

Western Committee on Crop Pests Guide to Integrated Control of Plant Pests

INSECT MANAGEMENT IN SPECIAL CROPS

(Pulse Crops, Buckwheat, Millet and Canaryseed)

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ALFALFA LOOPER

Management:

| Insecticide | Crop | Rate / acre | Rate / Hectare | Preharvest Interval (days) | Ref |
|---------------------|------------|--------------------|----------------|----------------------------|-----|
| Naled Dibrom | Dry beans | 0.445 – 0.890 L | 1.10 – 2.2L | 4 | - |
| Carbaryl Sevin | Field peas | 1.90 L | 4.7L | 3 | - |
| Methomyl Lannate | Field Peas | 0.206 kg | .510kg | 1 | - |

Restrictions:

methomyl: Do not graze livestock within 10 days.
naled: Do not apply when temperature is over 32°C. Do not graze within 4 days of application

APHIDS

Sampling Methods and Economic Threshold -

Canaryseed: A nominal threshold for aphids in canaryseed is 10 -20 aphids on 50% of stems prior to soft dough stage.

Field peas: Sampling to determine aphid density should be done when 50 to 75% of the pea plants are in flower. Economic thresholds may vary depending on the value of the crop and cost of control, as well as variation in potential seed weight caused by variation in precipitation and heat stress. The economic threshold in peas at \$0.21/kg (\$5.71 per bushel) and average control cost of \$16.63-\$22.86/ha (\$6.73-\$9.25/acre) is 2 to 3 aphids per 8-inch (20 cm) plant tip, or 9 to 12 aphids per sweep, at flowering (4). If the economic threshold is exceeded, a single application of insecticide when 50% of plants have produced some young pods will protect the crop against yield loss and be cost-effective. Cultivars of peas may also vary in their tolerance to feeding by pea aphids, thus economic injury levels may differ between cultivars (5,6). The economic thresholds presented above were developed using “Century” field peas.

The following table relates the yield loss in peas for average aphid counts per sweep or per 20-cm tip of a field pea stem when about 25 % of the crop has begun to flower.

| <u>Aphids per sweep</u> | <u>Aphids per tip</u> | <u>% yield loss</u> |
|-------------------------|-----------------------|---------------------|
| 7 | 1 | 3.4 |
| 10 | 2 | 4.9 |
| 12 | 3 | 6.1 |
| 15 | 4 | 7.1 |
| 16 | 5 | 8.0 |
| 18 | 6 | 8.8 |
| 20 | 7 | 9.6 |
| 21 | 8 | 10.3 |

Soybean Aphid on Soybeans: At least 250 aphids per plant on average and the population is increasing, and plants are in the R1 (beginning bloom) to R5 (beginning seed) growth stages (7).

A binomial sequential sampling plan for soybean aphids, commonly called “speed scouting” has been developed to assist in making soybean aphid treatment decisions (8). With this method, the sampler determines whether a plant has 40 or more aphids or not; plants with less than 40 are considered non-infested, and plants with 40 or more aphids are considered infested. A minimum of eleven plants to as many as 31 plants are sampled using this technique. The parameters used with this method is equivalent to a mean density of 250 aphids per plant. Decisions on whether to treat, continue sampling, or not to treat for aphids are made using the following levels of infested plants:

| Do not treat Resample in 7-10 days | Continue sampling 5 more plants | Treat decision, Confirm in 3-4 days |
|--|---|--|
| 6 or less | 7 to 10 | 11 or more |
| 10 or less | 11 to 14 | 15 or more |
| 14 or less | 15 to 18 | 19 or more |
| 18 or less | 19 to 22 | 23 or more |
| 22 or less | 23 to 26 Stop Sampling. Resample the same field in 3-4 days. | 27 or more Confirm “treat” decision. Resample the same field in 3-4 days. Apply insecticide in 3-4 days if confirmed. |

Lentils: For pea aphids in lentils, a nominal threshold is 30 to 40 aphids per 180° sweep of a 38 cm (15 inch) diameter insect net, and few natural enemies are present, and when aphid numbers do not decline over a 2-day period.

