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Insect Control Recommendations For Producing Clover Seed in Idaho

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Harmful insects and mites may severely reduce yields of clover seed. In many cases, these pests must be controlled to get economic yields. This publication describes the important insects found in Idaho on clover grown for seed and lists the pesticides registered in Idaho for control of these pests.

Important Species

Clover Aphid

Clover aphids excrete large quantities of honeydew that clog the seedhead, thus lowering the market value. Serious injury can also result when large numbers of the small, yellowish-green aphids suck sap from clover plants. This causes stunting and irregular growth, particularly to the growing tips of young plants.

Clover aphids overwinter in the egg stage that can be found on apples and related woody plants. The eggs hatch at the same time as buds open in the spring. Wingless females produce succeeding generations of females, after which winged forms appear and fly to clover plants. Several generations of wingless and winged aphids develop throughout the summer. In autumn, the winged aphids fly to woody plants where males and females mate and the females produce eggs to complete the cycle.

Pea Aphid

Pea aphids pierce the leaves, stems and blossoms with their mouthparts to suck sap from the plant. Toxins injected during feeding cause stunting of the plant which results in fewer and smaller seeds. Pea aphids produce small amounts of honeydew.

In Idaho, pea aphids overwinter in the egg stage on clover and alfalfa. The following spring, the eggs hatch into wingless females that mature and give birth to living young. Ten to 15 generations may be produced in a single season on leguminous plants.

Cutworms

Several cutworm species occur in clover and are particularly important in the early spring in newly seeded

fields. They live in the soil during the day and come up at night to feed on leaves, stems and blossoms. Tender seedlings can be severely damaged. The most common species occurring from March through May include the redbacked cutworm and the spotted cutworm. Cutworms overwinter as partially grown larvae or pupae depending upon species. Both attack the clover just as it breaks dormancy in the spring.

The variegated cutworm occurs from May through July and is often the most important pest on established clover. These cutworms feed directly on blossoms and developing seed. The variegated cutworm is a grayish-brown caterpillar with distinctive dark "V" or "W" markings on its back.

Alfalfa Looper

Alfalfa loopers feed on leaves and blossoms during June and July. They are only occasional pests but, when numerous, can cause heavy loss of bloom. These caterpillars range in color from light green with a white stripe on the side to brown or black with a light stripe on the side. Their size ranges from .5 inch when they are first noticed to 1.5 inches in length when mature.

This insect overwinters as a pupa, emerging in May as an adult moth. The eggs the alfalfa looper deposits on weed hosts hatch in 3 to 5 days. The larvae feed upon the weed until they mature, then they pupate in the soil. The next generation of adult moths emerge in about 7 days. Although there are three to four generations in a season, only the early generation (June-July) is a serious pest of clover seed.

Meadow Spittlebug

Spittlebugs cause injury to clover plants when they feed on the plant sap. Both adults and immatures have piercing-sucking mouthparts and cause stunting, dwarfing, loss of vitality and lowered seed yield.

Adult spittlebugs are .4 inches long and mottled gray and brown in color. They resemble leafhoppers but are usually larger and more robust. Immatures (nymphs) are

yellow or green and are usually protected in a wet, bubbly mass of spittle on the plant stem.

Eggs hatch in late March and April, and nymphs migrate to tender, growing plants to begin feeding. They feed for 7 to 8 weeks inside the spittle before maturing as adults in early June. Adults continue to feed on plants until late summer. The eggs are then laid on plant stems and overwinter in the field.

Clover Leaf Weevil

Clover leaf weevils damage clover plants when they feed on leaves and stems. Larvae and adults have chewing mouthparts, but the larvae cause greater damage since they feed upon foliage for several weeks before maturing into adult weevils.

Clover leaf weevil adults are large, brown, snout beetles measuring nearly .3 inches in length. The larva is light green in color with one white stripe down its back. The head is brown. A fully grown larva is about .5 inches long.

Clover leaf weevils lay eggs in the fall. Larvae feed throughout the winter when weather conditions permit, becoming fully grown in April or May. Pupation occurs in the soil, and adult weevils emerge in 10 to 12 days. Adults feed briefly but become inactive for most of the summer. Normally, only one generation occurs in a year, but in exceptionally mild seasons, a second generation of adults may emerge before winter. Females of this generation lay eggs the following spring.

Grasshoppers

Damage is caused by adult and immature grasshoppers as they feed on plant leaves, stems and blossoms. Heavy infestations are often present in fields near rangeland and uncultivated waste areas. As the rangeland dries in early summer, the grasshoppers migrate to irrigated fields.

Several species of grasshoppers can be found in clover seed fields including migratory grasshoppers, two-striped grasshoppers, redlegged grasshoppers and clearwinged grasshoppers. Various species of larger bandwinged grasshoppers are often present in low numbers.

