

Biology, ecology, and management of PNW huckleberries

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Outline

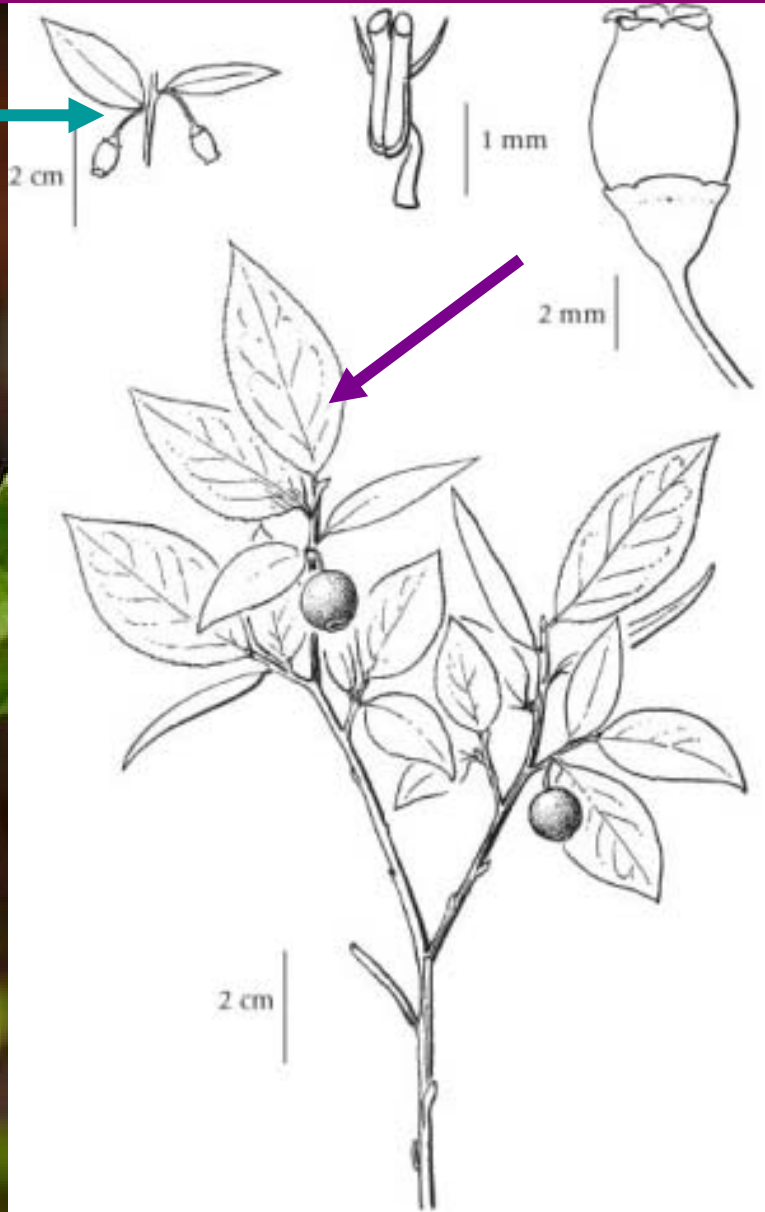
- Review basic biology and ecology of *Vaccinium*
- Known effects of harvesting and forest management
- Future research directions

Genus *Vaccinium*

- Family Ericaceae (Heath)
- Includes 35 genera (*Arbutus*, *Arctostaphylos*, *Cassiope*, *Rhododendron*)
- *Vaccinium* includes 43 species

Vaccinium in the PNW

- *V. parvifolium* - red
- *V. ovatum* - evergreen
- *V. deliciosum* - Cascade bilberry
- *V. scoparium* - grouse whortleberry
- *V. ovalifolium/alaskaense* - oval-leaf blueberry
- *V. membranaceum* – big, black, blue, thin-leaved, mountain



