



Castilleja

The Newsletter
of the Wyoming
Native Plant Society

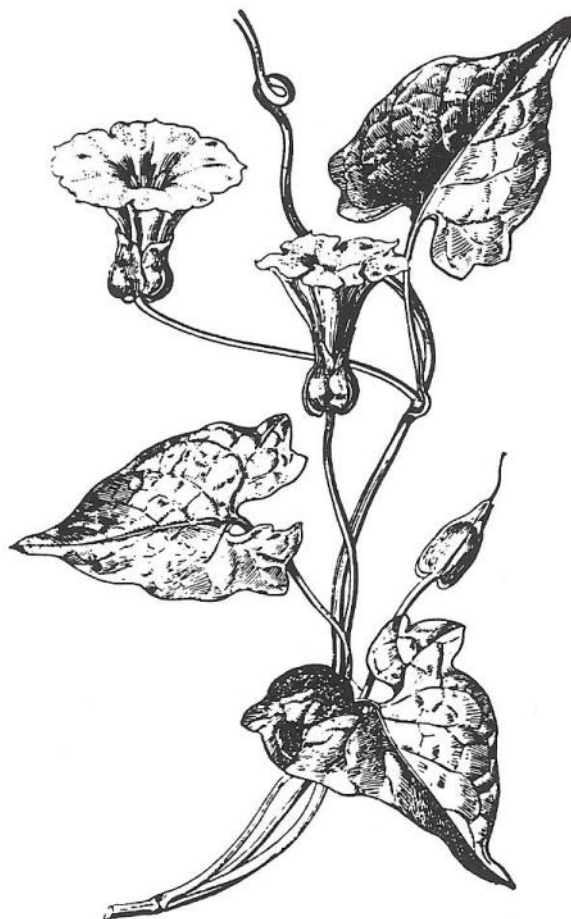
May 1999
Volume 18, No. 2

Special Weed Issue

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Hedge bindweed (*Calystegia sepium* var. *angulata*) is a weedy vine in the morning glory family (Convolvulaceae) that can be recognized by its large, funnel-like white to pink flowers, large ovate bracts, and arrowhead-shaped leaves. This species is considered an introduced weed in eastern North America, but is probably native in the western United States. It is closely related to field bindweed (*Convolvulus arvensis*), a non-native agricultural pest with smaller flowers and linear bracts. *Calystegia sepium* occurs in disturbed areas of northern and eastern Wyoming. Illustration from Gustav Hegi's *Illustrierte Flora von Mitteleuropa*.



WNPS NEWS

Renewal Time/Elections: A renewal notice and ballot is enclosed with this issue. Members with a 98 or 99 on their mailing label need to renew now to remain in good standing, while those with a 00 are paid through the year. (Not to worry – WNPS is Y2K compatible!)

Beginning this month, the cost of membership in the Society is regrettably increasing from \$5 to \$7.50 to reflect recent increases in the cost of postage and copying. Membership in WNPS is still, however, the least expensive of any Native Plant Society in the West!

The following individuals have kindly agreed to run for the WNPS board: President – Jim Ozenberger (Jackson), Vice President – Amy Roderick (Laramie), Secretary-Treasurer – Laura Welp (Laramie), 2-year board member – Steve Laster (Pinedale). As always, write-in votes are welcome. Please also list 1-3 potential locations for the 2000 annual meeting and field trip.

Scholarship Award: The Board is pleased to announce that 2 students have been awarded the Society's annual scholarship for 1999. Michele Slaton, a graduate student at the University of Wyoming, was awarded \$400 for her study on the effects of elevated concentrations of atmospheric carbon dioxide on leaf form and function of 50 alpine grass, forb, and woody shrub species in the Medicine Bow Range. Michael Tercek of Tulane University was also awarded \$400 for his project examining the habitat requirements and evolutionary history of Ross' bentgrass (*Agrostis rossiae*), an endemic of thermally-influenced areas in Yellowstone National Park. The Board would like to thank all of the students who submitted worthy proposals in 1999. Thanks also to Society members who contributed to the scholarship fund during the past year.

New Members: Please welcome the following new members of WNPS: Bernie Bornong (Sheridan), Greg Brown (Laramie), Eva Crane (Lander), Jody Horvath (Wapiti), William Jennings (Louisville, CO), Rose Lehman (Idaho Falls, ID), Lorie Talbott (Green River), Niki Tippetts (Moose), and Joe Vollmer (Laramie).

We're looking for new members: Do you know someone who would be interested in joining WNPS? Send their name or encourage them to contact the Society for a complimentary newsletter.

Attention Readers: We are always looking for articles and illustrations for the newsletter. Items for the October issue are needed by 15 September 1999.

Treasurer's Report: Balance as of 1 May 1999: General Fund \$454.84; 1999-2000 Student Scholarship Fund \$305.00; Total funds: 759.84 WF

Wyoming Native Plant Society
1604 Grand Ave., Laramie, WY 82070

President: Charmaine Delmatier (Green River)
Vice President: Jim Ozenberger (Jackson)
Secretary-Treasurer: Walter Fertig (Laramie)
Board Members: Nina Haas (Cheyenne)
Jennifer Whipple (Mammoth)
Newsletter Editor: Walter Fertig (307) 745-5026 (wk)/e-mail: clyde@uwyo.edu .

Teton Chapter: PO Box 82, Wilson, WY 83014 (Joan Lucas, Treasurer).

Contributors to this issue: Charmaine Delmatier (CD), Walter Fertig (WF), Ellen Hand Galligan, Gustav Hegi.

Botany Briefs

Mosses of Wyoming: The scientific study of mosses (bryology) does not receive as much recognition as other aspects of botany, but has a long history in Wyoming. Aven Nelson published the first paper on Wyoming mosses in 1900, in which he provided a checklist of 119 species based largely on his collections from the Laramie and Medicine Bow ranges and Yellowstone National Park and other specimens at the Rocky Mountain Herbarium. In the 1930s, Cedric Lambert (C.L.) Porter published a revised checklist of 215 mosses of Wyoming as part of his doctoral dissertation from the University of Washington. Most recently, Dr. Patricia Eckel of the Buffalo Museum of Science (Buffalo, NY) has combed the bryophyte literature and herbarium collections across the United States (including the Rocky Mountain Herbarium and Yellowstone National Park Herbarium) to compile a checklist of 315 species and varieties of mosses for Wyoming. The complete checklist entitled "Synopsis of the mosses of Wyoming" was published in *The Great Basin Naturalist* in 1996.