Grasshoppers overwinter in the soil as eggs. Nymphs hatch in April or May and feed on vegetation for up to 60 days before maturing. Fully winged adults then disperse to suitable plant hosts where additional crop damage can be severe. Adults mate in late summer and lay eggs in the soil.

Clover Root Curculio

The main damage caused by this pest is a result of larval feeding on the root and at times girdling it. This root damage often allows entry of infectious soil organisms that kill or severely weaken the plant.

The adult root curculio is a small (.2 inches) grayish weevil that feeds on foliage. Adults do little damage. Fully grown, whitish colored larvae are about .4 inches in length.

Both adult and egg stages overwinter. Eggs laid in the spring hatch in one week, whereas fall laid eggs overwinter to hatch the following spring. Adults emerge in June and July and live nearly one year. No insecticides are registered for controlling this pest.

Clover Seed Chalcid

Adult clover seed chalcids are tiny, black wasps that emerge in early summer and lay eggs inside the soft clover seed. The white, legless larvae devour the inside of the seed and mature into adults in 30 to 40 days. A season may have two or three generations. Larvae overwinter in the harvested seed or in seeds that have fallen to the ground. Seed yields may be reduced by up to 20 percent by seed chalcids.

Spider Mites

Spider mites are tiny and spider-like, less than .1 inches long. They overwinter in the field in the previous year's crop residue and become active in late spring. Depending on their food supply, they vary in color from green to yellow or orange.

Feeding injury to the leaves first gives the appearance of light green stippling. Severe injury causes the leaves to turn brown and become dry, making them useless. Mite webbing makes harvest difficult.

Lygus Bugs

Adult lygus bugs are .25 inches long and .12 inches wide. They range from green to brown in color. A light yellow "V" is on its back. Immatures range from less than .1 to .2 inches long and are glossy green. Lygus overwinter as adults in old crop residue and other protected places. They insert eggs into the stems of plants after the clover has started growing in the late spring.

Lygus bugs occur in large numbers in all types of clover seed fields; however, damage varies between clover varieties. In red clover seed, lygus do little damage and are not economically important. In other varieties including white Dutch, Alsike and Ladino, lygus bugs feed on many parts of the plant causing blasted buds, blossom drop and shriveled seed.

Clover Head Weevils

Two weevils are in this group. The clover seed weevil is the major pest, and the clover head weevil is a minor pest. The seed weevil is a small, gray weevil about .1 inches long. The larva feeds on the seeds, damaging two to four seeds in each pod of Alsike, white Dutch or Ladino clovers. Red clover is not attacked.

Adults overwinter beneath dead plant material and other debris and emerge in late May. Early in June, the adults move into clover fields and lay eggs into immature pods with half grown seeds. Eggs hatch by mid-June, and larvae feed on seeds for 2 to 3 weeks. Pupation occurs in the soil, and mature adults emerge in about 2 weeks. Only one generation occurs each year.

Insect Control on Clover Seed

Pest	Insecticide: Choose one of the following	Min. days between application and harvest if used for hay	Rate of active ingredient per acre	Remarks
Cutworms	Dylox	0	1 to 1.5 lb	Chaff from seed crop may be used for feed or forage; however, do not cut green crop for these purposes if more than three applications are made per cutting.
	Sevin XLR	0	1 lb	Do not apply Sevin XLR within 7 days of blossoming clover. Do not apply to the blossoming crop.
Grasshoppers	Malathion	0	1 to 1.25 lb	Do not apply Diazinon, Parathion, Methyl Parathion or Malathion within 7 days of blossoming clover. Do not apply any of these insecticides to the blossoming crop.
	Diazinon	10	.5 lb	
	Parathion	15	.25 to .5 lb	
	Methyl Parathion	15	.25 to .5 lb	
	Sevin XLR	0	1 lb	
Alfalfa Looper	Dipel 4L	0	1 to 2 pints	Best results are obtained when loopers are small (1/2 inch or less).
Spittlebug	Malathion	0	1.5 lb	Do not apply Malathion to blossoming clover nor within 7 days of the crop coming into bloom.
	Methoxychlor	7	1 lb	
Spider Mites	Metasystox-R	—	.5 lb	Chaff from seed crop may be used for feed or forage; however, do not cut green crop for these purposes. Use on seed crop only. Repeat as necessary up to 21 days before harvest.
	Trithion	28	.5 to 1 lb	Do not graze or feed crop residue to livestock.
	Di-Syston 15G	7	1 lb	Apply by broadcast as needed. Allow at least 28 days between applications. Irrigate immediately.
	Comite	—	1.25 to 1.64 lb	Do not mix Comite with Dylox, Systox or other insecticides because it will be very hazardous to bees. Do not feed Comite-treated foliage, chaff or seed cleanings to livestock. Do not graze treated fields.
	Kelthane	—	.5 to 1.4 lb	Treated fields are not to be grazed, and crop residues and cuttings are not to be fed to livestock or baled for such use. Fields must be cleared by burning crop residues or by discing into the soil.
Clover Aphid Pea Aphid	Trithion	28	.5 to 1 lb	Do not apply more than one application per cutting if used for hay.
	Metasystox-R	—	.5 lb	Chaff from seed crop may be used for feed or forage; but do not cut green crop for these purposes. Use on seed crop only. Repeat as necessary up to 21 days before harvest.
	Di-Syston 15G	7	1 lb	Apply granules by broadcast treatment; irrigate immediately. Allow minimum of 28 days between applications.
	Systox	—	.25 to .5 lb	Chaff from seed crop may be used for feed or forage; however, do not cut green crop for these purposes. Use on seed crop only. Repeat as necessary up to 15 days before harvest.
	Methyl Parathion	15	.5 to .75 lb	Do not apply Parathion, Methyl Parathion, Diazinon or Malathion within 7 days of blossoming clover. Do not apply any of these insecticides to the blossoming crop.
Malathion	0	1 to 1.25 lb		
Parathion	15	.25 to .75 lb		
Armyworms	Sevin XLR	0	1 lb	Do not apply Sevin XLR within 7 days of blossoming clover. Do not apply to the blossoming crop.
	Dylox	7	1 to 1.5 lb	Chaff from seed crop treated with Dylox may be used for feed or forage. Do not cut green crop for feed or forage if more than three applications are made per cutting.
	Methoxychlor	7	1.5 to 2 lb	
	Methyl Parathion	15	.5 lb	Apply before armyworms reach third instar.
	Malathion	0	1.5 lb	Do not apply Parathion, Methyl Parathion or Malathion within 7 days of blossoming clover. Do not apply any of these insecticides to the blossoming crop.
	Parathion	15	.5 to .75 lb	

