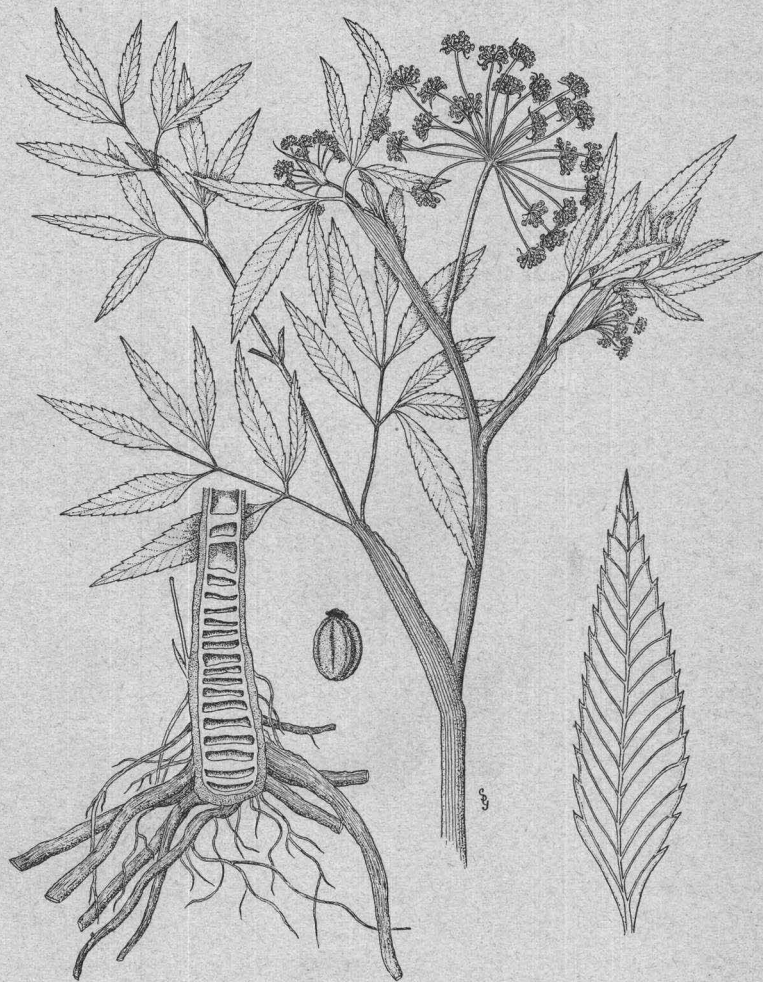


Water Hemlock

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WATER HEMLOCK—*Cicuta Douglasii*—Showing stem with leaves and flowers, leaflet enlarged (note veins terminating in notches along leaf margins), root sectioned to show divisions, and "seed." "Seed" magnified 4 diameters.

Oregon State System of Higher Education
Federal Cooperative Extension Service
Oregon State College
Corvallis

Water Hemlock

(*Cicuta Douglasii*)

By LAWRENCE JENKINS and E. R. JACKMAN*

Illustrations by Cathrine Davis Young

Other names: Wild parsnip, Poison parsnip, Cowbane, *Cicuta*.

Seven genera of plants, all members of the carrot or parsley family, (*Umbelliferae*) are somewhat similar in appearance. They are: (1) *Cicuta* or water hemlock, (2) *Conium* or poison hemlock, (3) *Sium cicutaefolium* or water parsnip, (4) *Angelica*, (5) *Osmorhiza* or sweet cicely, (6) *Oenanthe sarmentosa* or water parsley, and (7) *Pastinaca sativa* or parsnip.

The first two are poisonous and the third has been reported to be poisonous. The other four are not, and in some cases they are useful forage plants. The poisonous water hemlock, the poison hemlock, and *sium* species are commonly confused with the others. An attempt is made here to give the reader enough detail in description and illustrations to enable him to avoid some of the poisonous plants and recognize the other kinds.

