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WATCH FOR

Poison Hemlock: A Growing Concern in Kentucky

By JD Green

Poison hemlock (*Conium maculatum*) has been increasing in Kentucky during the past several years. Although this plant was often seen along roadways, abandoned lots, fencerows, and other non-cropland sites, in more recent years, it has expanded out into grazed pasture lands and hay fields. The concern not only stems from its invasive nature, but the fact that it is one of the most toxic plants in the world. Throughout history, the toxicity of poison hemlock is well known for accidental deaths of humans and other animals. The death of Socrates in 329 B.C. is perhaps the most well known case involving the death of a human.

Poison hemlock is known to be a native of Europe and was introduced into the United States as an ornamental in the 1800's. Since that time this aggressive plant has been extremely successful in distributing itself throughout most of North America. It is now widespread throughout most counties in Kentucky. Although poison hemlock is often associated with areas that have moist soil conditions, it can also survive in dry sites.

Description– Poison hemlock is classified as a biennial that reproduces only by seed. It is capable, however, of completing its lifecycle as a winter annual in Kentucky if it germinates early during the fall months. Flowers and new seed are typically produced in late May and June. Although plants emerge as a cluster of leaves that form a large rosette, poison hemlock is most noticeable at this stage of growth in early spring with its parsley-like leaves which are highly dissected or fern-like. The individual leaves are shiny green and triangular in appearance. As the plant begins to send up flower stalks, the leaves are alternately arranged on the main stem. Each individual leaf is pinnately compound with several pairs of leaflets that appear along opposite sides of the main petiole. As the plant matures, poison hemlock can grow upwards to about 6 to 8 feet tall. At maturity the plant is erect, often with multi-branched stems, and forming a deep taproot. Poison hemlock has hollow stems which are smooth with purple spots randomly seen along the lower stem that help distinguish it from other plants similar in appearance. The flowers, when mature,

Figure 1. Poision Hemlock

are white and form a series of compound umbels (an umbrella-shaped cluster of small flowers) at the end of each terminal stalk.

Toxicity-All classes of livestock are known to be affected by poison hemlock. Cattle, horses, and goats are considered to be the most susceptible domestic animals although other animals can be affected as well. Symptoms of poisoning can occur rapidly anywhere within 30 minutes to 2 hours depending on the animal, quantity consumed, and other factors. Initial symptoms can include nervousness, trembling, muscular weakness and loss of coordination, dilation of pupils, coma, and eventually death from respiratory paralysis. Lethal doses for cattle are considered to be in the range of 0.2 to 0.5% of the animal's body weight. Poison hemlock is also known to cause fetal deformation when pregnant animals consume the plant.

Fortunately most animals tend to avoid grazing poison hemlock if other forage is readily available. However, animals may be more prone to consume green plants during the late winter and early spring when other forage species are more limited. All parts of the plant, including the seeds, are considered to contain the toxic principles (coniine and coniceine). Toxicity may be somewhat reduced in dried plants, but the potential for toxicity still exists, particularly when a sufficient quantity is consumed in dried hay. Therefore, extreme caution should be considered before feeding animals hay known to contain poison hemlock.

Control-The principle control strategy for poison hemlock is to prevent seed production which can be a challenge since a fully mature plant is capable of producing 35,000 – 40,000 new seeds. It is too late to utilize herbicide control methods after plants have produced flowers. Therefore, mechanical control efforts (if feasible) such as mowing or cutting down individual plants should be initiated just before peak flower production to avoid or reduce the amount of new seed being produced. Make note of areas heavily infested with poison hemlock this spring and begin to look for emergence of new plants in the fall. During the late fall (November) or early spring (March) is the best time of year for herbicide treatment. In grass pastures and hayfields herbicide products containing 2,4-D can be effective when applied to young, actively growing plants in the rosette stage of growth. Spot treatments with products containing 2,4-D, triclopyr, or glyphosate can also be used depending on the location.

FRUIT CROPS

Diseases Affect Blueberry Production in Kentucky
By John Hartman

Blueberry harvest is well underway in Kentucky. Blueberries are subject to plant and crop losses due to diseases. Most losses are due to root rot or to stem and twig canker diseases. In recent years, several important blueberry diseases have been observed in the field and diagnostic laboratory.

