PLANTS Help

Users of the Internet Explorer (IE) browser may experience display issues when using PLANTS.

Introduction

The PLANTS database contains native and naturalized plants of the PLANTS Floristic Area (PFA), which consists of North America and all additional U.S. territories and protectorates. Vascular plant distributions are mapped at the state and province level, and by U.S. county. Our checklists for the non-vascular mosses, liverworts, hornworts, and lichens cover all of North America north of Mexico; no additional distribution data are available for these plants. The total number of PFA accepted taxa at the rank of species and below is about 38,000. Comprehensive data for the U.S. territories and protectorates in the PFA Pacific Basin area are in preparation but are not yet included in PLANTS. PLANTS also has about 5000 vascular plants that do not occur spontaneously (i.e., are not naturalized) in the PFA; most of these are of economic importance, and many of them are cultivated within the PFA.

Acknowledgments

John Kartesz, Biota of North America Program, provided the foundational U.S. vascular plant checklist, state and county distribution, and the original duration, growth habit, and native status data used in PLANTS. NRCS is pleased to have significantly funded BONAP and supported the development of this critical land management information from 1990 until 2006. Luc Brouillet (Université de Montréal) and Canadian colleagues generously donated Canadian vascular plant names with distribution and attributes in 2006. Vascular plant data—especially native status and scientific name authorities and orthography—have since been partially revised by Mark Skinner, former NPDT employee, and will continue to be revised internally and by external specialists for the foreseeable future.

Robert Egan (University of Nebraska Omaha) and Theodore Esslinger (North Dakota State University) provided the North American lichen checklist, which is periodically published in *The Bryologist*.

Lewis Anderson (deceased) and Molly McMullen of Duke University provided the original North American moss checklist, which was updated by Marshall Crosby of the Missouri Botanical Garden.

Ray Stotler (deceased) and Barbara Crandall-Stotler of Southern Illinois University, Carbondale provided the North American liverwort and hornwort checklists.

Checklist higher taxonomy was developed by Mark Skinner and Dieter Wilken.

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USDA, NRCS, 1997 - Northeastern Wetlands Flora @ USDA-NRCS PLANTS Database

Plant Data Use

Our plant information, including the distribution maps, lists, and text, is not copyrighted and is free for any use. Please cite the PLANTS Database as:

USDA, NRCS. [YEAR]. The PLANTS Database (http://plants.usda.gov, 2/25/2021[DAY MONTH YEAR]). National Plant Data Team, Greensboro, NC USA.

Linking to PLANTS

Linking to plant profile pages, or any page on PLANTS, requires no permission and we welcome it. However, linking to an individual image may require permission depending on the Usage Guidelines for that image.

Culturally Significant Plants

Culturally Significant Plant Guides

Acknowledgment: The information in these Plant Guides was largely compiled by M. Kat Anderson (retired NRCS ethnoecologist) and could not have been done without the collaboration and cooperation of many members of Native American tribal groups actively using plants in everyday living. The information was gathered directly from tribes and through published literature sources based upon indigenous knowledge.

In collaboration with Native American plant authorities, NRCS plant material centers, and university specialists, has assembled a series of culturally significant plant guides and technical notes for each NRCS region. These guides can help Native American tribes and NRCS field offices to establish and manage culturally significant plants and restore traditional gathering sites.

Cleaning elderberry (*Sambucus mexicana*) fruits by a Sierra Miwok family, which will be used in the making of jams, jellies, and pies. (Photos © M. Kat Anderson (retired), National Plant Data Team)

These guides provide information and images of plant species that play a significant role in the lives of Native Americans involved in cultural activities utilizing plants. The guides feature one native plant species each, and provide botanical identifying features, morphology, general information about the plant's reproductive biology, range, distribution, and habitat requirements. Each guide has a horticultural section with tips on how to collect seed, propagate and grow the plant, and how to maintain existing stands of the plant with standard and indigenous horticultural practices. Guides also contain cultural information about where the plant grows, when and how it is harvested, how it is prepared and used, and its general role in maintaining tribal ethnicity. There is a list of possible seed and container sources, a bibliography of references, and images if available. Pertinent links to other sites containing ethnobotanical species abstracts are also included.

Click here for a list of plants for which we have Culturally Significant Plant Guides.

Rich in nutrients, cattail pollen (*Typha* spp.) was used to make cakes and mush by tribes in many parts of the United States.

Previous Activities of the NPDT in Ethnobotany

Ethnographic Studies

This work was based upon contacts with indigenous peoples and involves documenting different indigenous harvesting and horticultural practices and their potential effects on the maintenance of biological diversity and other indicators of ecosystem health and productivity. Tasks included interviews with Native Americans, archival research in libraries, cultural museum artifact studies, and field visits to traditional gathering sites.

Ecological Assessments

This involved assessment of the inter-relations and impacts of indigenous cultural practices on plant populations, communities, and ecosystem characteristics and dynamics. Two levels of study were employed:

Observational Studies - Design and implement observational studies of the environmental and ecological background of anthropogenic plant populations and plant communities, and of the complex of processes involved in the maintenance of long-term productivity of traditional gathering sites. This approach focuses on spatial and temporal relationships and on processes as well as potential effects on different levels of biological organization.

Baskets, such as winnowers and wokas scoops, are made with the stems of tules or bulrushes (*Scirpus* spp.) by tribes in California, Oregon, and the Great Basin.

Ecological Field Experiments - Document the effectiveness of horticultural techniques in conserving biodiversity and/or sustaining the productivity of vegetation types by conducting of field experiments to measure the effects of simulated indigenous horticultural practices on specified features or characteristics of individual plants, populations, or plant communities.

What is Ethnobotany?

Ethnobotany is the study of how different cultures (usually indigenous groups) use, manage, and generally interact with plants. Major topics include ways that different cultures perceive, classify, and evaluate plant species and ways that cultures enhance native plant populations for their own needs using such techniques as pruning, burning, sowing, weeding, and coppicing. Comparative research on how plant resources are used, maintained, and changed by different

societies is useful for developing general theories and methods for using, managing, and conserving these resources.

Native American Cultures and Useful Native Plants

Of the 18,000 vascular plant species in the United States, each Native American tribe traditionally used hundreds to thousands. Some of these plants are still gathered today: Sioux women still dig edible prairie turnips (*Psoralea esculenta*) in the wind-riffled Midwestern prairies; Western Mono women still pluck long golden flower stalks from deergrass (*Muhlenbergia rigens*) tufts for baskets along sandy California riverbanks; the Lac du Flambeau still harvest wild rice (*Zizania* spp.) and tap maple sugar from sugar maple trees (*Acer saccharum*).

Chia (*Salvia columbariae*) is a major edible seed still gathered by tribal families in the Great Basin, Southwest, and California. The parched seeds are ground into a meal from which cakes or mush can be made.

Hidden within the simple act of gathering frequently lie complex rules that safeguard the plant stock from being over-harvested. For example, Klikitat basket makers of southern Washington dig the roots of western red cedar (*Thuja plicata*) every three years, giving the trees time to re-grow and replenish the supply. For many curative plants, Navajo medicine men still refrain from harvesting from the same stand two years running, granting periods of rest and re-growth between those of tillage and extraction. Other resource management techniques are practiced to augment wild plant populations in special places. The Timbisha Shoshone prune honey mesquite (*Prosopis glandulosa*), a very important food resource, keeping areas around the trees clear of undergrowth, and also of dead limbs and lower branches. The Dena'ina of south-central Alaska still dig the edible tubers of Alaska carrots (*Hedysarum alpinum*) with a moose leg bone or horn, cut off the thick end of the tuber, and then bury it to insure that more potatoes will grow.