Insect Control on Clover Seed (cont'd)

Pest	Insecticide: Choose one of the following	Min. days between application and harvest if used for hay	Rate of active ingredient per acre	Remarks
Clover Leaf Weevil	Methoxychlor	7	1 lb	Do not apply Malathion within 7 days of blossoming clover or to the blossoming crop.
	Malathion	0	1 lb	
Clover Seed Chalcid	No effective chemical control is available. Taking a cutting of hay in early June will reduce seed chalcid populations. Volunteer and waste area clover plants should be removed. These plants act as reservoirs for the chalcids. Fall cultivation and irrigation also helps to reduce chalcid populations. Disking in waste seed to bury developing chalcids at least 1 inch in the soil will reduce adult emergence.			
Clover Head Weevils	Parathion	15	.5 lb	Apply spray when first seed crop blooms, begins to turn down and becomes brown and you reach two weevils per sweep with an insect net, usually the first week in June. Allow at least 7 days between spraying Parathion and introduction of bees into the field. Do not spray clover during bloom period to avoid injury to honeybees.
Lygus Bugs	Dylox	7	1 to 1.5 lb	Lygus bugs are usually controlled by treatments for clover seed weevil.
	Methyl Parathion	15	.7 lb	Do not apply Parathion within 7 days of blossoming.

Add a buffering agent when organophosphates are used in alkaline water.

Minor Pests

Armyworms occur late in the season and feed primarily on weeds in the field. They cause little damage to cover seed. Pea leaf weevils occur only rarely in established clover seed but may cause significant damage to seedling plants. Nitidulid beetles feed on pollen on clover flowers. The feeding causes clover flowers to dry, thus preventing seed set.

Pollinator Safety Precautions

1. Honey bees are highly attracted to clover blossoms and are important as pollinators of clover seed crops. Avoid using pesticides during the clover bloom period unless absolutely necessary.

2. Choose pesticides that are the least hazardous to bees. Consult Current Information Series 458, *Prevent Insecticide Poisoning of Pollinators*, for an up-to-date list of insecticides and their toxicities.

3. Use extreme care when applying any hazardous insecticide adjacent to a blooming clover field.

Insect Control Precautions

1. Do not use insecticide-treated clover, chaff or seed screenings for food or animal feed unless permitted by the labels of all spray products used.

2. Thorough coverage is necessary for insect and mite control. Use sufficient water.

3. Time applications to proper weather conditions so the least amount of drift to neighboring crops will occur.

4. Buffering increases effectiveness of certain insecticides, so follow label recommendations to prevent injury to beneficial insects.

5. Systox, parathion and methyl parathion are especially hazardous to applicators. Follow label instructions precisely when storing, handling and applying these poisonous materials. Post fields as required to prevent others from entering. Destroy empty containers as label directs.

Pesticide Residues — These outlines for use are based on the best information currently available for each chemical listed. If followed carefully, residues should not exceed the tolerance established for any particular chemical. To avoid excessive residues, follow label directions carefully with respect to dosage levels, number of applications and minimum interval between application and reentry or harvest.

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