Compared to many other areas of North America, the moss flora of Wyoming is relatively depauperate. For example, Eckel notes that New York state has 503 moss taxa and the island of Newfoundland has 445 moss species. Other western states also have low moss richness, with 292 species reported for Colorado, 257 in Idaho, and 358 in Montana. WF

Ref: Eckel, P.M. 1996. Synopsis of the mosses of Wyoming. *Great Basin Naturalist* 56(3): 197-204.

A Potpourri of Weeds

By Walter Fertig

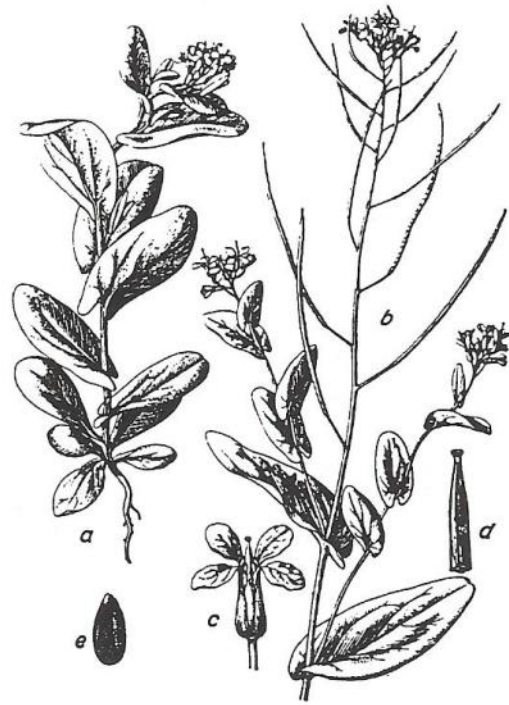
Non-native plant species, also known as aliens, exotics, introduced, non-indigenous, or just plain "weeds", are increasingly recognized as a serious threat to native biological diversity and agroecosystems throughout the world. Nearly 4,000 species of plants have been introduced to North America from other lands in the past three centuries, of which only a small percentage are truly noxious. This small group, however, has already invaded over 100 million acres of land nationwide, and continues to expand over an area twice the size of Delaware each year (Brumback 1998). A recent study by The Nature Conservancy indicates that alien plant and animal species are contributing to the decline of 42% of all Threatened and Endangered species in the United States due to competition for resources and habitat degradation (Stein and Flack 1996). Economic losses stemming from reduced farm yields, loss of animal forage, and clogged irrigation ditches over the past century number in the billions of dollars.

Not all non-native species are bad (obviously society would suffer greatly if introduced food crops were eliminated), and many enhance the aesthetic pleasure of our gardens and city parks. Nonetheless, exotics are inappropriate in areas managed for their natural character or in habitats critical for native wildlife and plants. To better manage our wildlands and wildlife, better information is needed on the identity and potential problems caused by weeds. Weed education is the purpose of this special section of *Castilleja*.

What is a weed?

In describing Wyoming's weed problem in 1896, University of Wyoming professor Aven Nelson wrote "It has often been said that a weed is only a plant out of place ... that insists on growing where it is not wanted" (Nelson 1896). Under this definition, a weed may be either "native" (originally present in the state prior to European settlement) or "non-native" (introduced following European settlement). A more useful term from a management perspective is "invasive" – non-native species that readily escape from cultivation to become established in natural habitats and which alter their environment to the detriment of pre-existing plants and natural communities.

The "nativeness" of a species is determined primarily from the study of old herbarium collections and the written reports of early naturalists. Species are considered foreign if they are well-documented by herbarium specimens in their native land, but absent from early collections or records kept by pioneer botanists in their new range. This system is not without its flaws, as herbarium collections may be incomplete for some taxa and some species may be migrating into new



Above: *Conringia orientalis*, an introduced mustard from Eurasia. Ill. from Hegi's *Illustrierte Flora von Mitteleuropa*.

entirely on their own. The debate over the North American or Eurasian origin of such widely dispersed "weeds" as Kentucky bluegrass (*Poa pratensis*) and Water-cress (*Rorippa nasturtium-aquaticum*) may never be satisfactorily resolved.

Weed characteristics

Invasive plants have a number of life history attributes that are similar to those of early successional species (plants adapted to colonize disturbed sites). Introduced weeds are capable of exploiting both "natural" disturbances, such as volcanic eruptions, fires, and flooding, or human-induced disturbances, such as tilling of soil, road and building construction, or mining. Increasing evidence suggests that weeds can also become established in relatively undisturbed natural areas, especially in mesic habitats with rich soils (Stohlgren *et al.* 1999).

Weeds often have many of the following life history characteristics (from Baker 1974):

- * Non-specific germination requirements
- * Seed longevity
- * Rapid growth and quick flowering
- * Continuous seed production during the growing season
- * Self-compatibility
- * If cross-pollinated, pollination by wind or unspecialized visitors
- * High seed production
- * Ability to disperse seeds over both the local area and long distances

- * If perennial, ability to spread vegetatively and resprout from broken fragments
- * Aggressive competitors with few predators

Daehler (1998) in a survey of invasive plant species in natural areas around the world found that the types of plants most prone to "invasiveness" are grasses, nitrogen-fixers, climbers, trees with clonal growth, and aquatic to semi-aquatic herbs. Current quarantine programs designed to screen out agricultural weeds may be inadequate if they do not address this broader group of potential natural area invaders.

Where did our introduced weeds come from?

Most Wyoming exotics originated from areas with temperate climates in northern Europe or central Asia. These species have become successful because they are preadapted to Wyoming's climate and have escaped the disease and predatory organisms that kept them in check in their native range. Only a small percentage of Wyoming weeds have Mediterranean or subtropical affinities.

How did our non-native plants arrive?

Exotic plant species have reached North America by a variety of means, including contaminated hay and seed, ship ballast, and intentional introductions of crop, forage, and ornamental species. Richard Mack (1990) has proposed that mail-order seed catalogs may have been an important vector for the spread of weeds after the US Civil War. Once established, many weeds have been able to spread by hitching a ride on wild and domestic animals, human clothing, dirty vehicles, trains, and the wind.

Native "weeds"

A number of native species have "weedy" tendencies and are preadapted to exploit naturally or human-disturbed environments. Skeletonleaf bursage (*Artemisia tomentosa* or *Franseria discolor*) is one such native which can be an agricultural or garden pest and is listed as a "Noxious Weed" by the Wyoming Department of Agriculture. This species is related to larger, non-native *Ambrosia* species which can be a source of late-summer pollen that brings misery to hay fever-sufferers. Other apparently "native" weeds include Reed canary-grass (*Phalaris arundinacea*) and Hedge bindweed (*Calystegia sepium* var. *angulata*).

