



Castilleja linariifolia

Castilleja

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Above: *Abronia ammophila* (Yellowstone sand verbena).
By B. Heidel

ONLY in National Parks

Wyoming is a land of many firsts, foremost when it comes to National Parks. Yellowstone National Park was the first national park to be established in the nation in 1872, and Devils Tower National Monument was the first national monument in the country, 34 years later, in 1906. In fact, creation of Yellowstone NP pre-dated statehood, so that technically, Yellowstone NP never was nor will be in Wyoming! If Wyoming events sometimes happen precociously, it should come as no surprise that both these designations happened before the establishment of the National Park Service (NPS) a century ago in 1916.

Before 2016 and the 100th National Park Service anniversary get away from us, we have time to celebrate NPS lands and their riches in native plants. NPS is anything BUT a monolithic land manager in our state, and Wyoming is also home to national historic sites and national recreation areas administered by NPS (Table 1). What all NPS units and all regions all have in common is a central natural resources mandate stressing preservation and public enjoyment.

This bodes well for a special league of native Wyoming plants that are found only on NPS lands in the state, including at least 41 such vascular plant species (Table 2). A few of the green NPS denizens are found nowhere else in the world but national parks – see Jennifer Whipple’s *Yellowstone Science* article about the plant species endemic to Yellowstone NP (https://www.nps.gov/yell/learn/upload/ys20_1.pdf). This doesn’t even include the many species that are concentrated on NPS lands though also found elsewhere in Wyoming.

A high proportion of the 41 NPS plant species of concern are wetland species as found on the lakes, ponds, rivers, springs and thermal features of NPS units in Wyoming where researchers continue to discover native species that are new to NPS units if not the state – see the newsletter article “Plunging into Yellowstone aquatics” (http://www.wynps.org/wp-content/uploads/Oct14_Castilleja.pdf). Unfortunately, NPS lands are also sometimes at the forefront of some new state plant records for noxious weeds, making them the vanguards in both native and noxious realms.

...National Park Service lands in Wyoming also harbor some of the highest numbers of populations for certain other rare plant species, or else their largest populations. National Parks, as the Nation’s best idea, are the best or only bastion for some of Wyoming’s rare plant riches. BH (Cont. p. 3 for Tables 1 and 2).

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WYNPS News

Tis the Time: Please renew your membership for 2017 and cast your vote for new 2017 officers – thanks!

Mark Your Calendar: June 9-12, Wyoming Native Plant Society 2017 Annual Meeting will be in the Black Hills. The Great Plains Native Plant Society is co-host. Watch for hike and registration announcements on our homepage and in the next newsletter. Activities will be centered in Sundance, and camping is available at Sundance trail head, Reuter Campground, Mountain View KOA, or hotels in town. See you in Sundance!

Treasurer's Report: Treasurer's report: Balance as of 29 Nov 2016: Scholarship = \$1485; general fund = \$6848; total = \$8333.

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Message from the President

As I enter the hot-chocolate-drinking phase of my term, I find myself thinking of the new plants learned and friends made along the trail. It has been a busy and rewarding time for me, and I thank all of you for entrusting me to lead the organization. I have no doubt that there are things I could have done better, but I am proud of what has been accomplished by the Board of Directors during my tenure as your President.

It takes many committed and active members to make a successful organization. I encourage all to consider volunteering to serve on the Board of Directors or on a committee. Trust me, you will be glad that you did ☺.

I have many to thank for supporting me: Ann Boelter, Hollis Marriott, Dorothy Tuthill, Walt Fertig, Brian Sebade, Bob Giurgevich, Amy Taylor, Bonnie Heidel, just to name a few! I won't be a stranger, and I look forward to continuing to support the Society on our Facebook page.

Happy Trails to You,

~Karen Clause

Markow Scholarship/Grant: Please distribute the enclosed scholarship/grant announcement for the 2017 Scholarship/Grant – due 15 Feb. Submittal can be on-line or by mail, for receipt by the deadline.

Deadline for next Issue: Announcements and ideas are welcome at any time. The next deadline is 15 Feb.

