrate; lateral wings 0.8–2 mm wide, dorsal ribs filiform. Desert shrub, sagebrush, pinyon-juniper, mountain brush, and ponderosa pine communities at 1,524 to 2,285 m in Beaver, Garfield, Iron, Kane, Millard, and Washington counties; Oregon to California east to Colorado and Arizona; 44 (viii). Our materials are perhaps referable to var. *parishii* (Coult. & Rose) Jepson [*Peucedanum parishii* Coult. & Rose]. This variety has been keyed as having glabrous fruits, and the Utah materials with pubescent fruits have been referred to as var. *nevadense*. However, the Utah plants have dimorphic ultimate leaf segments 1–27 mm long. This is a feature of var. *parishii*. The ultimate leaf segments of var. *nevadense* are only 2–3 mm long. A specimen from Navajo Mountain, San Juan County (Albee 4463 UT), has uniformly small leaf segments and glabrous fruits.

Lomatium nudicaule (Pursh) Coult. & Rose Naked-stem Lomatium. [*Smyrniium nudicaule* Pursh]. Plants 20–45 cm tall, acaulescent, glabrous, from a taproot, without persistent leaf bases or these few and weakly persisting; leaves ternate or biternate; with 3–11 distinct leaflets, petioles to 6 cm long, or obsolete and the blades arising from a dilated sheath, blades 4–10 cm long, ovate in outline, leaflets 2–5 cm long mostly 1–5.5 cm wide, ovate or orbicular to reniform, coarsely toothed toward the apex; peduncles 15–27 cm tall, sometimes swollen at the apex; rays of the umbel 7–27, 8–10 cm long; involucrel lacking; pedicels 3–10 mm long; petals yellow; styles about 1–2 mm long; fruit 8–12 mm long, 2–5 mm wide, the lateral wings about 0.5 mm wide, dorsal ribs filiform. Sagebrush, pinyon-juniper, and mountain brush communities at 1,585 to 2,530 m in Box Elder, Juab, and Tooele counties; southern British Columbia to central California and east to southwestern Alberta and Utah; 6 (iii).

Lomatium nuttallii (Gray) Macbr. Stinking Lomatium. Plants 15–50 cm tall, acaulescent,

glabrous, strongly aromatic, from a branched caudex, the caudex clothed with persistent leaf bases; leaves pinnatifid to bipinnate or ternate-pinnately compound, petioles gradually expanded into a dilated sheath, with the sheath 2–21 cm long, blades 2–15 cm long, usually oblong in outline, ultimate leaflets or segments about 7–30, 0.3–6.5 cm long, 0.5–2 (4) mm wide; peduncles 12–47 cm long; rays of the umbel (3) 5–12, 1–5 cm long; bractlets of the involucl 3–10 mm long; pedicels 2–10 mm long; calyx teeth about 0.5 mm long, rather scarious; petals and stamens yellow, soon turning pale to white in herbarium specimens; styles about 2–3 mm long; fruit 5–15 mm long, 3–5 mm wide, lateral wings about 0.5–1 mm wide, the dorsal ribs filiform or somewhat prominent with rudimentary wings. There are two geographically separated varieties that are distinct morphologically, but some of the smaller specimens of var. *nuttallii* are much like those of var. *alpinum*. They are separated as follows:

1. Fruit 5–8 mm long, the lateral wings ca 0.5 mm wide; pedicels 4–10 mm long; umbels with only 3–6 rays; leaves once pinnatifid with sessile segments or some of the lower pairs of segments bipinnatifid; plants of Washington and western Millard counties *L. nuttallii* var. *alpinum*
- Fruit 10–15 mm long, the lateral wings about 1 mm wide; pedicels 2–6 mm long; umbels with up to 12 rays; leaves pinnatifid to ternate-pinnately compound, with the lowest pair of primary leaflets on petiolules (1) 2.5–9 cm long; plants of Sevier and eastern Millard counties and northward . *L. nuttallii* var. *nuttallii*

Var. *alpinum* (Wats.) Mathias Pinyon-juniper and mountain brush communities at 2,225 to 2,440 m in Millard and Washington counties; western Nevada and southwestern Utah; 4 (0).

Var. *nuttallii* [Peucedanum graveolens Wats.] Sagebrush, bullgrass, mountain brush, Douglas-fir, limber pine, and spruce-fir communities, often in rocky places, mostly on limestone and other basic substrates, sometimes in raw snowflush areas, at 1,980 to 3,200 m in Cache, Davis, Duchesne, Millard, Rich, Salt Lake, Sanpete, Sevier, Summit, Tooele, Utah, Wasatch, and Weber counties; western Nevada, and western Wyoming; 85 (xviii).

***Lomatium parryi* (Wats.) Macbr.** Parry Lomatium. [*Peucedanum parryi* Wats.; *Cogswellia cottami* Jones]. Plants 8–40 cm tall, acaulescent, glabrous, from a branched caudex, clothed at the base with persisting leaf bases; leaves bipinnatifid or partly tripinnatifid, with mostly 7–9 opposite pairs of primary leaflets or the upper leaflets simple, petioles 3–16 cm long, terete, often persisting for a few years without shredding, blades 7–24 cm long, lowest pair of lateral primary leaflets 1/10–1/4 as long as the leaf blade, sessile or with petiolules to 1.2 cm long, the ultimate segments mostly 50–150, 1–15 mm long, 1–2 mm wide, acute; peduncles 5–32 cm long; rays of the umbel 8–13, 1–5 cm long; bractlets of the involucl 3–10 mm long, entire, tridentate or rarely pinnatifid, spreading to reflexed in age; pedicels 1–2 cm long; petals yellow, turning white in herbarium specimens; styles about 2–4 mm long; fruit 6–20 mm long, 5–10 mm wide, the lateral wings 1–3 mm wide, the dorsal ribs filiform. Desert shrub, blackbrush, pinyon-juniper, and mountain brush communities at 975 to 2,320 m in Emery, Garfield, Grand, Iron, Kane, San Juan, and Washington counties; Utah to eastern California; 65 (v).