At least 23 "native" North American species are thought to be naturalized in Wyoming following white settlement. These species include a number of Great Plains forbs and grasses (such as *Coreopsis lanceolata*, *C. tinctoria*, *Ratibida tagetes*, *Cucurbita foetidissima*, and *Chloris verticillata*) that have moved westward along roadsides, as well as a small group of California and Pacific Northwest species that have spread eastward. Other "natives" to become established are ornamental

species that appear as roadside waifs (*Eschscholzia californica* and *Nemophila menziesii*).

A few North American natives have become exotic pests in other lands. Tall coneflower (*Rudbeckia laciniata*) and Bigleaf lupine (*Lupinus polyphyllus*) are western species that have been widely cultivated in Europe and which have escaped along roadsides and in wetland areas. A number of North American pine species have also escaped from cultivation to become aggressive pests in Scandinavia, South Africa, and New Zealand.

Weeds in the Wyoming flora

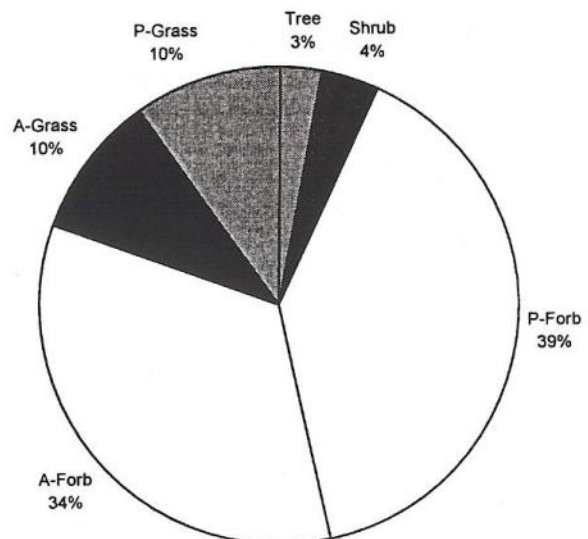
The vascular plant flora of Wyoming consists of 2761 species and varieties, of which 348 taxa are considered non-native (12.6%). Compared to other states and geographic areas, Wyoming's exotic flora is relatively low. The number of alien species per log area (a useful calculation to adjust for differences in size between states) in Wyoming is 64.4, a figure which is also low when compared to other floras (see table below).

Percentage of Alien Species
In Selected Floras

State/Region	# Alien	% Alien	# Alien/log area
New York	1082	35.8	210.5
California	1025	17.5	182.6
Hawaii	861	47.4	203.8
Illinois	782	27.5	151.1
Colorado	492	16.0	90.6
Texas	492	9.8	84.2
Louisiana	405	13.6	79.5
Wyoming	348	12.6	64.4
Alberta	280	16.0	48.1
New Mexico	229	ca 7.9	41.6
North Dakota	171	15.0	32.5

From Rejmanek and Randall (1994), Stuckey and Barkley (1993) and Fertig (unpublished data)

Exotics in the Wyoming Flora



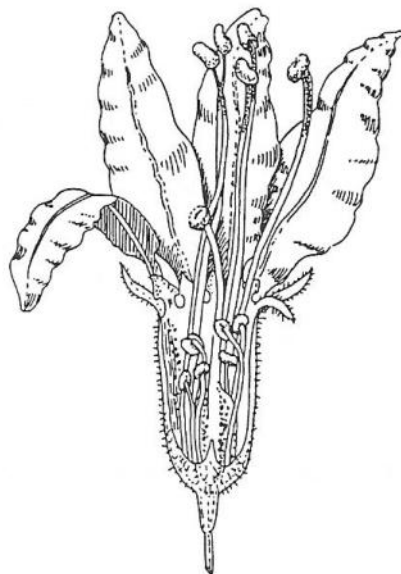
Nearly two-thirds of the exotic species in the flora of Wyoming are annual or perennial forbs, while graminoids (grass-like plants) account for about 20% and trees and shrubs only 7% (there are no alien ferns or fern-allies in Wyoming). Although there are relatively few taxa of annual graminoids in the flora, exotics account for nearly 55% of the state's total. Alien species also comprise 30% of all species of annual forbs in Wyoming and 25% of all state species of trees. By comparison, less than 9% of all perennial forb, perennial graminoid, and shrub taxa in Wyoming are non-native. The grass family (Poaceae) has the highest number of non-native species in the state with 66, while the Asteraceae has 53, the Brassicaceae 37, and the Fabaceae 25.

Biological control of weeds

Chemical herbicides were once the control measure of choice for weed species, until high application costs and concerns over public health and environmental contamination forced weed scientists to consider alternative tactics. Biological control, utilizing insect herbivores, fungi, or disease organisms, is becoming increasingly important for the control of selected non-native plants. The principle behind biocontrol is simple: identify, collect, and release herbivorous or disease organisms from a weed's native range into new areas where the weed has become a problem. Over the long term, biocontrol tends to be cheaper and more effective than traditional spraying programs. Success stories include the eradication of non-native cacti in Australia by cactus moths and the containment of exotic St. John's-wort in California with leaf beetles. Similar programs to contain Canada thistle and leafy spurge by using gall flies and flea-beetles, are currently being developed by scientists at the University of Wyoming. Some care still needs to be taken in releasing new organisms, as they may attack related, non-target species. For example, weevils released to control exotic thistles in the west have also been found to feed on rare, native thistles.

Some Wyoming weeds:

Purple loosestrife (*Lythrum salicaria*) is a tall, handsome, purple-flowered perennial herb that has become widely established throughout wetland areas of North America since first being introduced from Europe as an ornamental in the early 1800s. Left unchecked, purple loosestrife can quickly crowd out native wetland plants to form monocultures that provide little food or shelter for waterfowl and other wildlife. In Wyoming, this species has been reported from Cheyenne, Lovell, Lusk, and Sheridan. A small population on FE Warren Air Force Base near Cheyenne may jeopardize populations of the Threatened Preble's meadow jumping mouse and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*).



Above: Purple loosestrife flower by Ellen Hand Galligan.

Kentucky bluegrass (*Poa pratensis*) is a rhizomatous, perennial grass that is ubiquitous in lawns, meadows, and streambanks across North America, Eurasia, and North Africa. American Indians referred to Kentucky bluegrass as "white man's foot grass" in the belief that the species grew wherever the white man trod. The rapid spread of Kentucky bluegrass has led some scientists to speculate that certain strains of the species may have been native. While there may be some merit to this (the name *Poa agassizensis* is available for such forms), the degree of intergradation between these forms today is so complete as to make the question moot. Although its foreign origin may make it undesirable to some, Kentucky bluegrass is highly valuable as a forage species for livestock and wildlife and for erosion control through its sod-forming roots.

