The Discovery of Shepherd's Desert Parsley (*Lomatium pastorale*), an Oregon Endemic

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In 1978 I went on a long field trip to northeastern Oregon with an aphidologist, Dave Voegtlin. We spent time in the Wallowa Mountains and the Blue Mountains. Our main camp in the Blue Mountains was near some springs on the north slope of Green Mountain. The meadow across the road from our camp was dominated by a *Lomatium* in fruit. It was so abundant that chipmunks or mice had left piles of the empty husks of its mericarps around the ends of logs. Upon returning to Eugene, I found I could not identify it so I sent a specimen to Dr. Lincoln Constance, the guru of *Lomatium* in North America. He replied that he couldn't place it, thought it was new, and sent me a draft Latin description by return mail! He also suggested that I send a duplicate specimen to Mark Schlessman, a graduate student who was working on a taxonomic study of a group of lomatiums that might be related to the one I'd found and see what he thought. Well, he thought my plant was not new but rather a form of *L. leptocarpum*. Lincoln and I decided to shelve the idea of describing it as new, at least for the moment.

A Shepherd's Lomatium?

In July 1980, I returned to the Blue Mountains on a field trip with the Emerald Chapter of the Native Plant Society of Oregon (NPSO). We camped at the same site on Green Mountain where Dave Voegtlin and I had camped two years before. We were joined by several NPSO members from eastern Oregon, including Bob Meinke (now Plant Conservation Biology Program Leader, Oregon Department of Agriculture) and Charlie Johnson (former Umatilla National Forest ecologist, now deceased). In the course of our excursions we found an additional population of the Green Mountain *Lomatium* on Ruckel Ridge and compared it with the other *Lomatium* species in the area. All, including the local experts, agreed that a new species was at hand. In 1983 Lincoln Constance and I reviewed the material in the herbarium at Berkeley. This affirmed our conviction that this plant should be formally described as a new species. I chose the specific epithet

Mericarps of shepherd's desert parsley. Ventral view, top; dorsal view, below. Photo by David Wagner.

By 1907 the mountains of northeastern Oregon had been subjected to over 20 years of heavy grazing, creating large areas where the native vegetation had been "tramped out." The foreground was described as low weedy cover surrounded by bare soil and "erosion pavement," a range management term for rocks remaining after the soil had been eroded away (Skovlin *et al.* 2001). Photo by Arthur W. Sampson in 1907; courtesy of the USDA Forest Service Pacific Northwest Experiment Station Starkey Experimental Forest and Range, LaGrande.

pastoralis to reflect the historic sheep grazing at the original locality. The abundance of the desert parsley was probably the result of the severe former disturbance to its habitat. Charlie Johnson had pointed out that the dearth of grasses in the Green Mountain meadow was a consequence of proximity to the waterhole and previous use as a sheep bedding area when numerous bands[1] of sheep grazed along the spine of the Blue Mountains. Even though 80 years had passed since the heaviest grazing had ended, grasses had still not returned to the density found in other meadows. Historic trampling and compaction that removed essentially all the native grass cover may be the reason that shepherd's desert parsley could maintain its amazing abundance (estimated over 10,000 plants) at the Green Mountain site.

Despite our conviction that we had a good species, Lincoln and I continued to hesitate on publication because Mark Schlessman maintained a different view. There seemed no reason to rush into print. More sites could be explored to determine the extent of its populations. The several populations that I had found after the initial discovery appeared to me to be stable and secure. By this time, I had become immersed in studying liverworts and the *Lomatium* manuscript languished in a file. Lincoln Constance had plenty of other things to do to keep him busy and did not push me. Starting up a private consulting business focused on bryophytes in 1993 kept my attention away from *Lomatium* until 2006, when Jimmy Kagan (Director of the Oregon Biodiversity Information Center) urged me to move on formalizing the name. In the meanwhile, Mark Schlessman's interest in the plants had waned. Botanists in eastern Oregon had found the plant in several new sites and were anxious to have a proper name. Jimmy introduced me to Mark Darrach (Umatilla National Forest, Pendleton), who offered to co-author the paper. I accepted with alacrity. We began work on the manuscript together in 2010 and by 2011 published the new species as *Lomatium pastoralis*[2], 34 years after I first recognized the plant (Darrach and Wagner 2011). The new species, *Lomatium pastorale* D.H. Wagner ex M.E. Darrach & D.H. Wagner, has been added to the Oregon Flora Project checklist (Cook and Sundberg 2011).