***Lomatium ravenii* Mathias & Const.** Raven Lomatium. Plants 4–23 cm tall, acaulescent, densely hirtellous throughout, from a taproot, with a simple or branched crown, usually clothed at the base by shredded leaf bases; leaves ternate-bipinnate or 2–3 times pinnately dissected, with 5–7 (8) opposite pairs of primary leaflets, petioles to 6 cm long or lacking and blades arising from dilated sheaths to 2 cm long, blades 1.5–8 cm long, finely and completely dissected, the lowest pair of primary leaflets usually over 1/2 as long as the leaf blade, sessile or with petiolules to 1.5 cm long, the ultimate segments about 300–600 or more, 1–5 mm long, 0.5–1 mm wide; peduncles 2.5–21 cm long; rays of the umbel nearly obsolete or to 3.7 cm long; bractlets of the involucl 1–3 mm long, linear, pubescent; pedicels 1–8 mm long; petals white; anthers purple; styles about 1–2 mm long; fruit 6–10 mm long, 3–6 mm wide, pubescent, the lateral ribs with wings 0.5–1 mm long, dorsal ribs filiform. Pinyon-juniper-mahogany communities, at ca 2,380 m in western Millard County; Great Basin from southeastern Ore-

gon and southwestern Idaho to northern California, central Nevada and western Utah; 1 (i). Except for the white petals, purple anthers and sometimes slightly less pubescent foliage, plants of this taxon could pass for plants of *L. foeniculaceum*. Fruiting specimens may be difficult to distinguish.

Lomatium scabrum (Coul. & Rose) Mathias Rough Lomatium; Cliff Lomatium. [*Cynomarathrum scabrum* Coul. & Rose]. Plants 6–25 (34) cm tall, acaulescent, mostly scabrous, from a branched caudex, clothed at the base by persistent leaf bases; leaves bipinnately to tripinnately dissected, with (5) 7–11 opposite pairs of lateral primary leaflets, petioles 1–7 (10) cm long, blades (1.5) 2–11 cm long, lowest pair of primary leaflets less than 1/3 as long as the leaf blade and seldom over 1/4 as long, sessile or nearly so, the ultimate segments about 50–400 or more, 1–4 mm long, 0.4–2 mm wide; peduncles 5–25 (32) cm long; rays of the umbel 4–11, 0.5–2 (3) cm long; bractlets of the involucre 1–4 mm long, linear; pedicels 1–5 (10) mm long; petals and stamens mostly yellow or occasionally white when fresh, fading white in herbarium specimens; styles about 2–3 mm long; fruit 4–7 mm long, 3–4 mm wide, the lateral wings to 1 mm wide, the dorsal ribs filiform or sometimes with a rudimentary wing at the base. There are 2 intergrading varieties as follows:

1. Leaves mostly bipinnately dissected, with about 50–110(140) ultimate segments; fruit 4–8 mm long; plants mostly found above 1,615 m *L. scabrum* var. *scabrum*
- Leaves tripinnately dissected, with about 150–400 or more ultimate segments; fruit 6–9 mm long; plants mostly found below 1,615 m *L. scabrum* var. *tripinnatum*

Var. *scabrum* Desert shrub, pinyon-juniper, mountain brush, and white fir communities, mostly on limestone and dolomite outcrops at 1,615 to 2,684 m in Beaver, Iron, Juab, and Millard counties and adjacent Nevada; 55 (xii). Some specimens, especially from Iron County, are wholly transitional to the following variety.

Var. *tripinnatum* Goodrich, var. nov. Similis *Lomatium scabro* var. *scabro* sed foliis tripinnatifidis et segmentis ultimo plus numerosis differt. HOLOTYPE: Utah. Washington Co., T41S, R16W, Sec 10, SE1/4, 14.2 km 340 degrees NW of St. George, Lava Ridge-Snow

Canyon, 1,280 m elev., *Mahonia-Fraxinus-Coleogyne-Arctostaphylos* comm., on sandstone, 8 May 1984, S. Goodrich 20282 (BRY); isotypes ARIZ, RM, CAS, UC, POM, NY, UT, UTC, MO, US, WS. Additional specimens: Washington Co., T41S, R17 W, Sec 8, NE1/4, 22.5 km 309 degrees NW of St. George, 8 May 1984, S. Goodrich 20268 (ARIZ, BRY, CAS, MO, NY, POM, RM, UC, US, WS). Blackbrush and pinyon-juniper communities, often on sandstone or in sandy places at 792 to 1,475 (2,170) m, in Washington County; and adjacent Arizona; 29 (ii).