Water hemlock, poisonous to both man and animal, has been known for centuries and is reported to be the most poisonous plant in the temperate zone. It is a perennial found in all counties of Oregon, in wet places along streams, irrigation ditches, and sloughs. The roots are the most poisonous parts, the young shoots next, followed by stems and leaves. Experiments conducted at Corvallis in 1897 showed that a piece of root the size of a walnut would kill a mature cow. More recent work indicates that somewhat larger doses may be necessary to cause death.†

The plant ranges from 2 to 8 feet tall and produces fleshy rootstocks that may be nearly vertical or horizontal, depending on location. Stems are hollow, smooth, and pale green. Unlike other members of this family, the mature plant immediately below the ground surface has a crown with many finger-like rootstocks from a few inches long to 8 or 10 inches. These fingers branch from the crown and somewhat resemble artichoke tubers or poorly shaped sweet potatoes. They are hollow and on cutting lengthwise one finds several partitions forming distinct chambers that give a corrugated or ribbed appearance to the cut stem and rootstock. Distance between partitions varies from practically nothing to about $\frac{1}{4}$ of an inch, depending on age of plant and stage of growth.

The cut root exudes a yellow, oily, sweet-smelling substance that comes from small pores along the divisions and sides of the cut surface. If immersed in water, this yellow juice forms an oily, soapy film on the surface.

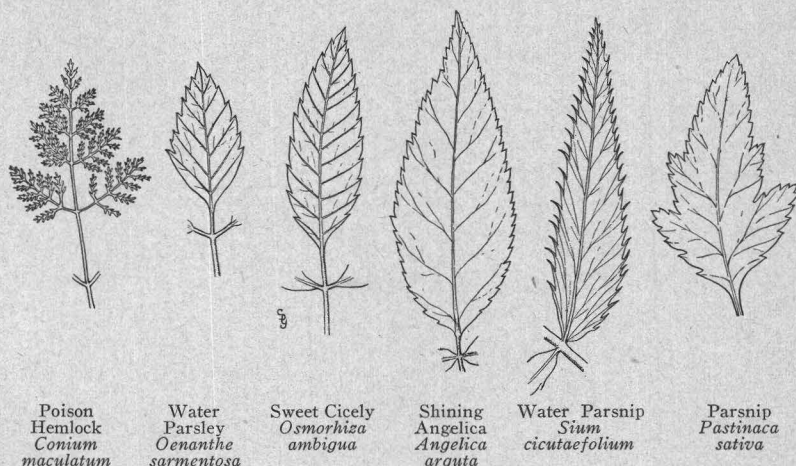
Small white flowers are produced in double umbrellalike arrangements from 2 to 5 inches in diameter, giving an attractive lacelike appearance to the cluster. Seed is about $\frac{1}{12}$ inch long, egg shaped, nearly smooth, longitudinally striped, and somewhat flattened on the sides. Water hemlock reproduces both by seed and rootstocks, but because of the locations where the plant grows, seeds of it are practically never found in agricultural seeds.

Leaflets are lance-shaped with pointed ends and saw-toothed margins. The veins of the leaves run from the midrib to the notches along the leaf edges. Practically all other plants with similar leaves have small veins running from the large central vein to the ends of the sawteeth on the leaf margins. This is important and is the quickest way to distinguish this plant from others. (See illustration.) The fact that water hemlock grows only in wet places is helpful

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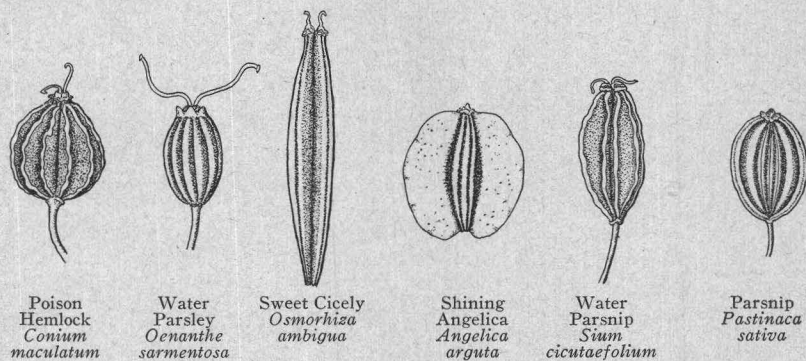
† Fleming, C. E., Peterson, N. F., Wright, W. R., and Louck, R. C., 1920. The poison parsnip or water hemlock; a plant deadly to livestock in Nevada. Nevada Agricultural Experiment Station Bulletin 100: 1-23.

in identifying it. This characteristic also increases the hazard of livestock poisoning because the roots pull easily from wet ground. Ordinarily livestock will not feed upon water hemlock when there is an abundance of other forage. The plant appears early in the spring before much of the grass has started, and most of the losses occur then.