Twig blights, stem cankers, stem blights. These diseases are caused by several fungi including species of *Phomopsis, Fusicoccum*, and *Botryosphaeria*. The most visible symptoms of canker diseases are dieback of twigs, branches, or entire stems, often adjacent to healthy parts of the same plant. Dead branches may have brown or reddish-brown leaves clinging to them (Figure 2). Symptoms may begin on smaller twigs and then spread into larger branches and the crown. Some lesions appearing on infected stems may be a red-maroon-brown color and be centered around a leaf scar, with a bulls-eye pattern. Other lesions may appear as a broad brown or tan discoloration of the woody tissue, often on one side of the stem. Main stem infections can quickly lead to flagging and dieback of the entire stem (Figure 3).

Figure 2. Twig affected by blueberry canker disease.

Figure 3. Phomopsis canker causing dieback of blueberry branches (APS photo).

Phytophthora Root Rot. Root rot, caused by *Phytophthora cinnamomi* or other species of *Phytophthora* is usually associated with poorly-drained areas of a field where the fungus thrives and survives for long periods of time. The very fine absorbing roots turn brown to black; larger diameter roots may also be discolored. Above-ground symptoms include chlorosis and reddening of the leaves, small leaves, defoliation, branch dieback, death of entire stems, stunting, and death of the entire bush. The disease may be present in a few infected plants scattered throughout the planting, but is more often localized in a group of plants in a low lying area of the field (Figure 4). Heavy clay soils often favor root rot.

Figure 4. Phytophthora root rot killed plants at the end of this row of blueberries (APS photo).

Mummy Berry. This sometimes-devastating disease is caused by the fungus *Monilinia vaccinii-corymbosi*. The fungus overwinters in mummified fruit on the ground. Young shoot tissue infected in early spring may become blighted, resembling frost injury. The fungus also infects the developing fruit causing it to become malformed, and turning salmon or grey by midsummer (Figure 5). By fall, these fruit drop to the ground where they turn to mummies, ready to produce spores the next spring.

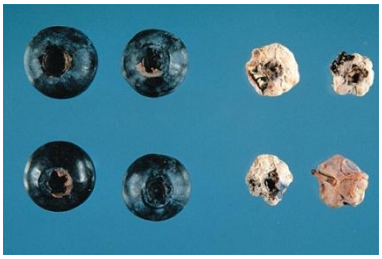

Figure 5. Blueberry mummy berry disease compared to healthy fruit (APS photo).

Botrytis Blight/Gray Mold. The fungus *Botrytis cinerea* causes ripening fruit to rot with a typically gray, moldy cast (Figure 6). The fungus also causes a stem canker which is similar to that caused by other fungi. Cultivars with tight fruit clusters are more prone to gray mold.

Figure 6. Blueberry Botrytis fruit rot (APS photo).

Anthracnose. Caused by the fungus *Colletotrichum gloeosporioides*, anthracnose primarily rots fruit, but also infects twigs and spurs. The disease causes a soft, sunken berry rot, usually on the calyx end, which ruins fruit quality. The fungus may produce a salmon or rust-colored mass of spores on the rotted berry. Anthracnose can also cause a post-harvest fruit decay and is favored by warm, wet weather.

Iron Chlorosis. This abiotic disease appears as chlorotic (yellow) and stunted plants (Figure 7). The major cause of chlorosis is planting on a site with pH levels above 5.5. The best soils for blueberries are well-drained sandy silt loam or silt loam, with a pH of 4.5 to 5.2, organic matter of 4 to 7% and adequate phosphorus and potassium. Blueberries with iron deficiency will be growing under stress and be more susceptible to many of the canker diseases.

Figure 7. Interveinal chlorosis of Blueberry leaves caused by iron deficiency.

