Poison Hemlock and Western Water Hemlock – Deadly plants that may be growing in your pasture

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Poisonous plants are a major cause of economic loss to the livestock industry. These losses may be from death, abortion, poor production and birth defects to name a few. Each year these plants adversely affect 3 to 5 percent of the cattle, sheep, and horses that graze western ranges (Panter et al., 2011). This article will focus on two common plants in Oregon: poison hemlock and western water hemlock. Ingestion of either of these plants by humans or livestock typically results in death. The deadly properties of hemlock have been known for centuries. Socrates is the most famous victim of these properties as he was forced to drink a toxic potion made from hemlock in 329 B.C. Native Americans also used the juice of the hemlock plant to poison the tips of their arrows (Pokorny et al., 2012). In the past, the roots of poison hemlock have been mistaken for wild parsnips and eaten by people. A Tacoma, Washington woman apparently put hemlock in a salad she ate and tragically died (Beecher et al., 2012). Stories abound regarding children making whistles or snorkels from the hollow stems of these plants and becoming ill and succumbing to the toxic alkaloids present in all parts of the plant. This article will highlight the differences between these deadly plants and include some strategies for eliminating them from your property.

Poison Hemlock - (Conium maculatum)

Introduction

Poison hemlock, also called poison parsley, is a member of the plant family, Apiaceae. Other members of this plant family include carrots, celery and parsnip. Like other members in this plant family, poison hemlock flowers have white, umbrella shaped clusters in addition to the fernlike appearance of the leaves. This why people over the years have mistaken poison hemlock for wild carrot, wild parsnip or wild parsley. This plant is distributed throughout North America and was brought here originally by Europeans sometime in the 1800s. Poison hemlock quickly escaped their gardens and now infests roadsides, creeks, irrigation ditches, cultivated fields and pastures. Poison hemlock typically grows in wet soils, but on occasion can tolerate semi dry soils. It has been found in gardens, in pastures and in crops (DiTamaso et al., 2013).

Identification

Poison hemlock grows into a rosette the first year but does not flower until its second year. Each flower develops into a green, deeply ridged fruit that contains several seeds. After maturity, the fruit turns grayish brown. It is a biennial, or sometimes in favorable conditions it may be a perennial, growing 3 to 8 feet tall and occasionally reaching 10 -12 feet. During the first year of growth, poison hemlock forms a large rosette and usually remains in the vegetative stage. During the second year, it produces tall stems and then flowers. The large, dried stems have been known to remain toxic for up to three years. Poison hemlock can be differentiated from a carrot or parsnip plant by the profuse number of purple spots on the stem. In addition, the stem is smooth and hairless. Leaves are also smooth and hairless with large, glossy green, finely divided, fern-like leaves. Eight known alkaloids contribute to poison hemlock’s toxicity. Poison hemlock typically
produces a bad smell that closely resembles mouse urine. This unpleasant odor is especially noticeable when the leaves are crushed (Graham et al.).

**Toxicity**

All parts of poison-hemlock (leaves, stem, fruit, and root) are poisonous. Leaves are especially poisonous in the spring, up to the time the plant flowers. The good news for livestock producers is animals will avoid this plant as long as there is quality feed available. However, if the plant is disguised in hay or pasture grasses and ingested it only takes a small amount to kill. Sheep may be poisoned by eating as little as 4 to 8 ounces of green leaves. Cattle that eat as little as 10 to 16 ounces may be affected. All classes of livestock and wildlife are susceptible to poison hemlock.

Signs of poisoning usually appear within an hour after an animal eats the plant. Animals die from respiratory paralysis in 2 to 3 hours. Signs to look for include a loss of appetite, excessive salivation, bloat, and a rapid but feeble pulse. Animals also show evidence of muscular incoordination and appear to have great abdominal pain. Other signs include muscle tremors, frequent urination, defecation, and "nervousness". In animals that die, breathing ceases due to respiratory paralysis before cardiac arrest.

Birth defects due to ingesting sub lethal amounts of poison hemlock occur in all livestock and may include crooked legs (crooked calf disease, arthrogryposis), cleft palate, and kinked tails. Arthrogrypotic skeletal malformations occur in calves when poison hemlock is ingested by pregnant cows between days 40 through 70 of gestation. For sheep, goats and pigs these problems occur when animals are exposed to hemlock during the 30 to 60 day period of gestation. In addition, poison hemlock poisoning is indistinguishable from lupine induced “crooked calf disease” without a necropsy (Panter et al., 2011).

**Management**

**Mechanical Treatment**

Plowing or repeated cultivation will prevent poison hemlock from establishing. Digging poison hemlock can be effective when caught early and the plant population is small. Do be careful when digging or mowing poison hemlock. It is recommended to wear rubber gloves and a mask whenever handling this plant. On a hot day the plants’ toxins may be absorbed into the skin. Do not burn the plant as the smoke can contain deadly toxins. In fact, hemlock is so poisonous that some of poison hemlock’s alkaloid compounds have the ability to pass into milk when animals feed on sub lethal amounts of this plant, which can adversely alter the flavor and safety of milk used for human consumption (DiTamaso et al., 2013).

