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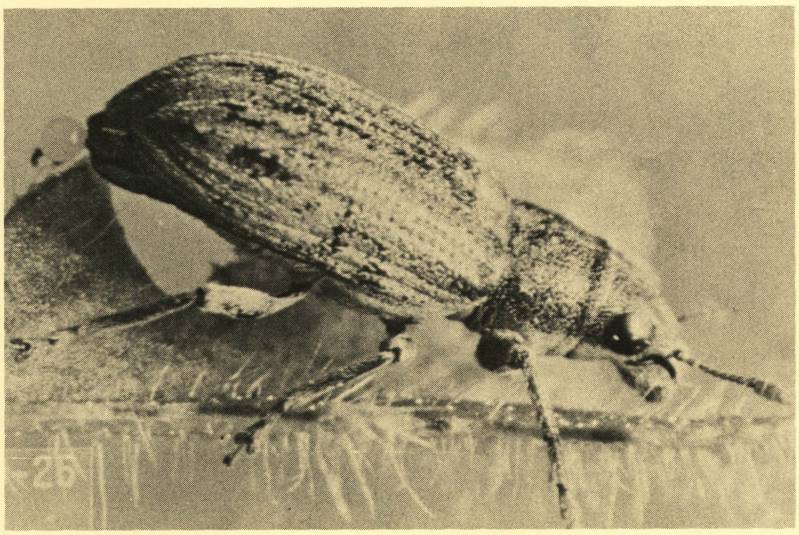

The Pea Leaf Weevil

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The pea leaf weevil, *Sitona lineatus* (L.), is an introduced insect that can be extremely destructive to peas in northern Idaho and eastern Washington. The weevil adults damage spring and winter peas by feeding on seedling foliage. The larvae damage plants by feeding on root nodules. Adult and larval feeding result in retarded plant growth, reduced vigor or death. Feeding often is reflected in reduced yield at harvest.

Appearance

The adult is a small, slender, grayish-brown weevil with three light, inconspicuous lengthwise stripes on its thorax and wing covers. The adult is small for a weevil but large for a mite. Its beak is short and stubby. Overwintering adults lose most of their scales and bristles and appear black. Newly laid eggs are white, small, smooth and subspherical. The eggs of pea leaf weevil are also small for weevils. The eggs darken to black within 48 hours of being laid. The larva is cream colored, C-shaped and has a shiny brown head. The pupa is white, adultlike, immobile and contained within an earthen cell.

Life history

In fall, adult weevils feed on many different plants but prefer perennial legumes. They overwinter in alfalfa, clover and vetch in fields, along roadsides, in field borders and in other protected sites (Fig. 1). They become active at temperatures above 39°F and will feed throughout the winter when temperatures reach this level. In spring, they prefer winter peas and spring peas.

During March and April, the weevils feed at their overwintering sites. Margins of winter pea fields adjacent to these sites may show feeding injury. From late April to mid-May at all elevations in northern Idaho and eastern Washington, the weevils migrate and attack both spring and winter pea seedlings (Fig. 1). The weevils fly only on calm, sunny spring days when temperatures are at least 62°F. At higher elevations where spring peas may not have emerged during May, the adults occasionally will return to the perennial legumes and feed a few days before migrating again. Once in the pea field, the adults feed voraciously.

Each female scatters up to 3,000 single eggs on soil near the base of pea plants. As the eggs hatch, the tiny, elongate larvae burrow into the soil where they feed on *Rhizobium* bacteria that form nodules in association with the pea roots.

Pupation occurs in the soil, and new adults emerge at about the time peas mature. The new adults feed on any green foliage left in the field and then move to perennial legumes where they feed and spend the winter. Only one generation occurs each year.