Lomatium triternatum (Pursh) Coul. & Rose Ternate Lomatium. [*Seseli triternatum* Pursh]. Plants 20–70 cm tall, acaulescent or subcaulescent, mostly hirtellous throughout except on the fruit, from a taproot with simple or sparingly branched crown, not clothed at the base with persistent leaf bases or only weakly so; leaves ternate-pinnately compound with (3) 9–21 leaflets or segments, petioles up to 23 cm long including the dilated sheathing base, or reduced to the sheath; blades 4–20 cm long, ovate in outline, the lowest primary leaflets often over 1/2 as long as the leaf blade, ultimate leaflets or segments 1–13 cm long, 1–15 mm wide; peduncles 15–55 cm long; rays of the umbel 4–20, 2–10 cm long; bractlets of the involucre about 6–10, 1–10 mm long, about 0.1–0.5 mm wide; pedicels 2–7 mm long; petals and stamens bright yellow when fresh but fading to white in herbarium specimens; styles about 1–1.5 mm long; fruit 8–15 mm long, 4–11 mm wide, the lateral wings 1–2.5 (4) mm long, the dorsal ribs filiform. There are 2 subspecies. In Utah they can be separated as follows:

1. Ultimate leaflets or segments linear, over 10 times as long as wide, to 13 cm long, 1–6 (10) mm wide; fruit broadly elliptic, the mature wings as broad or nearly as broad as the body *L. triternatum* ssp. *platycarpum*
- Ultimate leaflets elliptic, 3–9 times as long as wide, 2–6 cm long, (3) 6–15 mm wide; fruit rather narrowly elliptic to nearly linear, the mature wings seldom more than half as wide as the body. *L. triternatum* ssp. *triternatum*

Ssp. *platycarpum* (Torr.) Cronq. [*L. simplex* (Nutt.) Macbr.]. Sagebrush-grass, pinyon-juniper, mountain brush, ponderosa pine, lodgepole pine, and dry meadow communities at 1,310 to 2,895 m in Box Elder,

Cache, Daggett, Duchesne, Morgan, Rich, San Juan, Summit, Uintah, Utah, Wasatch, and Weber counties; southern British Columbia and Montana to Idaho and Colorado; 116 (viii).

Ssp. triternatum Mountain brush and aspen communities, sometimes on heavy clay soils with *Wyethia* at 1,580 to 2,590 m in Weber and Summit counties; southern Alberta and British Columbia to Utah; 8 (0). Utah specimens are referable to *var. anomalus* (Jones) Cronq. [*L. anomalum* Jones].

Musineon Raf.

Perennial plants with leaves mostly at or near the base, from a thickened taproot with a simple or branched crown or caudex; leaves 1 or more times pinnately or ternate-pinnately compound; umbel compound; involucre usually lacking; involucre of several separate or basally united bractlets; calyx teeth well developed, ovate; petals and stamens white or yellow; stylopodium lacking; carpophore entire to deeply cleft; fruit ovoid to linear oblong, somewhat laterally compressed, evidently ribbed.

Musineon lineare (Rydb.) Mathias Rydberg *Musineon*. [*Daucophyllum lineare* Rydb. *Aletes tenuifolia* Coult. & Rose]. Plants 5.5–25 cm tall, caulescent or subcaulescent, glabrous, from a mostly branched caudex, more or less clothed at the base with long-persisting leaf bases; leaves mostly on the lower 1/3 of the plants, ternate or more often pinnate, with 2–4 opposite pairs of lateral leaflets, petioles 0.5–6 (14) cm long, blades 1–5.3 cm long; leaflets, sessile, entire or bifid, trifid or rarely pinnatifid, ultimate leaflets or lobes 3–20 mm long; peduncles 5–22 cm long, very slender; umbel solitary; rays about 5–10, 1–5 mm long; involucels of about 3 linear or narrowly elliptic bractlets 4–10 mm long; pedicels about 1 mm long; calyx teeth about 0.5 mm long, greenish or purplish with scarious margins; petals and stamens white; styles about 1 mm long; fruit 2–4 mm long, minutely scabrous, the ribs evident but not winged. Limestone cliffs in the Bear River Range, Cache County; endemic; 4 (0).

Oreoxis Raf.

Caespitose, acaulescent herbs from branched woody caudices, these usually

clothed with long-persisting leaf bases; leaves pinnate or bipinnate; umbels compound; involucre mostly lacking; bractlets of the involucre more or less united at the base, usually exceeding the flowers; calyx teeth conspicuous; petals and stamens yellow at least when fresh; stylopodium lacking; carpophore lacking; fruit oblong to ovoid-oblong, slightly compressed laterally, the ribs corky-winged. Plants of the genus could reasonably be included in *Cymopterus*, and with the recent discovery of the low elevation *O. trotteri* such inclusion will probably be necessary.

- 1. Bractlets obovate, toothed at the apex, usually purplish, plants of the La Sal Mountains *O. bakeri*
- Bractlets linear or narrowly elliptic, entire, acute to acuminate; plants more widely distributed 2
- 2(1). Plants pulvinate caespitose, forming clumps to 30 cm wide, from low elevations in Grand County; caudex clothed with a thatch of terete leaf bases; ultimate segments elliptic to cuneate-ovate *O. trotteri*
- Plants caespitose but hardly pulvinate, from high elevations, widespread; caudex clothed with short, more or less flattened leaf bases; ultimate segments of leaves linear to linear-elliptic *O. alpina*

Oreoxis alpina (Gray) Coult. & Rose *Alpine Oreoxis* [*Cymopterus alpinus* Gray]. Plants 2.5–11.5 cm tall, scabrous-hirtellous throughout, from a branched caudex, the caudex clothed with persisting leaf bases; leaves all basal, mostly bipinnate, with ca 4 opposite pairs of sessile or nearly sessile lateral primary leaflets, the upper pairs and those of smaller leaves sometimes once pinnate and then trifid to pinnatifid, petioles 0.5–2.5 cm long, blades 1–3.5 cm long oblong in outline, lowest pair of primary leaflets 4–14 mm long, the ultimate segments about 1–6 mm long, 0.4–1.5 mm wide, linear to narrowly elliptic; peduncles 2–10.5 cm long; umbel solitary; involucre lacking; rays 4–7, 1–6 mm long; involucels of 5–9 bractlets 1–4 mm long, united at the base; pedicels obsolete or to about 0.3 mm long; calyx teeth 0.6–1 mm long, green; petals and stamens yellow when fresh, fading to white or cream or purple tinged within a few years in herbarium specimens; styles 1.7–2 (3) mm long; fruit 4–5 mm long, the ribs with low corky wings to about 0.7 mm wide. Forb-grass, limber pine,

spruce, and alpine communities, and raw escarpments and barren ridges at 2,440 to 3,475 m in Duchesne, Garfield, Grand, San Juan, Sanpete, Summit, and Wayne counties; Wyoming to New Mexico and Arizona; 27 (vi).