**Chemical**

Treating poison hemlock with herbicides is most effective when done in late spring or early summer. Several combinations of herbicides are effective to include 2,4-D plus dicamba (2.5lb + 1 lb ae/acre). Glyphosate and triclopyr have also been used with success. Herbicides should be used on seedlings or small rosettes and not on fully mature plants for the ultimate success. To achieve complete eradication repeated applications may be required until the seedbank has been depleted. Please use caution as herbicides sprayed within 50 feet of a body of water can pose significant environmental hazards and typically require an aquatic herbicide. Be sure to contact
your local weed control authority or OSU Extension for specific herbicide recommendations and be sure to check the herbicide label for restrictions.

**Western Water Hemlock - (Cicuta douglasii)**

**Introduction**

Western water hemlock is a member of the plant family, Apiaceae. Often described as the most violently toxic of all North American plants. It only takes a piece of the root the size of a walnut to kill a 1200 pound cow or horse. Also known as cowbane, wild parsnip and beaver poison this plant is herbaceous and thrives along streams, marshes, rivers and irrigation ditches all over the Western United States and Canada.

**Identification**

Western water hemlock grows from 2 to 8 feet tall, depending on its location. The stems are hollow and it is easily identifiable by its roots which is a bulbous structure that is mostly hollow with the exception of a few partitions that form distinct chambers. Thick, fleshy tubers and slender individual roots grow from the bottom of the main rootstalk. The leaves of western water hemlock are arranged like a feather, dividing 1–3 times into narrow-toothed and lance-shaped leaflets that are 1–4 inches long. The leaflet veins run from the midrib to the notches along the leaf edges and then branch to the teeth-like tips. Like poison hemlock, western water hemlock’s flowers are white and grouped in umbrella-shaped clusters. Likewise, each flower is two-seeded. The tea-colored seeds are somewhat kidney-shaped with corky ridges. Western water hemlock reproduces from seed and vegetatively through overwintering root structures. Seeds from plants growing along irrigation canals can be transported by water or mud to other locations and can remain viable in soil for up to 3 years (Whaley et al., 2013).

**Toxicity**

The toxic substance in water hemlock is cicutoxin, a highly poisonous unsaturated alcohol that has a strong carrot-like odor. It is found principally in the tubers or roots but is also present in the leaves, stems, and immature seeds. If the tuber is cut or broken it exudes a highly poisonous brown or straw-colored liquid. This liquid is deadly as animals have been poisoned when water hemlock roots were trampled in the water releasing the toxic liquid and killing animals that drank the contaminated water. Livestock that ingest just the upper part of the plant may survive as this part is not as toxic as the roots but that is not as common. Typically, when livestock graze water hemlock the whole plant is pulled out of the soil due to the wet conditions and it is eaten root and all, especially with cattle. This is always fatal. Most livestock deaths are cattle but horses, sheep and swine are sometimes killed, too (USDA 2006).

**Management**

All classes of livestock and wildlife are susceptible to poisoning, with cattle, goats, and horses being the most sensitive. Most animal losses take place in the spring as it is one of the first plants to emerge. Fortunately, animals tend to avoid this plant when other forage is available, but they will consume it when grazing is poor. Consumption and poisoning may also occur
when hemlock is present in green chop, silage, or hay. Even when it is mature and dried out it still possesses toxins.

The best way to avoid livestock losses from western water hemlock poisoning is to eliminate it. If eradication is not complete, then areas known to be infested with western water hemlock, especially in the early spring, need to be strictly avoided by using fencing or by moving livestock to other paddocks. Similarly, it is critical when cleaning ditches or clearing land to avoid exposing the toxic roots of water hemlock, which then can be more easily ingested by livestock (Panter et al., 2011).

**Treatment**

**Mechanical Control**

Pulling by hand, especially western water hemlock, is very effective when the soil is moist. Be careful to pull the entire plant including all roots and dispose in a garbage bag and haul to the proper waste management facility. I have read several articles that recommend burning hemlock after pulling and that may be hazardous as the smoke may contain toxins that could cause severe illness and even death. Be sure to wear appropriate gloves as contact dermatitis is possible. If you contact the plant (especially the root) with your hand and then touch your eyes or mouth you can become very ill.

**Chemical**

For western water hemlock, application of chemicals is most effective when done in late spring or early summer. Several types of herbicide can be effective to include Glyphosate, 2,4-D, and picloram and 2,4-D and MCPA. Glyphosate is nonselective, so exercise caution to minimize injury or mortality of desirable plants that might help suppress new poison hemlock seedlings. Also, after western water hemlock is sprayed with herbicides, an increase in palatability can occur. Therefore, keep animals away from treated plants for 3 weeks after spraying. Chemical treatment of western water hemlock may require repeated applications to deplete the seed bank. A word of caution, herbicides sprayed within 50 feet of a body of water can pose significant environmental hazards and typically require an aquatic herbicide. Be sure to contact your local weed control authority or OSU Extension for specific herbicide recommendations and be sure to check the herbicide label for restrictions (Whaley et al., 2013).

In conclusion, both poison hemlock and western water hemlock plants require caution when handling. Constant vigilance is required to eliminate these toxic weeds from your property. A good manager can contain or eliminate hemlock in order to keep your livestock safe.

**Literature Cited**