ONLY in National Parks, cont. from p. 1

Table 1. National Park Service Lands in Wyoming

NPS Units Name	Area (ac)
Bighorn Canyon Natl. Recreation Area	21,156 ¹
Devils Tower Natl. Monument	1347
Fort Laramie Natl. Historic Site	833+340 ²
Fossil Butte Natl. Monument	8334
Grand Teton Natl. Park	224,053 ³
Yellowstone Natl. Park	1,900,032 ⁴



Table 2. Wyoming plant species of concern found only on National Park Service lands

Scientific Name ^{5,6}	Common Name	GRANK ⁷	SRANK ⁸
<i>Abronia ammophila</i> ¹	Yellowstone sand verbena	G1	S1
<i>Agrostis rossiae</i> ¹	Ross' bentgrass	G1	S1
<i>Aspidotis densa</i>	Indian's dream	G5	S1
<i>Carex flava</i>	Yellow sedge	G5	S1
<i>Carex laeviculmis</i>	Smooth-stemmed sedge	G5	S1
<i>Carex proposita</i>	Smoky Mountain sedge	G4	S1
<i>Cirsium canovirens</i>	Gray-green thistle	G4G5	S1
<i>Cyperus acuminatus</i> ⁶	Short-point flatsedge	G5	S1
<i>Cyperus bipartitus</i> ⁶	Shining flatsedge	G5	S1
<i>Dodecatheon jeffreyi</i> ssp. <i>jeffreyi</i>	Jeffrey's shootingstar	G5T3T5	S1
<i>Dulichium arundinaceum</i>	Three-way sedge	G5	S1
<i>Eleocharis bella</i>	Delicate spikerush	G5	S1
<i>Eriogonum umbellatum</i> var. <i>cladophorum</i> ¹	Yellowstone sulphur buckwheat	G5T1	S1
<i>Glandularia bipinnatifida</i>	Dakota vervain	G5	S1
<i>Huperzia haleakalae</i>	Fir clubmoss	G5	S1
<i>Ionactis alpine</i>	Lava aster	G5	S1
<i>Isoetes echinospora</i>	Spiny-spore quillwort	G5	S1
<i>Isoetes occidentalis</i>	Western quillwort	G4G5	S1
<i>Lemna gibba</i>	Inflated Duckweed	G4G5	S1
<i>Lemna valdiviana</i>	Pale duckweed	G5	S1

<i>Lipocarpha drummondii</i> ⁶	Dwarf rush	G4G5	S1
<i>Lobelia siphilitica</i> ⁶	Great blue lobelia	G5	S1
<i>Lysimachia thyrsiflora</i>	Swamp loosestrife	G5	S1
<i>Mimulus nanus</i> ssp. <i>nanus</i>	Dwarf purple monkey flower	G5T4	S1
<i>Montiastrum lineare</i>	Linearleaf miner's-lettuce	G5	S1
<i>Myriophyllum quitense</i> ⁹	Andean watermilfoil	G4?	S3
<i>Najas flexilis</i>	Slender naiad	G5	S1
<i>Ophioglossum pusillum</i>	Adderstongue	G5	S1
<i>Orobanche corymbosa</i> var. <i>corymbosa</i>	Flat-top broomrape	G4T4	S1S2
<i>Physaria pachyphylla</i>	Pryors twinpod		S1
<i>Polemonium micranthum</i>	Annual polemonium	G5	SH
<i>Potamogeton obtusifolius</i>	Blunt-leaf pondweed	G5	S1
<i>Potamogeton zosteriformis</i>	Flatstem pondweed	G5	S1
<i>Pseudognaphalium microcephalum</i> var. <i>thermale</i>	White cudweed	G5T4Q	S1
<i>Ranunculus aquatilis</i> var. <i>aquatilis</i>	White water-crowfoot	G5	S1
<i>Senecio hydrophiloides</i>	Sweet marsh butterweed	G4G5	S1
<i>Sisyrinchium idahoense</i> var. <i>idahoense</i>	Idaho blue-eyed grass	G5T4	S1
<i>Torreyochloa pallida</i> var. <i>fernaldii</i>	Fernald alkali-grass	G5T4Q	S1
<i>Trautvetteria caroliniensis</i>	Carolina tassel-rue	G5	S1
<i>Trisetum canescens</i>	Tall trisetum	G5	S1