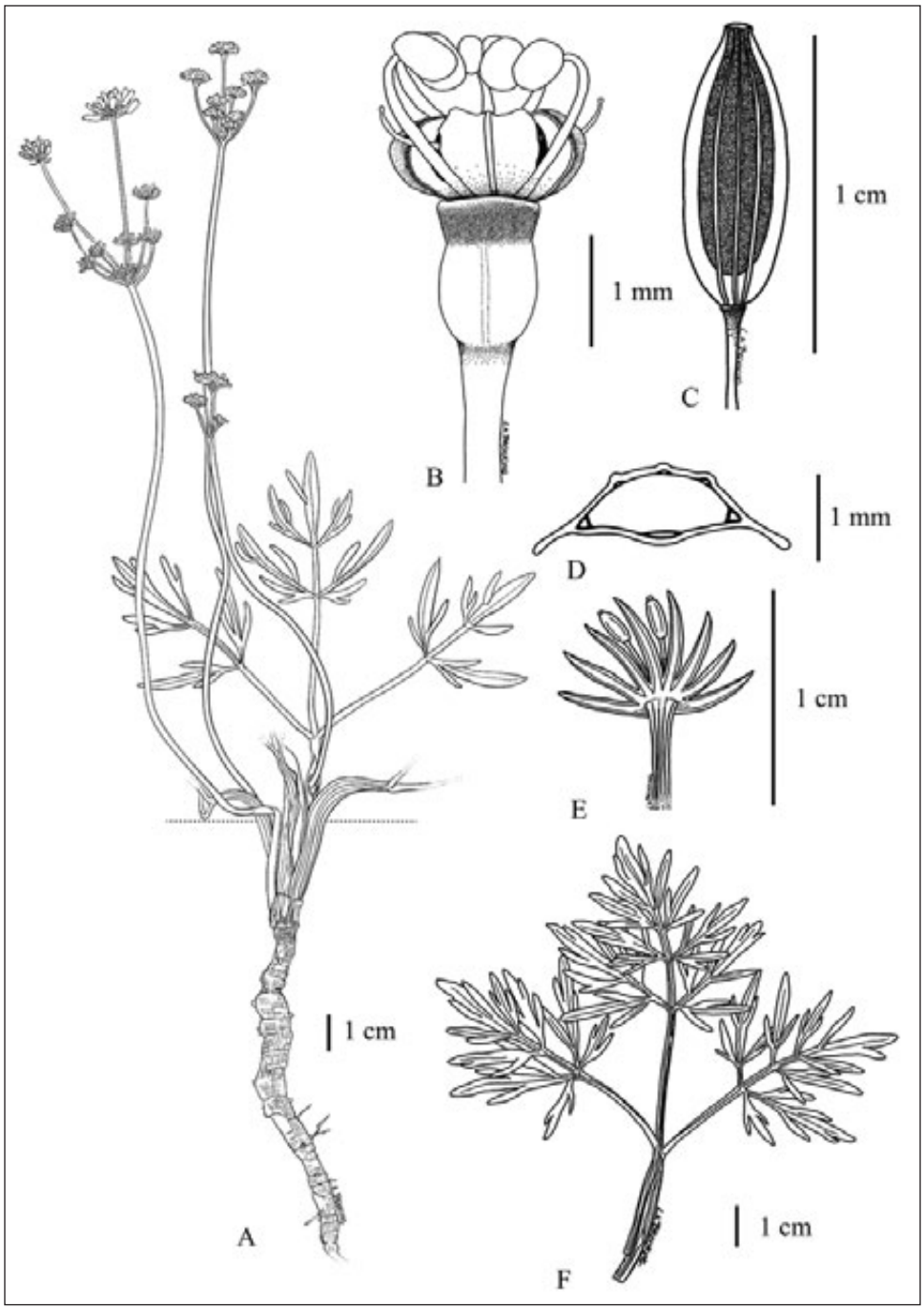


Illustration of *Lomatium pastorale*, drawn by Linda Brooking from Mark Darrach collection #429 on 15 June 2009. A. habit with dashed line representing typical location of ground surface; B. perfect flower at anthesis; C. mature fruit; D. mature fruit transection depicting vittae; E. involucel; F. typical leaf morphology. Reprinted from the Journal of Botanical Research Institute of Texas (5:429), by permission from Barney Lipscomb.

Distribution

Shepherd's desert parsley is a narrow endemic found only on the Umatilla and Wallowa-Whitman National Forests in Umatilla County of northeastern Oregon (see map). The original collection

1 Under the Forest Service permit system, a band comprises 1,000 ewes.

