

MEADOW DEATHCAMAS

Zigadenus venenosus W. Watson

Plant Symbol = ZIVE



Meadow deathcamas. Photo by Eve Warren, USDI BLM.

Alternate Names

Common Names: meadow death camas, grassy death camas

Scientific Names: *Z. intermedius* Rydb., *Z. salinus* A. Nelson, *Z. gramineus* Rydb.

Caution: This plant can be toxic.

Uses

Livestock: Deathcamas is toxic to all classes of livestock and wildlife. Sheep and cattle are most commonly affected, but occasional losses of horses and domestic chickens have also been reported (Burrows and Tyrl 2001). Marsh et al. (1915) reported the loss of 500 sheep in a single event.

Pollinators: Deathcamas has been promoted for pollinator plantings; however its use by bees is limited to a few specialist species due to the toxicity of the pollen (Cane et al 2004).

Ethnobotanical: The toxic nature of meadow deathcamas was well known to Native Americans (Burrows and Tyrl 2001; Chestnut 1902; Turner 1980). Several tribes applied

mashed bulbs externally to heal bruises, sprains and boils (Chestnut 1902; Blankinship 1905).

Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g., threatened or endangered species, state noxious status, and wetland indicator values).

Weediness

Meadow deathcamas may be considered weedy in some regions or habitats (Whitson et al. 1996). Consumption of deathcamas has been linked to deaths of livestock and humans (Burrows and Tyrl 2001). Please consult with your local NRCS Field Office, Cooperative Extension Service office, state natural resource, or state agriculture department regarding its status and use. Weed information is also available from the PLANTS Web site at <http://plants.usda.gov/>. Please consult the Related Web Sites on the Plant Profile for this species for further information.

Description

General: Meadow deathcamas is a perennial bulbous native forb in the lily family (liliaceae). The plants are 1 to 2 feet tall with linear grass-like leaves mostly arising below the stem middle. The flowers are born in panicles with flower bearing stems 1/4 to 1 inch in length. The petals are creamy white, 1/4 inch long, with a large gland at the base. The fruit is a capsule which dries and splits at maturity releasing the seed (Welsh et al. 2003). There are approximately 130,000 seeds per pound (Vance 2010). The common name refers to the toxicity of the plant and its similarity in appearance to camas (*Camassia quamash*).

Distribution:

Meadow deathcamas occurs in western North America from Saskatchewan to British Columbia and south to Baja California and New Mexico (USDA NRCS 2014). For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Habitat: Meadow deathcamas is commonly found in moist meadows to dry rocky hillsides in ponderosa pine, mountain shrub, wet grasslands and prairie communities at elevations from 1,400 to 8,000 feet (Hickman 1993; Welsh et al. 2003).

Adaptation

Meadow deathcamas is adapted to sandy to rocky soils (Hauser 2006) in areas receiving 12 to 20 inches annual precipitation. It is shade intolerant (Klinka et al 1989). This species is well adapted to areas prone to wildfire. The tops of the plants are killed, but the bulbs survive and

deathcamas is among the first plants to regenerate after fire (Volland and Dell 1981).

Establishment

Deathcamas is not recommended for rangeland plantings. See "Seed and Plant Production" for more information on plant propagation.

Management

Meadow deathcamas is typically very sparse on the landscape but can become prominent on overgrazed sites (USDA FS 1937). It greens up early in the spring and offers tempting forage. The best way to avoid problems is to keep livestock away from heavily infested areas (USDA FS 1937). A proper grazing regimen is recommended to prevent deathcamas from increasing on rangelands. The likelihood of consumption increases following fire as deathcamas regenerates quickly from underground bulbs.

Deathcamas species contains a wide range of toxic alkaloids with meadow deathcamas having the most diverse group of alkaloids in the genus (Burrows and Tyrl 2001). A lethal dose is estimated to be 1% of body weight of green plants in sheep, but severe illness can occur with dosages as low as 0.2 to 0.5% body weight (Panter and James 1989). Cattle are more susceptible to illness from deathcamas ingestion, but sheep are at greater risk because they are more likely to eat the plants (Marsh et al. 1915).

Signs of poisoning can begin several hours to a day after ingestion. Indications include frothy salivation and strings of saliva hanging from the mouth (Burrows and Tyrl 2001). Depression, vomiting, and grinding of the teeth are also signs. In severe cases, loss of appetite, loss of coordination, weakness and death follow.

Treatments for deathcamas poisoning include atropine for relief of the cardiovascular effects and picROTOXIN to counteract depression (Burrows and Tyrl 2001).

Pests and Potential Problems

Deathcamas has been mistaken for other edible bulbous plants such as wild onion, sego lily and camas, especially when flowers are lacking (Cronquist et al. 1977). Eating one or two bulbs is enough to cause severe illness in children, and 4 or 5 can cause death depending on the species (Burrows and Tyrl 2001).

Environmental Concerns

Meadow deathcamas is highly toxic. It has been linked to the deaths of thousands of sheep and other livestock. It increases with overgrazing.

Control

Spraying deathcamas with 2,4-D in early spring when plants are in the 3 to 5 leaf stage provides fair control (Hyder and Sneva 1962).

Please contact your local agricultural extension specialist or county weed specialist to learn what works best in your area and how to use it safely. Always read label and safety instructions for each control method. Trade names and control measures appear in this document only to provide specific information. USDA NRCS does not guarantee or warranty the products and control methods named, and other products may be equally effective.