Acorns from the California black oak (*Quercus kelloggii*) are harvested in the fall by many Native American families and made into a mush, soup, or patties and eaten with beef or venison.

Traditionally, native plants were integrated into every facet of daily living among indigenous people: used for adornments, basketry, building materials, ceremonial events, clothing, cordage, cosmetics, dyes, foods, games, household utensils, medicines, musical instruments, poisons, tools, toys, transportation, and weapons. Plants were gathered from below sea level to above timberline and all vascular life forms were used, from herbs, to grasses, sedges, shrubs, trees, and vines. The vegetation was the grocery store, the pharmacy, and the hardware shop, tailored by each cultural group into its own unique ethnobotany.

This collective wisdom about how to tend, judiciously harvest, and use native plants has evolved over thousands of years and gives us models of human intervention in nature that demonstrate a common ground between the conservation and utilization of plants. Some of these plants may have importance to modern society in the form of new food crops or medicines.

As populations of useful native plant species continue to dwindle on tribal and public lands, there is increasing need expressed by Native Americans to the NRCS Plant Material Centers (PMC) and field Offices to assist them in the re-establishment of culturally significant plants in various landscapes. Ethnobotanical projects involve increasing partnerships between NRCS offices, Native American tribes, public land agencies, and private landowners. NRCS Plant Material Specialists in different parts of the country have begun using their skills to assist tribes in propagating, out-planting, and managing populations of culturally significant plant species in reservation and rancheria settings. Some of the plants that the PMC's are working with are featured in PLANTS--native plants that are still vitally important to Native Americans to continue their traditions of basketry, ceremonies, preparing traditional foods, and other customs.

Digging stick and blue dicks (*Dichelostemma capitatum*) corms. These underground storage organs, called "Indian potatoes," are eaten raw, boiled, or baked by tribes in the Southwest, California, and the Great Basin.

What is Ethnoecology?

Long straight shrub shoots of sumac (*Rhus* spp.), willow (Salix spp.), deer brush (*Ceanothus integerrimus*), and redbud (*Cercis occidentalis*) are harvested by weavers in the West for prized basketry material, one or two years after pruning back the old growth.

Ethnobiology is the umbrella term for the study of human cultures and their interactions with other organisms. It includes ethnomycology (uses of mushrooms); ethnozoology (uses of wildlife); ethnoentomology (uses of insects) and ethnobotany (uses of plants), and ethnoecology. Ethnoecology explores how human groups see nature through a screen of beliefs, knowledge and purposes. It also investigates how humans use, manage and appropriate both biotic and non-biotic natural resources. Systems of production for food, basketry, cordage, medicines, etc. are studied directly in the field. Ethnoecologists record detailed information about the human behavior in these systems, such as their actual horticultural practices and harvesting strategies, and the traditional ecological knowledge upon which these systems are based. The ethnoecologist, in addition to relying on ecological methods and concepts, draws upon linguistic, cognitive, and evolutionary theory and methods.

Data Sources

Nomenclature and Taxonomy

Higher levels: families, orders, classes, divisions, kingdoms

Plant kingdom (Kingdom Plantae): Raven, P.H., R.F. Evert and S. Eichhorn. 1986. *Biology of plants*, 4th ed. Worth Publishers, New York.

> Liverworts (Division Hepatophyta) and hornworts (Division Anthocerotophyta): Schuster, R. 1966. *Hepaticae and Anthocerotae of North America*, vol. 1. Columbia University Press, New York.
>
> Mosses (Division Bryophyta): Anderson, L.E., H.A. Crum, and W.R. Buck. 1990. List of the mosses of North America north of Mexico. *The Bryologist* 93: 448-499.
>
> Fern allies: Lycopods (Division Lycopodiophyta), horsetails (Division Equisetophyta), and whiskferns (Division Psilophyta): Gifford, E.M., and A.S. Foster. 1989. *Morphology and evolution of vascular plants*, 3rd ed. W.H. Freeman and Co., New York.
>
> Ferns (Division Pteridophyta): Tryon, R.M., and A.F. Tryon. 1982. *Ferns and allied plants*. Springer-Verlag, New York.
>
> Gymnosperms: Cycads (Division Cycadophyta), ginkgos (Division Ginkgophyta), conifers (Division Coniferophyta), and gnetophytes (Division Gnetophyta): Gifford, E.M., and A.S. Foster. 1989. *Morphology and evolution of vascular plants*, 3rd ed. W.H. Freeman and Co., New York.
>
> Flowering plants (Division Magnoliophyta): Cronquist, A. 1981. *An integrated system of classification of flowering plants*. The New York Botanical Garden. Columbia University Press, New York.

Fungus kingdom (Kingdom Fungi): Hawksworth, D.L., P.M. Kirk, B.C. Sutton, and D.M. Pegler. 1995. Ainsworth & Bisby's dictionary of the fungi, 8th ed. CAB International, Wallingford, UK.

Using the sources above, Mark Skinner and Dieter Wilkin developed the higher-level classification used in PLANTS.

Lower levels: genera, species

See our Data Partners page for our sources of names of genera and species. The National Plant Data Team continuously reviews and updates these data.

Distribution, Duration, Growth Habit, Nativity

The Sources tab on each plant Profile Page lists our sources of distribution data. Most of our distribution data comes from published books and papers. Some data are from published or

unpublished databases, including databases of herbarium specimens. A small part of our distribution data comes from personal observations.

John Kartesz, Biota of North America Program, collected and provided the original state and county distribution data and the duration, growth habit, and native status data used in PLANTS. Luc Brouillet (Université de Montréal) and Canadian colleagues generously donated Canadian vascular plant distributions and attributes in 2006. The National Plant Data Team continuously reviews and updates these data.

Images

The Images tab on each plant Profile Page shows the source of each image. You may also use the Image Search to find images by the artists who created them.

Conservation Plant Characteristics

These data were gathered from the scientific literature, gray literature, agency documents, and the knowledge of plant specialists. They were used in the former VegSpec application, a web-based decision support system that helped land managers plan and design natural resource conservation plantings. NRCS staff developed this information. It was supplemented by the USGS Wetland Research Center.

Endangered, Threatened, and Rarity Status

The Rarity tab on appropriate Profile Pages lists the federal, state, and private sources of these data.

Invasive/Noxious Status

The Invasive/Noxious tab on appropriate Profile Pages lists the federal, state, and private sources of these data.

Wetland Status

Wetland status (shown on the Wetland tab on appropriate Profile Pages) is copied from the official National Wetland Plant List site.

Wildlife Values

The Wildlife tab on appropriate Profile Pages lists the sources of these data.

Distribution Update

Updating Distributions: Standards for Contributors

The PLANTS database covers vascular plants, mosses, liverworts, hornworts, and lichens of the U.S. and its territories. We welcome thorough, verifiable plant distribution information from the public. Such distribution information must be relatively detailed about locality, documenter, and source of documentation. **Incomplete or unverifiable information will not be accepted.** Please follow the guidelines below for providing distribution information, and then send us an email with your distribution updates.

1. Locality and other information (required):

- Provide country, state/province, and county/parish/equivalent. These are the units that PLANTS maps. Furthermore, *localities provided should give the town or city, or even more precise geographic information, such as within 100 m in latitude/longitude or Universal Transverse Mercator (UTM) coordinates.
- *Date of documentation, including the day, month, and year.
- *Name of the collector or documenter.

*If you are reporting distributions from a printed flora, you do not need such precise locality information.

2. Plant documentation (required), which must contain information for *at least one* of the three categories of sources below. If you provide photos or herbarium specimens (A or B below), tell us in detail how you made the identification (e.g. literature source, experts consulted, etc.).