2 The International Code of Nomenclature for Algae, Fungi and Plants requires that the gender of specific epithet match the genus, so the proper Latin termination is *pastorale.*

Developing fruit and asymmetrical (dimidiate) involucel of shepherd's desert parsley. Photo by Mark Darrach, taken at the type locality in Umatilla County, 15 June 2010.

in June 1978 was from shallow, rocky soils at 1,555 m on a gentle south-facing slope on the north ridge of Green Mountain in Umatilla County on the Umatilla National Forest. Experienced field botanists on the Umatilla and Wallowa-Whitman National Forests conducted numerous surveys in the general area during the last three decades. Two populations recently studied by Forest Service botanists are confined to small areas within several square kilometers.

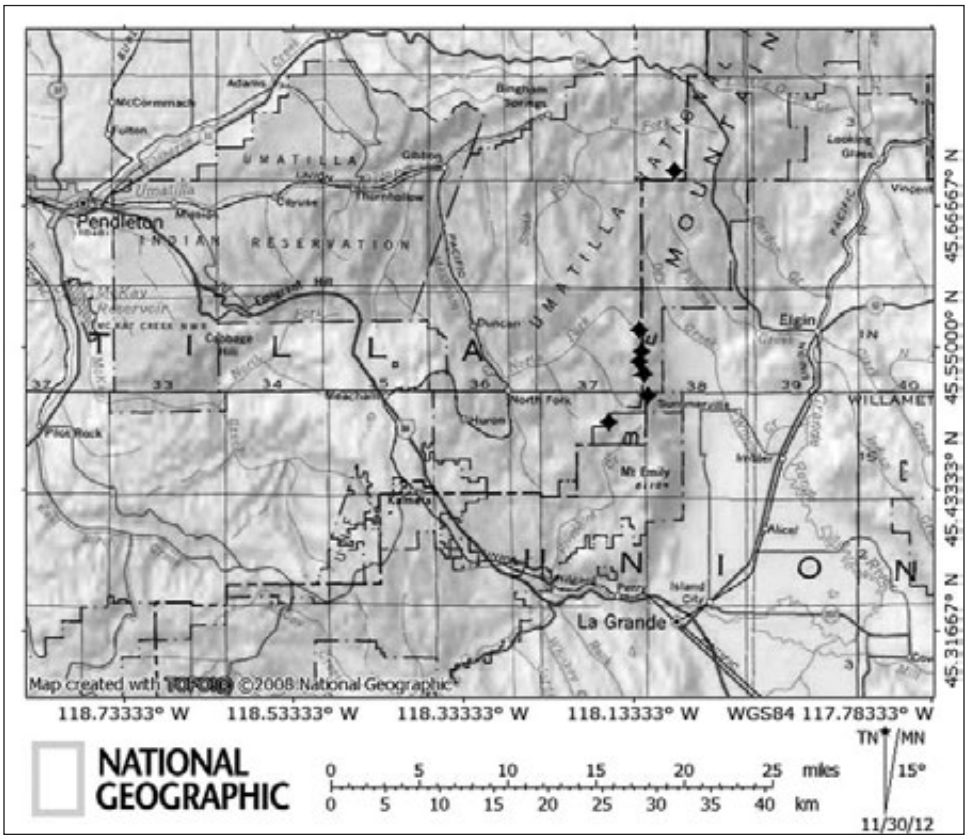
What Differentiates Shepherd's Desert Parsley?