Vaccinium membranaceum

V. membranaceum – Biology

- Flowers are bee-pollinated
- Seeds (~ 47 / berry) animal dispersed
- Seed germination is extremely sensitive to drought
- Reproduction by seed rare in nature
- Reproduces mainly from rhizomes
- Fruit production moderately drought tolerant, frost intolerant

V. membranaceum - Belowground

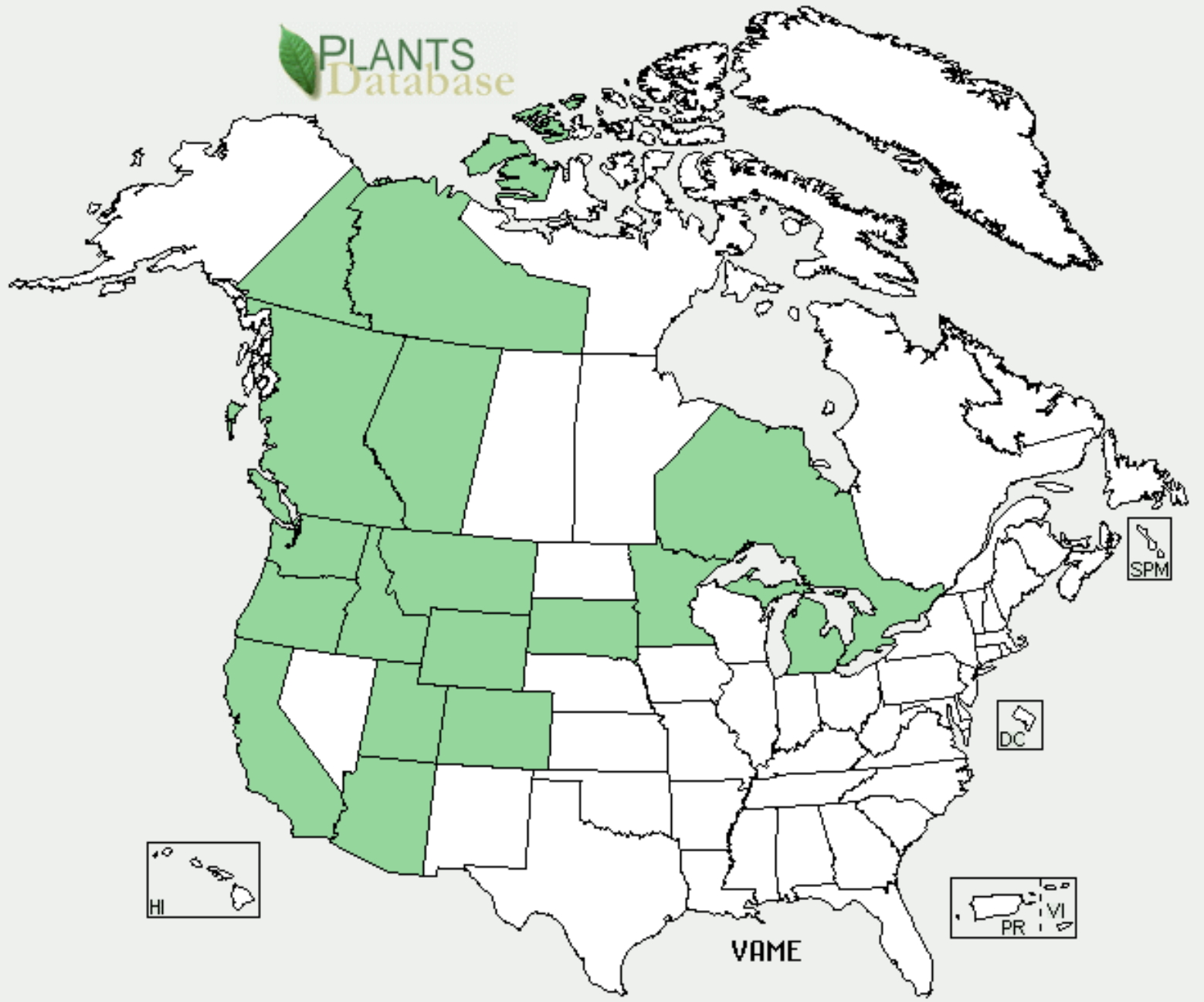
- Unique to the Ericaceae are *ericoid mycorrhizae*
- Mycorrhizae = symbiosis between a fungus and plant root
- *Ericoid mycorrhizae* consist of thin root hairs and a specific type of fungus
- Aid in nutrient uptake



