A revised *Flora of the Pacific Northwest*: Taxonomic implications Washington’s flora
(or, why accept all those annoying name changes?)

*Lewisia tweedyi* (Portulacaceae)  
*Lewisiospis tweedyi* (Montiaceae)  
*Disporum hookeri*  
*Prosartes hookeri*

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The Revised Flora

- An inventory of native and naturalized plants in our area.
- An identification manual.
- A guide to current names and classifications.
- Basic info for each taxon (e.g., morphology, habitat, distribution).

Promotes the adoption of current knowledge.
Floras are dynamic

- Ongoing field work continues to add to our baseline knowledge of which species occur within the region and where.
- Additional exotic taxa continue to be found in our area.
- New species continue to be described, even here in the PNW.
- Taxonomy is not a static science. Classifications change as new information comes to light. DNA-based phylogenies have resulted in numerous changes, especially at the ranks of family and genus.
- Changes in classification usually result in name changes.
Scientific names serve dual purposes:

1. as aids for memory and communication.
2. to convey information about classifications and relationships (in this sense, names are hypotheses subject to revision).

Floras are dynamic

Why can’t scientific names remain unchanged?

These two functions (communication & classification) may appear to be at odds with each other. But are they?

New classifications (and resulting name changes) represent refined hypotheses that allow more accurate communication.
Luzula campestris?

Luzula comosa var. comosa  
Luzula comosa var. laxa  
Luzula cascadensis  
Luzula macrantha  
Luzula multiflora  
Luzula subsessilis

True Luzula campestris, an aggressive lawn weed from Europe:
# Changes to the Flora

40+ years of accumulated changes to our flora:

<table>
<thead>
<tr>
<th></th>
<th>1973 Flora</th>
<th>Revised Flora</th>
<th># Added</th>
<th>% Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Families</td>
<td>131</td>
<td>159</td>
<td>28</td>
<td>21.4%</td>
</tr>
<tr>
<td>Genera</td>
<td>836</td>
<td>1,145</td>
<td>309</td>
<td>37%</td>
</tr>
<tr>
<td>Species</td>
<td>3,659</td>
<td>4,946</td>
<td>1,287</td>
<td>35.2%</td>
</tr>
<tr>
<td>Infraspecies</td>
<td>1,429</td>
<td>1,402</td>
<td>-27</td>
<td>-1.9%</td>
</tr>
<tr>
<td>Terminal Taxa</td>
<td>4,415</td>
<td>5,505</td>
<td>1,090</td>
<td>24.7%</td>
</tr>
<tr>
<td>Native Terminal Taxa</td>
<td>3,661</td>
<td>4,032</td>
<td>371</td>
<td>10.1%</td>
</tr>
<tr>
<td>Exotic Terminal Taxa</td>
<td>754</td>
<td>1,432</td>
<td>678</td>
<td>89.9%</td>
</tr>
</tbody>
</table>

- Over 1,000 taxa are not included in the 1973 Flora.
- 40% of taxa in 1973 Flora are affected by nomenclatural changes.
Changes to genera in the 1973 Flora:

- 269 genera with no changes (32%)
- 91 with name changes to some of taxa
- 294 with increase/decrease in # of taxa
- 90 with some taxa transferred to other genera
- 92 with all taxa transferred to other genera
Hitchcock’s taxonomic philosophy:

“The concepts of species and other taxa is conservative, both from the standpoint of the number of groups recognized and from the standpoint of following historical practice in doubtful cases.”

- from Volume 5 of the full Flora.
Changes to the Flora

Hitchcock’s taxonomic philosophy:

“A great many of the binomials proposed in the past as representing distinct species prove, on reconsideration with more ample material and in the light of modern biological knowledge, to be wholly without foundation.” (Volume 5)

However, molecular studies and other taxonomic revisions have revalidated and “resurrected” many of those old names.
Changes to the Flora

Publication dates for added taxa and nomenclatural changes:

Genera:
- New Name published on/after 1973: 7
- New Combination published on/after 1973: 41
- Published before 1973: 372

Species & Infraspecies:
- New Name published on/after 1973: 681
- New Combination published on/after 1973: 171
- Published before 1973: 2,581
Washington Natural Heritage Program Rare Plant List

- 181 No change
- 103 Non-trivial name change
- 45 Not in 1973 Flora
Confusing rare *Nuttallanthus texanus* with introduced *Linaria purpurea*
Rare Plants and Noxious Weeds

Washington Noxious Weed List

- Not in 1973 Flora: 43
- Non-trivial name change: 28
- No change: 80
Native vs. exotic *Hieracium*

13a Basal and lower st lvs gen absent or withered when in fl; middle and upper st lvs sessile; native or intro spp.