¹ Includes land in Montana

² The second figure represents non-NPS federal lands administered by NPS as part of Fort Laramie NHS

³ Does not include the Dec 2016 acquisition of State Land expanding GTNP

⁴ Includes land in Idaho and Montana

⁵ Global distribution is restricted to Yellowstone National Park

⁶ Not restricted to NPS lands, but the only places they occur on public lands in WY are on NPS

⁷ Global rank assignment in system by NatureServe, with G1=Globally Imperiled and G5=Demonstrably Secure throughout its distribution

⁸ State rank assignment in system by NatureServe, with S1=Globally Imperiled and S5=Demonstrably Secure in its Wyoming distribution

⁹ No longer considered rare based on Hellquist et al. (2014) records

Growing Native Plants

Part 22. Tall Shrubs

By Robert Dorn

Artemisia tridentata var. *tridentata*, Basin Big Sagebrush, grows to 10 feet or more high and can be trained like a single-trunked small tree. This is the tallest of our three varieties. The leaves are gray-green, to 2 inches long, and usually tipped with three teeth or lobes. They are aromatic, especially when wet after a rain. They persist over winter and are replaced by new leaves in the spring. The flowers are yellow, rather inconspicuous, and borne in small heads in elongate panicles. They appear mostly in August and September. The plants occur naturally mostly in our western basins especially along washes and in other moist depressions. They prefer moist to dry, open areas in deep loamy soil. They are very cold and drought tolerant but do not tolerate wet conditions nor highly alkaline soils. It can be grown from seed or winter stem cuttings treated with rooting hormone. Seed may not ripen until January so it is best to collect it after that time when it will have been cold stratified as well. Surface sow to allow light exposure. Seed is also commercially available. Cold stratification for 10 days may help germination of commercial seed. Small plants are easily transplanted.



Artemisia tridentata var. *tridentata*, Carbon County

Salix lasiandra var. *caudata*, Whiplash Willow, is generally 15 feet high or less and about half as wide. The leaves are lance shaped, dark green, somewhat shiny, to 5 inches long, and turn yellow in fall. The flowers are borne in catkins which appear with the leaves from May to July depending on elevation. The

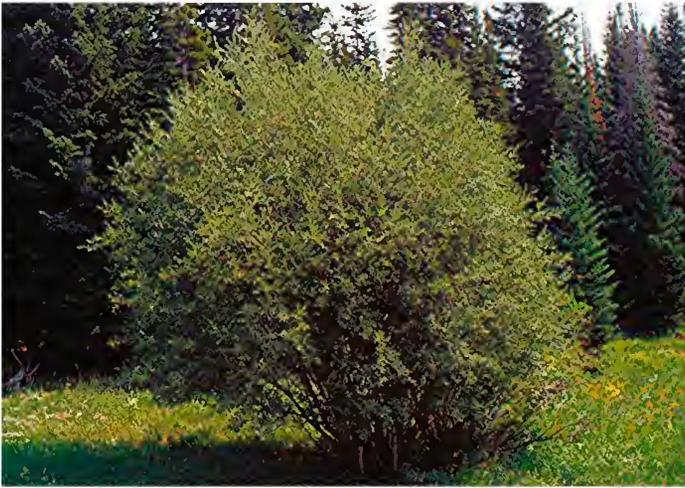
plants occur naturally along streams and in swamps and wet meadows in the mountains and foothills and rarely lower down. They prefer moist to wet areas in full sun. It is easiest to grow from stem cuttings taken in late winter, dipped in rooting hormone, and placed in water or a continuously moist growing medium. If in water, transplant to soil once a good cluster of roots develops and keep wet until well established. It is also in the nursery trade.