***Oreoxis bakeri* Coult. & Rose** Plants 1–12 cm tall, slightly puberulent at base of umbels and rays; leaves basal, bipinnate for the most part or pinnate with pinnatifid or trifid leaflets, with 3–4 opposite pairs of lateral primary leaflets, the petioles 0.8–2.5 cm long; blades 0.8–5 cm long, lowest pair of primary leaflets to about 1 cm long, sessile or nearly so, the ultimate segments to 7 mm long, to 1 mm wide; peduncles 1–11 cm long; umbels solitary, involucre lacking; rays 3–8, 3–5 mm long; bractlets of the involucre united at base, 3–5 mm long, nearly linear-elliptic to obovate, usually 3-toothed at the apex; petals and stamens yellow at least when fresh; styles to about 1 mm long; fruit 2–4 mm long, the ribs with low corky wings to 0.75 mm wide. Alpine forb-grass communities, at ca 3,660 m, La Sal Mountains, in Grand and San Juan counties; Colorado, Utah, and New Mexico; 4 (0).

***Oreoxis trotteri* Welsh & Goodrich** Plants pulvinate-caespitose, forming clumps to 30 cm wide, 4–8 cm tall, scabrous and more or less glandular, from a branching caudex, this clothed with a thatch of persistent, terete leaf bases and peduncles; leaves all basal, bipinnate, with ca 4 opposite pairs of sessile, lateral, primary leaflets, the upper pairs and those of the smaller leaves sometimes once-pinnate and then trifid or pinnatifid; petioles 1–3.5 cm long; blades 1.5–2.3 cm long, oblong in outline, the lowest pair of primary leaflets 3.5–5 mm long, the ultimate segments 1–3.5 mm long, 1–3 mm wide, elliptic to cuneate-ovate; peduncles 4–7.5 cm long; umbel solitary; involucre lacking; rays 5–7, 3–5 mm long; involucels of 4–7 linear-subulate bractlets 2–3.5 mm long, distinct or essentially so; pedicels obsolete or to ca 1 mm long; calyx teeth ca 1 mm long, green or purplish; petals and stamens yellow; styles 1–1.2 mm long; fruit 2.8–4.8 (5) mm long, the ribs with low, corky wings to 0.7 mm wide. Mixed juniper and warm desert shrub community at ca 1,464 m in Grand County; endemic; 2 (0).

Orogenia Wats.

Perennial acaulescent glabrous low herbs from a fusiform or globose root; leaves ternate or

biterminate with linear entire leaflets; umbel compound; involucre lacking or of a few linear minute scarious bractlets; calyx teeth obsolete; petals and stamens white or purplish; stylopodium lacking; carpophore lacking; fruit oblong to oval, nearly round in cross section, the dorsal ribs evident or obsolete, the lateral ones corky-winged but inflexed into the commissure, a corky riblike projection also running the length of the commissural faces of each mericarp.

***Orogenia linearifolia* Wats.** Indian Potato. Plants 5–10 (13) cm tall, glabrous, not aromatic, from a globose or fusiform root, with a fragile etiolated subterranean pseudoscape-like stem easily detached from the tuberous root; leaves borne at ground level or a few arising from the tuberous root with etiolated petioles, ternate or biterminate, blades 3–8 (12.5) cm long, the 3–9 leaflets 1.5–5 (11.5) cm long, 1–11 mm wide, linear, entire, the lowest pair of petiolules to 2 cm long; peduncles 3–8 cm long, usually a little longer than the subterranean stem; involucre lacking; rays 3–12, but rarely more than 5 of them fertile, 0.3–3 cm long; involucel proper apparently lacking, but some of the pedicels usually bearing a linear bractlet to 4 mm long; pedicels nearly obsolete or to 2 mm long; petals white; filaments white, anthers pale or dark purple; styles about 1 mm long; fruit about 4–6 mm long; dorsal ribs filiform. Sagebrush-grass, oak, maple, aspen, ponderosa pine, white fir, and rarely desert shrub communities, mostly flowering at the edge of melting snow at 1,370 to 2,805 m in Beaver, Box Elder, Juab, Millard, Morgan, Salt Lake, San Juan, Sanpete, Sevier, Summit, Tooele, Uintah, Utah, Wasatch, Washington, and Weber counties; Washington to Montana, south to Utah and Colorado; 50 (vii).

Osmorhiza Raf.

Perennial caulescent usually pubescent herbs from taproots with simple or branched crowns; leaves ternately or pinnately 1–3 times compound with well-marked leaflets; umbels compound; involucre lacking or of 1 or a few narrow foliaceous bracts; involucel lacking or of several foliaceous reflexed bractlets; calyx teeth obsolete; petals and stamens white, greenish white, yellow, pink, or purple; stylopodium, conic to depressed; car-

pophore bifid less than 1/2 its length; fruit linear or clavate, somewhat compressed laterally, bristly hispid to glabrous, the ribs narrow.