Blueberry disease management. With good crop management, most blueberry diseases can be avoided. The following suggestions should be useful:

- To avoid Phytophthora root rot disease, choose a site that is well-drained or install tiles or raised beds to improve drainage.
- Choose a site that receives full sun with no shade.
- Be sure that soil pH is suitable for blueberries. If needed, begin soil pH adjustments a year or two before planting.
- Select disease-resistant cultivars where they are available.
- Purchase only healthy, disease-free virus-indexed plants from a reputable nursery.
- Sanitation is essential; remove and destroy canker-infected canes and branches, old and weak stems, and badly diseased plants.

- A dormant application of lime sulfur may be helpful in canker disease management.
- If mummy berry disease is a problem: before bud break, rake up and burn mummies or cultivate between rows or apply at least 2 inches of mulch to bury them.
- Remove old canes and twiggy wood to promote ventilation and sunlight penetration.
- Avoid use of excess nitrogen fertilization; do not fertilize in late summer.
- Control weeds to improve drying of the fruit and foliage.
- Water plants during dry periods to reduce stress.

In some circumstances, canker diseases have devastated Kentucky blueberry plantings. In most of these instances, plants were growing under stressful conditions such as drought or high pH soils. For most Kentucky locations, blueberry diseases are not a serious problem as long as the site is well-drained, soil pH is near 5.0, soil has adequate organic matter, good sanitation pruning practices are used, and the plants are watered regularly during dry periods. With good growing conditions and following good cultural control practices, use of fungicides can be minimized.

Disease management advice can be found in U.K. Cooperative Extension Publication ID-94, *Midwest Commercial Small Fruit and Grape Spray Guide 2009* and the *Midwest Small Fruit Pest Management Handbook* available at Kentucky County Extension Offices.

TOBACCO

Current Disease Status
By Kenny Seebold

As of June 15, blue mold has been found in two counties in southeastern Pennsylvania (Chester and Lancaster). The outbreaks thus far have been limited to transplants produced in both float-beds and traditional plant beds, and we still don't have a handle on why blue mold showed up first in Pennsylvania. We may never know!

Fortunately for our growers, there has been little chance of spore movement from the Pennsylvania sources into Kentucky and its immediate neighbors. So, despite conditions that have been extremely favorable for blue mold, we appear to be free of this problem. Still, we need to keep an eye out for blue mold in Kentucky and surrounding areas. Plants still on float beds will be at greatest risk and should be treated with Dithane/Penncozeb/Manzate until they are set. The blue mold risk is fairly low at the moment, and the current blue mold forecast predicts movement of spores into Maryland, Virginia, and North Carolina. Given this, I don't see a critical need for fungicide applications aimed at preventing blue mold at this point in time. Should the situation change, we'll post an alert through the Kentucky Blue Mold Warning System and on the Kentucky Tobacco Disease Information Page (www.uky.edu/Ag/KPN/kyblue/kyblue.htm). In the meantime, please continue to watch for blue mold and report any suspected finds as quickly as possible.

SOYBEAN

Late Planted Soybeans Can Produce Late Season Insect Problems
By Doug Johnson

Kentucky grown soybeans, particularly those in the southwestern portion of the state, will be at elevated risk of damage from soybean podworm. This is the same insect know more widely as the corn earworm. This is the case yearly because we plant so many double crop beans. However, this year due to planting delays and possibly wheat harvest delays, we may see a significantly larger portion of our soybean crop planted significantly later than in most years.

If you noticed Dr. Chad Lee's comments on late planting in our Grain Blog (http://graincrops.blogspot.com/2009/06/planting-soybeans-late-and-target.html) he mentions two important factors that will affect the impact of corn earworm as well as general production. Certainly the late planting date is a major problem, but the second is lack of closure in the canopy. Dr. Lee's comments were directed at seeding rates needed to

obtain canopy closure and thus some important agronomic benefits (for example, weed suppression and light interception). In addition, an "open canopy" situation is also associated with more damage by corn earworm. Apparently, corn earworms have greater survival in open canopied fields.

Additional, risk factors for corn earworm damage is the association of soybeans fields with maturing corn fields. When corn approaches maturing and begins to dry down, the plants become less attractive to female corn earworm moths looking for a place to lay their eggs.

Figure 8. Corn earworm damage to soybean pod.