Salix lasiandra, cultivated in Cheyenne

Salix scouleriana, Scouler Willow, can reach 30 feet high and half as wide. The leaves are dark green on the upper side and lighter on the underside, obovate to oblanceolate, to 3 inches long, and turn yellow in fall. The flowers are borne in catkins which usually appear before the leaves similar to the "pussy willow." They appear from April to June depending on elevation. The plants occur naturally on moist, well drained slopes or in open woods in the mountains. This willow is unlike most others in that it does not tolerate wet conditions but still needs a moist soil for most of the growing season. It will also tolerate light to moderate shade once established. Propagation is the same as for *Salix lasiandra* above. Fresh seed will germinate readily on a wet soil surface where there is direct light. Stored seed may not germinate. It is also in the nursery trade. [The photo of *S. scouleriana* is on the next page.]





Salix scouleriana, Rio Blanco County, Colorado

Sambucus racemosa, Mountain Elderberry, grows to 12 feet high and 8 feet wide. The multiple stems often die back nearly to the ground in winter. The stems are pithy and tend to be weak. The leaves are opposite and pinnately compound with mostly 5 or 7 leaflets to 5 inches long. The flowers are cream colored to white, about 1/4 inch across, and borne in a pyramid-like cluster to 4 inches long at tips of stems. They appear from May to July. The fruits are red to black berries, about 1/4 inch wide, and attractive to birds. The plants occur naturally in moist, open or partly shaded areas of the mountains. It is easily transplanted. Seed needs 30 to 60 days dry, warm stratification followed by 90 to 150 days cold stratification. It is also in the nursery trade.



Sambucus racemosa, Garfield County, Colorado

Viburnum lentago, Nannyberry, grows to 15 feet high and 10 feet wide. The leaves are opposite, ovate to elliptic with long pointed tips, to 3.5 inches long, and turn orange or reddish in fall. The flowers are creamy white, to 1/4 inch across, and in clusters to 5 inches across at the branch tips. They appear in May and June. The fruits are berry-like, to 1/2 inch long, changing from green to red to blue-black, and in drooping clusters. They are attractive to birds. The plants occur naturally in moist to dry woods or along streams on the plains or in the foothills. They prefer moist, loamy, open or partly shaded conditions. It can be grown from hardwood cuttings or seed. The seed needs 150 to 270 days warm stratification (root develops), 60 to 120 days cold stratification (breaks epicotyl dormancy), then sow in place in spring. Barely cover with soil to allow some light exposure. Seed growing can be a challenge. It is also in the nursery trade.



Viburnum lentago, Crook County

The Sequel: Alive and Well

It's time to take stock! Floras contain cumulative roll calls, and hidden in the ranks of current floras are native plant species that have not been documented in recent decades. The last time Wyoming's historical species were flagged (Heidel 2003), there were 41 historical species. Since then, eight species have been re-discovered and ten more were flagged as having taxonomic change or questions whether or not they were in Wyoming, changing whether or not they are considered.

Historical species recognized in the Wyoming flora (Dorn 2001) defy ranking in the state species of concern lists (Heidel 2012, and updates). In general, they have not been documented since 1970 when systematic surveys and precise location information came into common practice in the state. Some were last collected by Aven Nelson, or much earlier by Thomas Nuttall.

Eight species re-joined the ranks of the alive-and-well (Table 1). Four were re-discovered as a result of floristic inventories through the Rocky Mountain Herbarium, and two were re-discovered as part of recent aquatic plant research in Yellowstone National Park. Six of the eight species are aquatic or wetland plants, reflecting botanical work in these habitats.

Table 1. Wyoming plants rediscovered since 2003

Scientific name	Common name	Source
<i>Astragalus diversifolius</i>	Meadow milkvetch	Heidel 2009
<i>Astragalus leptaleus</i>	Park milkvetch	Lukas 2012
<i>Carex proposita</i>	Smoky Mountain sedge	Kesonie 2009
<i>Cirsium canovirens</i>	Gray-green thistle	YELLO
<i>Huperzia haleakalae</i>	Fir clubmoss	Kesonie 2009
<i>Potamogeton obtusifolius</i>	Blunt-leaf pondweed	Hellquist et al. 2014
<i>Potamogeton zosteriformis</i>	Flatstem pondweed	Hellquist et al. 2014
<i>Spirodela polyrrhiza</i>	Common water-flaxseed	Kesonie 2009

As of 2016, twenty-five species are still regarded as historical (Table 2), i.e., it is not known whether or not they persist in Wyoming until there are concerted surveys or other forms of investigation. A state rank of "historical" flags the need for botanical work.

