

Insect Control in Small Grains (for Grain only) – 2020

David Owens, Extension Entomologist and Bill Cissel, Extension IPM Agent, University of Delaware
(adapted from VA Pest Management Guide, section written by D. Ames Herbert Jr, retired Extension Entomologist)

Additional small grain insect pest information can be found here:

<https://www.udel.edu/academics/colleges/canr/cooperative-extension/sustainable-production/pest-management/vegetable-fruit-field/small-grains/>

NOTE: The label is the law. Be sure to read the label before making any pesticide applications and observe all label restrictions including but not limited to days from last application to harvest.

OLF = Other labeled formulations

True Armyworm and Grass Sawfly

1. Sampling: Armyworms and grass sawflies should be detected while they are still small and easier to control. Check fields once each week starting in late April. Examine fields for clipped heads and larvae throughout the field as well as along field margins and in lodged areas.

Sawflies - Young sawflies often blend into the vegetation. A sweep net is helpful in detecting the initial presence of sawflies in a field. Since sawflies feed during the day and can be found on the plants, sample plants by shaking the wheat stalks of two rows toward the inner space between the rows. Examine 5 linear feet between two rows in at least 10 sites. Count the number of worms and note any head clipping at each site.

True Armyworm - Armyworms often escape detection during the day since they hide under debris and weeds and feed at night. Examine first the debris and undergrowth on the ground surface along field margins and lodged areas. Check for small armyworms curled in a C-shape at the base of plants or under debris and weeds. Examine 5 linear foot of row in at least 10 locations throughout a field, count the worms and note any leaf defoliation and/or head clipping. Armyworm frass or droppings also may be found on the soil surface.

2. Decision Making: As a general rule, barley should be treated if the number of armyworms exceeds one per linear foot between rows. In wheat, armyworms tend to nibble on the tips of kernels rather than clip heads; thus, populations of one to two worms per linear foot between rows are required to justify control. In high management wheat fields, treatment is recommended when armyworm levels exceed 3 to 5 per square foot of surface area. The grass sawfly threshold is 0.4 larvae per foot of row for wheat or barley. Note that small grain fields with mixed infestations of armyworms and sawfly caterpillars may need treatment even if worm counts of each pest do not exceed threshold levels.

Insecticides Labeled for Control of True Armyworm and Grass Sawfly					
NOTE: Higher labeled rates needed for Grass Sawfly					
Insecticide (Formulation)	Mode of Action Group	Amount active ingredient per acre	Amount product per acre	PHI (days)	Remarks
beta-cyfluthrin (Baythroid XL)	3	0.014 to 0.019 lb.	1.8 to 2.4 fl. oz.	30	RESTRICTED USE.
chlorantraniliprole + lambda-cyhalothrin (Besiege)	3 + 28	0.065 + 0.033 lb.	10 fl. oz.	30	RESTRICTED USE.


cyfluthrin (Tombstone 2 EC)	3	0.028 to 0.038 lb.	1.8 to 2.4 fl. oz.	30	RESTRICTED USE. Wheat Only
lambda-cyhalothrin (Warrior II) or OLF	3	0.025 to 0.03 lb.	1.60 to 1.92 fl. oz.	30	RESTRICTED USE
zeta-cypermethrin (Mustang Maxx)	3	0.02 to 0.025 lb.	3.2 to 4.0 fl. oz.	14	RESTRICTED USE
spinetoram (Radiant SC)	5	0.023 to 0.047 lb.	3.0 to 6.0 fl. oz.	21	True Armyworm Only
spinosad (Blackhawk)	5	0.025 to 0.075 lb.	1.1 to 3.3 oz.	21	True Armyworm Only
chlorantraniliprole (Coragen 1.67)	28	0.02 to 0.025 lb.	3.2 to 4.0 fl. oz.	14	RESTRICTED USE

Grain Aphids (Bird-cherry Oat Aphid, English Grain Aphid, Greenbug)

1. Sampling: In the fall, examine 1 linear row-ft in 10 sites, estimate the number of aphids per foot. After head emergence, examine 10 grain heads in 10 sites until early dough, counting aphids per head and noting beneficial insect activity.

Do not bias sampling by checking a few heads along the field margins where infestations usually are higher. Aphids usually are clustered as colonies among bracts of the grain head and may move slightly when disturbed. Anything that actively moves when disturbed is probably a predator. Make a note of the ratio of predators to aphids.

2. Decision Making: The need for treatment depends primarily on the number of aphids, plant maturity, and the presence of natural enemies. Treatment during the grain head stage is generally considered when aphid numbers exceed 15- 25 per head, especially if the crop is late, cool weather is forecasted and the natural enemy complex is lacking. Control is not advised if the crop is approaching the hard dough stage and where there is good predator/parasite activity. Ratios of one or more predators to every 50 to 100 aphids are sufficient to achieve biological control.