A. Photographs

- These must be representative of the morphology of the plant, adequate for identification. Such morphological characteristics would be those used in a taxonomic key to distinguish the taxon of interest (species, subspecies, or varieties) from other similar plants. Photos sent without identification will not be considered.
- Photos must have the plants in clear focus and appropriately lighted.
- Submitted photos will be used only for identification, not posted on the website nor made available to the public.

B. Herbarium specimens: pressed, dried plant material

- As with photographs, such specimens must contain the necessary representative morphology of the plant, adequate for taxon identification. They also must not be moldy, decomposing, damaged by insects or other organisms, or contain any other damage that will obscure positive identification.

• You may refer us to specimens deposited in an internationally recognized herbarium (see Index Herbariorum), or mail us a collection of your own. Any specimens you provide us must contain ample material. If you plan to supply us with specimens of your own, before doing so please review some guidelines for making herbarium specimens (1)(2). After we examine these specimens we will send them to a proper herbarium. As with photos, specimens sent without identification will not be considered. If you plan to collect specimens to provide us with distribution updates, please be sure they are legally collected by respecting private and public landowner rights, rules, and regulations, and by following any local, regional, national, or international plant protection and quarantine laws.

C. Published literature

• Such literature must be publicly available and preferably peer-reviewed. This can include floras, scientific journals, reports from heritage programs or similar organizations, as well as doctoral dissertations and master's theses. Provide details about the literature source you are using (title, authors, page numbers, publication date, publisher).
• Records from databases directly associated with herbaria are also acceptable, such as the Consortium of California Herbaria (CCH), the Southwest Environmental Information Network (SEINet), the Plants of Washington (WTU), amongst many others. Furthermore, state Natural Heritage database records also are acceptable.

Please email your updates to the PLANTS National Plant Data Team.

Endangered, Threatened, and Rare Plants

The Endangered and Threatened data in the previous PLANTS version were outdated and not migrated to the new PLANTS version. A new PLANTS Rarity dataset has been developed and will be deployed to PLANTS in a later release. The new Rarity dataset along with explanations of the data and the Rarity Search can be downloaded at the USDA CloudVault.

Fact Sheets and Plant Guides

These documents provide information about conservation plants that are commonly used to improve the land or are useful in other ways. Many are important for plant community restoration or are used in various conservation activities such as creating buffers, growing windbreaks, stabilizing soil, reclaiming old mines, and providing habitat for wildlife. Others are of great cultural significance to Native Americans, are commonly used in landscapes, or provide valuable forage for livestock. Some are invasive or noxious weeds.

Fact Sheets

Fact Sheets provide brief descriptions of a plant and its uses and offer cultural recommendations. Plant Materials staff prepared most of our Fact Sheets.

Plant Guides

Plant Guides are similar to Fact Sheets but are usually more extensive and more narrative and are typically referenced to source documents. Although many Plant Guides emphasize a particular aspect of a plant's biology — perhaps its cultural significance or weediness — we are not distinguishing these various types here. Plant Materials and NPDT staff have prepared Plant Guides, as well as other partners within NRCS or at other Institutions.

You can use a combination of the Plant Characteristics available through PLANTS and these Fact Sheets and/or Plant Guides together. We encourage NRCS Field Offices to use our Web information and these documents to develop locally-oriented Fact Sheets or Plant Guides.

We continue to write new Fact Sheets and Plant Guides and welcome your ideas on sources of information. If you can provide comparable documents that we could adapt and post at PLANTS, we would much appreciate it; we at NRCS welcome new partners of all kinds. If you are interested, please consult the Technical Publications page .

Growth Habits

PLANTS Description	PLANTS Definition	Notes
Forb/herb	Vascular plant without significant woody tissue above or at the ground. Forbs and herbs may be annual, biennial, or perennial but always lack significant thickening by secondary woody growth and have perennating buds borne at or below the ground surface. In PLANTS, graminoids are excluded but ferns, horsetails, lycopods, and whisk-ferns are included.	Applies to vascular plants only. Federal Geographic Data Committee (FGDC) definition includes graminoids, forbs, and ferns.
Graminoid	Grass or grass-like plant, including grasses (Poaceae), sedges (Cyperaceae), rushes (Juncaceae), arrow-grasses (Juncaginaceae),and quillworts (*Isoetes*).	Applies to vascular plants only. An herb in the FGDC classification.
Lichenous	Organism generally recognized as a single "plant" that consists of a fungus and an alga or cyanobacterium living in symbiotic association. Often attached to solid objects such as rocks or living or dead wood rather than soil.	Applies to lichens only, which are not true plants.
Nonvascular	Nonvascular, terrestrial green plant, including mosses, hornworts, and liverworts. Always herbaceous, often attached to solid objects such as rocks or living or dead wood rather than soil.	Applies to non-vascular plants only; in PLANTS system this is groups HN (Hornworts), LV (Liverworts), and MS (Mosses).
Shrub	Perennial, multi-stemmed woody plant that is usually less than 4 to 5 meters (13 to 16 feet) in height. Shrubs typically have several stems arising from or near the ground, but may be taller than 5 meters or single-stemmed under certain environmental conditions.	Applies to vascular plants only.
Subshrub	Low-growing shrub usually under 0.5 m (1.5 feet) tall, never exceeding 1 meter (3 feet) tall at maturity.	Applies to vascular plants only. A dwarf-shrub in the FGDC classification.

Tree	Perennial, woody plant with a single stem (trunk), normally greater than 4 to 5 meters (13 to 16 feet) in height; under certain environmental conditions, some tree species may develop a multi-stemmed or short growth form (less than 4 meters or 13 feet in height).	Applies to vascular plants only.
Vine	Twining/climbing plant with relatively long stems, can be woody or herbaceous.	Applies to vascular plants only. FGDC classification considers woody vines to be shrubs and herbaceous vines to be herbs.

Invasive/Noxious Weeds

The Invasive/Noxious Weeds data in the previous PLANTS version were outdated and not migrated to the new PLANTS version. A new PLANTS Invasive/Noxious Weeds dataset has been developed and will be deployed to PLANTS in a later release. The new Invasive/Noxious Weeds dataset along with explanations of the data and the Invasive/Noxious Search can be downloaded at the USDA CloudVault.

Native Status Jurisdiction and Native Status Codes

Codes applying to high-level geographic regions in the PLANTS Floristic Area (PFA; North America north of Mexico and all additional U.S. territories and protectorates).

Native Status Jurisdiction Code	Description
AK	Alaska
CAN	Canada
GL	Greenland (Denmark)
HI	Hawaii
L48	Lower 48 States
NA	North America (only non-vascular plants and lichens have Native Status given at this level)
NAV	Navassa Island (the sole Caribbean member of the United States Minor Outlying Islands)
PB	Pacific Basin excluding Hawaii
PR	Puerto Rico
SPM	St. Pierre and Miquelon (France)
VI	U.S. Virgin Islands

Native Status Code	Description
	Native:
N	Native
N?	Probably Native
	Introduced (non-native):
GP	Garden persistent - persists in gardens and around old habitations, not naturalized.
GP?	Probably Garden persistent
I	Introduced (reproduce spontaneously in the wild without human help, and tend to persist).
I?	Probably Introduced
W	Waif - an ephemeral introduction, not persistently naturalized.
W?	Probably a Waif

The PLANTS Floristic Area (PFA) is divided into Native Status jurisdictions to try to improve the information about where plants are native. A plant that is native to any part of a Native Status jurisdiction (e.g., L48, the lower 48 states) is considered Native, even if some populations within that area are introduced. For example, the L48 Native Status value for smooth cordgrass

(*Spartina alterniflora*) is N (Native) despite the existence of introduced populations on the West Coast. However, a plant like dandelion (*Taraxacum officinale*) is considered both Native and Introduced because it has infraspecific taxa that either are native or introduced to L48. Plants that do not occur in the PFA, yet have profile pages, do not have Native Status values in PLANTS though they may be cultivated or used as ornamentals within the PFA.