Table 2. Wyoming plants known only from historical records

Scientific Name	Common Name
<i>Arceuthobium douglasii</i>	Douglas-fir dwarf mistletoe
<i>Asclepias hallii</i>	Hall's milkweed
<i>Asclepias subverticillata</i>	Horsetail milkweed
<i>Bromus pubescens</i>	Hairy wood brome
<i>Callirhoe involucrata</i>	Purple poppy-mallow
<i>Collomia grandiflora</i>	Large-flower mountain-trumpet
<i>Cuscuta megalocarpa</i>	Big-fruited dodder
<i>Draba spectabilis</i> var. <i>oxyloba</i>	Showy draba
<i>Elymus triticoides</i>	Beardless wildrye
<i>Euphorbia exstipulata</i> var. <i>exstipulata</i>	Square-seeded spurge
<i>Froelichia gracilis</i>	Slender snake-cotton
<i>Heterocodon rariflorus</i>	Western pearl-flower
<i>Hymenopappus tenuifolius</i>	Chalkhill woollywhite
<i>Lithospermum multiflorum</i>	Purple gromwell
<i>Melica smithii</i>	Smith's melic-grass
<i>Oxytheca dendroidea</i>	Treeline puncturebract
<i>Penstemon watsonii</i>	Watson's beardtongue
<i>Polemonium micranthum</i>	Annual Jacob's-ladder
<i>Polystichum scopulinum</i>	Mountain holly-fern
<i>Potentilla ambigens</i>	Silky-leaf cinquefoil
<i>Ranunculus flabellaris</i>	Greater yellow water buttercup
<i>Spirodela polyrrhiza</i>	Common water-flaxseed
<i>Stephanomeria exigua</i>	White-plume wire-lettuce
<i>Townsendia florifera</i>	Showy Townsend-daisy

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Botanist's Bookshelf-

Thinnard, F. 2016. **Explorers' Botanical Notebook: In the footsteps of Theophrastus, Marco Polo, Linnaeus, Flinders, Darwin, Speke and Hooker.** Firefly Books, Ltd., Richmond, Ontario. 176 pp. Photographs by Yannick Fourie. (Hardcover, 8.70 x 13.50") (ISBN-13: 978-1770857636). \$39.95 Canadian + Shipping
(<http://www.fireflybooks.com/index.php/catalogue>)

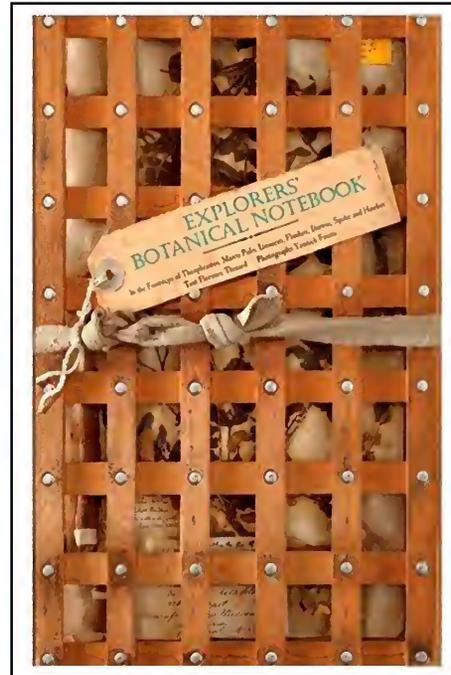
By Dorothy Tuthill

When I struggle with the apparent plant-blindness of our contemporary society, it's nice to be reminded that it hasn't always been thus. The orchid craze of the nineteenth century led to the exploration (and desecration) of tropical areas around the world, in the search for the most sublime of species. The search for plants of potential medical value led explorer and Harvard professor Richard Evans Schultes deep into Amazonia, adventures that have captured the imagination of many and inspired a popular movie series. Christopher Columbus was looking for plant materials—herbs and spices—when he bumped into the “new world,” and much of the new world was first experienced by Europeans through the strange and colorful plants collected to become trophies in the gardens of the rich.