Insecticides Labeled for Control of Aphids During the Head Stage					
Insecticide (Formulation)	Mode of Action Group	Amount active ingredient per acre	Amount product per acre	Time limits: days before harvest (PHI)	Remarks
dimethoate (Dimethoate 400) or OLF	1B	0.25 to 0.375 lb.	0.5 to 0.75 pt.	35	Wheat Only
malathion (Malathion 57 EC)	1B	0.938 to 1.0 lb.	1.5 to 1.6 pt.	7	GENERAL USE Barley and Wheat Only
beta-cyfluthrin (Baythroid XL)	3	0.014 to 0.019 lb.	1.8 to 2.4 fl. oz.	30	RESTRICTED USE
cyfluthrin (Tombstone 2 EC)	3	0.028 to 0.038 lb.	1.8 to 2.4 fl. oz.	30	RESTRICTED USE Wheat Only
lambda-cyhalothrin (Warrior II) or OLF	3	0.03 lb. 0.03 lb.	1.92 fl. oz.	30	RESTRICTED USE
lambda-cyhalothrin + thiamethoxam (Endigo ZC)	3 + 4A	0.031 + 0.041 lb.	4.5 fl. oz.	30	RESTRICTED USE Barley Only 
flupyradifurone (Sivanto 200 SL)	4D	0.938 to 1.0 lb.	1.5 to 1.6 pt.	7	GENERAL USE Barley and Wheat Only

Cereal Leaf Beetle

1. Sampling: In many areas of the Mid-Atlantic, cereal leaf beetle eggs are heavily parasitized; thus, the larval stage is the best indicator of the potential yield loss. Begin sampling fields in late March to early April as soon as adult beetles are observed. Examine 5-10 tillers (entire stems) in at least 10 locations throughout a field. Count the number of eggs and larvae per stem and estimate the percent defoliation. If only eggs are found, the field should be re-sampled at a later date when eggs have hatched and larvae are detected.

2. Decision Making: A number of introduced parasites have been instrumental in keeping cereal leaf beetle populations below economic damage levels. Also, favorable planting dates may help suppress populations. Wheat planted early in the fall immediately after the Hessian fly-free date will be more advanced in growth the next spring than late-planted small grains. These early plantings will be less attractive to and more tolerant of the beetles when they peak in the spring. **Cereal leaf beetle infestations on spring-planted oats cannot be avoided by means of planting date.** Generally, barley is more advanced in maturity and thus less attractive when beetles are active.

Adults can move into small grain in mid-March and deposit eggs which hatch into larvae. Larvae feed on small grain by stripping leaves of valuable photosynthetic tissue. New research indicated that damage to both flag and stem leaves reduces yield. New research has shown that the best control is achieved if treatments are applied when larvae are small. Treatment should be considered if 25, total, eggs and small larvae are found on 100 stems. Of that 25, at least 1/2 should be larvae. Research indicates that the greatest damage can occur between the flowering and the soft dough stage. Once wheat reaches the hard dough stage, beetle damage has little effect on yield and controls are not needed.

Insecticides Labeled for Control of Cereal Leaf Beetle					
Insecticide (Formulation)	Mode of Action Group	Amount active ingredient per acre	Amount product per acre	PHI (days)	Remarks
beta-cyfluthrin (Baythroid XL)	3	0.008 to 0.014 lb.	1.0 to 1.8 fl. oz.	30	RESTRICTED USE.
cyfluthrin (Tombstone 2 EC) or OLF	3	0.016 to 0.028 lb.	1.0 to 1.8 fl. oz.	30	RESTRICTED USE. Wheat Only
lambda-cyhalothrin (Warrior II) or OLF	3	0.02 to 0.03 lb.	1.28 to 1.92 fl. oz.	30	RESTRICTED USE.
lambda-cyhalothrin + thiamethoxam (Endigo ZC)	3 + 4A	0.031 + 0.041 lb.	4.5 fl. oz.	30	RESTRICTED USE Barley Only
zeta-cypermethrin (Mustang Maxx)	3	0.011 to 0.025 lb.	1.76 to 4.0 fl. oz.	14	RESTRICTED USE
spinetoram (Radiant SC)	5	0.016 to 0.047 lb.	2.0 to 6.0 fl. oz.	21	GENERAL USE



Hessian Fly

The Hessian fly is not a major pest in the Mid-Atlantic States because small grains normally are planted after the adult flies occur ("fly-safe" date). There are no insecticidal control measures that can be applied once the field becomes infested. Control is based entirely upon prevention. The important components of preventative fly management include: planting wheat only after the fly-safe planting date; destroying volunteer wheat plants by tillage methods; and planting resistant varieties, especially when planting very early. Check the following table for the fly-safe dates in your area and contact your local Extension agent for information on resistant varieties. However, flies can infest fields planted after that date by moving from volunteer grain plants in or from nearby fields.

Safe Planting Dates

Delaware counties

New Castle	Oct. 3	Kent	Oct. 8	Sussex	Oct. 10
-------------------	--------	-------------	--------	---------------	---------