14a Lf margins gen minutely inrolled, scab with short (0.1–0.2 mm), stiff, triangular hairs, if elongate hairs present these gen not swollen at the base; upper st and peduncles stellate, not glandular; middle and upper phyllaries not stellate, gen glab. rarely slightly glandular or long-hairy; open for, stream banks, meadows, rocky slopes, shores, roadsides; native AK s to n OR, e to At; Eurasia; narrow-lvd h. (*H. canadense*)

11 H. *umbellatum* L.

14b Lf margins gen flat, scab and also with elongate hairs swollen at base; upper st and peduncles gen stellate and short-glandular; middle and upper phyllaries gen glandular, or stellate and glandular, occ long-hairy; roadsides, sandy fields, disturbed ground; intro s BC to WA, e N Am; native to Europe; Savoy h.

12 H. *sabaudum* L.

13b Basal and lower st lvs present and green when in fl, with long petioles; middle and upper st lvs petioled; intro spp.

15a Basal and lower st lf blades rounded, truncate or cordate at base, sharply differentiated from petiole; roadsides, open for, disturbed ground, railroads; intro s BC s to n OR e N Am; native to Europe; wall
DNA-based Disintegrations

Chenopodium chenopodioides
Disintegration of Liliaceae
Chenopodium ambrosioides
Chenopodium botrys
Chenopodium multifida
Chenopodium pumilio

Chenopodium capitatum
Chenopodium foliosum
Monolepsis nuttalliana
Monolepsis spathulata

Monolepsis pusilla

Chenopodium polyspermum

Chenopodium chenopodioides
Chenopodium glaucum
Chenopodium rubrum

Chenopodium murale
Chenopodium urbicum
Chenopodium hybridum

Dysphania ambrosioides
Dysphania botrys
Dysphania multifida
Dysphania pumilio

Blitum capitatum
Blitum virgatum
Blitum nuttallianum
Blitum spathulatum

Micromonolepis pusilla

Lipandra polysperma

Oxybasis chenopodioides
Oxybasis glauca
Oxybasis rubra

Chenopodiastrum murale
[not in our Flora]
Chenopodiastrum simplex

7 Remaining Chenopodium spp.

Chenopodium s. str. (6/7 with name changes)
Disintegration of Chenopodium

Chenopodium chenopodioides

Oxybasis chenopodioides

Oxybasis macrosperma (= C. macrospermum)

Chenopodium rubrum var. rubrum
Disintegration of *Chenopodium*

*Oxybasis rubra var. rubra*

*Chenopodium rubrum var. rubrum*

*Oxybasis macrosperma?*
“Further study needed”

• A primary goal of the Flora is to bring current knowledge together into a single accessible resource.

• However, our collective knowledge continues to change.

• Some genera and species in our area remain poorly understood; some have not yet been investigated using molecular methods.

• In a very real sense, the new Flora will be outdated the moment it is published.

• In some cases, all we can do is say “further study needed”
“A new Flora does not necessarily result in an easier or simpler identification process, nor does it necessarily result in cleaner and more clearcut taxonomic classifications. While greater clarification of concepts and diagnostic characters may be achieved for some groups, there are many cases where further study reveals greater patterns of complexity that may be difficult to represent as discrete taxa.”


Examples: Antennaria, Delphinium, Grindelia, Lupinus

Counter-examples: Astragalus, Botrychium, Lomatium
Pedicularis pulchella from Wenatchee Mountains

Wenatchee Mts (Arnett 2008-17):

A specimen from Montana:
Claytonia umbellata from Wenatchee Mountains
Astragalus sp. from northeast Olympic Mountains.

An undescribed species?
“Further study needed”

Taxa that may remain unnamed even as the Flora goes to press

*Botrychium ‘viride’*

*Botrychium ‘furculatum’*

*Lomatium ‘argentophyllus’*

*Oreocarya ‘montana’*
(SDSU20708)

*Physaria ‘andersonii’*
(Mark Darrach)
Species published as new to science in Flora area after 1973:
Impacts of a new Flora

• Provides a new baseline inventory of which taxa occur in our area.

• Aids conservation and restoration work, land management decisions, weed control, ecological studies, floristic studies, and other types of research.

• Improves our ability to accurately communicate information about the plants of Washington.

• Will influence the names used in field guides, pamphlets, web sites, and other resources, thereby reaching people who never use the book itself.

• Provides an up-to-date starting point for anyone seeking to learn plant families and scientific names, and will make it easier for the rest of us to “relearn” the flora.
*Sabulina basaltica*, Olympic Mts.

*Sabulina sororia*, Twin Sisters Range.