Halogeton (*Halogeton glomeratus*) is a red-stemmed, annual herb with fleshy, essentially tube-shaped leaves adapted to disturbed or overgrazed alkaline desert habitats. A native of central Asia, halogeton first appeared in the Great Basin in the 1930s and rapidly spread through much of the Intermountain West. The plant is rich in oxalates and can be toxic to grazing animals, especially domestic sheep.

Canada thistle (*Cirsium arvense*) is one of our most successful invasive weeds due to its prodigious production of easily-dispersed seed (over 1500 per plant), ability to spread vegetatively by rhizomes and sprouts, and release of allelopathic chemicals into the soil. Despite its name, Canada thistle is native to southeastern Europe, but has become widely established in Canada and the northern United States (including most of

Wyoming). This species can be extremely difficult to control, but encouraging success is being achieved with a variety of biocontrol insects, including gall flies, stem-mining weevils, and flea beetles.

Hybrid salsify (*Tragopogon miscellus*) is a polyploid hybrid, derived from natural crosses between *Tragopogon dubius* and *T. pratensis* in the vicinity of Pullman, Washington. It has since spread to parts of Idaho, Montana, and northern Wyoming. This species raises a disturbing philosophical question: does a "new" species derived in North America from hybridization of two exotics outside their homeland qualify as a native?

What can I do?

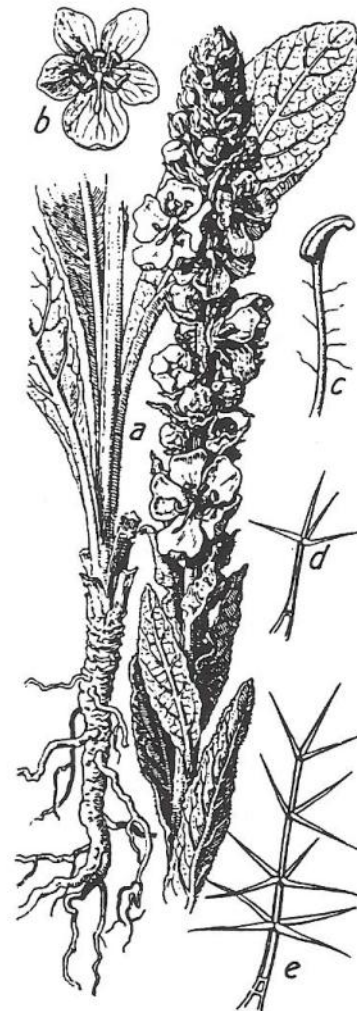
Containing the spread of exotic plants will require the cooperation of all citizens. Gardeners need to take a keener interest in the origin and invasibility of plants that they choose for their homes and parks. Species that are known to be invaders should be avoided. Retail seed providers and botanical gardens need to take great care in determining the possible negative consequences of new garden or crop species before they are offered to the public. Nature enthusiasts need to take more responsibility in learning the identity of non-native plants and in reporting new infestations to the appropriate land management agency, county weed and pest office, or extension service. Weed control organizations need to continue developing new, integrated techniques to combat invading plants while not compromising the health of humans and the environment. Cooperation of all of these groups, and continued vigilance will help stem the tide of exotic invasion in Wyoming.

References

- Baker, H.G. 1974. The evolution of weeds. *Annual Review of Ecology and Systematics* 5:1-24.
- Brumback, W. 1998. New England's green invasion. *New England Wildflower* 2(3): 4-6.
- Daehler, C.C. 1998. The taxonomic distribution of invasive angiosperm plants: ecological insights and comparison to agricultural weeds. *Biological Conservation* 84: 167-180.
- Dorn, R.D. 1992. *Vascular Plants of Wyoming*, second edition. Mountain West Publ., Cheyenne, WY.
- Hitchcock, C.L. and A. Cronquist. 1973. *Flora of the Pacific Northwest*, an Illustrated Manual. Univ. Washington Press, Seattle, WA.
- Mack, R.N. 1990. Catalog of woes. *Natural History*. March 1990: 44-53.
- Nelson, A. 1896. The worst weeds of Wyoming. Bulletin # 31 UW Agriculture College WY Experiment Station.
- Rejmanek, M. & J.M. Randall. 1994. Invasive alien plants in California: 1993 summary and comparison with other areas in North America. *Madrono* 41:161-177.
- Randall, J.M. & J. Marinelli, eds. 1996. *Invasive Plants: Weeds of the Global Garden*. Brooklyn Botanic Garden, Brooklyn, NY.
- Stein, B.A. & S.R. Flack, eds. 1996. *America's Least Wanted: Alien Species Invasions of US Ecosystems*. The Nature Conservancy, Arlington, VA.
- Stohlgren, T.J., D. Binkley, G.W. Chong, M.A. Kalkhan, L.D.

- Schell, K.A. Bull, Y. Otsuki, G. Newman, M. Bashkin, & Y. Son. 1999. Exotic plant species invade hot spots of native plant diversity. *Ecological Monographs* 69:25-46.
- Stuckey, R.L. & T.M. Barkley. 1993. In: *Flora of North America* Editorial Committee. *Flora of North America* Vol. 1. Introduction. Oxford Univ. Press.
- Weber, E.F. 1997. The alien flora of Europe: a taxonomic and biogeographic review. *Journal of Vegetation Science* 8:565-572.
- Welsh, S.L., N.D. Atwood, S. Goodrich, and L.C. Higgins. 1993. *A Utah Flora*, second edition, revised. Brigham Young Univ. , Provo, UT.
- Whitson, T., ed. 1991. *Weeds of the West*. Western Society of Weed Science and Univ. of Wyoming.

Below: Mullein (*Verbascum thapsus*) from Hegi's *Illustrierte Flora von Mitteleuropa*.



Non-Native Plants of Wyoming

By Walter Fertig

This list has been developed from the collections of the Rocky Mountain Herbarium and a review of recent taxonomic literature. Species are arranged alphabetically by family. The growth form of each plant is indicated in parentheses after the scientific name: T = tree, S = shrub, PF = perennial forb, AF = annual forb, PG = perennial graminoid, AG = annual graminoid. Pertinent synonyms are listed in parentheses after the common name. A "*" before the name indicates that a species is naturalized in Wyoming after being introduced from native populations elsewhere in North America. Species with a "\$" are listed as Noxious Weeds under the Wyoming Weed and Pest Control Act. Nomenclature follows Dorn (1992) for scientific names and Hitchcock and Cronquist (1973) and Welsh *et al.* (1993) for common names.