Management:

| Insecticide | Crop | Rate / acre | Rate / Hectare | Pre harvest Interval (days) | Ref |
|-----------------------------|---------------------------------|--------------------|-----------------------|------------------------------------|------------|
| Lambda – Cyhalothrin | Fababeans, Lentil, peas (field) | 34 ml | 84ml | 14 | - |
| Matador/silencer | Soybeans | 34 – 94 ml | 84 – 232 ml | 21 | |
| Matador | Soybeans | 34 ml | 84 ml | 21 | |
| Silencer | Soybeans | | | | |

| | | | | | |
|--|---|---|--|--------------------------------------|---|
| Methomyl Lannate | Peas (field) | 0.206 kg | .510kg | 1 | - |
| Malathion Malathion 500 Malathion 500E | Dry beans Dry beans Peas (field) Canaryseed | 0.56 – 1.21 L 0.61 – 1.11 L 0.91 kg 0.56 L | 1.40 – 3.0L 1.50 –2.74L 2.24 kg 1.4 L | 1 3 3 14 | 1 |
| Diazanon Diazanon 50W Diazanon 500E Diazanon 50 EC | Dry beans | 0.40 kg 0.445 kg 0.45 kg | .988 kg 1.10 kg 1.11 kg | 7 3 7 | - |
| Naled Dibrom | Dry beans | 0.445 – 0.890 L | 1.10 - .420 L | 4 | - |
| Dimethoate Cygon 480 – AG Lagon/Cygon | Dry beans Peas (Field) Soybeans Canaryseed | 0.28 – 0.40 L 0.11 – 0.17 L 0.28 – 0.40 L 0.20 L | .70 - .988 L .271 - .420 L .70 - .988 L .50 L | 7 3–21 (see label) 30 21 | - |
| Endosulfan Thionex EC Thiodan | Dry beans Dry beans | 0.6 – 1.0 L 0.6 – 1.0 L | 1.5 – 2.5 L 1.5 – 2.5L | 2 2 | - |

Restrictions -

- dimethoate: Do not feed or allow livestock to graze treated pea vines within 21 days after application. Do not apply foliar sprays during the heat of the day when temperatures are exceedingly high. Do not graze or feed treated bean forage to livestock.
- endosulfan: dry beans, peas - do not ensile or feed crop refuse (vines, tops, stalks or threshings) to livestock.
peas - treat only if crop is to be mechanically harvested by combine. Apply not more than twice per year.
- methomyl: Do not graze livestock for 10 days after treatment.
- naled: Do not apply when temperature is over 32°C.

References -

1. Wise, Pest. Res. Rep. 1988: 82
2. Moons, Pest. Res. Rep. 1987: 91
3. Baillargeon, Pest. Res. Rep. 1978: 193
4. Maiteki and Lamb, J. Econ. Entomol. 1985: 1449-1454.
5. Soroka and Mackay, Can. Ent. 1990: 1201-1210.
6. Soroka and Mackay, Can. Ent. 1990: 1193-1199.
7. Ragsdale et al., J. Econ. Entomol. 2007: 1258-1267.
8. Hodgson et al. J. Econ. Entomol. 2004: 2127-2136.

CUTWORMS

Cutworms: Army, Dark-sided, Pale western, Red-backed, Variegated and White cutworms

Management:

| Insecticide | Crop | Rate / acre | Rate / Hectare | Preharvest Interval (days) | Ref |
|---|---|------------------|----------------|-------------------------------|-----|
| Lambda – Cyhalothrin Matador/Silencer | Beans (dry), Chickpeas, peas (field), soybeans, Lentils | 34 ml | 84 ml | 14 | |
| Deltamethrin Decis | Lentils | 80 ml | 197 ml | 30 | |
| Permethrin Pounce, Perm up | Lentils, peas (field) | 73 – 158 ml | 180 – 390 ml | Treat Prior to six leaf stage | |
| Chlorpyrifos Lorsban, pyrinex, nufos, citadel | Lentils | 0.354 – 0.486 ml | .874 – 1.20 ml | 21 - 60 | 1,2 |

Restrictions -

chlorpyrifos: Apply once per season in 50 - 200 L water/ha.

Note -

permethrin: Use the high rate when the soil surface is extremely dry, when cutworms are nearing maturity or the infestation is heavy. Apply in the evening or at night when cutworms are most active. Do not disturb soil surface for 5 days after treatment.

References -

1. Allen and Askew, Pest. Res. Rep. 1971:154.
2. Askew *et al.*, Pest. Res. Rep. 1973:151.

EUROPEAN CORN BORER**Management :**

| Insecticide | Crop | Rate / acre | Rate / Hectare | Preharvest Interval (days) | Ref |
|---|-----------|-------------|----------------|----------------------------|-----|
| Lambda – Cyhalothrin Matador/Silencer | Dry Beans | 34 ml | 84 ml | 14 | - |

GRASSHOPPERS**Economic Threshold -**

Lentils: The average yield loss is estimated to be approximately 2% for every one grasshopper/m² (1). For lentils at \$0.30/kg, an insecticide application would be warranted in areas within lentil fields where the grasshopper density exceeds 2 grasshoppers/m² at flowering. Grasshopper damage tended to be most severe within the field margin (5-10 m), therefore, producers should scout throughout the field and treat only regions of the field where control measures are warranted. In most case, only the field perimeters and the source areas (grass ditches and fence lines) would require treatment (1).

