

Pest Management Plan for Seed Alfalfa Lygus Bugs

General Information

- Lygus are the most troublesome insect pests in seed alfalfa production. They are difficult to control with currently registered insecticides due to resistance, and even in areas where resistance is not a problem, repeat treatments are often necessary to combat serious infestations.

Populations migrate from the foothills into alfalfa seed fields early in the season. Adult lygus may also overwinter in crowns of alfalfa plants in seed fields. Populations that build up within seed fields create problems when they cannot be controlled and then move out into neighboring crops, such as cotton. In a typical year, lygus may appear as early as April and remain in fields until they dry down prior to harvest. Lygus seem especially drawn to the greener areas of the field.

- A recent strategy is to delay treatment as long as possible, maintaining pollinator activity, and then treat with available insecticides. However, by then, the populations are well beyond threshold levels, and it is difficult to get effective control from currently registered materials. In addition, the lygus move into surrounding crops, which typically use the same materials for control. This amplifies the development of resistance.

Some carbamates and pyrethroids used for lygus control may cause spider mite populations to increase due to loss of natural enemies and reproductive stimulation of the mites.

- There are no new lygus insecticides on the horizon

Review of Registered Materials

Temik (aldicarb) is fairly selective and could be part of a “preventative” program, which could include mites, aphid, and lygus. If large lygus populations migrate into the field, the grower may need to apply an over the top treatment. If applied prior to placement of the pollinators, Temik might eliminate the pre-bee insecticide application and reduce the number of miticide applications. It has been effective in some cases in cotton - growers obtained up to 3 weeks of lygus control after irrigation. It has a different delivery mechanism than other products currently in use - requiring ingestion vs. contact to kill.

Dibrom (naled) may work well in combination with Temik. It is a relatively inexpensive, non-selective organophosphate that has a 24(c) registration. It could be applied to control lygus populations that migrate into the field as a quick knockdown material with little residual activity. It kills both adults and nymphs on contact. The pollinators would have to be moved out of the field prior to application, but could return to the field more quickly than if alternate materials with longer residual activity were used. It was also suggested that growers might consider Dibrom after clipback to kill overwintering lygus adults in the crowns of alfalfa plants.

Monitor (methamidophos) was once again registered for use on alfalfa seed (24(c) registration) in July 1998. It is the most frequently used material for controlling insect pests (primarily lygus) prior to the placement of pollinators in the field. Monitor is an organophosphate with moderate selectivity. It is toxic to honeybees and leafcutter bees, so applications cannot be made during bloom.

Supracide (methidathion) registration was lost several years ago, but was registered via the 24(c) process in 1997. Supracide, an organophosphate, is moderately selective with a short period of residual activity. This material is used prior to placing bees in the field for pollination and is thought to be safer to bees (queen and brood) as compared to Monitor.

Capture (bifenthrin) has been the most effective material available for lygus control since its registration [24(c)] in 1991. It is a pyrethroid, and as such is a non-selective insecticide/miticide. Unfortunately, in the past two years, the length of the effective control period has declined due to the onset of resistance documented by bioassays conducted in commercial fields. FMC modified the registration for seed alfalfa in 1996 to limit the number of applications of Capture to **once** per season, although the cotton label (Section 3 registration) allowing three applications did not change. The recommended time for applications to take place is between June 1 and July 31. Capture is relatively safe to honeybees, but when combined with Comite, will kill leafcutter bee populations. Leafcutter bees must not be returned to fields treated with Capture + Comite for 8-10 days.

Metasystox-R (oxydemeton methyl) is an older organophosphate that had fallen into disuse for a period due to the perception of high levels of lygus resistance. As a result of bioassays which indicated that it was effective against lygus populations, this material is once again being used in area seed fields. It only controls young lygus, and has moderate selectivity and a short residual period. It is somewhat more expensive than other options.

Carzol (formetanate hydrochloride) is a Carbamate. It knocks down adult populations, but has little residual activity. It is toxic to predatory mites. It is very expensive compared to other available materials.

