Medicinal Plant Fact Sheet: Ligusticum porteri / Osha Common Name
Osha, Porter's lovage, Porter's licorice-root, Porter's wild lovage, loveroot, bear medicine, bear root, mountain lovage, Indian parsley, mountain ginseng, nipo, chuchupate

Scientific Name
Ligusticum porteri Coulter & Rose (Apiaceae or Carrot Family)

Description

Osha is an herbaceous perennial growing from 50 to 100 cm tall or more. In winter, the above-ground parts die back to a thick, woody and very aromatic rootstock. The plant has deeply incised, elliptic or lance-shaped leaf segments that are 5 to 40 mm in width with larger basal leaves. The white flowers appear during late summer, and are approximately 2 to 5 mm in diameter with five petals. They are grouped in flat-topped, compound umbels and are followed by reddish, oblong, ribbed fruits 5 to 8 mm in length.

Distribution

Osha is native to mountains of western North America from Wyoming (Arizona, Colorado, Idaho, New Mexico, Nevada, and Utah) to the states of Sonora and Chihuahua, Mexico. Osha often grows in rich, moist soils in wooded habitats—from pine-oak woodland to spruce-fir forest—but it is also found on slopes and in meadows with drier, rocky soils from1,500 to 3,505 meters (4,900-11,500 feet; Cronquist et al. 1997, Welsh 1993, Martin et al. 1998)

Reproduction

Like many plants in the Apiaceae, the flowers are attractive to a variety of insects such as flies, beetles, bees and wasps. However, studies of pollination biology among plants in the carrot family find that there is a distinction between mere visitors and effective pollinators, with the latter being andrenid, colletid and halictid bees (Lindsey 1984) in some cases. Halictid bees have been seen visiting flowers of osha in the Chiricahua Mountains of Arizona (M. F. Wilson, observation Sep. 2, 2003). Seeds of osha are not dispersed by animals or wind and most likely remain close to the parent plant when they drop (David Inouye, pers. comm. 2007).

Medicinal Uses

Osha has been used medicinally by indigenous people for centuries and subsequently absorbed into the pharmacopeias of other peoples. The genus contains many plants that are used medicinally in both the Old and New Worlds (Mabberley 1997). The roots have been used in various preparations (tinctures, infusions or teas) and taken internally especially for catarrh, colds, coughs, bronchial pneumonia, flu and other respiratory infections. Root preparations are used to treat fever, diarrhea, gastrointestinal disorders, hangover, sore throats and rheumatism (Moerman 1998, Reina-Guerrero 1993, Wilson & Felger, in prep., Yetman & Felger 2002). Externally, root preparations were used to treat

aches and pains, digestive problems, scorpion sting, wounds and skin infections. The hollow stems have been smoked to break the nicotine habit (Bye 1986, Curtin 1976).

The genus *Ligusticum* consists of 40-50 species of circumboreal plants (Mabberley 1997). Many are used medicinally. American *Ligusticum* species have been used as anticonvulsants, to stimulate appetite, and to treat anemia, hemorrhage, tuberculosis, stomach disorders, heart troubles, respiratory infections, earaches, sinus infection and congestion, and other ailments (Moerman 1998). Some Asian members of this genus are important in Chinese, Japanese and Korean herbal formularies. *Ligusticum chuanxiong* Hort. (*L. wallichii* Franch.), Szechuan lovage root, is used to treat amenorrhea, dysmenorrhea, headaches, ischemia and thrombosis (Bensky & Gamble 1993). Many peoples of north temperate regions eat portions of a number of species of *Ligusticum* raw, cooked as potherbs, or as condiments or spice (Tanaka 1976).

Chemistry

Chemical analysis conducted on *L. porteri* has identified pthalides and monoterpenes (Beck 1996, Delgado et al. 1992, Gillespie & Duszynski 1998)

More chemical work has been conducted on the Asian members of the genus than American species. Several different classes of compounds have been isolated from *Ligusticum*: alkaloids (such as perlolyrine, tetramethylpyrazine, and others); an anthraquinone (chrysophanol); phenolic compounds (such as ferulic acid and caffeic acid); phenylpropanoids; phthalides (such as butylidenephthalide, ligustilide, 4-hydroxy-3-butylphthalide, senkyunolide and others); coumarins and furanocoumarins; and terpenoids (such as α-pinene, β-pinene**,** and limonene) (Huang & Pu 1990, Shibano et al. 2005, Sinclair 1998, van Wyk & Wink 2004, Yan et al. 2005)

Trade

L. porteri is sold in the form of ground roots, whole roots, tinctures, and seeds. Osha harvest appears to be declining. Figures for the trade of dried osha root demonstrate a precipitous drop after the 3-year United States Forest Service moratorium was enacted in 1999. Annual domestic trade in dried wild roots had not reached even 10% of former high figures after the year 2000 (AHPA 2007). Because of the decline in trade of wild roots, cultivated material became more important in commerce after 2002.