Management -

| Insecticide | Crop | Rate / acre | Rate / Hectare | Preharvest Interval (days) | Ref |
|--|--|------------------------------------|-----------------------|-----------------------------------|------------|
| Carbaryl Eco Bran | Beans | 0.8 – 1.6 kg | 1.97 – 3.95 kg | 5 | - |
| Lambda – Cyhalothrin Matador/Silencer | Chickpeas, Lentils. Peas (field), Soybeans | 34 ml | 84 ml | 14 | - |
| Deltamethrin Decis | Lentils | 40 – 60 ml (ground) 60 ml (air) | 98.8 – 148 ml | 30 | - |
| Malathion Malathion 500 Malathion 500E | Lentils | 0.68 L 0.69 L | 1.68 L 1.70 L | 30 14 | - |
| Chlorpyrifos Lorsban/ pyrinex/nufos/citadel | Lentils | 0.235 – 0.486 L | .58 – 1.2 L | 21 - 60 | - |

Restrictions -

deltamethrin: Do not feed treated straw or crop residue to livestock within 1 day of application. Do not graze treated fields. Do not apply more than 3 times per year. Apply not more than twice per year by air.

ground application: Use 100 - 200 L water/ha. Do not apply if temperature exceeds 25°C.

aerial application: Use 11-22 L of water per ha. Do not apply more than 2 times per year. Do not apply when wind exceeds 8 km/h (5 mph). Use high rate only.

Notes -

deltamethrin: Best control achieved when grasshoppers in the 2 - 4 nymph stages. Observe buffer zone around sensitive areas: 100 m. when applying by air, 15 m. when applying by ground.

References -

1. Olfert and Slinkard, Crop Protection. 1999:527-530.

GREEN CLOVERWORM

Economic Injury Level: In soybeans, economic injury levels have been developed to reflect the amount of precipitation and canopy development (1). During drought, when canopy development is seriously impaired, use an economic injury level of 10 green cloverworms per m of soybean row. Use an economic injury level of 22.5 green cloverworms per m of soybean row under normal to above-normal precipitation conditions.

Management:

| Insecticide | Crop | Rate / acre | Rate / Hectare | Preharvest Interval (days) | Ref |
|--------------------|-------------|--------------------|-----------------------|-----------------------------------|------------|
|--------------------|-------------|--------------------|-----------------------|-----------------------------------|------------|

| | | | | | |
|------------------------------|-----------|-------------|-------------|---|--|
| Endosulfan Thiodan | Dry Beans | 0.6 – 1.0 L | 1.48 – 2.47 | 2 | |
|------------------------------|-----------|-------------|-------------|---|--|

References -

- Ostliei & Pedigo, J. Econ. Ent. 1985:437-444.

LEAFHOPPERS**Economic Thresholds:**

Dry beans: Unifoliate stage – 0.25 leafhoppers per trifoliate;
 Second trifoliate stage – 0.5 leafhoppers per trifoliate
 Fourth trifoliate stage – 1 leafhopper per trifoliate
 First bloom – 2 leafhoppers per trifoliate

Management:

| Insecticide | Crop | Rate / acre | Rate / Hectare | Preharvest Interval (days) | Ref |
|---|---|------------------------------|------------------------------|-----------------------------------|------------|
| Thiamethoxam Cruiser Maxx Beans | Dry Beans | Seed treatment | | | - |
| Lambda – Cyhalothrin Matador/Silencer | Dry Beans, Chickpeas, Fababean, Lentils, | 34 ml | 84 ml | 14 | - |
| Carbaryl Sevin | Dry Beans | 1.01 L | 2.49 L | 5 | - |
| Malathion Malathion 500 Malathion 500E | Dry Beans Dry Beans, Peas (field) | 0.56 – 1.21L 0.61 – 1.11L | 1.38 – 2.9L 1.50 – 2.74L | 1 3 | - |
| Diazanone Diazanone 50W Diazanone 50 EC | Dry Beans | 0.40 kg 0.445 L | .988 kg 1.10 L | 7 7 | - |
| Dimethoate Cygon 480 AG Lagon, Cygon 480 EC, Cygon 480 Ag | Dry Beans, Soybeans | 0.28 – 0.40L 0.28 – 0.40L | .69 - .988 L .69 - .988 L | 7 30 | |
| Endosulfan Thionex/Thiodan | Dry Beans | 0.6 – 1.0 L | 1.48 – 2.47 L | 2 | - |

Restrictions -

dimethoate: Do not graze or feed treated forage to livestock.
 endosulfan: Do not ensile or feed crop refuse to livestock.
 malathion: peas: Do not apply unless foliage is dry.