- 1. Ovaries and fruit glabrous, generally obtuse at both ends; petals and stamens yellow or greenish yellow; leaves (1)2 times pinnately or ternate-pinnately compound; plants strongly aromatic, usually with more than 2 stems *O. occidentalis*
- Ovaries and fruit bristly hispid, with long, pointed bristly hispid tails; petals white or greenish white; leaves biternate; plants not strongly aromatic, often with solitary stems . . . 2
- 2(1). Mature fruit including tails mostly 16–25 mm long, the apex concavely pointed into a 1–2 mm long beak; the most divergent rays spreading 30 degrees to 65 degrees from the peduncle; fruiting pedicels mostly ascending-spreading; plants most common below 2,470 m elev *O. chilensis*
- Mature fruit including tails mostly 13–18 mm long, the apex convex and obtuse; the most divergent rays spreading 40 degrees to 90 degrees from the peduncle; fruiting pedicels horizontally spreading to ascending; plants common above as well as below 2,470 m *O. depauperata*

***Osmorhiza chilensis* H. & A.** [*O. nuda* Torr.]. Stems often solitary, 18–75 cm tall, from a taproot, without long-persisting leaf bases; herbage not strongly aromatic; leaves basal and 2–3 cauline, biternate, usually with 9 distinct leaflets, petioles about 3–16 cm long, or cauline leaves sessile, blades 5–15 cm long, lateral primary leaflets about as long as the central one, with petiolules (1) 2–5.5 cm long, blades of leaflets 1–4 (5.5) cm long, elliptic to ovate, lobed to cleft, and toothed, ciliate and often pubescent on nerves below and sometimes scattered pubescent between the nerves; peduncles 5–34 cm long; umbels 1–5; involucre lacking; rays 3–7, 2.5–9 (13) cm long, ascending or spreading-ascending, glabrous to hirtellous; involucels lacking; pedicels 5–22 (30) mm long, ascending; petals and stamens greenish white; styles less than 0.5 mm long; fruit, including the tails, 16–25 mm long, linear-clavate, bristly-hispid, the beak concavely pointed, 1–2 mm long, the concave beak usually evident in young fruits. Oak, maple, aspen, Douglas-fir, white fir, narrowleaf cottonwood, and riparian communities at 1,520 to 2,470 (2,680) m in Box Elder, Cache, Daggett, Davis, Duchesne, Juab, Mil-

lard, Salt Lake, Sanpete, Tooele, Uintah, Utah, Wasatch, Washington, and Weber counties; Alaska to California, east to Alberta and Arizona, also Great Lakes region and in Argentina and Chile; 54 (viii). See *O. depauperata*.

***Osmorhiza depauperata* Phil.** Blunt-fruit Sweet-cicely. [*O. obtusa* (Coul. & Rose) Fern.]. Stems mostly solitary, 14–63 (77) cm tall, often with a slight ring of hairs at the nodes, from a taproot, without persisting leaf bases; herbage not strongly aromatic; leaves basal and 1–3 cauline, biternate, usually with 9 distinct leaflets, or the upper cauline ones once-ternate, petioles (1) 3–17 cm long, often with dilated, ciliate bases, blades (2) 4–11 cm long, the lateral primary leaflets about equal to the central one or a little shorter, with petiolules (0.5) 1–4 cm long, blades of leaflets 1–4 (5.5) cm long, elliptic to ovate, lobed to cleft and toothed, ciliate and often pubescent on nerves below and sometimes scattered pubescent between nerves; peduncles 3.5–15 (22.5) cm long; umbels 3–6; involucre lacking, or rarely of a solitary bract to 12 mm long; rays 3–5, 1.5–8.5 cm long, spreading to divaricate, involucels lacking or infrequently of 1 or 2 separate ciliolate bractlets to 3 mm long; pedicels 5–20 mm long, spreading to divaricate; petals greenish white; styles about 0.2 mm long; fruit, including the tails (11), 13–18 mm long, linear-clavate, the beak convex-obtuse. Oak, maple, aspen, ponderosa pine, Douglas-fir, lodgepole pine, spruce-fir, riparian, and rarely pinyon-juniper and sagebrush communities at 1,980 to 3,200 m in all Utah counties except Cache, Davis, Emery, Morgan, Piute, Rich, and Wayne; Alaska to California, east to South Dakota and New Mexico, also in the Great Lakes Region, also Chile and Argentina; 110 (xv). Very much like *O. chilensis* but generally at higher elevations and with more widely spreading rays and pedicels and shorter fruits, and much more common and widespread in Utah than is *O. chilensis*. Although the two taxa are similar and have about the same distribution in North and South America, the differences seem quite constant.

***Osmorhiza occidentalis* (Nutt.) Torr.** Western Sweet-cicely. [*Glycosma occidentalis* Nutt. ex T. & G.]. Plants 6–13 dm tall, from a taproot, with few or no persisting leaf-bases; strongly aromatic, leaves (1)2 times pinnate or

the upper cauline ones ternate pinnately compound, with 3-4 pairs of opposite lateral primary leaflets, petioles of lower leaves 4-30 cm long or longer, the upper ones reduced, lower blades to 25 cm long or longer, the upper ones much reduced, the lowest pair of primary leaflets usually again pinnate, usually over 1/2 as long as the leaf blade, with petiolules 1-3.5 cm long, ultimate leaflets 1-9 cm long 0.5-4 cm wide, lanceolate to lance-elliptic or ovate coarsely toothed and some often lobed; peduncles 6-20 cm long; umbels about 3-5; involucre lacking or occasionally of 1-2 linear or filiform bracts to 16 mm long; rays 7-13, 2-6.5 cm long, involucels lacking; pedicels 2-7 mm long, calyx obsolete; petals greenish white or greenish yellow, about 1-2 mm long; stylopodium low; styles about 0.75-1 mm long; carpophore divided to the base; fruit 16-20 mm long, 2-3 mm wide, linear, glabrous. Tall forb, aspen, oak-maple, spruce-fir, riparian, and infrequently in sagebrush communities at 1,765 to 3,170 m in Box Elder, Cache, Carbon, Duchesne, Iron, Juab, Millard, Morgan, Salt Lake, San Juan, Sanpete, Sevier, Summit, Tooele, Utah, Wasatch, Washington, and Weber counties; southern British Columbia and Alberta south to California and Colorado; 67 (xvi).