Shepherd's desert parsley is most easily distinguished from other members of the genus by relatively broad simple leaflets, narrowly elliptical fruits on short (but easily observed) pedicels, a strongly dimidiate involucel (the whorl of small bracts immediately below the individual flower clusters is asymmetrical), and peduncles that remain strongly decumbent at the base but with ascending middle and upper segments.

The two species with which *Lomatium pastorale* is most likely to be confused are *L. ambiguum* and *L. leptocarpum*, which are occasional to frequent associates. *Lomatium leptocarpum* differs in having nearly sessile, narrowly oblong fruits, a usually well-developed radial involucel, narrow and more numerous leaflets, and peduncles which are only rarely strongly decumbent at the base. *Lomatium ambiguum* is found only infrequently scattered within the known *L. pastorale* populations, being more abundant on adjacent slightly steeper scabland slopes with better drainage. *Lomatium ambiguum* has long pedicels with upright fruits, lacks an involucel entirely, typically includes at least one cauline leaf on mature specimens, and the peduncle bases are not decumbent.

Phenology and Ecology

Look for shepherd's desert parsley to emerge in late April or early May. Its bright yellow flowers appear about a month later, with flowering peaking the last week of May through the first week of June. By the end of June, the mature fruits are dehiscing, and the plants are senescing so that by mid-July only remnant dry leaves and stems remain around the root crown. Examinations of annual scars on root crowns indicate that individuals may live more than 60 years.



Map of shepherd's desert parsley locations in northeastern Oregon. Prepared by Cindy Roché using TOPO! software by National Geographic.

This tap-rooted perennial grows exclusively on shallow, poorly-developed soils over Miocene age Columbia River Basalt bedrock in open, vernally moist sites. Although these areas are referred to as scablands, there is typically very little exposed rock. In these lithosols, roots of these plants penetrate the layer of highly fractured basalt. Common associated species include other geophytes (*Allium fibrillum, Fritillaria pudica, Lomatium ambiguum, L. leptocarpum, L. grayi, L. piperi, Triteleia grandiflora*), sparse native bunchgrasses (*Achnatherum lemmonii, Danthonia unispicata, Poa secunda, Pseudoroegneria spicata*), and various forbs (*Achillea millefolium, Balsamorhiza hookeri, Eriogonum heracleoides, Senecio integerrimus*). For a full listing of associated species, refer to Darrach and Wagner (2011).

Shepherd's desert parsley in full flower on 31 May 2010. Note the decumbent peduncles. Photo by Mark Darrach.

Conservation

Dense populations grow as the dominant species in early seral sites that are recovering from severe disturbance; in contrast, plants tend to be widely scattered in habitats in later seral stages. In response to periodic disturbance, shepherd's desert parsley populations appear to increase relative to associated grass species. Shepherd's desert parsley was found in greatest abundance in areas that had been nearly completely denuded by destructive grazing practices in the early 20th century that left the sites in a vegetative disclimax condition that persists to the present (Darrach and Wagner 2011). It has also been found growing on fractured basalt bedrock on the excavated floor of an inactive crushed rock quarry. These factors led me (and my colleagues in the field) to surmise that it is an early seral species that relies on a persistent disturbance regime to maintain population levels. Thus, this rare species might require grazing management as a conservation practice. Other forms of disturbance that may favor its survival are pocket gophers (*Thomomys talpoides*), herds of large ungulates, off-road vehicles and fire control activities.