Reduced drawing of leaves or leaflets of six plants that are sometimes confused with water hemlock.

Damage. The plant is always a threat if present in a community because sooner or later a child will mistake the sweet-smelling roots for edible roots. In one county three children on a camping trip were killed in that way. Live-stock losses are rather frequent but ordinarily only one animal will be killed



Enlarged drawing of fruit or "seeds" of six plants that are sometimes confused with water hemlock.

at a time, and death is often blamed upon fate or something else than the water hemlock.

Another common poisonous plant often confused with water hemlock is poison hemlock (*Conium maculatum*). This plant is more vicious than water hemlock in name only. It finds its way into history through such episodes as the death of Socrates in 399 B. C. after he was given the "cup of the deadly hemlock." The foliage has a distinct, strong, and disagreeable taste and odor,

and stock will not eat the plant unless starved to it. Leaves of poison hemlock are more finely divided than those of water hemlock. Unlike water hemlock, it has a solid taproot. It can be identified readily by the presence of purplish spotting along its stems. It grows very rank, often reaching a height of 8 to 10 feet. The weed is only a biennial and therefore not difficult to eradicate.

The drawings on page 3 illustrate the leaves and seeds of this weed and others closely related.

Symptoms of water hemlock poisoning. The first symptom of water hemlock poisoning is the loss of control of muscular action. Affected animals walk stiffly, sway, and may fall down. They often froth at the mouth, and the nose and mouth quiver. Violent convulsions, clamping of the jaws, grating of the teeth, rapid kicking, and sometimes stiffening out of the legs follow. The pulse is weak and rapid, and breathing is labored and irregular. Convulsions are intermittent and increase in violence in fatal cases. Bloating occurs in about half of the sheep observed and in a lesser proportion of cattle.* Sometimes stock will die within 15 minutes after eating the weed, but they ordinarily live 3 or 4 hours. Occasionally animals may get only a taste and may show symptoms of poisoning for several days and then recover. Even small amounts of the root are fatal, however, and death follows more frequently than not.

Preventive measures. Obviously the best way to avoid loss is to keep the grazing or pasture land covered with sufficient desirable forage. Barn lots, lanes, and other closely pastured places should be kept free of the weed. If possible, livestock in the early spring should not be turned into an area known to be infested with the weed. Delay using such pasture until there is sufficient forage to satisfy the stock. Under these conditions they will not ordinarily eat these less palatable plants. The poison works so rapidly that remedies are generally of little value. If symptoms are observed early enough, some results may be obtained by giving a liberal dose of melted lard or other fatty substances.* In some cases hypodermic injections of morphine have been used effectively to control convulsions.†

Symptoms of poisoning from poison hemlock are similar to water hemlock except that convulsions do not occur. The same treatment should be used.

Control. Water hemlock can be easily controlled by digging out the whole plant. Roots are shallow and can be dug or pulled in the early spring without much effort. Neither tops nor roots should be left where stock may find them. Roots left on top of the ground have been known to cause death three years after digging.‡ *All roots should be burned.*

Water hemlock grows only in wet places, and drainage of swampy areas may largely eliminate it.

Poison hemlock is a biennial and can be controlled by preventing seed formation.

Chemical control is not likely to be effective, because the roots, and often part of the stem, are usually in water.

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* Sampson, Arthur W., Malmsten, Harry E., 1935. Stock poisoning plants of California; Univ. of Calif. Agr. Exp. Sta. Bul. 593, Page 31.

† Marsh, C. D., Clawson, A. B., and Marsh, H., 1914; Cicutra or water hemlock; U. S. Department of Agriculture Bul. 69: 1-27.

‡ Lawrence, William E., The principal stock-poisoning plants of Oregon; Oregon Agr. Col. Exp. Sta. Bul. 187, Page 22.