Aceraceae

Acer negundo var. *violaceum* (T) Box-elder

Amaranthaceae

* *Amaranthus californicus* (AF) California pigweed
Amaranthus retroflexus (AF) Rough pigweed

Apiaceae

Anthriscus caucalis (AF) Bur-chervil
Carum carvi (PF) Caraway
Conium maculatum (PF) Poison-hemlock
Daucus carota (PF) Queen Anne's lace
Falcaria vulgaris (PF) Sickfew
Levisticum officinale (PF) Lovage
Pastinaca sativa (PF) Common parsnip

Asteraceae

Anthemis arvensis (AF) Field chamomile
Anthemis cotula (AF) Stinking mayweed
Anthemis tinctoria (PF) Yellow chamomile
Arctium lappa (PF) Great burdock
\$ *Arctium minus* (PF) Common burdock
Artemisia abrotanum (S) Garden sagebrush
Artemisia absinthium (PF) Absinthium
Artemisia annua (AF) Annual wormwood
\$ *Carduus acanthoides* (PF) Plumeless thistle
\$ *Carduus nutans* (PF) Musk thistle
Centaurea cyanus (AF) Bachelor's button
\$ *Centaurea diffusa* (PF) Bushy knapweed
Centaurea iberica (PF) Iberian star-thistle
\$ *Centaurea maculosa* (PF) Spotted knapweed
\$ *Centaurea repens* (PF) Russian knapweed
Centaurea scabiosa (PF) Hard-heads
Centaurea solstitialis (PF) Yellow star-thistle
Chrysanthemum balsamita (PF) Costmary
\$ *Chrysanthemum leucanthemum* (PF) Ox-eye daisy
Chrysanthemum parthenium (PF) Feverfew
Cichorium intybus (PF) Wild chicory
\$ *Cirsium arvense* (PF) Canada thistle
Cirsium vulgare (PF) Bull thistle

* *Coreopsis lanceolata* (PF) Longstalk tickseed
* *Coreopsis tinctoria* (AF) Plains tickseed
Cosmos bipinnatus (AF) Cosmos
Crepis tectorum (AF) Annual hawksbeard
Filago arvensis (AF) Field filago
Galinsoga quadriradiata (AF) Fringed quickweed
Hieracium aurantiacum (PF) Orange hawkweed
Hieracium caespitosum (PF) Yellow king-devil
Hieracium flagellare (PF) Whiplash hawkweed
Hieracium floribundum (PF) Glaucous hawkweed
Lactuca serriola (AF) Prickly-lettuce
Matricaria maritima (PF) Scentless chamomile
Matricaria recutita (AF) Chamomile
* *Onopordum acanthium* (PF) Scotch thistle
* *Ratibida tagetes* (PF) Shortray prairie coneflower
Rudbeckia laciniata var. *hortensis* (PF) Coneflower
Scorzonera laciniata (PF) False salsify
Senecio vulgaris (AF) Common groundsel
\$ *Sonchus arvensis* (PF) Field sow-thistle
Sonchus asper (AF) Prickly sow-thistle
Sonchus oleraceus (AF) Common sow-thistle
Sonchus uliginosus (PF) Marsh sow-thistle
Tagetes patula (AF) French marigold
Tanacetum vulgare (PF) Tansy
Taraxacum laevigatum (PF) Red-seeded dandelion
Taraxacum officinale (PF) Common dandelion
Tragopogon dubius (PF) Yellow salsify
* *Tragopogon miscellus* (PF) Hybrid salsify
Tragopogon porrifolius (PF) Salsify
Tragopogon pratensis (PF) Meadow salsify

Berberidaceae

Berberis thunbergii (S) Japanese barberry

Boraginaceae

* *Amsinckia lycopsoides* (AF) Tarweed fiddleneck
* *Amsinckia menziesii* (AF) Menzies' fiddleneck
Anchusa arvensis (AF) Alkanet
Asperugo procumbens (AF) Madwort
\$ *Cynoglossum officinale* (PF) Common hound's-tongue
Echium vulgare (PF) Common viper's bugloss
Lappula squarrosa (AF) European stickseed
Lithospermum arvense (AF) Corn gromwell
Myosotis arvensis (PF) Field forget-me-not
Myosotis micrantha (AF) Smallflower forget-me-not
Myosotis scorpioides (PF) Common forget-me-not
Myosotis sylvatica (PF) Wood forget-me-not

Brassicaceae

Alyssum alyssoides (AF) Pale alyssum
Alyssum desertorum (AF) Desert alyssum
Alyssum parviflorum var. *micranthum* (AF) Small alyssum
Armoracia rusticana (PF) Horse radish
Barbarea vulgaris (PF) Bitter watercress
Berteroa incana (AF) Berteroa
Brassica juncea (AF) Indian mustard
Brassica kaber (AF) Charlock
Brassica rapa (AF) Field mustard
Camelina microcarpa (AF) Littlepod falseflax
Camelina sativa (AF) Falseflax
Capsella bursa-pastoris (Shepherd's purse)
Cardaria chalepensis (PF) Chalapa hoarycress
\$ *Cardaria draba* (PF) Heart-podded hoarycress
\$ *Cardaria pubescens* (PF) Globepodded hoarycress

Chorispora tenella (AF) Blue mustard
Conringia orientalis (AF) Hare's-ear mustard
Descurainia sophia (AF) Flixweed
Draba nemorosa (AF) Woods draba
Draba verna (AF) Spring whitlow-grass
Erucastrum gallicum (AF) Dog mustard
Erysimum repandum (AF) Spreading wallflower
Euclidium syriacum (AF) Euclidium
Hesperis matronalis (PF) Dame's rocker
Isatis tinctoria (PF) Dyer's woad
Lepidium campestre (AF) Field pepperwort
Lepidium latifolium (PF) Pepperwort
Lepidium perfoliatum (AF) Clasp ing peppergrass
Lepidium sativum (AF) Garden cress
**Lepidium virginicum var. medium* (AF) Tall peppergrass
Lobularia maritima (AF) Sweet alyssum
Malcolmia africana (AF) Malcolmia
Raphanus sativus (AF) Jointed charlock
Rorippa nasturtium-aquaticum (PF) Water-cress
Sisymbrium altissimum (AF) Tumblemustard
Sisymbrium loeselii (AF) Loesel tumblemustard
Thlaspi arvense (AF) Field pennycress

Campanulaceae

Campanula rapunculoides (PF) Creeping bellflower

Cannabaceae

Cannabis sativa (PF) Marijuana

Caprifoliaceae

Lonicera morrowi (S) Morrow's honeysuckle
Lonicera tatarica (S) Tatarian honeysuckle
Viburnum lantana (S) Wayfaring tree