Lannate (methomyl) is a Carbamate with low selectivity and short residual activity. It must be used at high rates to control lygus, but then it negatively impacts pollinators. It is used primarily to control aphids and worms, and should be reserved until late in the season for that purpose.

Lorsban (chlorpyrifos) has moderate selectivity and moderate residual activity. It is somewhat more effective than Lannate for lygus control, but can have a negative impact on pollinators. Because this material provides good worm control, it should be used late in the season for that purpose.

Unregistered Materials

Orthene (acephate) breaks down into Monitor, and Valent is interested in registration of this material to replace Monitor. Orthene has been reported to cause alfalfa varieties resistant to spotted alfalfa aphid to become susceptible. There is also a tendency for this material to flare mites. It has little selectivity and moderate residual activity. It should be used five days prior to bee placement, or move bees out of the field if used during bloom.

Biological Control Options

Predators and parasites of lygus have been investigated with no success, to date, in developing effective biological control measures.

Cultural Control Options

Strip planting other crops, such as safflower or alfalfa hay, for the purpose of (1) providing a refuge for pollinators or (2) establishing a trap crop for lygus is an option, but has not been successful in large-scale trials. Safflower is a minor crop with few, if any, registered materials which effectively control lygus. When alfalfa hay was used as a trap crop, the number of acres required made it an uneconomical option. Both practices created non-uniformity of soils across a production unit which made it impossible to manage subsequent crops.

Piggy-backing insecticide applications with irrigation minimizes the period of time that pollinators are repelled.

We must continue to develop management recommendations for short-season crop production. Reduced pest control and irrigation costs may make this an economic option.

We must continue to support breeding efforts to develop alfalfa varieties resistant to lygus.

Guidelines

- Routinely scout alfalfa seed fields and adjacent fields during the season.
- Be alert for mass migration when adjacent host crops begin to decline.
- Spot or strip treat and use ground applications when possible to improve coverage.
- Limit use of individual materials to once per season if possible and rotate among classes of insecticides when available.
- If possible, do not use mixtures of more than two compounds.
- Delay the use of pyrethroids and other non-selective pesticides as long as possible.
- Monitor development of resistance using bioassays.

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Revised 7/98

LYGUS MANAGEMENT PLAN

SCOUTING RECOMMENDATIONS: Scout fields twice weekly beginning early season and continuing until the crop begins to dry down in preparation for harvest. Lygus populations are determined from counts that consist of two sweeps at each of 5 or 10 locations throughout the field. Each sweep covers an arc of 180° with the net striking the top 8-10 inches of the plants. In general, all counts from a field are averaged and treatment decisions are based on this *average* population (insects per sweep) but it is prudent to delay treatment until egg hatch is complete. Occasionally it is practical to treat only portions of a field. By continuous monitoring of predators and pests in the field, accurate assessments can be made that will result in reduced use of chemicals and improved timing of applications.

EARLY SEASON		MID-SEASON	LATE SEASON
Stage I: Carbamates	Stage II: Organophosphates	Stage III: Pyrethroids	Stage IV: OP's/ Carbamates/Mixtures
TEMIK may be applied prior to row closure or second crop irrigation, whichever occurs later. It is taken up by the plant following subsequent irrigation or rainfall, and does not become effective for Lygus control until that time.	If Lygus are present, apply MONITOR or SUPRACIDE up to 3 days prior to placing bees in or around the field. Do not make more than 1 pre-bloom application per crop season. If Temik has been applied, higher Lygus thresholds may be tolerated (>4-6/sweep).	To control low Lygus populations that may appear in seed fields before Temik is activated, apply MSR for nymphs, DIBROM for adults <i>only</i> if Monitor or Supracide has <u>not</u> been used previously.	Apply LANNATE, LORSBAN, or CARZOL if Lygus counts average 10-15 per sweep. Once bees are removed, apply MONITOR or SUPRACIDE if Lygus counts average 10-15 per sweep.