These risk factors are compounded by the fact that corn earworm is not easily detected in the field. The insect generally does not feed to any great extent on the foliage so it does not produce any easily seen evidence of its presence. One MUST get out into the field and look down into the canopy at the blooms, petioles and pods.

One can obtain some early warning of the presence of these pests by checking the UK-IPM web pages (http://www.uky.edu/Ag/IPM/ipm.htm). Corn earworm is one of the insects that we trap for at both Princeton and Lexington, KY. (Those of you in the southern tier of counties, especially the purchase area, may want to check the University of Tennessee traps at Jackson and Milan. http://www.utextension.utk.edu/fieldCrops/cotton/cotton_insects/ipmnewsletters.htm).

The Kentucky graphics will illustrate to you the presence of the adult moths as indexed by these traps. Remember the moths are not your target; it is the caterpillars that do the damage. But the caterpillars will begin appearing sometime after the moth flight, depending upon temperature. Also, our graphics provide you with a view of what this years' population size as compared to previous years, and a rolling five year average.

You should be scouting from late bloom through maturity. Late planted fields, especially those in which a closed canopy did not develop, and are located near maturing corn fields are at greatest risk.

Adults are buff to light green moths with a wingspan at rest of about 1/2". Eggs are white to pink, about 1/30" wide and laid singly. Larvae (worms) are very small to 1 1/2" in length when full grown. They are usually tan to pale green with several dark stripes down the back. However, color may be quite variable, with some individuals almost black.

These insects feed almost exclusively on pods. They eat away the pod wall and completely consume the seed.

If you are using a shake cloth in wide rows the threshold is greater than 2 worms per row foot. If you are using a sweep net in narrow rows the threshold is 9 worms per 25 sweeps on average. In both cases one should sample in at least five locations in each field and average the results. So, just to review; factors for increasing risk from this pests are: late planting, late blooming, open canopy and nearness (especially during bloom and early pod set) to maturing corn. The greatest area of risk will be the Purchase Area and the southern tier of Pennyrile Area counties.

VEGETABLES

Stink Bugs in Pepper and Tomato Fields
By Ric Bessin

There has been high levels of stink bug damage in field corn this spring, so it is likely that we will see damage by stink bugs to tomatoes and peppers later this summer. Stink bug damage to pepper and tomato is noticed at harvest, but the damage occurs several weeks in advance of

Figure 9. Stink bug damage on pepper fruit.

harvest as the fruit begin to size. Stink bug feeding causes a light colored corky area just underneath the skin of the fruit. These damaged areas are visible through the skin.

Generally, stink bug numbers and their damage on various crops are expected to be up this year across the state. Damage was common early in the season on corn. The same species of stink bugs, the brown and green stink bugs, attack pepper and tomato fruit, with the brown being more difficult to control. Stink bug damage to tomatoes picked in the breaker stage is not readily discernable and may escape detection until the fruit are ripened.

Figure 10. Brown stink bug.

Adult stink bugs migrate from weedy areas into pepper fields, particularly when the weedy plants begin to decline. Continual weed management throughout the season around fields helps to reduce stink bug immigration into fields. In terms of insecticidal control, thiamethoxam (Actara), endosulfan (Thionex, Endosulfan) and the pyrethroid insecticides (Ambush, Asana, Baythroid, Pounce, Proaxis, Warrior) are the most effective insecticides registered for peppers against stink bugs, but they provide only fair to good control of stink bugs. When scouting peppers and tomatoes for stink bugs and their damage in order to make control decisions, keep in mind that the presence of fruit damage does not mean that stink bugs are necessarily still active.

Insect Trap Count
June 5-12

By Patricia Lucas

Location	Princeton, KY	Lexington, KY
Black cutworm	71	40
Armyworm	139	608
Corn earworm	49	9
European corn borer	0	0
Southwestern corn borer	22	0
Fall armyworm	0	0

Graphs of insect trap counts for the 2008 season are available on the IPM web site at -http://www.uky.edu/Ag/IPM/ipm.htm. View trap counts for Fulton County, Kentucky at - http://ces2.ca.uky.edu/fulton/InsectTraps

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