Caryophyllaceae

Agrostemma githago (AF) Common corncockle
Arenaria serpyllifolia (AF) Thyme-leaf sandwort
Cerastium fontanum (PF) Common mouse-ear chickweed
Dianthus armeria (AF) Deptford pink
Dianthus barbatus (PF) Sweet William
Dianthus deltoides (PF) Maiden pink
Gypsophila paniculata (PF) Baby's-breath
Gypsophila scorzonifolia (PF) Pink baby's-breath
Holosteum umbellatum (AF) Holosteum
Saponaria officinalis (PF) Bouncing-bet
Silene cserei (PF) Balkan catchfly
Silene dichotoma (AF) Forked catchfly
Silene latifolia (PF) White campion
Silene noctiflora (AF) Night-flowering catchfly
Silene vulgaris (PF) Bladder campion
Spergula arvensis (AF) Stickwort
Spergularia echinosperma (AF) Spiny-seed sandspurrey
Spergularia marina (AF) Common sandspurrey
Spergularia media (AF) Stout sandspurrey
Spergularia rubra (AF) Red sandspurrey
Stellaria media (AF) Chickweed
Vaccaria hispanica (AF) Cow-herb

Chenopodiaceae

Atriplex heterosperma (AF) Two-seed orache
Atriplex hortensis (AF) Garden orache
Atriplex rosea (AF) Red orache
Bassia hyssopifolia (AF) Bassia

Chenopodium album (AF) Lambsquarter
Chenopodium botrys (AF) Jerusalem-oak
Chenopodium glaucum var. glaucum (AF) Oak-leaved goosefoot
Halogeton glomeratus (AF) Halogeton
Kochia scoparia (AF) Summer cypress
Salsola australis (AF) Russian thistle
Salsola collina (AF) Tumbleweed

Convolvulaceae

**Convolvulus arvensis* (PF) Field bindweed
Cuscuta approximata (PF) Clustered dodder
Cuscuta epithymum (PF) Thyme dodder

Cucurbitaceae

**Cucurbita foetidissima* (PF) buffalo-gourd

Dipsacaceae

Dipsacus fullonum (PF) Fuller's teasel
Knautia arvensis (PF) Field scabious

Elaeagnaceae

Elaeagnus angustifolia (T) Russian olive

Euphorbiaceae

Euphorbia agraria (PF) Shining spurge
**Euphorbia chamaesyce* (AF) Prostrate spurge
Euphorbia cyparissias (PF) Cypress spurge
**Euphorbia esula var. esula* (PF) Leafy spurge
**Euphorbia esula var. uralensis* (PF) Leafy spurge
Euphorbia helioscopia (AF) Summer spurge
**Euphorbia maculata* (AF) Spotted spurge
Euphorbia nutans (AF) Eyebane

Fabaceae

Astragalus cicer (PF) Chick-pea milkvetch
Astragalus tibetanus (PF) Tibetan milkvetch
Caragana arborescens (S) Pea-tree
Coronilla varia (PF) Crown vetch
Gleditsia triacanthos (T) Honey-locust
Lathyrus latifolius (PF) Everlasting sweetpea
Lathyrus sylvestris (PF) Narrowleaved everlasting sweetpea
Lotus corniculatus (PF) Birdsfoot trefoil
Medicago falcata (PF) Yellow alfalfa
Medicago lupulina (AF) Black medic
Medicago polymorpha (AF) Bur-clover
Medicago sativa (PF) Alfalfa
Melilotus albus (PF) White sweetclover
Melilotus officinalis (PF) Yellow sweetclover
Onobrychis viciifolia (PF) Saintfoin
Oxytropis riparia (PF) Oxus oxytrope
Robinia pseudoacacia (T) Black locust
Sphaerophysa salsula (PF) Sphaerophysa
Trifolium fragiferum (PF) Strawberry clover
Trifolium hybridum (PF) Alsike clover
Trifolium pratense (PF) Red clover
Trifolium repens (PF) White clover
**Trifolium wormskjoldii* (PF) Springbank clover
Vicia cracca (F) Bird vetch
Vicia villosa (AF) Hairy vetch