Native status is difficult to define and is somewhat arbitrary in circumscription. In PLANTS, "Native" means plants naturally occurring in the PFA roughly at the beginning of persistent European colonization, in the late 15th Century. Introduced plants arrived at that time or later, with human assistance, from some other part of the world. At PLANTS we use "Introduced" since it is widely known rather than the similar term naturalized. Native status often is difficult to assign because (1) the flora of the region was not known in the late 1400s and poorly known long after, (2) people have been moving plants for thousands of years, and (3) it is often hard to know how a plant got where it is.

Searches

On the left side of every page, PLANTS has a basic search and several specialized searches. Each search produces a list of name-matches with links to PLANTS profile pages. Information provided with a search return include accepted PLANTS symbol, scientific name with link to profile page, synonyms (if any), common name, number of images.

In the basic search and many of the specialized searches, there is a text box in which you can type all or part of a Scientific Name, Common Name, Symbol, or Family Name. Click inside the box below the text box to choose what you want to search. Then, depending on what you chose, what you type in the text box matches any part of a Scientific Name, Common Name, Symbol, or Family, whether capitalized or not.

For example, find the Basic Search at the upper left of a page. Click the box below the text box—by default it says "Scientific Name." In the list that appears, click the line that says, "Common Name". Next, type "hood" in the text box above and click the "Go" button with your mouse or press "Enter" on your keyboard. This search returns a list of plants with common names such as "Arizona monkshood," "longhood milkweed" and "Mt. Hood bugbane". To search for two strings of text separated by an unknown number of characters, use the wildcard "%". For example, typing "blue%hood" in a Common Name search returns a list of plants with common names "southern blue monkshood," "northern blue monkshood," and "twining bluehood."

When PLANTS return the results of your search, filters appear on the left side of the page. Using these, you may filter results by Duration, Group, Growth Habit, Invasive/Noxious Status, Nativity Status, Rarity Status, State/Province, or Wetland Region, and whether the plants have Characteristics, Fact Sheets/Plant Guides, or Images.

- **Basic Search**
  - Find matching Scientific Names, Common Names, Symbols, or Family Names.
- **Characteristics**
  - Get a list of plants that match over 80 NRCS Conservation Plant Characteristics.
- **Duration Search**
  - Get lists of plants by duration: Annual, Biennial, or Perennial.
- **Fact Sheets/Plant Guides**
  - Get a list of plants that have Fact Sheets or Plant Guides.
- **Group Search**
  - Get lists of plants by the following informal group: Dicots, Ferns, Green Algae, Gymnosperms, Hornworts, Lichens, Liverworts, Lycopods, Monocots, Mosses, Quillworts, Red algae, and Whisk-ferns.
- **Growth Habit Search**
  - Get lists of plants by growth habit, such as Forb/herb, Graminoid, Lichenous, Nonvascular, Subshrub, Shrub, Tree, and Vine.
- **Image Search**
  - Find images by Scientific Name, Common Name, Symbol, or Family Name.
  - Filter by image location, artists, copyright status, and image type (photograph or line drawing).
  - View by text list or thumbnails.
- **Invasive/Noxious Search**
  - The new Invasive/Noxious dataset is not yet available on the PLANTS website; it will be included in a subsequent release. The dataset along with explanations of the data and the Invasive/Noxious Search can be downloaded at the USDA CloudVault.
- **Rarity Search**
  - The new Rarity dataset is not yet available on the PLANTS website; it will be included in a subsequent release. The dataset along with explanations of the data and the Rarity Search can be downloaded at the USDA CloudVault.
- **State Search**
  - Find matching Scientific Names, Common Names, Symbols, or Family Names based on geographic area.
  - Get plant lists for states (and counties) and provinces in the PLANTS Floristic Area.
- **Wetland Search**
  - Find matching Scientific Names, Common Names, Symbols, or Family Names with wetland status.
  - Get lists of wetland plants by Federal wetland region.

Symbols

Family symbols are composed of the first six letters of the family name, plus a tiebreaking number (tiebreaking numbers start with the number 2) if needed (e.g., CEPHAL2 for Cephaloziaceae, CYPERA for Cyperaceae). Genus symbols are composed of the first five letters of the genus name, plus a tiebreaking number if needed (e.g., CYPER for Cyperus, NYMPH for *Nymphaea*, NYMPH2 for *Nymphoides*). In cases where the genus name is less than five letters the symbol is the genus itself, plus a tiebreaking number if needed (e.g., IVA for *Iva*, NAMA4 for *Nama*, SIDA for *Sida*). Species symbols are composed of the first two letters of the genus name and the first two letters of the species epithet, plus a tiebreaking number if needed (e.g., NAMA for *Najas marina*, SIDA2 for *Siphula dactyliza*). Symbols for infraspecific taxa (i.e., subspecies, varieties, forms) are composed of the first two letters of the genus name, the first two letters of the species epithet, and the first letter of the infraspecific epithet, plus a tiebreaking number if needed (e.g., COBUV for *Cotoneaster buxifolius* f. *vellaeus*, DROCA5 for *Dryas octopetala* f. *argentea*, RUIDS2 for *Rubus idaeus* ssp. *strigosus*, SAPUV for *Sarracenia purpurea* var. *venosa*, SOCAC3 for *Solidago canadensis* var. *canadensis,* SORUR for *Solidago rugosa* ssp. *rugosa*).

The symbols for unknown plants represent general categories such as "deciduous tree" or "herbaceous vine" that are useful in survey, monitoring, and inventory work.

PLANTS Symbols serve as a convenient shorthand for scientific plant names. They were first used in the Soil Conservation Service's *National List of Scientific Plant Names* first published in 1971 (revised 1982) and have been used in the PLANTS system ever since. PLANTS Symbols are widely used in NRCS and other federal agencies.

References

Soil Conservation Service, U.S. Department of Agriculture. 1971. *National list of scientific plant names*. Soil Conservation Service, U.S. Department of Agriculture, Lincoln.

Soil Conservation Service, U.S. Department of Agriculture. 1982. *National list of scientific plant names*, vols. 1 (*List of plant names*), 2 (*Synonymy*). Soil Conservation Service Technical Publication 159. U.S. Government Printing Office, Washington, D.C.

Taxonomy and Nomenclature

In PLANTS, a single common name (National Common Name) is found below the scientific name at the top of a profile page. For some plants alternative common names are also included and these appear on the profile page in the General Information table. Additional common names can be found in many lists available on PLANTS, such as the NRCS State Plants Checklists; state endangered, threatened and rarity lists; state invasive plant lists; state noxious weed lists; the U.S. endangered and threatened species list; and the U.S. noxious weed list.

The accepted scientific name is found at the top of the profile page. Synonyms of the accepted name are found on the Synonyms tab. Synonyms are validly published names that are not accepted.

At the end of a scientific name its authorship is given. Author citations follow the standardized forms (usually abbreviations) provided by the International Plant Names Index, originally based on *Authors of Plant Names* (Brummitt and Powell, 1992). For example, in *Helonias bullata* L., the L. indicates that the name was authored by Carolus Linnaeus, L. being the standardized form for the citation of Linnaeus. Author(s) appearing in parentheses indicate that a person or persons authored the basionym upon which the accepted combination is based. A basionym is a previously published name on which a new combination or name at new rank is based. A combination is a name below the rank of genus that consists of the genus name combined with one (binomials for species) or two (trinomials for subspecies, varieties, or forms) epithets. For example, *Toxicodendron radicans* (L.) Kuntze indicates that the accepted combination was published by Otto Kuntze ("Kuntze") and was based on the basionym *Rhus radicans* authored by Linnaeus ("L.").