ericoid mycorrhizae

V. membranaceum – Ecology

- High fire tolerance (rhizomes!)
- Intermediate in shade-tolerance
- Medium to coarse textured soils (pH 5.5)
- Low nutrient requirements
- Found from dry to moist coniferous forests and openings, usually above 3,000'
- Widely distributed in montane, subalpine, and boreal zones



Use and Management

- Historically fires kept huckleberry fields open and productive
- With fire management (i.e., control), huckleberries were out-competed
- Motivated research on how to maintain huckleberries

Kerns et al. 2004

- Compared huckleberry abundance among thinned (10-25 yr), un-thinned (same age), and old growth stands in Oregon.
- *V. parvifolium* abundance was greatest in previously thinned stands ($n > 10$)
- *V. membranaceum* abundance was greatest in old-growth and not found in previously thinned areas ($n = 1$).

Minore et al. (1979, 1984)

- Summarized results from experiments near Mt. Hood and Mt. Adams
- Sheep grazing, cut and burn, burn, and borax (Adams)
- Cut and burn, burn, herbicide (2-4D frill), and *Phellinus* (Hood)
- Controlled burning was difficult at high elevation

Adams

- Fire killed shoots, but stimulated sprouting
- Burning treatments significantly reduced berry production, even after 7 years
- Other treatments did little to reduce competing species

Hood

- Sprouting after fire was rapid
- With burning treatments, berry production initially dropped then recovered to control levels
- Competing trees were not killed with *Phellinus*
- 2,4 D (frill) doubled berry production – minimal damage to *Vaccinium*

Rocky Mountain Research*

- Low to moderate severity fire: Big huckleberry showed good vegetative response in lightly burned areas of western larch/Douglas-fir forests in western Montana
- Spring burns: resulted in greater increase in sprouts than fall burns
- Slow to recover from high severity wildfires

Synthesis so far

- Controlling competing vegetation can be challenging
- Response to fire depends on severity of burn
- Management effects likely site or region specific

Plant association database

Scientific Name	Spp	Plant assn	Ave cover	plots	Total plots
Vaccinium membranaceum	VAME	TSME/VAME-SOSI2	24.8	17	17
Vaccinium membranaceum	VAME	TSME/VAME/CLUN2-NWO	20.3	20	20
Vaccinium membranaceum	VAME	TSME/RHMA3-NWO	4.0	21	29
Vaccinium membranaceum	VAME	ABGR/CHUM	1.4	9	11
Vaccinium membranaceum	VAME	ABGR/TRLA2	1.0	5	5

Potential Project: Mapping potential areas for huckleberry production

- Groups of plant associations have been mapped for forests covered by NW Forest Plan
- Mapping complete or on-going for additional Forest lands
- Current conditions (i.e., stand age) and other information (fire history, etc.) also exist for many areas

Potential Project: Mapping potential areas for huckleberry production

- Would overlay current conditions onto PAGs in a GIS and develop a predictive model (based on associations and land-use) for huckleberries abundance
- Product - Map showing likelihood (probabilities) of huckleberry production
- Field check
- Refine model as necessary

Potential Project: Mapping potential areas for huckleberry production

- Benefit - Landscape-scale analysis of potential for sustainable huckleberry production
- Limitation – Fruiting is weather dependent, difficult to model

Future research

- Field experiments!
- Comparing *realistic* management options that minimize physical damage to huckleberries
- Do huckleberries need fire?
- How do fire and other management practices effect ericoid mycorrhizae?

Role of charcoal?



Key References

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