Seeds and Plant Production

Insect pollination is required for seed production in deathcamas (Cane et al 2004; Moldenke 1976). Pollen and nectar of foothills death camas (*V. paniculatus*) was found to contain the same toxins as are found in the vegetative plant parts. Adults of the generalist solitary bee, *Osmia lignaria* (Megachilidae), were paralyzed and soon after died when fed biologically relevant doses of deathcamas toxins; larval progeny eating dosed provision masses likewise died. Similarly, pollen of meadow deathcamas shaken into sugar water killed 89% of the bees that fed on it within 16 hours (Hitchcock 1959). This high mortality rate probably explains the absence of the 50+ native bee species from this potential host (Cane et al 2004). The solitary bee, *Andrena astragali*, is known to use death camas pollen to feed itself and its progeny.

Seed falls easily from mature capsules and can be cleaned with a hammermill and airscreen cleaner. Seeds placed in cold/moist stratification for 90 days resulted in 90% germination compared to 0% germination from the non-stratified control (Bartow 2003). All portions of the plant, including the fruit and seed are toxic and should be handled with care.

Plants can also be propagated by division and bulb offshoots (Hauser 2006).

Cultivars, Improved, and Selected Materials (and area of origin)

There are no releases of meadow deathcamas. Common seed harvested from native stands is available in limited quantities.

References

- Bartow, A.L. 2003. Propagation protocol for production of container *Zigadenus venenosus* S. Watson plants; USDA NRCS Covallis Plant Materials Center. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org>.
- Blankinship, J.W. 1905. Native economic plants of Montana. Montana Agricultural College Experimental Station. Bulletin 56.
- Burrows, G.E. and R. J. Tyrl. 2001. Toxic Plants of North America. Iowa State Press. Ames, IA. 1342p.

- Cane, J.; Weber, M.; Yost, M.; Gardner, D. 2004. Alkaloids and old lace: pollen toxins exclude generalist pollinators from death camas (*Toxicoscordion* [= *Zigadenus*] *paniculatum*) (Melanthiaceae). [Abstract]. Salt Lake City, UT. <http://www.2004.botanyconference.org/engine/search/index.php?func=detail&aid=1128>. (January 2014).
- Chestnut, V.K. 1902. Plants used by the Indians of Mendocino County, California. Contributions from the U.S. National Herbarium. 7: 295-408.
- Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal, and P.K. Holmgren. 1977. Intermountain Flora. Vol. 6. The monocotyledons. Columbia Univ. Press, NY.
- Hauser, A.S. 2006. *Zigadenus venenosus*. In: Fire Effects Information System, [Online]. US Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/>
- Hickman, J.C., editor. 1993. The Jepson manual: higher plants of California. Univ. of California Press, Ltd. Los Angeles. 1400p.
- Hitchcock, J.D. 1959. Poisoning of honey bees by death camas blossoms. America Bee Journal. 99: 418-419.
- Hyder, D.N., and F.A. Sneva, 1962. Chemical control of foothill deathcamas. J. Range Manage. 15:25-27.
- Klinka, K. Krajina, V.J., Ceska, A. and A.M. Scagel. 1989. Indicator plants of coastal British Columbia. Vancouver, BC: University of British Columbia Press. 288p.
- Marsh, C.D., Clawson, A.B and H. Marsh. 1915. *Zigadenus*, or death camas. USDA Bull 125.
- Panter, K.E. and L.F. James. 1989. Death camas-early grazing can be hazardous. Rangelands. 11: 147-149.
- Turner, N.J., Bouchard, R. and I.D. Dorothy. 1980. Ethnobotany of the Okanagan-Colville Indians of British Columbia and Washington. British Columbia Provincial Museum.
- [USDA FS] USDA Forest Service. 1937. Range Plant Handbook. Washington DC: U.S. Department of Agriculture, Forest Service, Variously paginated.
- [USDA NRCS] USDA Natural Resources Conservation Service. 2014. The PLANTS Database, version 3.5. URL: <http://plants.usda.gov> (accessed 21 Jan 2014). Baton Rouge (LA): National Plant Data Center.
- Vance, Nan C. 2010. Evaluation of native plant seeds and seeding in the east-side central Cascades ponderosa pine zone. Gen. Tech. Rep. PNW-GTR-823. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 85 p.
- Volland, L.A. and J.D. Dell. 1981. Fire effects on Pacific Northwest forest and range vegetation. Portland, OR: US Department of Agriculture, Forest Service, Pacific Northwest Region, Range Management and Aviation and Fire Management. 23p.
- Welsh, S.L., Atwood, N.D., Goodrich, S. and L.C. Higgins. 2003. A Utah Flora. Brigham Young University. Provo, UT. 912p.
- Whitson, T.D. (ed.) et al. 1996. *Weeds of the West*. Western Society of Weed Science in cooperation with Cooperative Extension Services, University of Wyoming. Laramie, Wyoming.

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For more information about this and other plants, please contact your local NRCS field office or Conservation District at <http://www.nrcs.usda.gov/> and visit the PLANTS Web site at <http://plants.usda.gov/> or the Plant Materials Program Web site <http://plant-materials.nrcs.usda.gov>.

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