Term or Abbreviation	Description
as to type	faithful to the type.
auct.	*auctorum* (Latin): of authors. Used to represent the preponderant incorrect usage of a name that has been widely misapplied.
auct. plur.	*auctorum plurimorum* (Latin): of most authors. Used to represent the preponderant incorrect usage of a name that has been widely misapplied.
database artifact	a duplicate record, typographic (data entry) error, or other erroneous record.
excl. type	excluding the type.
excluded	an accepted name, but the plant is no longer thought to occur in the PLANTS Floristic Area.
inc. sed.	*incertae sedis* (Latin): of uncertain placement. Used for names that cannot be placed in the current taxonomic scheme.
ined.	*ineditus* (Latin): unpublished.

ined.?	probably unpublished.
nom. conf.	*nomen confusum* (Latin): confused name. Based on heterogenous elements from which it is impossible to select a lectotype.
nom. cons.	*nomen conservandum* (Latin): name conserved under Art. 14 of the *International Code of Nomenclature for Algae, Fungi, and Plants* (Turland et al., 2018).
nom. dub.	*nomen dubium* (Latin): doubtful name. Application of name is uncertain.
nom. illeg.	*nomen illegitimum* (Latin): a validly published name rendered illegitimate, according to Arts. 52-54 of the *International Code of Nomenclature for Algae, Fungi, and Plants* (Turland et al., 2018)., by not being in accordance with specified rules (see Art. 6.4).
nom. inq.	*nomen inquirendum* (Latin): a name that requires investigation.
nom. inval.	*nomen invalidum* (Latin): name not validly published according to Arts. 32-45 of the *International Code of Nomenclature for Algae, Fungi, and Plants* (Turland et al., 2018).
nom. nud.	*nomen nudum* (Latin): name published without description or reference to a published description.
nom. rej.	*nomen rejiciendum* (Latin): name rejected under Art. 14 or Art. 56 of the *International Code of Nomenclature for Algae, Fungi, and Plants* (Turland et al., 2018).
nom. utique rej.	*nomen utique rejiciendum* (Latin): a name rejected under all circumstances, according to Art. 56.1 of the *International Code of Nomenclature for Algae, Fungi, and Plants* (Turland et al., 2018).. Neither it, nor names based upon it, should be used.
non	(Latin): not (of).
orth. cons.	*orthographia conservanda* (Latin): conserved orthographic variant under Art. 14.11 of the *International Code of Nomenclature for Algae, Fungi, and Plants* (Turland et al., 2018).
orth. rej.	*orthographia rejicienda* (Latin): rejected orthographic variant under Art. 14.11 of the *International Code of Nomenclature for Algae, Fungi, and Plants* (Turland et al., 2018).
orth. var.	orthographic variant: an incorrect alternate spelling of a name according to Art. 61 of the *International Code of Nomenclature for Algae, Fungi, and Plants* (Turland et al., 2018).
p.p.	*pro parte* (Latin): in part. Used to indicate that only part of a taxon is being referred to.
(pro hybr.)	*pro hybrida* (Latin): as a hybrid. Used to indicate that the name of a species was originally published as a hybrid.

(pro sp.)	*pro speciei* (Latin): as a species. Used to indicate that the name of a hybrid was originally published as a species.
(pro nm.)	*pro nothomorpho* (Latin): as a nothomorph. Used to indicate that the name of a hybrid below the rank of species was called a "nothomorph", but now is treated as a variety according to Art. H.12.2 of the *International Code of Nomenclature for Algae, Fungi, and Plants* (Turland et al., 2018)..
sensu	(Latin): in the sense of. Used in author citations of misapplied names in front of the name of the author misapplying the name.

References

Brummitt, R.K. and C.E. Powell. 1992. *Authors of plant names.* Royal Botanic Gardens, Kew.

Turland, N.J., J.H. Wiersema, F.R. Barrie, W. Greuter, D.L. Hawksworth, P.S. Herendeen, S. Knapp, W.-H. Kusber, D.-Z. Li, K. Marhold, T.W. May, J. McNeill, A. M. Monro, J. Prado, M.J. Price and G.F. Smith. 2018. *International code of nomenclature for algae, fungi, and plants (Shenzhen Code) adopted by the Nineteenth International Botanical Congress Shenzhen China, July 2017*. *Regnum Vegetabile,* vol. 159. Koeltz Botanical Books, Glashütten.

Wetland Indicator Status

On June 1, 2012, the 2012 National Wetland Plant List replaced the 1988 U.S. Fish and Wildlife Service's *National list of plant species that occur in wetlands* (U.S. Fish & Wildlife Service Biological Report 88 (24)) for all wetland determinations and delineations performed for Section 404 of the Clean Water Act, the Swampbuster provisions of the Food Security Act, and the National Wetland Inventory. This list was developed by the U.S. Army Corps of Engineers, the Fish and Wildlife Service (FWS), the Environmental Protection Agency, and the Natural Resources Conservation Service using taxonomic and distribution data from the Biota of North America program (BONAP) and legacy information from the FWS. It is directed by the Corps of Engineers.

The 2012 list included changes in the names of species, the recognition of new species, changes in wetland regions, and changes in the wetland indicator statuses of species. This list was updated again on July 11, 2013, April 3, 2014, and April 18, 2016. These updates included more changes in the names of species, more changes in the wetland indicator statuses of species, the addition of new species, and the removal of species that were listed as Upland in all regions. For further information, see the official website of the National Wetland Plant List.

Note: PLANTS does not accept a few of the species names on the National Wetland Plant List. *The species names in the NWPL must be used by those performing federal wetland delineations.*

Section Quick Links

- Indicator categories
- Regions and subregions
- Additional Information

Scientific names and regional wetland indicators for the PLANTS 2016 National Wetland Plant List are taken from the official version of the National Wetland Plant List:

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List: 2016 wetland ratings.* Phytoneuron 2016-30: 1-17. (See also the official website of the National Wetland Plant List.)

Definitions of indicator categories are taken from:

Lichvar, R.W., N.C. Melvin, M.L. Butterwick, and W.N. Kirchner. 2012. *National Wetland Plant List indicator rating definitions.* U.S. Army Corps of Engineers, Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory ERDC/CRREL TR-12-1.

Definitions of wetland regions are taken from:

U.S. Army Corps of Engineers. 2007. *Regional supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region* (Version 2.0). U.S. Army Corps of Engineers, Engineer Research and Development Center, Environmental Laboratory ERDC/EL TR-07-24.

U.S. Army Corps of Engineers. 2008. *Regional supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0). U.S. Army Corps of Engineers, Engineer Research and Development Center, Environmental Laboratory ERDC/EL TR-08-28.

U.S. Army Corps of Engineers. 2010. *Regional supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region* (Version 2.0). U.S. Army Corps of Engineers, Engineer Research and Development Center, Environmental Laboratory ERDC/EL TR-10-20.

U.S. Army Corps of Engineers. 2011. *Regional supplement to the Corps of Engineers Wetland Delineation Manual: Caribbean Islands Region* (Version 2.0). U.S. Army Corps of Engineers, Engineer Research and Development Center, Environmental Laboratory ERDC/EL TR-11-4.

U.S. Army Corps of Engineers. 2010. *Interim regional supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region*. U.S. Army Corps of Engineers, Engineer Research and Development Center, Environmental Laboratory ERDC/EL TR-10-9.