LYGUS BUGS

Management:

| Insecticide | Crop | Rate / acre | Rate / Hectare | Preharvest Interval (days) | Ref |
|--|--|------------------------------|------------------------------|-----------------------------------|------------|
| Lambda – Cyhalothrin Matador/Silencer | Dry Beans, Fababeans, Lentils, Soybeans | 34 ml | 84 ml | 14 | - |
| Carbaryl Sevin | Dry Beans | 2.12– 2.59 L | 5.23 – 6.39 L | 5 | - |
| Dimethoate Cygon 480-AG Lagon/ Cygon 480 EC / Cygon 480-AG | Dry Beans, Soybeans | 0.28 – 0.40L 0.28 – 0.40L | .69 - .988 L .69 - .988 L | 7 30 | |

PEA LEAF WEEVIL

Sampling Methods and Economic Threshold: A nominal threshold is: feeding damage on the terminal leaves (also known as the emerging node or clam leaf) on 1 out of 3 plants. Feeding damage is a very characteristic crescent notching. When scouting, damage estimates should be done on at least 10 plants at each of 5 spots along the edge of the field. Then again at another 5 spots more than 100 m into the field. Following this assessment if 1 out of 3 plants (or more) are showing damage on the terminal leaf then control measures may be warranted. If control measures are to be taken, spraying should occur prior to the 5 to 6 node stage. The preference for earlier application is to minimize the amount of egg laying. Application should only occur if there is new feeding damage on the terminal leaves (clam leaf).

Management:

| Insecticide | Crop | Rate / acre | Rate / Hectare | Preharvest Interval (days) | Ref |
|---|-------------|--|-----------------------|-----------------------------------|------------|
| Thiamethoxam Cruiser Maxx Pulses | Field Peas | 50 – 83 ml of Cruiser 5FS / 100 kg seed | | | - |
| Lambda – Cyhalothrin Matador/Silencer | Field Peas | 34 ml | 84 ml | 14 | - |

SEEDCORN MAGGOT**Management:**

| Insecticide | Crop | Rate | Preharvest Interval (days) | Ref |
|---|-------------------------|--|-----------------------------------|------------|
| Thiamethoxam Cruiser Maxx Beans | Dry Beans, Soybeans, | 50 – 83 ml of Cruiser 5FS per 100 kg seed | | - |

| | | | | |
|----------------------------------|---------------------------------------|-----------------------------|----|---|
| Agrox CD, Agrox B-2, DCT | Dry Beans, Field Peas, Soybeans | Seed Treatment | | - |
| Diazinon Diazinon 50 W | Dry Beans, Field Peas, Soybeans | 20 g/300 ml water/ 4 L seed | 14 | - |

SPIDER MITES

Management

| Insecticide | Crop | Rate / acre | Rate / Hectare | Preharvest Interval (days) | Ref |
|---|-------------|--------------------|-----------------------|-----------------------------------|------------|
| Malathion Malathion 500E | Field Peas | 0.91 L | 2.24 L | 3 | - |
| Dimethoate Lagon/cygon 480 EC, Cygon 480-AG | Soybeans | 0.40 L | .988 L | 30 | - |

Restrictions -

- dimethoate: Do not apply more than 3 times per season. Do not feed or allow livestock to graze treated forage.
- malathion: Do not apply unless foliage is dry.

STINK BUGS**Management:**

| Insecticide | Crop | Rate / acre | Rate / Hectare | Preharvest Interval (days) | Ref |
|--------------------------|-------------|--------------------|-----------------------|-----------------------------------|------------|
| Carbaryl Sevin | Dry Beans | 2.12 – 2.59 L | 5.25 – 6.4 L | 5 | - |

VARIEGATED CUTWORM**Management:**

| Insecticide | Crop | Rate / acre | Rate / Hectare | Preharvest Interval (days) | Ref |
|-----------------------------------|-------------|-------------------------------|------------------------------|-----------------------------------|------------|
| Carbaryl Sevin XLR Plus | Dry Beans | 30 – 35 ml/100 m of row | 74 -86 ml/100 m of row | 5 | - |

WIREWORMS**Management:**

| Insecticide | Crop | Rate | Preharvest Interval (days) | Ref |
|--|--|---|-----------------------------------|------------|
| Thiamethoxam Cruiser Maxx Beans Cruiser 350FS | Dry Beans, Soybeans Buckwheat, Millet | 83 ml of Cruiser 5FS / 100 kg of seed 29 – 86 ml / 100 kg of seed | | - |