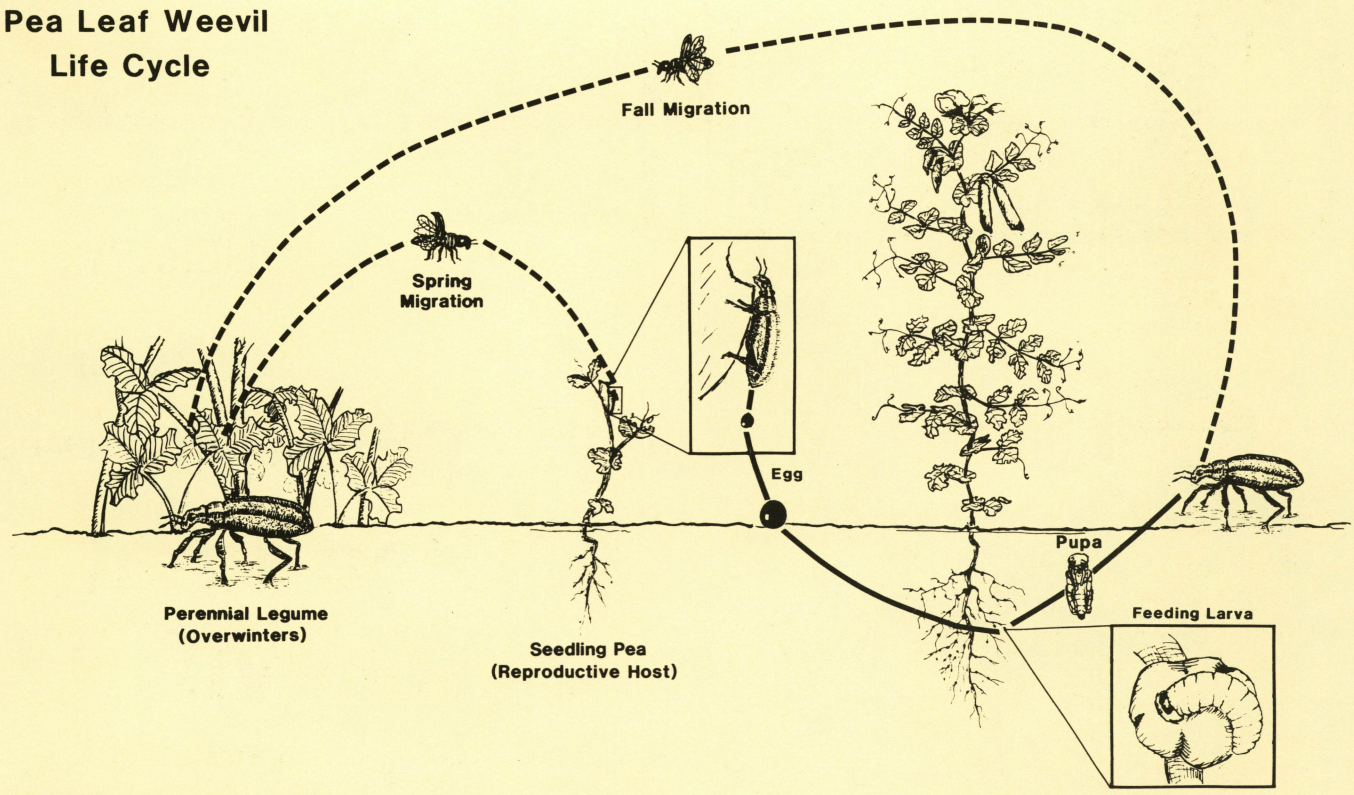

Fig. 1. Pea leaf weevil life cycle in the Palouse region of northern Idaho and eastern Washington.

Host plants

Certain legumes provide the primary food for adult weevils. In the Pacific Northwest, pea, broad bean and vetch are the principal reproductive hosts of the pea leaf weevil. The adults feed heavily and may cause stand reduction on alfalfa and clovers when peas are not available or when peas are used as a cover crop for new alfalfa or clover seedlings.

Damage by adults and larvae

After their spring migration, adult weevils often occur in large numbers in seedling pea fields. In some years, most pea fields are infested with damaging populations. In other years, only an occasional field is damaged. The number of adults produced the previous summer and their success at surviving the winter determine the severity of pest problems. Winter mortality is controlled primarily by pathogens, winter temperatures, days of snow cover and availability of food.