U.S. Army Corps of Engineers. 2010. *Regional supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* (Version 2.0). U.S. Army Corps of Engineers, Engineer Research and Development Center, Environmental Laboratory ERDC/EL TR-10-1.

U.S. Army Corps of Engineers. 2010. *Regional supplement to the Corps of Engineers Wetland Delineation Manual: Hawai'i and Pacific Islands Region*. U.S. Army Corps of Engineers, Engineer Research and Development Center, Environmental Laboratory ERDC/EL TR-10-6.

U.S. Army Corps of Engineers. 2010. *Regional supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region* (Version 2.0). U.S. Army Corps of Engineers, Engineer Research and Development Center, Environmental Laboratory ERDC/EL TR-10-16.

U.S. Army Corps of Engineers. 2009. *Regional supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*. U.S. Army Corps of Engineers, Engineer Research and Development Center, Environmental Laboratory ERDC/EL TR-09-19.

U.S. Army Corps of Engineers. 2010. *Regional supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Version 2.0). U.S. Army Corps of Engineers, Engineer Research and Development Center, Environmental Laboratory ERDC/EL TR-10-3.

Indicator categories

Indicator Code	Indicator Status	Designation	Comment
OBL	Obligate Wetland	Hydrophyte	Almost always occur in wetlands
FACW	Facultative Wetland	Hydrophyte	Usually occur in wetlands, but may occur in non-wetlands
FAC	Facultative	Hydrophyte	Occur in wetlands and non-wetlands
FACU	Facultative Upland	Nonhydrophyte	Usually occur in non-wetlands, but may occur in wetlands
UPL	Obligate Upland	Nonhydrophyte	Almost never occur in wetlands

These indicator statuses are used to designate a plant species' preference for occurrence in a wetland or upland. The information supporting the indicator status assignments for the 1988 wetland list was qualitative, not quantitative. To better reflect the supporting information, the new category definitions are based on qualitative descriptions.

Regions and subregions

The wetland regions, the states wholly or partly in each region, and the definition of each region are listed below. Most of the regions are now defined by the boundaries of Land Resource Regions (LRRs) and Major Land Resource Areas (MLRAs) recognized by the Natural Resources Conservation Service. LRRs are groups of MLRAs. For the boundaries of LRRs and MLRAs, see the NRCS Major Land Resource Area (MLRA) page.

Region	Geographic areas in region	Definition of region
Alaska	AK	State of Alaska
Arid West	AZ, CA, CO, ID, MT, NV, NM, OR, TX, UT, WA, WY	LRRs B, C, LRR D except MLRAs 22A, 22B, 39, and except embedded mountains above and including the ponderosa pine zone
Atlantic and Gulf Coastal Plain	AL, AR, DC, DE, FL, GA, IL, KY, LA, MD, MS, MO, NC, NJ, OK, PA, SC, TN, TX, VA	LRR O, LRR P except MLRA 136, MLRA 149A of LRR S, LRRs T, U
Caribbean	PR (Puerto Rico), VI (U.S. Virgin Islands)	LRR Z
Eastern Mountains and Piedmont	AL, AR, DC, DE, GA, IL, IN, KS, KY, MD, MO, NC, NJ, NY, OH, OK, PA, SC, TN, VA, WV	LRR N, MLRA 136 in LRR P, MLRAs 147, 148 in LRR S
Great Plains	CO, KS, MN, MT, NE, NM, ND, OK, SD, TX, WY	LRRs F, G except parts of MLRA 62 above lower limit of ponderosa pine zone, H, I, J

Hawaii and Pacific Islands	HI, GU (Guam), MP (Northern Mariana Islands), AS (American Samoa)	LRR V, portions of LRR Q
Midwest	IL, IN, IA, KS, KY, MI, MN, MO, NE, ND, OK, OH, SD, WI	LRR M
Northcentral and Northeast	CT, IL, IN, MA, ME, MI, MN, NH, NJ, NY, OH, PA, RI, VT, WI	LRRs K, L, R, MLRA 149B in LRR S
Western Mountains, Valleys, and Coast	AZ, CA, CO, ID, MT, NV, NM, OR, SD, UT, WA, WY	LRRs A, E, MLRAs 22A, 22B, 39 of LRR D, MLRA 62 of LRR G, other mountains above and including the ponderosa pine zone

The Alaska, Atlantic and Gulf Coastal Plain, Hawaii and Pacific Islands, and Northcentral and Northeast regions each have subregions. In these subregions, the wetland indicator status of several plant species differs from the status of the same species in the rest of the region. Alaska has 14 subregions, and the Atlantic and Gulf Coastal Plain region, the Hawaii and Pacific Islands region, and the Northcentral and Northeast region have one subregion each. For maps of these subregions, see the official website of the National Wetland Plant List.

The table below lists each subregion, the region to which it belongs, and the states wholly or partly included in each subregion.

Subregion	**Region**	**Geographic areas in subregion**
Alaska Interior	Alaska	AK
Arctic Coastal Plain	Alaska	AK
Cook Inlet Lowlands	Alaska	AK
Copper River Basin	Alaska	AK
Interior Alaska Highlands	Alaska	AK
Interior Alaska Lowlands	Alaska	AK
Interior Alaska Mountains	Alaska	AK
Interior Brooks Range	Alaska	AK
Northern Brooks Range Mountains	Alaska	AK
Northern Seward Peninsula-Selawik Lowlands	Alaska	AK
Pebble, Donlin, Aniak	Alaska	AK
Seward Peninsula Highlands	Alaska	AK
Upper Kobuk and Koyukuk Hills and Valleys	Alaska	AK
Western Brooks Range Mountains, Foothills, and Valleys	Alaska	AK
Western Gulf Coast	Atlantic and Gulf Coastal Plain	AR, IL, KY, LA, MS, MO, OK, TN, TX

South Pacific Islands	Hawaii and Pacific Islands	GU (Guam), MP (Northern Mariana Islands), AS (American Samoa)
Northcentral Great Lakes	Northcentral and Northeast	IL, IN, MI, MN, OH, WI

Additional Information

For additional information, see the official website of the National Wetland Plant List.

Conservation Plant Characteristics

We have Characteristics for about 2000 conservation plant species and 500 cultivars. (A cultivar is a variety, strain, or race that has originated and persisted under cultivation or was specifically developed for cultivation.)

These data have been gathered from the scientific literature, gray literature, agency documents, and the knowledge of plant specialists. Characteristics data values are best viewed as approximations since they are primarily based on field observations and estimates from the literature, not precise measurements or experiments. Characteristics for the many conservation plant species native to the U.S. were typically provided by experts familiar with the species in its natural setting. Most values given apply to plants nationwide. Many values are relative to other species since absolute figures are not available. If you think the data can be improved, please contact the Data Steward.

The Characteristics are grouped into four general categories, each of which covers a broad aspect of each conservation plant: Morphology/Physiology, Growth Requirements, Reproduction, and Suitability/Use. Each characteristic is described in the list below. Below the description of each non-numeric characteristic is a list of the possible values for that characteristic.

MORPHOLOGY/PHYSIOLOGY

Active Growth Period: Plants have their most active growth in which seasonal period?

- Spring, Spring & Fall, Spring & Summer, Spring Summer & Fall, Summer, Summer & Fall, Fall, Fall Winter & Spring, Year-round

After Harvest Regrowth Rate: What is the relative rate of regrowth of a herbaceous plant after a harvest of above ground herbage? Woody plants are left blank here.

- Slow, Moderate, Rapid

Bloat: What is the relative potential of an herbaceous plant to cause bloat in livestock? Woody plants are scored "None" here by default.

