

## INSECTICIDE RECOMMENDATIONS FOR SMALL GRAINS - 2023

(Barley, Oats, Wheat)

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Small grains are multi-purpose crops that occupy an important place in production systems. Small grains are attacked by a wide variety of insect pests, but good cultural practices can greatly reduce the potential for economic losses:

- Plant at the proper time (see [AGR-18](#)). Planting too early can result in problems with fall armyworms, Hessian flies, aphids, wheat curl mite and diseases carried by insects and mites.
- Use recommended seeding rates. Stands that are too thick provide good over-wintering sites for pests and are prone to armyworm infestations in the spring.
- Do not apply excess nitrogen. Luxuriant growth promotes aphid and armyworm problems. To establish need and estimate timing of insect control in small grains, fields should be checked weekly when temperatures are above 50°F from emergence to maturity.
- Know the difference between pest insects and beneficial insects.
- Check with your County Extension Agent for Agriculture about training in pest identification, damage thresholds, and control measures (Integrated Pest Management and Pesticide Safety Education training).

### Additional Information

In addition to these recommendations the producer is advised to review [IPM-4 Kentucky IPM Manual for Small Grains](#). This publication will provide information about identification, life cycle, scouting techniques, and threshold values for the common pests of small grains. Also, additional information can be found on the [Comprehensive Guide to Wheat Management in Kentucky](#) at: <http://www2.ca.uky.edu/agcomm/pubs/id/id125/id125.pdf>

Additionally, you may find useful information about a specific pest in our ENTFACT series. These fact sheets may be found on the Entomology web pages at: <http://entomology.ca.uky.edu/entfacts>  
These and other publications and educational materials are also available to the producer through your County Extension Office.

### Use Insecticides Properly

Products listed in this publication are not the only products labeled for use. These products are commonly used and generally available in Kentucky. You may find many other products with different trade names containing the same active ingredient. Be sure the product you choose is labeled for the intended use and registered in Kentucky.

This publication is an abbreviated guide; it is **not a substitute for a product label**. Before using an insecticide, read the entire label. Note sections containing directions for use, and the warning and precautionary statements. Be thoroughly familiar with the proper safety equipment (i.e., goggles, protective suits, respirators, etc.) required to afford maximum protection. Those involved in control operations should always know the name of the chemical being used and the particular concentration being applied.

Chemicals listed in **bold italics** are **Restricted Use** pesticides. Persons buying, using, or supervising the use of these pesticides must be certified as competent to do so. Certification training is available from your county extension agent for agriculture. Check <https://entomology.ca.uky.edu/uk-pesticide-safety-education-program-psep> for information on certification.

### Insecticide Use for Plant Health Response

It is my position that insecticides should only be used to reduce, prevent, avoid, or mitigate insect pests or problems related to insect activity (such as the vectoring of certain diseases). I do not encourage nor recommend the use of insecticides for plant health responses in the absence of arthropod pest management. I feel that insecticides should be used to protect the yield and quality of agricultural products. In my opinion, using insecticides for reasons other than pest management unnecessarily increases the potential for non-target impacts, development of insecticide resistance, and exposure of mixers and applicators

### Multi- Active Ingredient Insecticides

There are a number of products on the market which contain multiple insecticide active ingredients (AIs). Examples are Cobalt (chlorpyrifos and gamma-cyhalothrin), Besiege (lambda-cyhalothrin and chlorantraniliprole), Brigadier (bifethrin and imidacloprid), Hero (zeta-cypermethrin and bifethrin), Endigo (lambda-cyhalothrin and thiamethoxam), Leverage (imidacloprid and cyfluthrin), Swagger (bifethrin and imidacloprid), Voliam Xpress (lambda-cyhalothrin and chlorantraniliprole), and Voliam Flexi (thiamethoxam and chlorantraniliprole). These products are not recommended for use when products containing a single insecticide AI, provides comparable control unless there is a specific need to use multiple AIs for resistance management of specific, difficult to manage pests. The use of multiple insecticide AIs when a single AI will suffice may expose sub-economic pest populations to selection pressure and increases the likelihood of non-target effects on pollinators and natural enemies of arthropod pests.

### Selecting Which Insecticide to Use

Using the same insecticide over and over is never a good idea. This may lead to resistance within the targeted pest population. The tables below are set up to allow you to select among products. While products may have different trade names, they may have the same active ingredient or a different active ingredient but the same mode of action. Note that the Trade name (above) and active ingredient name (below) are listed in the left most column. In addition, the second column will list the active ingredient's **Mode of Action (MOA)**. The mode of action is an indication of how the insecticide kills the pest. Choosing products with different modes of action will aid in avoiding resistance.

### Seed Treatment for Aphid Control

Use only on very early planting in fields with a history of barley yellow dwarf virus problems.

The seed applied insecticides Cruiser (thiamethoxam) and Gaucho (imidacloprid) are registered for use on Wheat and Barley. These products must be applied by a commercial seed treater. The manufactures, Syngenta and Bayer respectively, control the rates and combination of products. See your seed supplier for information.