Oxypolis Raf.

Perennial, caulescent, glabrous herbs from fasciated tuberous roots; leaves pinnate; umbels compound; involucre and involucel lacking; rays ascending; calyx teeth conspicuous; petals white to purple; stylopodium conic; carpophore divided to the base; fruit oblong to oval, strongly flattened dorsally, dorsal ribs filiform, lateral ribs broadly winged.

Oxypolis fendleri (Gray) Heller [*Archemora fendleri* Gray]. Plants 6-8 dm tall, without persisting leaf-bases; leaves pinnate with 2-5 pairs of opposite lateral leaflets, the upper ones sometimes reduced to bladeless or nearly bladeless sheaths, the petioles (3) 5-15 cm long or the upper blades sessile on a dilated sheath, blades 7-17 cm long, oblong in outline, leaflets sessile, 2-5 cm long, ovate to orbicular, shallowly to deeply crenate-dentate or serrate or rarely incised, or those of the upper leaves lanceolate to linear and sometimes entire; peduncles (1) 4-20 cm long; umbels usually 4 or more per stem; involucre

lacking; rays 5-14, 1-5 (7) cm long, ascending; involucels lacking; pedicels 3-10 mm long; petals and stamens white; styles mostly less than 1 mm long; fruit 3-5 mm long. Streambanks, on Abajo and La Sal mountains in San Juan County; Wyoming south to New Mexico; 4 (0).

Pastinaca L.

Biennial or perennial caulescent herbs from large taproots; leaves pinnately compound, with broad-toothed to pinnatifid leaflets; umbels compound; involucre and involucel usually lacking; calyx teeth obsolete; petals yellow or red; stylopodium depressed-conic; carpophore divided to the base; fruit elliptic to obovate, strongly flattened dorsally, the dorsal ribs filiform, the lateral ones narrowly winged.

Pastinaca sativa L. Parsnip. Biennial caulescent aromatic herbs 8-15 dm tall, from a taproot; leaves pinnate or partly bipinnate in some of the lower leaflets, with 3-6 opposite or offset pairs of lateral leaflets; petioles 3-15 mm long or lacking and the blade sessile on a dilated sheath; blades 12-35 cm long or longer, oblong in outline; leaflets sessile and sometimes confluent or the lower ones sometimes on petiolules to 1.7 cm long, the blades 2.5-12 cm long, lanceolate to ovate, coarsely serrate, and often lobed; umbels 6-15 or more, the terminal one sessile or pedunculate but shorter than the 2 immediately lateral ones, the lateral umbels alternate or opposite or on opposite branches supporting 2 or more umbels; involucre lacking or of 1-few linear entire or occasionally toothed or lobed bracts to 2 (4) cm long; rays 9-25, 0.8-8.5 cm long; involucels lacking or infrequently of 1-2 linear bractlets to 2 mm long; pedicels 4-20 mm long; petals greenish yellow or reddish; styles less than 0.5 to about 1 mm long; fruit 5-8 mm long, 3-6 mm wide, broadly elliptic to orbicular or obovate, strongly flattened dorsally the dorsal ribs filiform, lateral ribs slightly winged. Ditch banks, roadsides, fence lines, gardens, fields, margins of ponds and lakes, and moist floodplains at 1,370 to 2,365 m, probably cultivated in all counties of the state, escaping and persisting, introduced from Europe, now widely established in North America; 23 (x). The cultivated plants (ssp. *sativa*) differ from the wild plants [ssp. *sylvestris*

(Mill.) Roua & Camus] in having larger roots. Some of the wild plants might be recent escapes from cultivation.

Perideridia Reichenb.

Perennial, caulescent herbs from a fusiform or tuberous root or fascicle of tuberous roots, these often deep-seated and easily detached from the rather fragile etiolated subterranean portion of the stem and often lacking in herbarium specimens; leaves ternate, pinnate, or ternate-pinnately compound, the upper ones sometimes reduced to a simple, linear rachis; petioles sheathing; umbels compound; involucre lacking or of mostly few more or less scarious bracts; involucre lacking or of 1–few bractlets; calyx teeth inconspicuous, of the texture and color of the petals (in ours); petals white when fresh; stamen white; stylopodium conic or low conic; carpophore divided to the base; fruit linear-oblong to orbicular, scarcely compressed or lightly so at right angles to the commissure, with filiform ribs.

1. Bractlets of the involucre scarious, as wide or to 5 times as wide as the pedicels, 3–5 mm long, linear to ovate, often caudate; styles 1–2 mm long after anthesis; longest rays rarely over 2 cm long; lower leaves mostly ternate-pinnately 2 or more times compound with petiolulate primary leaflets, the ultimate divisions commonly 10–50 or more per leaf *P. bolanderi*
- Bractlets of the involucre not scarious or with narrow scarious margins, only about as wide as the pedicels, to 3 mm long, linear or linear subulate; styles to about 1 mm long after anthesis; longest rays commonly 2–3(4) cm long; leaves ternate or pinnate; leaflets or pinnatifid divisions sessile, simple, commonly 3–5, rarely over 10 per leaf *P. gairdneri*