- None, Low, Medium, High

C:N Ratio: C:N ratio is the percentage of organic carbon divided by the percentage of total nitrogen in organic material. We specify the organic material as either the above ground biomass of an herbaceous plant or the above ground herbaceous material of a woody plant. Our relative values correspond to these numerical ranges: Low: <23; Medium: 23 – 59; High: >59.

- Low, Medium, High

Coppice Potential: Is the tree or shrub suitable for the coppice method of silviculture. Coppicing completely removes the canopy of woody plants, cutting them at or just above ground level. Plants other than trees and shrubs are scored "No" here by default.

- Yes, No

Fall Conspicuous: Are the leaves or fruits conspicuous during Autumn from a landscaping aesthetics standpoint?

- Yes, No

Fire Resistant: Is the plant known to resist burning? If the plant can carry a fire—and most can—this value will be no. This characteristic is best evaluated with reference to problem fires in California.

- Yes, No

Flower Color: What is the predominant color of the flowers?

- Blue, Brown, Green, Orange, Purple, Red, White, Yellow

Flower Conspicuous: Are the flowers conspicuous from a landscaping aesthetics standpoint?

- Yes, No

Foliage Color: What is the predominant color of the foliage?

- Dark Green, Green, Gray-Green, Red, White-Gray, Yellow-Green

Foliage Porosity Summer: How porous is the foliage during the summer months?

- Porous, Moderate, Dense

Foliage Porosity Winter: How porous is the foliage during the winter months?

- Porous, Moderate, Dense

Foliage Texture: What is the general texture of the plant's foliage relative to other species with the same growth habit?

- Fine, Medium, Coarse

Fruit/Seed Color: What is the predominant and conspicuous color of the mature fruit or seed from a landscaping aesthetics standpoint?

- Black, Blue, Brown, Green, Orange, Purple, Red, White, Yellow

Fruit/Seed Conspicuous: Is the fruit or seed conspicuous from a landscaping aesthetics standpoint?

- Yes, No

Growth Form: What is the primary growth form on the landscape in relation to soil stabilization on slopes and streamsides? Each plant species is assigned the single growth form that most enhances its ability to stabilize soil. Descriptions of the possible values follow.

- **Bunch:** Plant development by intravaginal tillering at or near the soil surface without production of rhizomes or stolons.
- **Colonizing:** A plant that is likely to behave as a colonizer when planted to enhance soil stabilization.
- **Multiple Stems:** Plant development by producing two or more stems. Examples: roundleaf dogwood (*Cornus rugosa*) and red huckleberry (*Vaccinium parvifolium*).
- **Rhizomatous:** Plant development by the production of rhizomes which give rise to vegetative spread.
- **Single Crown:** A herbaceous plant that develops one persistent base.
- **Single Stem:** Plant development by the production of one stem. Examples: corn (*Zea mays*) and American beech (*Fagus grandifolia*).
- **Stoloniferous:** Plant development by the production of stolons which give rise to vegetative spread.
- **Thicket Forming:** A plant that is likely to develop thickets when planted to stabilize soil.

Growth Rate: What is the growth rate after successful establishment relative to other species with the same growth habit?

- Slow, Moderate, Rapid

Height at Base Age, Maximum: Maximum height (in feet) of a tree, shrub or sub-shrub, under ideal conditions, at a base age. The base age is 20 years for trees in temperate areas (>30 degrees north latitude), 10 years for trees in tropical areas (≤30 degrees north latitude), and 10 years for all shrubs and sub-shrubs. Ideal conditions are defined as soil pH = 5.0-7.8; soil salinity ≤ 4 mmhos/cm; soil depth ≥ 40 inches; effective average annual precipitation ≥ 30 inches; soil texture class = medium; no ponding; rare or no annual flooding; and high water table depth ≥ 1 foot during plant active growth period. Plants other than trees, shrubs, and sub-shrubs are left blank here.

Height at Maturity: Expected height (in feet) of plant at maturity. This is an estimate of the median mature height of all plants of a species or cultivar. Within a species mature height is quite variable, so this estimate is provided only to give a rough idea for planning purposes.

Known Allelopath: Has this plant species been shown to be allelopathic to at least one other species?

- Yes, No

Leaf Retention: Does the tree, shrub, or sub-shrub retain its leaves year round? Plants with other growth habits are scored "No" here by default.

- Yes, No

Lifespan: What is the expected lifespan (in years) of a perennial plant relative to other species with the same growth habit? For the Tree growth habit: Short: < 100; Moderate: 100 - 250; Long: >250. Life spans for other growth habits are not quantified.

- Short, Moderate, Long

Low Growing Grass: Does the growing point (terminal meristem) of the vegetative grass tiller remain either at or near the crown? Plants other than grasses are scored "No" here by default.

- Yes, No

Nitrogen Fixation: How much nitrogen is fixed by this plant in monoculture? Our relative values correspond to these numerical ranges: None: 0 lb. N/acre/year; 0<Low<85; Medium: 85-160; High: >160.

- None, Low, Medium, High

Resprout Ability: Will the woody perennial resprout following top (above ground biomass) removal? Herbaceous plants are scored "No" here by default.

- Yes, No

Shape and Orientation: What is the growth form or predominant shape of an individual plant? (This characteristic is especially useful for selecting species for windbreaks.)

- Climbing, Columnar, Conical, Decumbent, Erect, Irregular, Oval, Prostrate, Rounded, Semi-Erect, Vase

Toxicity: What is the relative toxicity of the plant to either humans or livestock?

- None, Slight, Moderate, Severe

GROWTH REQUIREMENTS

Adapted to Coarse Textured Soils: Can this plant establish and grow in soil with a coarse textured surface layer? See table below for more information.

- Yes, No

Adapted to Medium Textured Soils: Can this plant establish and grow in soil with a medium textured surface layer? See table below for more information.

- Yes, No

Adapted to Fine Textured Soils: Can this plant establish and grow in soil with a fine textured surface layer? See table below for more information.

- Yes, No

Characteristics soil texture groups and corresponding soil texture classes:

Characteristics soil texture group	**Corresponding soil texture classes from the Soil Texture Triangle**		
Coarse	Sand	Coarse sand	Fine sand
Coarse	Loamy coarse sand	Loamy fine sand	Loamy very fine sand
Coarse	Very fine sand	Loamy sand	
Medium	Silt	Sandy clay loam	Very fine sandy loam
Medium	Silty clay loam	Silt loam	Loam
Medium	Fine sandy loam	Sandy loam	Coarse sandy loam
Medium	Clay loam		
Fine	Sandy clay	Silty clay	Clay

Source: The soil texture classes are from the Soil Science Society of America. An NRCS team partitioned the soil textures into the three groups.

Anaerobic Tolerance: What is the relative tolerance to anaerobic soil conditions?

- None, Low, Medium, High

CaCO3 Tolerance: What is the relative tolerance to calcareous soil? We define calcareous soil as soil containing sufficient free CaCO3 and other carbonates to effervesce visibly or audibly when treated with cold 0.1M HCl. These soils usually contain from 10 to almost 1000g/kg CaCO3 equivalent.

- None, Low, Medium, High

Cold Stratification Required: Will cold stratification significantly increase the seed germination percentage of this plant?

- Yes, No

Drought Tolerance: What is the relative tolerance of the plant to drought conditions compared to other species with the same growth habit from the same geographical region? Drought tolerance is defined here in the following fashion: Imagine that in an acre of land there are low areas that have heavy soil and tend to accumulate more soil moisture, and higher areas that have coarse textured soil and tend to accumulate less soil moisture. Some plant species are

most frequently found growing in the higher areas with the coarse soil texture. These plant species are considered to be more drought tolerant than the species that are frequently found in the low areas with fine textured soil.

- None, Low, Medium, High

Fertility Requirement: What relative level of nutrition (N, P, K) is required for normal growth and development?

