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Spring Bean Leaf Beetles

Bean leaf beetles have not been a big problem the last couple of years, but we usually have at least some areas each year that have problems with the bean leaf beetle, and early planted soybean fields always attract some beetles. Because the bean leaf beetle can be a pest of seedling soybean, we'll discuss it in some detail.

Bean leaf beetles have two generations a year in Nebraska. However, since they overwinter as adults, three periods of beetle activity are seen in the growing season: Overwintering colonizers, F1 generation (offspring of the colonizers, the true first generation) and the F2 generation.

Bean leaf beetles overwinter as adults in leaf litter (woodlots) and soybean residue. They become active fairly early in the year (April-May) and often can be found in alfalfa prior to soybean emergence. As soybeans emerge, the beetles quickly move to the seedling plants, feeding on cotyledons and expanding leaf tissue. These overwintered beetles, called colonizers, mate and begin laying eggs. Females live about forty days and lay from 125 to 250 eggs. After egg laying is complete the colonizing population dwindles as the beetles die. A new generation of beetles (F1) will begin to emerge in late June to early July. The F1 beetles mate and produce a second generation of beetles (F2) that begin to emerge in mid August and feed on leaf and pod tissues. The pod-feeding F2 beetles are most likely to cause economic damage.

Bean leaf beetles vary in color, but are usually reddish to yellowish-tan. They are about ¼ inch long and commonly have two black spots and a black border on the outside of each wing cover. These spots may be missing, but in all cases there is a small black triangle at the base of the wings near the thorax.

Because they move to soybean fields so soon after seedling emergence, early-planted fields will usually have more beetles and suffer the most injury. This has become more of a problem in recent years because planting dates seem to be getting earlier each year. Although the defoliation can appear quite severe, research in Nebraska and elsewhere has shown that it usually does not result in economic damage. Soybean plants can compensate for a large amount of early tissue loss, so it takes a considerable amount of beetle feeding to impact yield. Generally, unless insect populations are large enough to cause more than 50% to 60% defoliation of seedling soybeans, it is unlikely that treatment would be economically justified. Tables 1 and 2 show economic thresholds for bean leaf beetle on seedling soybean. Be aware that these thresholds are for defoliation of beans at VC - V1. If beetles enter the field right at or during seedling emergence, the thresholds will likely be lower because the beetles do not have leaf tissue to eat and will feed

on the growing point, stem, and cotyledons. We do not have a good research base for bean leaf beetle injury to newly emerging soybean, but the thresholds are probably about 1.5 beetles lower than the VC thresholds.

Remember that early-planted soybeans are the most susceptible. If economic thresholds are reached, many insecticides are available for bean leaf beetle control, including Asana, Baythroid, Dimethoate, Lorsban, Lannate, Mustang Max, Penncap-M, Pounce, Sevin and Warrior. All will do an adequate job if applied according to label directions.

Another reason some producers treat bean leaf beetle on seedling soybeans is to reduce the pod-damaging F2 generation that emerges in August; however, UNL Extension does not recommend this practice. There are many environmental factors that can impact beetle populations throughout the growing season, making it impractical to use spring beetle numbers to accurately predict if beetle populations will reach economically damaging levels in August. Regular scouting and the use of the appropriate economic thresholds are the best way to manage late season bean leaf beetle in soybean. Late-season economic thresholds will be included later this summer.

For similar reasons, we do not at this time recommend treating soybean seed with Gaucho or Cruiser to control bean leaf beetles to prevent defoliation or the spread of bean pod mottle virus unless damage from the virus has been confirmed. Although the beetle is a known vector of the virus, and yield declines have been documented in other states, the relationship in Nebraska is not as well known. Yield trial results from the use of Gaucho and Cruiser in Nebraska have been inconsistent and do not justify the added expense in most fields at this time.

Table 1. Early Season Bean Leaf Beetle Economic Thresholds (Beetles per plant).