Perideridia bolanderi (Gray) Nels. & Macbr. Yampah. [*Podosciadium bolanderi* Gray]. Plants 23–40 cm tall, glabrous, without long-persisting leaf bases; leaves often crowded on the lower part of the stem, ternate-pinnately 2 or more times compound, with petiolulate primary leaflets, the upper ones reduced, and sometimes simple and linear, often withered before or shortly after anthesis, petioles to 4 cm long or lacking and the petiolules arising directly from a dilated sheath, blades 4–12 cm long, the ultimate leaflets strongly dimorphic, 0.2–8 cm long,

mostly 10–50 or more per leaf on the lower leaves; peduncles (2) 5–14 cm long; umbels 2–6 per stem; involucre lacking or usually of 1–4 scarious bracts to 5 mm long; rays 4–12, 1–2 cm long; bractlets of the involucre about 4–8, 3–5 mm long, to 2.5 mm wide, linear to ovate and often caudate, with pale yellow-green midrib, this often flanked on either side by purple and then by conspicuous scarious margins; pedicels 3–6 mm long; petals white; styles 1–2 mm long, spreading to recurved; fruit 3–4 (5) mm long, some of the ribs usually conspicuously ridged. Sagebrush, juniper, mountain brush, and stream-side communities, sometimes in snowflush areas at 1,524 to 2,320 m in the western 1/2 of Box Elder County and Deep Creek Mountains., Juab County; eastern Oregon and western Idaho south to California and Utah; 12 (iii). Sometimes confused with *P. gairdneri*, but in addition to the several features listed in the key it differs as follows (features of *P. gairdneri* in parentheses): peduncles mostly 5–14 cm long (mostly 1–5 cm long); fruit 3–5 mm long, oblong, the ribs ridged (2–3 mm long, orbicular, the ribs obscure).

Perideridia gairdneri (H. & A.) Mathias False Yarrow [*Atenia gairdneri* H. & A.; *Carum garrettii* A. Nels. in Coult. & Rose, type from the Wasatch Mountains]. Plants 15–75 cm tall, glabrous, without long-persisting leaf bases; leaves 2–5 per stem, ternate or pinnate, with up to about 5, rarely more, sessile leaflets, the upper ones reduced and often simple and linear; leaflets to 13 cm long, mostly confluent with the rachis, linear and hardly wider than the petiole, occasionally expanded to 11 mm wide; peduncles (1) 2–5 (7) cm long; umbels 2–5 per stem; involucre lacking or occasionally of 1 or 2 linear bracts to 6 mm long; rays 7–16, 0.7–4 cm long; bractlets of the involucre lacking or more often 1–6, 1–3 mm long, linear or linear-subulate, hardly if at all wider and conspicuously shorter than the pedicels, not marked with purple or if so then the whole bractlet mostly purple; pedicels 3–5 mm long; petals white or turning purplish; styles to 1 mm long, recurved; fruit 2–3 mm long, orbicular, the ribs obscure. Sagebrush, forb-grass-silver sagebrush, meadow, oak, maple, aspen, and willow-streamside communities at 1,680 to 2,685 m in eastern Box Elder, Cache, Daggett,

Juab, Salt Lake, Sanpete, Summit, Utah, and Wasatch counties; British Columbia to southern California, east to Saskatchewan and New Mexico; 25 (v). Our plants belong to ssp. *borealis* Chuang & Const.

Podistera Wats.

Perennial acaulescent glabrous plants from taproots or branched caudices; leaves pinnate with deeply lobed leaflets; umbel solitary, compound, compact; involucre wanting; involucre of toothed bractlets; calyx teeth conspicuous, ovate; petals greenish yellow; stylopodium conic; carpophore stout, undivided; fruit oval, slightly flattened laterally, the ribs filiform to prominent.

Podistera eastwoodiae (Coul. & Rose) Mathias & Const. [*Ligusticum eastwoodae* Coul. & Rose]. Plants 7–20 (30) cm tall, acaulescent, without or with few long-persisting leaf bases; leaves pinnate, with 4–6 pairs of sessile lateral leaflets, petioles 1.5–7 cm long; blades 2.5–7.5 cm long, oblong in outline; leaflets about 1–2 cm long, ovate to obovate in outline, ternately or palmately lobed or cleft, the larger lobes again toothed or lobed; peduncles (7) 10–20 (30) cm tall; involucre lacking; rays 5–8, 2–8 mm long; bractlets of the involucre 4–6 mm long, often exceeding the flowers and fruit, ovate or obovate, with 2–3 teeth or lobes, with the texture and color of the leaves; pedicels 1–2 mm long; petals greenish yellow, turning purple; styles about 1 mm long; fruit about 3–4 mm long, the ribs evident but not winged. Apparently rare at upper elevations of the La Sal Mountains, San Juan County; Colorado, New Mexico, and Utah; 0 (0).

Sium L.

Perennial, caulescent herbs from fascicles of fibrous roots; leaves mostly pinnately compound or decomposed, with well-marked, toothed to pinnatifid leaflets; umbels compound; involucre of entire or incised, often reflexed bracts; involucre of narrow bractlets; calyx teeth minute or obsolete; petals white, stylopodium depressed or rarely conic; carpophore divided to the base (but threadlike and adnate to the faces of the mericarps in our plants); fruit elliptic to orbicular, slightly compressed laterally and somewhat constricted at the commissure, the subequal ribs prominent and corky but hardly winged.