- Low, Medium, High

Fire Tolerance: What is the relative ability to resprout, regrow, or reestablish from residual seed after a fire?

- None, Low, Medium, High

Frost Free Days, Minimum: The minimum average number of frost-free days within the plant's known geographical range. For cultivars, the geographical range is defined as the area to which the cultivar is well adapted rather than marginally adapted.

Hedge Tolerance: What is the relative tolerance of woody perennials to hedging (close cropping) by livestock or wildlife? Herbaceous plants are scored "None" here by default.

- None, Low, Medium, High

Moisture Use: Ability to use (i.e., remove) available soil moisture relative to other species in the same (or similar) soil moisture availability region.

- Low, Medium, High

pH, Minimum: The minimum soil pH, of the top 12 inches of soil, within the plant's known geographical range. For cultivars, the geographical range is defined as the area to which the cultivar is well adapted rather than marginally adapted.

pH, Maximum: The maximum soil pH, of the top 12 inches of soil, within the plant's known geographical range. For cultivars, the geographical range is defined as the area to which the cultivar is well adapted rather than marginally adapted.

Planting Density Per Acre, Minimum: Recommended minimum number of individual plants to plant per acre.

Planting Density Per Acre, Maximum: Recommended maximum number of individual plants to plant per acre.

Precipitation, Minimum: Minimum tolerable rainfall (in inches), expressed as the average annual minimum precipitation that occurs 20% of the time (i.e., the probability of it being this dry in any given year is 20%) at the driest climate station within the known geographical range

of the plant. For cultivars, the geographical range is defined as the area to which the cultivar is well adapted rather than marginally adapted.

Precipitation, Maximum: Maximum tolerable rainfall (in inches), expressed as the annual average precipitation of the wettest climate station within the known geographical range of the plant. For cultivars, the geographical range is defined as the area to which the cultivar is well adapted rather than marginally adapted.

Root Depth, Minimum: The minimum depth of soil (in inches) required for good growth. Plants that do not have roots such as rootless aquatic plants (floating or submerged) and epiphytes are assigned a minimum root depth value of zero.

Salinity Tolerance: What is the plant's tolerance to soil salinity? Tolerance to a soil salinity level is defined as only a slight reduction (not greater than 10%) in plant growth. None = tolerant to a soil with an electrical conductivity of the soil solution extract of 0-2 dS/m; Low = tolerant to 2.1-4.0 dS/m; Medium = tolerant to 4.1-8.0 dS/m; High = tolerant to greater than 8.0 dS/m.

- None, Low, Medium, High

Shade Tolerance: What is the relative tolerance to shade conditions?

- Intolerant, Intermediate, Tolerant

Temperature, Minimum (°F): The minimum tolerable temperature is the lowest temperature recorded in the plant's historical range. If this is not available, the record low January temperature recorded at climate stations within the current geographical range of the plant is used. This definition does not apply to summer annuals.

REPRODUCTION

Bloom Period: During what seasonal period in the U.S. does the plant bloom the most? The bloom period is defined as the time when pollen is shed and stigmas are receptive.

- Spring, Early Spring, Mid Spring, Late Spring, Summer, Early Summer, Mid Summer, Late Summer, Fall, Winter, Late Winter, Indeterminate

Commercial Availability: What is the availability of plant propagules in the commercial marketplace?

- No known source, Routinely available, Contracting only (available only through contracting with a commercial grower), Field collections only (not produced by commercial growers)

Fruit/Seed Abundance: What is the amount of seed produced by the plant compared to other species with the same growth habit?

- None, Low, Medium, High

Fruit/Seed Period Begin: Season in which the earliest fruit or seed of the fruit/seed period is visually obvious.

- Spring, Summer, Fall, Winter, Year-round

Fruit/Seed Period End: Season in which the latest fruit or seed of the fruit/seed period is visually obvious.

- Spring, Summer, Fall, Winter, Year-round

Fruit/Seed Persistence: Are the fruit or seed generally recognized as being persistent on the plant?

- Yes, No

Propagated by Bare Root: Is it practical to propagate this plant as a bare root product?

- Yes, No

Propagated by Bulbs: Is it practical to propagate this plant as bulbs?

- Yes, No

Propagated by Container: Does the plant lend itself to being developed as a container product?

- Yes, No

Propagated by Corms: Is it practical to propagate this plant as corms?

- Yes, No

Propagated by Cuttings: Is it practical to propagate this plant as either stem or root cuttings?

- Yes, No

Propagated by Seed: Is it practical to propagate this plant by seed?

- Yes, No

Propagated by Sod: Does the plant lend itself to being developed as a sod product?

- Yes, No

Propagated by Sprigs: Is it practical to propagate this plant by sprigs?

- Yes, No

Propagated by Tubers: Is it practical to propagate this plant by tubers?

- Yes, No

Seed Per Pound: How many seeds per pound are in an average seed lot?

Seed Spread Rate: What is the capability of the plant to spread through its seed production compared to other species with the same growth habit?

- None, Slow, Moderate, Rapid

Seedling Vigor: What is the expected seedling survival percentage of the plant compared to other species with the same growth habit?

- Low, Medium, High

Small Grain: Is this plant a small grain?

- Yes, No

Vegetative Spread Rate: At what rate can this plant spread compared to other species with the same growth habit?

- None, Slow, Moderate, Rapid

SUITABILITY/USE

Berry/Nut/Seed Product: Is the woody perennial suitable for the commercial production of either berries, nuts, or seeds? Herbaceous plants are scored "No" here by default.

- Yes, No

Christmas Tree Product: Is the plant known to be suitable for the Christmas tree market?

- Yes, No

Fodder Product: Is the plant known to be used as animal fodder material? The definition of fodder from the Crop Science Society of America is: Coarse grasses such as corn or sorghum harvested with the seed and leaves green or alive, then cured and fed in their entirety as forage.

- Yes, No

Fuelwood Product: What is the relative suitability or potential of this tree or shrub to produce fuelwood? If suitability is unknown, we have expressed fuelwood potential in terms of weight (in lbs) per cubic foot of green wood. Our relative values correspond to these numerical ranges: Low: <28; Medium: 28-35; High: >35. Plants other than trees and shrubs are left blank here.

- Low, Medium, High

Lumber Product: Is the plant suitable, or does it have potential, for use as a commercial lumber producer?

- Yes, No

Naval Store Product: Is the woody perennial suitable for production of naval store products? Navel Store Products are defined as tar, pitch, turpentine, pine oil, rosin, and terpenes obtained from pine and other coniferous trees. Herbaceous plants are scored "No" here by default.

- Yes, No

Nursery Stock Product: Is the plant suitable for production of nursery stock?

- Yes, No

Palatable Browse Animal: What is the relative palatability of this plant to browsing animals?

- Low, Moderate, High

Palatable Grazing Animals: What is the relative palatability of this plant to grazing animals?

- Low, Moderate, High

Palatable Human: Does the plant produce berries, nuts, seeds, or fruits that are palatable to humans?

- Yes, No

Post Product: Is the tree or shrub commonly used or does it have high potential for the production of posts, poles, mine timbers, or railroad ties? Plants other than trees and shrubs are scored “No” here by default.

- Yes, No

Protein Potential: What is the relative protein content of the plant parts that are grazed or browsed by animals?

- Low, Moderate, High

Pulpwood Product: Is the woody perennial commonly used or does it have high potential to be used for the production of pulpwood? Herbaceous plants are scored "No" here by default.

- Yes, No

Veneer Product: Is the tree commonly used or does it have high potential to be used for commercial veneer or plywood? Plants other than trees are scored “No” here by default.

- Yes, No