Arthur Sampson's photo of a sheep camp and bed ground in 1907 near Standley Spring in the Wallowa Mountains shows the band of about 1,200 wethers that grazed the surrounding range all summer. Close herding and night corraling were done for protection from predators, which were still numerous. Reprinted from Skovlin *et al.* 2001, courtesy of the USDA Forest Service Pacific Northwest Experiment Station Starkey Experimental Forest and Range, LaGrande.

Acknowledgements

Martin Vavra, Emeritus Rangeland Scientist, Starkey Ungulate Ecology Team, La Grande, provided the images of sheep on public rangeland, scanned by Brenda Carlson. Joan Frazee, Forest Service botanist, and Mark Darrach, Umatilla National Forest, contributed photographs of the desert parsley. Barney Lipscomb, editor of the Journal of Botanical Research Institute of Texas, sent a high resolution file of the type illustration. Cindy Roché prepared a distribution map.

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David Wagner holding a freshly excavated individual of shepherd's desert parsley; note the lack of tuberous thickening in the roots. Type locality, Umatilla County, Oregon. Photo: self-portrait, 4 June 1979.

Identifying *Lomatium pastorale*

For ease of identification, I inserted *L. pastorale* into the *Lomatium* key adapted from the Flora of the Pacific Northwest (Hitchcock and Cronquist 1973). Only relevant leads are shown.

1a Ultimate segments of leaves large, many or all at least 1 cm long
- 2a Ultimate segments wide, leaflets mostly > 5 mm wide
  - other species (including *L. martindalei*, *L. triternatum* and *L. nudicaule*)
- 2b Ultimate segments narrow, leaflets mostly < 5 mm wide
  - 6a Fruit linear to narrowly oblong, mostly > 3 times longer than wide
    - 7a Involucel absent; pedicels long, 4-13 mm
      - other species (*L. ambiguum* and *L. idahoense*)
    - 7b Involucel present; pedicels short or long
      - 9a Larger leaf segments mostly > 2 mm wide; mature pedicels 2-12 mm
        - 10a Stem puberulous; peduncles erect from base
          - *L. triternatum*
        - 10b Stem glabrous; peduncle decumbent at base
          - *L. pastorale*
      - 9b Larger leaflets mostly 1-2 mm wide; mature pedicels 0.5-3 mm
        - other species (*L. orogenioides* and *L. leptocarpum*)
  - 6b Fruit broad, mostly > 4 mm wide or less than 2.5 times longer than wide
    - other species

1b Ultimate segments of leaves relatively small, rarely any as much as 1 cm long
- other species

David Wagner was raised by missionary parents in India, attending boarding school in the foothills of the Himalaya Mountains from kindergarten through high school. Early in life he fell in love with mountains and nature. Depending on the season, he collected ferns, beetles, and butterflies, tracked birds and mammals, and chased snakes. After graduating from high school he returned to the USA for college. He received a BA (1968, Biology, Chemistry and Geology) from University of Puget Sound, Tacoma and his MS (1974) and PhD (1976) in Botany from Washington State University in Pullman. From there he moved directly to Eugene, Oregon, where he has lived and worked for over 35 years. He was Director and Curator of the University of Oregon Herbarium 1976 to 1993. Since 1993 he has operated the Northwest Botanical Institute, dedicated to research, education, and public service. He specializes in ferns, mosses and liverworts with a focus on field botany and taxonomy. He has been deeply involved with the Native Plant Society of Oregon, the Eugene Natural History Society and the Mount Pisgah Arboretum. He created the Willamette Valley Nature Calendar for 30 years, with the final edition published for 2012. Among his writings are the treatment of *Polystichum* in *Flora of North America* and the electronic, web-based *Guide to the Liverworts of Oregon.* He now writes a monthly nature column, "It's About Time," for the Eugene Weekly newspaper. His website is fernzenmosses.com.