	VC Soybeans Management costs			
Crop Value	$6	$8	$10	$12
$5	3	4	4	6
$6	2	3	4	5
$7	2	3	3	5
$8	2	2	3	4
$9	2	2	3	3
$10	1	2	2	3

	V1 Soybeans Management costs			
Crop Value	$6	$8	$10	$12
$5	4	5	7	8
$6	3	4	6	7
$7	3	4	5	6
$8	3	3	4	5
$9	2	3	4	4
$10	2	3	3	4

Common Mullein Control in Pasture

Common mullein (*Verbascim thapsus*) is a weed species on the increase in northeastern Nebraska's rangeland, woodland, and pastures. It is a biennial plant that reproduces only by seeds, but it is a prolific seed producer. The taproot of this species can access soil moisture from a deeper profile at much better rate than fibrous roots of pasture grasses, giving common mullein the competitive advantage over grass, especially during dry years.

Common mullein usually starts growing sparsely as individual plants and then spreads further if not controlled. A cluster of leaves, commonly known as a rosette, with a thick hair cover is a distinct identifying feature of this species. The stem is also woolly, erect, 2-6 ft tall, with no branches. Leaves are opposite, elliptic to ovate. Like many other plant species, the overall growth and development depends on the amount and timing of rainfall. Common mullein, in Nebraska, can flower in June and July, with yellowish flowers, and it has no value to livestock because of its low palatability.

Ranchers need to control this species because heavy stands can reduce grass production as much as 50%, especially in dry years, and the common mullein plants have no value for livestock forage. This weed can be controlled by various means. The best strategy is to control while the density is low. Density of this species can easily expand from few to hundreds plants per acre just over couple of years due to prolific seed production. Sparse populations can be controlled by mechanical removal using a spade or shovel in late April and early May. Individual plants can be dug out or cut just at the soil surfaces as long as whole rosette is removed. Single mowing of new 1-2 feet tall plants can reduce population and seed production for the season, especially in dry years. Herbicides can be also effective tools in providing season long control. However, one thing to note is that a thick wooly coat of hairs on the leaves can reduce herbicide uptake and level of control. Herbicide application should be conducted when the rosette has 6-12 leaves, before the stem starts to grow, which is usually in May. The list of effective herbicides and their rates per acre includes: Grazon P+D (3-4 pints/acre), Cimarron (0.75-1 oz/acre), and a 3-way-mix of Cimarron (0.5 oz) with Glean (0.5 oz) and RangeStar (32 oz). Make sure to use enough additives such are Crop Oil at 1-2 q/acre to help herbicide penetrate the thick wooly coat.

Western Ragweed Control in Pasture

Western ragweed *(Ambrosia psilostachya)* is a commonly found native weed in northeastern Nebraska's rangeland, prairies and disturbed sites in all soil types. It is a perennial forb from the sunflower family (Asteraceae) that reproduces both by seeds and rhizome. The rhizome is a horizontal creeping root system growing within the top 5-10 inches of the soil surface. The plants usually grow in sparse groups (patches or clusters). The stem is very erect, up to 3 ft tall, with many branches and long hairs giving the stem a coarse feeling. The leaves are alternate on the upper part of the stem, opposite on the bottom, with many divisions and teeth. Like many other plant species, the overall growth and development depends on the amount and timing of rainfall. Western ragweed, in Nebraska, can flower from July to October, with greenish-yellow flowers positioned on the top of the main stem and branches, and produces an inch long bur-like fruits with a single seed within each bur.

Western ragweed provides forage for deer and the fruits are an important food source for upland game-birds, wild turkeys and songbirds. Native Americans also made a tea from the whole plants to treat colds and cramps. Western ragweed has almost no value to livestock because of its low palatability. With other forage limited, it may be eaten. Pollen produced in late summer causes late summer hay fever in many people, due to presence of volatile oils, which can also cause skin irritation.

Due to its low value for livestock forage, it is a concern to livestock producers and ranchers. This weed can be controlled by various means. Mowing the plants when they are 4-6 inch tall can reduce the ragweed population considerably for the season. Mowing can be done one or two times per season depending on the amount of rainfall during the season. One mowing done in mid June is effective if the season is dry, due to lack of moisture needed for weed regrowth. If the season is wet, an additional mowing is needed in July-August. Herbicides can be also very effective in providing season long control. Herbicide application should be conducted when ragweed plants are 3-5 inches tall. The list of effective herbicides and their rates per acre includes: Salvo (12 oz/acre), 2,4-D-Ester (1qrt/acre), Grazon P+D (32 oz/acre), Weedmaster (32 oz/acre), Ally (0.25 oz/acre), and Vista (22 oz/acre).