Fumariaceae

Fumaria officinalis (AF) Common fumitory

Gentianaceae

Centaurium pulchellum (PF) Branching centaury

Geraniaceae

Erodium cicutarium (AF) Alfilaria

Geranium pusillum (AF) Small-flowered geranium

Grossulariaceae

Ribes sativum (S) Red currant

Hydrangeaceae

* *Philadelphus pubescens* (S) Ozark mock-orange

Hydrophyllaceae

* *Nemophila menziesii* (AF) Baby blue-eyes

Hypericaceae

Hypericum perforatum (PF) Klamath weed

Juncaceae

* *Juncus articulatus* (PG) Jointed rush

Juncus compressus (PG) Compressed rush

Lamiaceae

Dracocephalum thymiflorum (AF) Thyme-leaved dragonhead

Galeopsis ladanum (AF) Hemp-nettle

Glechoma hederacea (PF) Gill-over-the-ground

Lallemantia peltata (AF) Lallemantia

Lamium amplexicaule (AF) Common dead-nettle

Leonurus cardiaca (PF) Motherwort

Marrubium vulgare (PF) Horehound

Mentha spicata (PF) Spearmint

Nepeta cataria (PF) Common catnip

Nepeta grandiflora (PF) Large-flowered catnip

Nepeta racemosa (PF) Racemose catnip

Salvia nemorosa (PF) Wood salvia

Salvia pratensis (PF) Meadow salvia

Liliaceae

Asparagus officinalis (PF) Asparagus

Hemerocallis fulva (AF) Day-lily

Linaceae

Linum grandiflorum var. *rubrum* (AF) Flowering flax

Linum usitatissimum (AF) Common flax

Lythraceae

\$ *Lythrum salicaria* (PF) Purple loosestrife

Malvaceae

Abutilon theophrasti (AF) Velvetleaf

Alcea rosea (PF) Hollyhock

Lavatera thuringiaca (PF) Tree mallow

Malva moschata (PF) Musk mallow

Malva neglecta (AF) Common mallow

Malva parviflora (AF) Cheeseweed

Malva rotundifolia (AF) Dwarf mallow

Malva sylvestris (PF) High mallow

Malva verticillata (AF) Whorled mallow

Martyniaceae

* *Proboscoidea louisianica* (AF) Devil's claw

Molluginaceae

Mollugo verticillata (AF) Carpetweed

Moraceae

Morus alba (T) White mulberry

Oxalidaceae

* *Oxalis violacea* (PF) Violet wood-sorrel

Papaveraceae

* *Eschscholzia californica* (AF) California poppy

Papaver somniferum (AF) Opium poppy

Pinaceae

* *Larix occidentalis* (T) Western larch

Plantaginaceae

Plantago lanceolata (PF) English plantain

Plantago major (PF) Common plantain

Poaceae

Aegilops cylindrica (AG) Goatgrass

Agropyron cristatum var. *cristatum* (PG) Crested wheatgrass

Agropyron cristatum var. *desertorum* (PG) Desert crested wheatgrass

Agropyron cristatum var. *fragile* (PG) Siberian crested wheatgrass

Agropyron triticeum (AG) False wheatgrass

Agrostis capillaris (PG) Colonial bentgrass

Agrostis stolonifera (PG) Redtop

Aira caryophylla (AG) Early hairgrass

Alopecurus arundinaceus (PG) Creeping foxtail

Alopecurus pratensis (PG) Meadow foxtail

Apera interrupta (AG) Apera

Arrhenatherum elatius (PG) False oatgrass

Avena fatua (AG) Wild oats

Avena sativa (AG) Common oats

Bromus briziformis (AG) Rattlesnake brome

Bromus commutatus (AG) Hairy brome

Bromus inermis var. *inermis* (PG) Smooth brome

Bromus japonicus (AG) Japanese brome

Bromus secalinus (AG) Chess brome

Bromus squarrosus (AG) Square brome

Bromus tectorum (AG) Cheatgrass

* *Chloris verticillata* (PG) Showy windmill grass

Crypsis alopecuroides (AG) Pricklegrass

Dactylis glomerata (PG) Orchard grass

Digitaria ischaemum (AG) Smooth crabgrass

Digitaria sanguinalis (AG) Hairy crabgrass

Echinochloa crus-galli (AG) Common barnyard grass

Elymus elongatus var. *ponticus* (PG) Tall wheatgrass

Elymus hispidus var. *hispidus* (PG) Intermediate wheatgrass

Elymus hispidus var. *ruthenicus* (PG) Intermediate wheatgrass

Elymus junceus (PG) Russian wildrye

Elymus multicaulis (PG) Branched wildrye

Elymus racemosus (PG) Siberian wildrye

\$ *Elymus repens* (PG) Common quackgrass (*Agropyron repens*)

Eragrostis cilianensis (AG) Stinkgrass
Eragrostis minor (AG) Little lovegrass
Eragrostis pilosa (AG) India lovegrass
 * *Eragrostis spectabilis* (PG) Purple lovegrass
Festuca arundinacea (PG) Tall fescue
Festuca pratensis (PG) Meadow fescue
Hordeum distichon (AG) Two-rowed barley
Hordeum leporinum (AG) Rabbit barley
Hordeum vulgare var. *trifurcatum* (AG) Cultivated barley
Hordeum vulgare var. *vulgare* (AG) Cultivated barley
 * *Leersia virginica* (PG) Virginia cutgrass
Lolium multiflorum (PG) Italian ryegrass
Lolium perenne (PG) Perennial ryegrass
Lolium persicum (AG) Persian ryegrass
Panicum miliaceum (AG) Broom-corn millet
Phalaris canariensis (AG) Canarygrass
Phleum pratense (PG) Timothy
Poa annua (AG) Annual bluegrass
Poa bulbosa (PG) Bulbous bluegrass
Poa compressa (PG) Canada bluegrass
Poa pratensis (PG) Kentucky bluegrass
Poa trivialis (PG) Roughstalk bluegrass
Polypogon monspeliensis (AG) Rabbitfoot-grass
Puccinellia distans (PG) Weeping alkali-grass
Secale cereale (AG) Cultivated rye
Setaria glauca (PG) Yellow foxtail
Setaria italica (AG) Foxtail millet
Setaria verticillata (AG) Bristly foxtail
Setaria viridis (AG) Green foxtail
Sorghum halepense (PG) Johnson-grass
Triticum aestivum (AG) Cultivated wheat
Zea mays (AG) Maize

Polygonaceae

Polygonum aviculare (AF) Prostrate knotweed
Polygonum convolvulus (AF) Knot bindweed
Polygonum lapathifolium (AF) Curltop ladythumb
Polygonum persicaria (AF) Spotted ladythumb
Rumex acetosa (PF) Garden sorrel
Rumex acetosella (PF) Sheep sorrel
Rumex crispus (PF) Curly dock
Rumex patientia (PF) Patience dock
Rumex stenophyllus (PF) Slenderleaf dock

Portulacaceae

* *Claytonia umbellata* (PF) Umbellate spring-beauty
Portulaca oleracea (AF) Common purslane

Potamogetonaceae

Potamogeton crispus (PF) Curled pondweed

Ranunculaceae

Ranunculus acris var. *acris* (PF) Tall buttercup
Ranunculus repens var. *pleniforme* (PF) Creeping buttercup
Ranunculus repens var. *repens* (PF) Creeping buttercup
Ranunculus testiculatus (AF) Hornseed buttercup

Resedaceae

Reseda lutea (PF) Yellow mignonette

Rhamnaceae

Rhamnus cathartica (S) Common buckthorn
Rhamnus frangula (S) European alder-buckthorn

Rosaceae

Potentilla argentea (PF) Silvery cinquefoil
Potentilla norvegica (AF) Norwegian cinquefoil
Potentilla recta (PF) Sulphur cinquefoil
Pyrus malus (T) Apple
Rubus laciniatus (PF) Evergreen blackberry
Sanguisorba minor (PF) Garden burnet

Rubiaceae

Galium mollugo (PF) White bedstraw
Galium verum (PF) Yellow bedstraw

Salicaceae

Populus alba (T) White poplar
Salix fragilis (T) Crack willow
Salix pentandra (S) Laurel-leaved willow

Scrophulariaceae

\$ *Linaria dalmatica* (PF) Dalmatian toadflax
 \$ *Linaria vulgaris* (PF) Butter-and-eggs
Verbascum thapsus (PF) Common mullein
Veronica anagallis-aquatica (PF) Water speedwell
Veronica arvensis (AF) Common speedwell
Veronica biloba (AF) Bilobed speedwell
Veronica persica (AF) Persian speedwell

Solanaceae

Hyoscyamus niger (AF) Black henbane
Lycium barbarum (S) Matrimony vine
Solanum dulcamara (PF) Bittersweet
Solanum physalifolium var. *nitidibaccatum* (AF) Viscid nightshade

Tamaricaceae

\$ *Tamarix chinensis* (S) Tamarisk (includes *T. ramosissima*, *T. parviflora*)

Ulmaceae

Ulmus pumila (T) Siberian elm

Violaceae

Viola tricolor (AF) Pansy

Zygophyllaceae

Tribulus terrestris (AF) Puncture-vine

Summer Field Trips

June 5: From 9 AM to noon Todd Embree of the Teton Chapter will lead a field trip and discussion on the uses of native berry plants. The field trip will leave from the Blacktail Butte parking area on the main highway in Grand Teton National Park. For information, call Todd at 739-2314.