Both winter and spring peas are most susceptible to adult weevil damage as small seedlings. Seedling injury appears as scalloped leaf edges and destroyed growing points. Severe leaf ragging to complete defoliation may destroy the terminal growing point and ultimately kill the plant. Yields of winter peas may be reduced 15 to 25 percent if seedling plants are not protected, and spring peas may be killed entirely.

Austrian winter pea varieties with small leaves and exposed terminals such as Fenn, Melrose and Common are extremely susceptible to damage from adult pea leaf weevil feeding. In comparison, spring peas typical of the Alaska type and many wrinkle peas such as Dark Skin Perfection are moderately susceptible. Compared with other varieties, Scotch Green and yellow peas such as Latah and First and Best have some tolerance to feeding injury by pea leaf weevil adults.

Under favorable plant growing conditions, seedlings that develop multiple leaves with intact terminal buds will outgrow moderate weevil infestations. Environmental conditions that limit the growth of pea seedlings when weevils are present favor feeding injury. Cold, wet soil combined with a loose, cloddy or trashy seedbed; cold, wet weather; and large pea leaf weevil populations can be disastrous.

Larval feeding on the *Rhizobium* bacteria destroys the root nodules. Significantly larger yields of Austrian winter peas have been observed when peas were protected from pea leaf weevil larvae, but effective controls for the larvae are not currently available.

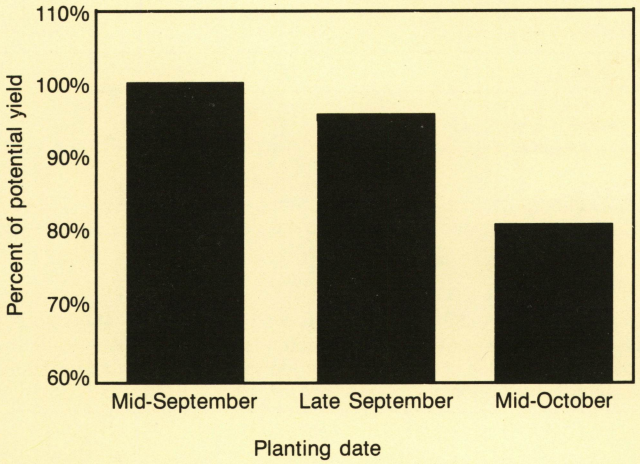

Fig. 2. Effect of planting date on yield of Austrian winter peas.

Adult control

During warm, wet winters, the fungus *Beauveria bassiana* (Bals.) Vuill. appreciably reduces numbers of overwintering adults. The number of live adults found overwintering in alfalfa during March and early April indicates the potential for weevil problems in May. Area monitoring of pea leaf weevil spring populations can allow prediction of potential problems on seedling peas. However, severity of infestations and need for chemical control on individual pea fields vary among years and locations.

For insecticide treatments to be effective, their timing must be based on thorough examinations two or three times a week of individual fields when peas are in the seedling stage. The need for chemical control depends on a number of factors: (1) weather and timing of pea leaf weevil migration, (2) number of seedlings and their emergence within a field, (3) adult weevil numbers and amount of seedling injury, (4) growth stage and rate of seedling development and (5) seedbed preparation. Most of these factors can change rapidly.

Effect of planting date — Spring pea seedlings are particularly vulnerable to injury as they emerge from the soil. Winter pea seedlings that are slow to break dormancy also are more vulnerable to defoliation and damage. Early fall planting of winter peas results in larger seedlings that are more tolerant to adult weevil feeding in spring and that produce higher seed yields (Fig. 2).

When to apply chemical controls — Adult weevils that are ragging leaves, notching clamshells and feeding on the terminal growing points of pea seedlings should be controlled as soon as possible. One pea leaf weevil for every two seedling plants can reduce pea seed yield. Damage may occur at lower infestation levels under adverse conditions for pea emergence or growth.

Peas up to the 2- to 4-leaf stage require treatment when one clamshell out of four shows feeding damage. Sample 1 linear foot of row at 20 to 30 locations throughout the field. Adult weevil samples are soil samples 1 foot long by 4 inches wide by ¼ to ½ inch deep. Look for feeding injury and adults present. If damage is light (occasional notching) and weevils are difficult to find even on sunny days, do not treat (Fig. 3). Peas past the seedling stage (six or more expanded leaves) with intact growing points can withstand some defoliation without serious injury.