Alfalfa Diseases Prevalent in Some Areas

Numerous alfalfa fields, especially in south central and southeast Nebraska, are severely infected with multiple fungal leaf diseases. The two most prevalent diseases are spring blackstem and leptosphaerulina leaf spot; common leaf spot also occurs but much less frequently.

In most severely affected fields, many leaves are likely to be lost prior to harvest due to these diseases and little can be done to prevent it. This problem adds to the losses experienced in these same fields from the severe freezing temperatures of early April.

Many fields look very ragged with uneven regrowth. Fields often look somewhat yellowish or a dull green and appear to be deteriorating. Closer examination of the leaves reveals numerous small, brown to black spots, especially on lower leaves (*Figure 1*), indicative of spring black stem and leaf spot. The small spots caused by spring black stem and leaf spot are often referred to as tar spots. These can increase in size and coalesce (*Figure 2*). Later stages start blackening the stem and cause leaves to yellow and fall.

Figure 1. Dark brown to black spots on the lower leaves of alfalfa indicative of spring black stem and leaf spot. (*Photos by Stephen Wegulo and Julie Breathnach*)

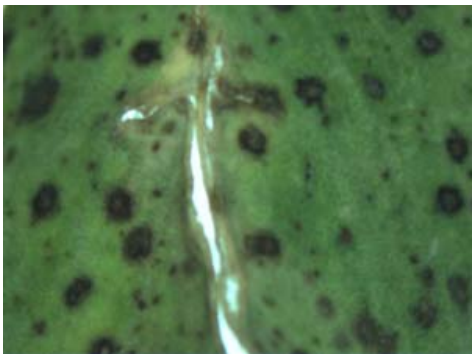

Figure 2. Lesions caused by spring black stem and leaf spot as seen under a dissecting microscope.

Leptosphaerulina leaf spot is more common on newer leaves near the top of the plant. It forms small lesions with tannish centers and brown or reddish-brown borders, often surrounded by a yellowish chlorotic area (*Figure 3*).

Fields tend to be worst in areas that recently received heavy rains. Both diseases are initiated by spores released from fruiting structures formed on leaves and stems during the previous year. During rainy weather in the spring, the fruiting structures release spores which are spread by splashing water and wind. It is likely that the recent rain aggressively caused the release and spread of spores, causing rapid and heavy infections. Moist or humid conditions will cause further spread of the diseases.

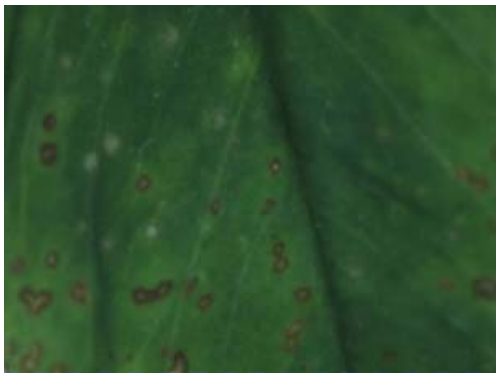

Figure 3. Lesions caused by Leptosphaerulina leaf spot as seen under a dissecting microscope.

Many growers are mistakenly attributing the deterioration of these fields to insects like alfalfa weevil or potato leafhopper. Some insects often are present but the number of insects present is too low to merit use of insecticides in most diseased fields, especially the widespread applications that are occurring.

Few fungicides are labeled for use on alfalfa. Kocide is the fungicide most commonly used, but it will not reduce the damage already present on the alfalfa. It will not help the current crop, but could reduce infection of regrowth following harvest. However, it is unlikely to be cost effective.

Deciding when to harvest these ragged, uneven and diseased fields is a more difficult question. Growth won't return to normal until after harvest. Usually an early harvest is recommended to salvage leaves before they die and drop to the ground. An early harvest might turn things around quickly; however, it also could weaken already weak plants even more. Some may even die. The best strategy may be to wait another 10 days until plants have had seven weeks to recover from the freeze, then harvest no matter how ugly the forage. In many fields, much of the bottom stem may have no attached leaves due to diseases. After harvest, expect regrowth to be a bit slow.
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