June 10: Joan Lucas of the Teton Chapter will lead a 1-hour tour of her native landscaped backyard in Wilson, starting at 7 PM. For more information, call Joan at 733-5600 (days) or 733-2523 (evenings).

June 19-20: 1999 Annual Meeting/Field Trip: The 1999 annual field trip is scheduled for Saturday, June 19 and Sunday June 20. We plan to meet Saturday 8:00 AM at the flag pole, adjacent to the parking lot of Western Wyoming Community College (WWCC), Green River Campus. As you head south out of Green River, turn left off of Uinta Dr. (Hwy 530) onto Upland Wy. WWCC will be about 1 mile on the right. It's the only building on the south side of Upland Wy. We'll begin the southwest Wyoming excursion by visiting Green River greenthread (*Thelesperma caespitosum*) approx. five miles east of Green River. The rest of the field trip will follow a geological loop around Flaming Gorge National Recreation Area, where we will encounter several other globally and state rare plant species, as well as what is expected to be an unusual display of desert endemics. Saturday will be spent on the west side of the Gorge and Sunday will be on the east side. We plan to visit the spectacular Red Canyon Overlook and continue on to relax Saturday night at Firefighter's Memorial Campground, about midway around the loop. A number of campsites have been reserved in Loop C. Campground fees are \$12.00 for each site and two vehicles are allowed per site. You can reimburse Char when you get there. There is a lodge southwest of the campground (Flaming Gorge Lodge, 435-889-3773) for those who desire immediate facilities. The lodge fills up fast, so make your reservations early. Please RSVP with Char (delmatierc@juno.com) or Walt (clyde@uwyo.edu) if you plan to camp so we can add additional campsites if needed.

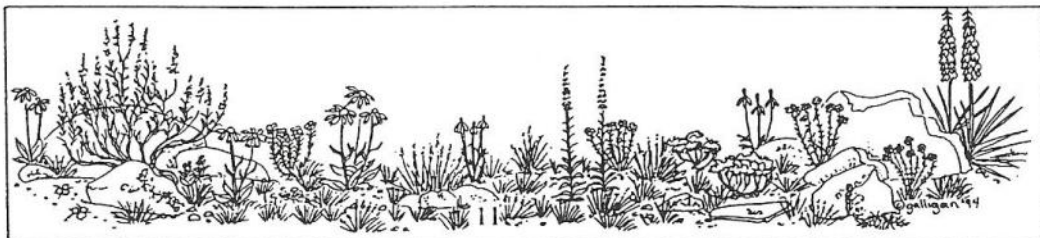
Our annual field trip is to a place like no other in Wyoming. Although, most everywhere I go in Wyoming I feel that way. However, overlooking the combination of bug repellent and sunscreen lotion, strong winds, extreme diurnal temperatures, an annual precipitation of usually less than 8 inches, where evaporation exceeds precipitation, and where the geology diversity is an interwoven anomaly, a distinct arid desert landscape unfolds: the semi-barren sagebrush steppe. The physiognomy is distinct and easily recognized with a suite of endemic plant species dominating the large open spaces.

The growing season is less than 3 months, giving us a small window of opportunity to witness this spectacular display of perennial endemics including a unique diminutive cushion plant, *Chamaechaenactis scaposa*. Unlike the display of annual ephemerals of the hot southwest deserts, a unique combination of low-growing herbaceous plants constitute an array of "ephemeral perennials" in this high cold desert plateau. It is due to above combined characteristics that Southwest Wyoming is home to a larger percentage of rare plants. For those early bird enthusiasts coming a day early, a Friday visit to Fossil Butte National Monument will undoubtedly prove to be both a geological and botanical exploration. It is here, that our only extant state population of Entire-leaved pepperplant (*Lepidium integrifolium*) is located (as well as 5-6 other regional endemics). For additional information, contact Charmaine at (307) 875-6437 or Walt at (307) 745-5026. CR.

June 26: In conjunction with the fledgling Laramie chapter of the Audubon Society, Walter Fertig will be leading a half-day hike to observe early summer wildflowers in the southern Laramie Range. The trip will convene at the Lincoln rest area off Interstate 80 (Happy Jack Road exit, ca 8 miles southeast of Laramie) at 9 AM.

July 31- August 1: Beartooth Range/Swamp Lake. This trip will convene at 9:30 AM at the Sunlight Bridge parking area in the Sunlight Basin, ca 38 miles northwest of Cody on the Chief Joseph Highway (allow about 1 hour to reach the site from Cody). From the bridge, we will proceed to Swamp Lake (ca 2 miles east of the Crandall Ranger Station) to spend the morning admiring boreal disjunct wetland species (expect to get your footwear wet!). From Swamp Lake, we will then travel on the Beartooth Highway (US 212) to the Clay Butte lookout and observe rare and endemic mustards, including the wily Wyoming whitlow-grass (*Draba pectinipila*), endemic to the Butte. Our last stop will be on the summit of the Beartooth Highway, where a large number of arctic disjuncts occur, including *Pedicularis oederi* and *Koenigia islandica*. Our camp for Saturday night will be near Lily Lake at the base of the Beartooths (off Highway 212). On Sunday morning, we will explore floating mats and bogs near Lily Lake.

Those arriving early on Friday afternoon may find camping and botanizing opportunities on the Bald Ridge Road, located off the north side of the Chief Joseph Highway, ca 0.5 miles after the turnoff to the Northwest College camp (if you reach the Dead Indian Hill summit overlook and parking area, you have gone too far). I will lead a late afternoon/evening walk in search of *Festuca hallii*, *Castilleja nivea*, *Pyrrocoma carthamoides*, *Shoshonea pulvinata*, and other endemic oddities. Please RSVP with Walt if you plan to attend. WF



The Wyoming Native Plant Society, established in 1981, is a non-profit organization dedicated to encouraging the appreciation and conservation of the native flora and plant communities of Wyoming. The Society promotes education and research on native plants of the state through its newsletter, field trips, and annual student scholarship award. Membership is open to individuals, families, or organizations with an interest in Wyoming's flora. Members receive *Castilleja*, the Society's quarterly newsletter, and may take part in all of the Society's programs and projects, including the annual meeting/field trip held each summer. Dues are \$7.50 annually.

To join the Wyoming Native Plant Society, return the membership form below to:

Wyoming Native Plant Society
1604 Grand Ave.
Laramie, WY 82070

Name:

Address:

☐ \$7.50 Regular Membership

☐ \$15.00 Scholarship Supporting Member
(*\$7.50 goes to the annual scholarship fund*)

Rhamnus cathartica (Common buckthorn), an introduced European shrub. Ill. from Hegi's *Illustrierte Flora von Mitteleuropa*.



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