Legal Protection and Conservation Status

During 1999, due to high demand and what was considered over collection in the southwestern United States, Regions 1 and 4 of the United States Forest Service issued a three-year moratorium on the personal and commercial use/collection of *Ligusticum*. Osha was listed as “rare” on the 1997 International Union for the Conservation of Nature’s Red List of Threatened Plants (Walter & Gillett 1998) but has not been subsequently listed. The species is not formally protected under native plant or endangered species laws. United Plant Savers (UpS), a conservation organization that

focuses its efforts on populations of medicinal plants collected from the wild, includes osha on a list of "at risk" species (UpS 2007). Osha was proposed for consideration of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) during 2000 (Anonymous 2000) based largely on a report produced by the University of Maryland Program in Sustainable Development and Conservation Biology (1999). However, *L. porteri* is not currently listed on CITES Appendices I, II, or III.

Although some populations of osha are considered large and secure there is little information available for other populations. Conservation action, if necessary, is hampered by the lack of data. There are no comprehensive management programs in place to manage populations of *L. porteri.* None of the western states with *L. porteri* populations prohibit collection of the plants on state lands. Grazing, commercial and residential development, recreational activities, off-road vehicles, logging and collection for medicinal use have all been cited as factors in the decline of *L. porteri* populations (University of Maryland Program in Sustainable Development and Conservation Biology 1999).

Sustainable Use and Conservation

There has been concern on the part of some experts that *L. porteri* is being overharvested (Robbins 1999). This is also true for Mexico because of this country's important and unregulated medicinal plant market (Felger et al. 1999, Felger & Wilson 1995, Martin et al. 1998, Stoleson et al. 2005). The entire plant is removed when the roots are harvested. Osha is considered to be slow-growing and some estimates consider the plants to be over ten years old when harvested. The destructive collection of osha from slow-growing populations could lead to unsustainable harvesting.

Cultivation of osha has proved to be challenging and not cost efficient (Cech 2002, David Inouye pers. comm.. 2007). Research into germination and in vitro propagation would be important to aid cultivation. David Inouye, Director of the Conservation Biology Program at the University of Maryland, asserts that osha is best cultivated by assisting propagation in wild stands. The best time to collect osha root is in the fall, after the seeds have had time to mature and fall to the soil. Education of collectors to harvest in a sustainable manner is always important in the case of wild-crafted herbs.

A syrup made from the stems has been used for many of the disorders that the root is used for (Curtin 1976) and this should be investigated as an alternative to destructive root harvesting. Other more common species in the Apiaceae, such as several *Angelica* spp. and others are used in virtually identical ways to *Ligusticum* (Yi et al. 2007) and their use as alternatives to wild-harvested osha should be considered.

[BOX]Sustainable Actions

- Wild-harvesters: Find out the legal requirements for wild-harvesting osha in your state; rotate harvest areas; thin patches rather than collecting all available plants; leave a portion of mature and juvenile individuals untouched. Collect plants after

mature seeds have fallen. Non-destructive harvest may be possible by taking only a portion of the roots (Cech 2002). Harvest should follow standards of the International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants (Medicinal Plant Specialist Group 2007).

- Growers: Research legal requirements for cultivating osha in your state; ensure seed is obtained in a way that does not threaten wild populations; consult local experts and resources for cultivation requirements in your area (McKeon 1999).
- Practitioners and Consumers: Choose ethically-wildcrafted or verifiably cultivated sources of osha roots or supplements; use osha only when it is best indicated; when choosing substitutes, exercise caution not to choose a species that is equally as vulnerable to overharvest (Cech 2002).
- Suppliers and manufacturers: consider promoting other herbs that have similar indications; the use of the herbaceous portions of osha should be investigated as an alternative to destructive root harvest (Curtin 1976, Pennington 1963, Yi et al 2007).

Disclaimer

Citation

Michael Wilson, Drylands Institute (www.drylandsinstitute.org).

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About the Author

Michael Wilson in an entomologist and botanist who is Research Director of Drylands Institute in Tucson, Arizona. With Richard Felger, he is working on *A Desert Pharmacopeia: The Medicinal Plants of Southwestern North America.* He is a contributor to articles that can be found in *Dry Borders: Great Natural Reserves of the Sonoran Desert* (University of Utah Press 2007), *Biodiversity, Ecosystems, and Conservation in Northern Mexico* (Oxford University Press 2005), and is a co-author of *Trees of Sonora, Mexico* (Oxford University Press 2001) among other publications.

More Information/Citations

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