

Insect, Disease and Weed Management in Timothy

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Timothy production in the Kittitas Valley and Columbia Basin is met with challenges from weeds, insects, rodents, and diseases both biotic and abiotic. This paper will address those of importance and some that may become important in the future.

Diseases

Foliar diseases occur when the environment presents the right combination of temperature, humidity and light, when the pathogen is present and viable and the host plant is in a susceptible state. With most foliar diseases of timothy, this occurs under prolonged cool and moist conditions during the growing season.

Purple eyespot, caused by *Cladosporium phlei* occurs only occasionally in our environment. It appears as small, oval, tan-colored leaf spots surrounded by a purple border, followed by leaf withering. The disease is favored by cool and humid conditions. There are some varietal differences reported. Recommended disease management includes following a good fertility program and using low seeding rates.

Leaf streak, caused by *Drechera phlei* displays as lengthwise brown streaks on leaves, often along the margins. Infected leaves wither and die. The disease reduces the feed quality and aesthetic value of timothy hay. Good fertility management is again recommended.

Silver top, caused by *Fusarium pose* (?) is represented by whitening and premature death of upper internodes and heads. Quebec scientists isolated *Fusarium pose* from tissue, but re-inoculation with the fungus failed to cause the disease. Similar symptoms can be caused by feeding by the meadow plant bug.

Brown leaf, can be caused by *Scolecotrichum graminis*, a fungus that attacks orchardgrass and grains as well. Over and under nitrogen fertilization, excessively thick stands, periods of drought and excessive heat are also implicated.

Ergot, caused by *Claviceps purpurea*, occasionally invades seed heads of timothy. Initial infections of developing seeds are obvious when infected florets exude a stinky-sticky slime. When the slime hardens into hard, black sclerotia, they appear as enlarged black seeds. Sclerotia fall to the ground, and form perithecia which produce ascospores. These are discharged into the air and can infect more florets. When spores contact the flower stigma, they penetrate the first day and slime forms within 5 days.

Slime mold, caused by *Sclerotinia sp.* occurs when plants are subjected to prolonged rain, high humidity, and excessive irrigation frequency or flooding. It turns the plant residue on the soil surface as well as the living portions of the timothy plant slimy black.

Stem rust caused by *Puccinia graminis* mainly attacks timothy in the north-central U.S. and occasionally here. Some varieties have resistance.

Anoxia is caused by flooding or over-irrigation. Plants turn chlorotic, sometimes bright yellow in color. The disease results from the roots being subject to the lack of oxygen. Plant substances produced by respiration cannot be exuded and transported away from the plant. Plants recover when the soil dries and roots again can exchange ions in the soil solution.

Insects

European skipper, (*Thymelicus lineola*), in the adult form is a brightly orange colored butterfly. The larvae are green with two white stripes. When they feed on timothy, the larvae pull in the leaf edges and form tunnels. The Western population of the insects now inhabits western Colorado, Idaho, Montana and British Columbia. It has not been reported in Washington. *Bt* insecticides are used to control the insect in states where it occurs.

Cereal leaf beetle (*Oulema melanopus*) (CLB) attacks orchardgrass and other grasses but prefers wheat, barley and corn. Yield losses of grain of up to 75% have been reported as a result of CLB feeding. The insect is gradually moving west from Michigan where it was introduced in the early 1960's. It is the cause of quarantines of hay products in California and parts of Canada. Populations requiring chemical control were reported in Grant County in 2005 on wheat. Several insecticides are effective on CLB including malathion, Lorsban and Warrior (properly timed), however Warrior and Lorsban are not labeled for timothy. Biological controls are working in certain areas of the U.S. WSU scientists are working with the release of *Tetrastichus julis* and *Anaphes flavipes* in Washington.

Sod webworms (Family *Pyralidae*) caterpillars or larvae have a dark head. Their bodies are light brown or gray with dark spotting. Caterpillars produce silken tunnels in the thatch. During the day, they hide within these webbed tubes, and at night they move out a short distance to feed. Sod webworms are typically 1 to 1 1/2 inches long when full grown.

Meadow plant bugs (*Lepidea sp.*) feed on stems, leaves and heads of timothy. Some heads turn white. Leaves and stems contain small white dots called stippling where the insect has fed.

Grass scale (*Eriococcus insignis*) are very small insects found on leaves near the stem. They have occasionally been a problem in the Kittitas Valley. There is a Special Local Needs label for the use of Supracide 2E in effect for Washington for the treatment of grass scale.

Thrips, primarily the western flower thrips (*Frankliniella occidentalis*) are commonly found on timothy. They are both a help and hindrance in that they do feed on timothy, but also prey on mites. Experience has shown that when insecticides are used for thrips control, mite populations often explode.

Mites

Three species of mites attack timothy in Washington; the Banks mite, Two-spotted mite and the McDaniel mite. Recent research by Dr. Doug Walsh, WSU Prosser, has determined that McDaniel mite was the prevalent species in the Kittitas Valley in 2004. Chemical control of mites is often very temporary, as their life cycle is very short (11 days). Broad spectrum insecticides often reduce the predator population allowing the return of mite populations exceeding the pre-treatment level. Recommended management includes good fertility, irrigation management to prevent excessively dry conditions, dust control along roads and mowing borders.

Broadleaf weeds

There are many broadleaf weeds to manage in timothy. Of major concern is white campion or white cockle (*Silene latifolia*). White campion is a biennial or short lived perennial plant that tolerates most standard phenoxy herbicides well. Once established it can produce seed within the normal cutting frequency of timothy in our environment. Some success in keeping white campion in check has been accomplished with the use of combinations of a phenoxy product, dicamba, and a sulfonyleurea (Ally). Carfentrazone-ethyl (Aim EW) may also be tank-mixed with a phenoxy and dicamba. Pyridines such as Stinger or Curtail may also be used, but caution should be taken to avoid using the forage or manure from livestock consuming pyridine-treated forage from being used as mulch or fertilizer. Diflufenopyr (Overdrive) may be used on grass hay. It controls henbit, prickly lettuce and other broadleaf weeds but can stunt timothy at higher rates if applied when timothy is actively growing. There are plantback restrictions with some compounds. Consult and follow the label before using any pesticide.

Grass weeds

There are no registered grass herbicides for use in timothy hay.

Cheatgrass is sometimes a problem in first cut timothy. Barnyardgrass and yellow foxtail are often problem weeds in second and third cut timothy.

Cultural practices to prevent the establishment of weeds in timothy include maintaining good fertility. High producing timothy requires 70-90 units of nitrogen between cuttings. Borders and roadsides should be kept free of weeds. Screens to catch floating weed seeds can be installed on irrigation turnouts. Crop rotations to perennial crops like alfalfa can clean-up weedy ground. It is important to make sure that seed is completely weed-free, especially of noxious weeds like white campion.

Pre-germination and cultivation of weeds prior to planting or applying glyphosate or paraquat to live weeds on the seedbed immediately before planting has helped reduce weed competition.

Rodents

Pocket gophers (*Thomomys talpoides*) and meadow voles (*Microtus sp.*) are two important rodent pests of timothy. Both consume plants. Voles and can decimate stands. Pocket gophers leave large mounds of soil on the surface which can be incorporated easily into harvested hay lowering its value. Meadow voles feed above ground and decimate large areas of foliage, weakening plants. Strychnine baits can be used to manage gophers. Trapping with crushing and clamping traps is illegal in Washington. Zinc phosphide pellets can be used to manage voles during the dormant season.