Sium suave Walt. Hemlock Water-parsnip. Plants 5–10 dm tall; leaves pinnate or occasionally partly bipinnate, with 4–6 opposite pairs of sessile lateral leaflets, lower petioles to 25 cm long, often septate, the upper ones smaller and sometimes reduced to a dilated sheath, lower blades 14–32 cm long, the upper ones reduced; leaflets 2–8 (15) cm long, (1) 3–8 (20) mm wide, linear to lanceolate, sharply and uniformly serrate to pinnatifid with linear segments; peduncles 4–10 cm long; umbels 3–11 or more per stem; involucre of about 1–6 separate, often reflexed bracts 2–9 mm long; rays 11–24, 1.5–3 cm long; involucels of (2) 5–12 separate bractlets 2–5 mm long; pedicels 2–8 mm long; petals and stamens white; styles about 1 mm long; fruit 2–3 mm long, the ribs prominent. Mud flats, marshlands, wet meadows, along streams and shorelines, and in ponds and lakes at 1,365 to 2,990 m in Garfield, Piute, Rich, Salt Lake, Sanpete, Sevier, Utah, and Wayne counties; southern British Columbia to Newfoundland, south to California and Virginia; 15 (i). Often confused with *Cicuta* and frequently found with that genus in herbaria, but conspicuously different by the merely pinnate leaves.

Torilis Adans.

Annual caulescent hispid or pubescent herbs from slender taproots; leaves 1–2 times pinnate or pinnately decomposed, petioles sheathing; umbels compound, capitate or open, sessile or pedunculate; involucre lacking or of a few small bracts; involucre of several linear or filiform bractlets; calyx teeth evident to obsolete; petals white; stylopodium thick, conic; carpophore bifid or cleft ca 1/3–1/2 its length; fruit ovoid or oblong, flattened laterally, tuberculate or prickly, the primary ribs filiform, setulose, the lateral ribs displaced onto the commissural surface, the intervals covered with glochidiate prickles or tubercles.

Torilis arvensis (Huds.) Link Hedge Parsley. [*Caucalis arvensis* Huds.]. Plants 3–10 dm tall, divaricately branched, appressed-hispid throughout, retrorsely so on the stems and antrorsely so on the leaves and rays; leaves 2–3 times pinnate, or the upper ones once-pinnate, the ultimate leaflets 5–60 mm long, 2–20 mm wide, ovate to linear lance-

olate, acute or acuminate, regularly incised or divided; peduncles 2–12 cm long; involucre lacking or of a single small bract; rays 2–10, 0.5–2.5 cm long; involucre of several subulate bractlets longer than the pedicels; pedicels 1–4 mm long; petals white; styles short; fruit ovoid-oblong, 3–5 mm long, the mericarps densely covered with straight glochidiate prickles with minute retrorse-barbs, these spreading almost at right angles and about as long as the fruit is wide. LaVerkin in orchard, (Barnum 1316 BRY); Washington County; adventive; introduced from southern and central Europe; 1(0).

Yabea K.-Pol.

Annual caulescent herbs from taproots; leaves pinnate or dissected; umbels compound; involucre of a few entire or dissected, usually somewhat scarious bractlets; calyx teeth evident; petals white; stylopodium thick and conic; carpophore entire or bifid at the apex; fruit oblong or ovoid, somewhat compressed laterally, with spreading uncinat prickles along alternating ribs, and bristly-hairy on the other ribs.

Yabea microcarpa (H. & A.) K.-Pol. California Hedge-parsley. (*Caulis microcarpa* H. & A.). Plants annual, caulescent, 8–40 cm tall, pubescent with spreading hispid hairs, from a slender taproot; leaves 2–3(4) times pinnate or ternate-pinnate, with about 3–4 opposite pairs of lateral primary leaflets, blades 1–5 cm long, oblong or ovate in outline, on petioles 1–4.5 cm long or the upper ones sessile, lowest pair of primary leaflets about 1/2 as long as the leaf blade, sessile or petiolulate, ultimate segments 1–8 mm long, 0.5–2 mm wide; peduncles 3–10 cm long; umbels 1–4, involucre resembling the upper leaves or a little smaller; rays (1) 2–7(9), 1.5–10 cm long, often about as long as the peduncles; involucre similar to the involucre, but usually reduced,

sometimes much reduced and the bractlets only pinnatifid or entire; pedicels 5–15 cm long; petals white; stamens white; styles very short; carpophore bifid for about 1/5 its length; fruit 3–7 mm long. The one specimen seen (Atwood 4871 BRY) is from the Pine Valley Mountains, Washington County; British Columbia south to Baja California, east to Idaho and Arizona; 1(0).

Zizia Koch

Perennial glabrous or subglabrous herbs with basal and cauline leaves, from a short caudex and a cluster of fleshy-fibrous roots; leaves simple or ternate, with toothed blades or leaflets; umbels compound; involucre lacking or obsolete; involucre of a few inconspicuous bractlets; calyx teeth well developed; petals bright yellow; stylopodium lacking; carpophore bifid about 1/2 its length; fruit oblong or broadly elliptic, somewhat laterally compressed, the ribs prominent but not winged.

Zizia aptera (Gray) Fern. [*Thaspium trifoliatum* var. *apterum* Gray]. Perennial, caulescent, glabrous herbs 15–50 cm tall, from a taproot or fascicle of roots, without long-persisting leaf bases; basal leaves simple, rarely ternate, petioles 3–18 cm long, blades 1.5–5 cm long, ovate to nearly orbicular, cordate, crenate-serrate; cauline leaves ternate, not over 3 cm long, the leaflets sessile or on petiolules to 4 mm long; peduncles 6–12 cm long; umbels 1 or 2 per stem; involucre lacking or obsolete; rays 10–17, 0.5–2 cm long; involucre of about 4–6 bractlets, to about 2 mm long, separate or united at the base; pedicels 1–3 mm long; petals yellow; stamens yellow; styles about 1 mm long; fruit about 2 mm long, the ribs prominent. Willow-streamside and meadow communities at 2,130 to 2,440 m in Sanpete, Sevier, Summit, Utah, and Wasatch counties; widespread in the United States and Canada; 12 (iii).