

## Poisonous Plants in the Apiaceae

Carl E. Bell

Regional Advisor- Invasive Plants,  
University of California Cooperative Extension, San Diego, CA

The Apiaceae, perhaps better known as the Umbelliferae, is a large family, with about 300 Genera and 3000 species worldwide. In the Jepson manual, there are 43 Genera (both native and non-native) listed as occurring in natural areas of California. Bailey's Manual of Cultivated Plants includes 24 Genera that are cultivated for food, as herbs, and for ornamental purposes throughout the US. Most of these are probably grown or have been grown in California. Nine of the species in Bailey's are also listed in Jepson as escaped from cultivation, but only two of these (Common fennel, *Foeniculum vulgare* and poison hemlock, *Conium maculatum*) are problem weeds. See the Table for a summary of the reportedly poisonous members of this family.

This is also one of the most robust families with regard to producing all sorts of chemicals not directly used for typical metabolic processes such as photosynthesis, growth, or reproduction. Some of these chemicals are toxic, including alkaloids and glycosides. These poisons are believed to aid umbels in warding off predation or disease. On the other hand, several members of the Apiaceae have been cultivated for centuries as foods or seasoning, such as celery, parsley, coriander/cilantro, fennel, and dill and for medicinal purposes. All of these species have very distinctive tastes and smells, but it is difficult to know how the chemicals involved aid the plant.

The family has very characteristic morphological features, typically with green, ribbed hollow stems; long, sheathing petioles; divided leaves; small flowers in umbel shaped inflorescences; and two sided seed. This similarity in appearance has led to some disastrous mis-identification in the field. Poison hemlock, for example, leaves have been confused with parsley, the roots with parsnips, and the seed with anise. James A. Duke, writing in the Handbook of Edible Weeds, states, "I feel strongly that amateur foragers should stay away from mushrooms and the Apiaceae .... There have been too many fatalities due to mistaken identities, not always by amateurs; sometimes the experts make fatal mistakes."

### Apiaceae with systemic toxins

The most famous toxic plant in this family is poison hemlock, which produces an alkaloid known as coniine. The execution of Socrates in 399 BC for criticizing the leadership of Athens was reputedly carried out by making him drink a concoction of poison hemlock. This was actually a 'humane' way to kill someone; coniine poisoning symptoms are a general, gradual weakening followed by respiratory failure. According to one source, Opium was often added to the brew to induce sleep and ease the passing of the victim. All parts of this plant are toxic, but particularly the roots and seed. Treatment is to induce vomiting as soon as possible or to have the

patient ingest charcoal to bind-up the coniine. Poison hemlock, like several toxic plants, also has a medical history. In a USDA publication from 1918, it was noted as being used for rheumatism, neuralgia, asthma, and “in cases where the nervous system is in an excited condition”. As noted above, it is weedy throughout California and grows readily along streams, roads, and in wet areas. A readily visible identifying characteristic is purple blotches on the stems.

Water hemlock (*Cicuta spp*) is represented by two native species in California and another 10 or so nationally. They are plants of wet areas, along streams and in marshes. The toxin in this case is cicutoxin, an unsaturated long-chain aliphatic alcohol. All parts of the plant are toxic, but especially the roots, which smell similar to parsnip. A piece of root the size of a walnut will reportedly kill a cow. The roots are hollow and often exude a yellow sap, but are still mistaken for parsnips. Poison symptoms are similar to poison hemlock, with the unpleasant addition of violent convulsions. Livestock poisonings have occurred in California during droughty periods when animals are foraging on anything green. Death takes place very quickly; livestock are generally not treated and the prospects for any person that ingests water hemlock are not good. Two related Genera from Europe, *Oenanthe* and *Aethusa*, with toxins similar *Cicuta* can be found in the US, but are not common in the west.

#### Apiaceae causing photosensitization

A more common form of poisoning by members of this family is photosensitization from exposure to furocoumarins (also known as psoralens). This is caused when skin comes in contact with wet foliage of plants containing the toxin. Later, when that skin is exposed to sunlight, the skin absorbs wavelengths of light not normally taken in, which can lead to second-degree sunburns. After the sunburn subsides, the skin often stays hyper-pigmented with a purple color for months, which in some cases becomes permanent. The list of known and suspected photosensitizing species in the Apiaceae is large, including some common cultivated plants like carrot, parsnip, and celery. Three other genera, *Berula* and *Heracleum*, which are native and *Ammi*, which is not, are also suspected of this type of toxicity. The case of celery is unusual, because the toxin is produced only when the pink root fungus, *Sclerotinia sclerotiorum*, is infecting the celery. Neither celery nor pink root will produce furocoumarins alone. Light skinned animals and people are more at risk for this problem than those with dark pigmentation. In the case of animals, ingestion can lead to symptoms and only unpigmented areas of skin will be affected.

In Egypt, *Ammi majus* is a documented herbal medicine for the treatment of leucoderma, a disease of that causes a patchy loss of skin pigmentation. Taken internally or as an ointment, followed by exposure to sunlight, pigmentation can be restored to affected individuals. One man's poison is truly another man's medicine in this case.

Reported/suspected poisonous species in the Apiaceae in California.

<b>Common Name</b> <i>Scientific name</i>	Native	Weedy	Crop	Poisonous properties
<b>Bisnaga</b> <i>Ammi visnaga</i>		Yes		Photosensitizing to light skinned people and livestock from contact with wet foliage and exposure to sunlight. Also used medicinally as a muscle relaxant.
<b>Celery</b> <i>Apium graveolens</i>		Yes	Yes	Photosensitizing when infested with Sclerotinium, tops have caused nitrate poisoning in cattle.
<b>Water parsnip</b> <i>Berula erecta</i>	Yes			Systemic toxin suspected of cattle death from consumption, not well documented.
<b>Water hemlock</b> <i>Cicuta spp.</i>	Yes 2 sp. in CA			Systemic poison (cicutoxin) considered the most toxic in North America. Symptoms similar to Poison hemlock, but also causes violent convulsions.
<b>Poison Hemlock</b> <i>Conium maculatum</i>		Yes		Systemic poison (coniine) causes gradual weakening leading to respiratory failure.
<b>Wild carrot, Queen Anne's Lace</b> <i>Daucus carota</i>		Yes	Yes	Reported to be photosensitizing.
<b>Water parsnip</b> <i>Heracleum lanatum</i>	Yes			Reported to be photosensitizing.
<b>Parsnip, Wild parsnip</b> <i>Pastinaca sativa</i>		Yes	Yes	Reported to be photosensitizing.
<b>Water parsnip</b> <i>Sium suave</i>	Yes			Suspected of systemic poisoning of livestock.

References:

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