Weather and soil conditions determine the length of time peas remain in the seedling stage. The insecticide must protect seedlings through their early growth period. It must be capable of killing weevils on nearly bare soil at cool temperatures and often under wet conditions.

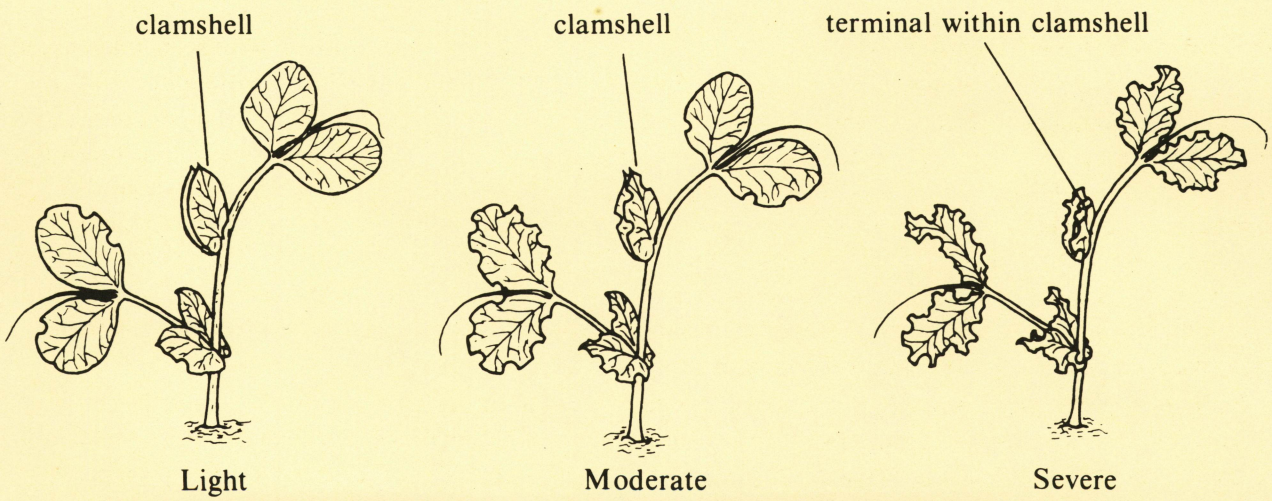

Fig. 3. Severity index of adult pea leaf weevil feeding on pea seedlings.

Recommended insecticides for control of pea leaf weevil adults on seedling peas.

Pesticide	Rate	Restrictions
	(ai/acre)	
Asana	0.025 to 0.05 lb	Do not apply within 3 days of harvest. Dry peas only. Do not exceed 0.1 ai/acre per year. Do not feed treated pea forage to livestock.
Imidan	1 lb	Do not apply within 7 days of harvest. Do not graze livestock or feed them treated forage within 7 days of application. Do not cut treated fresh pea forage for hay within 10 days of application. A buffer is beneficial when water pH is above 7.5.
methoxychlor	1.5 lb	Do not apply within 7 days of harvest.
Penncap-M	0.5 lb	Do not apply within 10 days of harvest. Do not harvest for forage or graze within 15 days of application. For Austrian winter peas, do not apply within 7 days of bloom or if bloom is evident in the area to be treated. There are geographical restrictions on uses of Penncap-M in Idaho. If misused, this formulation is especially hazardous to honeybees and other pollinating insects.

Pesticide residues — These recommendations for use are based on currently available labels for each pesticide listed. If followed carefully, residues should not exceed the established tolerances. To avoid excessive residues, follow label directions carefully with respect to rate, number of applications, and minimum interval between application and reentry or harvest.

Groundwater — To protect groundwater, when there is a choice of pesticides, the applicator should use the product least likely to leach.

Trade names — To simplify information, trade names have been used. No endorsement of named products is intended nor is criticism implied of similar products not mentioned.

The authors

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