This lavishly illustrated book recounts more than 60 tales of plant exploration, from 1465 B.C., when Queen Hatshepsut sent 1000 soldiers to Punt in search of myrrh, frankincense, and turpentine, to Francis Halle's 21st century exploration of the rainforest canopy of Madagascar. Each tale is accompanied with a full page (8.5 x 13.5") reproduction of a herbarium specimen, often one collected by the explorer himself, or rarely, herself. The tales, brief biographies, and additional materials are a pleasure to review, but the specimens are the dominant feature of the book, and the heart of it. Selected from the collections of the Royal Botanic Garden, Kew, and the Université Montpellier 2, they date back to the early 1800s. (With their many annotations, some tell post-collection tales, as well, though those are not revealed in this volume.) To give a small taste of the book:

A specimen of *Cinchona*, *C. officinalis*, its collection date unreadable, accompanies the story of

Joseph de Jussieu, who prepared an extract (quinine) from the tree while in Peru in 1737. He “went native” for a while, studying the plants and insects of the Amazon forest, and returned to Quito in time to see the beheading of the last Inca. After almost 40 years in Peru, he returned to France, though most of his specimens and work were lost at sea, including his report on quinine.



The story of quinine continues via a specimen of *Gustavia pulchra* (Lecythidaceae) collected along the Rio Negro in 1852 by Richard Spruce. It illustrates another tale of exploration in Amazonia, this time in search of *Cinchona pubescens* at the request of Queen Victoria. Though half paralyzed, Spruce was able to ship seeds and plantlets to England, indirectly saving thousands of lives. Spruce (whose writings eventually inspired Richard Schultes to head to Amazonia) also gathered copious records of indigenous uses of plants, and discovered a number of rare species, before retiring back to England after 15 years.

The names of many of these plant collectors will be known to the reader, though some will probably be unfamiliar, and the same is true for the plants represented in the book. Yet, the tales are all exciting (murders, shipwrecks, unimaginable hardships!), and the specimens and their labels will keep the attention of contemporary plant collectors and enthusiasts alike. Don't expect to learn many

Explorer's Botanical Notebook, cont. from p. 7

details about plant exploration, as most of the stories are less than a page in length. Rather, be prepared to immerse yourself in the adventure, take notes on which plants and adventurers to learn more about, and enjoy the beauty of this book.

As the foreword says, every herbarium specimen tells a tale, and this volume brings some of those tales to light. This book would be a beautiful gift for any plant-lover, including yourself!



Wyoming Native Plant Society is a non-profit organization established in 1981 to encourage the appreciation and conservation of the native plants and plant communities of Wyoming. The Society promotes education and research through its newsletter, field trips, annual student scholarships and small grants awards. Membership is open to individuals, families, or organizations. To join or renew, you can do it online (www.wynps.org) or return this form to:

Wyoming Native Plant Society
P.O. Box 2449
Laramie, WY 82073

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Check one: New member Renewing member

Check here if this is an address change.

Check here if you prefer to receive the newsletter electronically.

Payment:

WYNPS annual membership: \$10; or

WYNPS annual membership with scholarship support: \$20
(\$10 for membership and \$10 for Scholarship fund)

WYNPS Lifetime membership: \$300 (\$150 for membership
and \$150 for Scholarship fund)

In addition to the statewide organization, we have two chapters.

Membership in chapters is optional; chapter members must also be members of the statewide organization.

Sublette Chapter annual membership: \$5.00

Teton Plants Chapter annual membership: \$5.00

Total enclosed: _____ THANK YOU!

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