### Post Emergence Treatments for Aphids

See: Aphids and Barley Yellow Dwarf in Kentucky Grown Wheat. Entfact-121:  
<http://entomology.ca.uky.edu/ef121>

The most important time for controlling aphids to prevent BYD is the first 30 days following emergence. The second most important time is the second 30 days following emergence. Generally, an insecticide applied after the wheat reaches Feeke's 4.0 does little good. Current research data support the following treatment guidelines.

Numbers of aphids per foot of wheat row required to support an insecticide application for management of BYD.

<u>Crop Age</u>	<u>Aphids/Foot of Row</u>
30 days post emergence	3
30 to 60 days post emergence	6
More than 60 days post emergence	10

Delayed planting until after the Hessian fly free date (Oct. 10 north, to Oct. 15 south) will reduce aphid pressure in the fall. In late spring, treat only if large numbers of aphids are present and plants are exhibiting stress symptoms, or if there are an average of 50 or more aphids per head during the grain filling stage.

### Foliar Treatments for Aphids

Insecticide	MOA	Rate per Acre	Days to Harvest
<b>Baythroid XL</b> (cyfluthrin)	3A	1.8 to 2.4 fl. oz.	30 (Grain) 3 (grazing or forage)
<b>Fastac EC</b> (alpha-cypermethrin)	3A	1.8 to 3.9 fl oz	14 day PHI

<b>Mustang Max</b> (Wheat only) (zeta-cypermethrin)	3A	3.2 to 4.0 fl. oz.	14 (grain, forage & hay)
<b>Warrior II</b> (lambda-cyhalothrin)	3A	1.28 to 1.92 fl. oz.	30 (Grain & Hay)

#### Foliar Treatments for Armyworms

See: Armyworms in Small Grains. Entfact-111:

<http://entomology.ca.uky.edu/ef111>

Insecticide	MOA	Rate per Acre	Days to Harvest
<i>Bacillus thuringiensis</i> "B.t."	11B1 &11B2	Aid in control of armyworms can be obtained using many products containing "B.t.". Some examples are Dipel, Javelin and Lepinox. Check label for details. Days to Harvest = 0.	
<b>Baythroid XL</b> (cyfluthrin)	3A	1.8 to 2.4 fl. oz.	30 (Grain) 3 (grazing or forage)
<b>Fastac EC</b> (alpha-cypermethrin)	3A	1.8 to 3.8 fl oz	14 day PHI
Malathion 5 (Barley & Wheat) (malathion)	1B	1.6 fl. oz. (Oats & Wheat) 2.0 pts. (Barley)	7
<b>Mustang Maxx</b> (Wheat Only) (zeta-cypermethrin)	3A	1.76 to 4.0 fl. oz	14 (Grain, forage & hay)
<b>Prevathon</b> (chlorantraniliprole)	28	14 to 20 fl. oz.	1 day
Radiant SC (spinetoram)	5	3.0 to 6.0 fl. oz.	21 (grain or straw) 3 (forage fodder or hay)
Tracer (spinosad)	5	1.5 to 3.0 fl. oz.	21 (Grain or straw) 3 (forage or hay)
<b>Warrior II</b> (lambda-cyhalothrin)	3A	1.28 to 1.92 fl. oz.	30 (Grain & hay)

#### Foliar Treatment for Cereal Leaf Beetle

See: Cereal Leaf Beetle in Kentucky Wheat. Entfact-107:

<http://entomology.ca.uky.edu/ef107>

Treatment is justified if population size reaches one cereal leaf beetle (adult or larvae) per stem.

Insecticide	MOA	Rate per Acre	Days to Harvest
<b>Baythroid XL</b> (cyfluthrin)	3A	1 to 1.8 fl. oz.	30 (Grain) 3 (grazing or forage)
<b>Fastac EC</b> (alpha-cypermethrin)	3A	1.8 to 3.8 fl oz	14 day PHI
Malathion 5 (malathion)	1B	1 to 1 1/2 pts.	7
<b>MustangMax</b> (Wheat Only) (zeta-cypermethrin)	3A	1.76 to 4 fl. oz.	14 (Grain, forage & hay)
Radiant SC (spinetoram)	5	2 to 6 fl. oz.	21 (grain or straw) 3 (forage fodder or hay)

Tracer (Spinosad)	5	1 to 3 fl. oz.	21 (Grain or straw) 3 (forage or hay)
<b>Warrior II</b> (lambda-cyhalothrin)	3A	1.28 to 1.92 fl. oz.	30 (Grain & hay)

**Foliar Treatments for Grasshoppers**

See: Three Common Kentucky Grasshoppers and their Natural Enemies. Entfact-116:

<http://entomology.ca.uky.edu/ef116>

Insecticide	MOA	Rate per Acre	Days to Harvest/Forage
<b>Baythroid XL</b> (cyfluthrin)	3A	1.8 to 2.4 fl. oz.	30 (Grain) 3 (grazing or forage)
Dimethoate 4 (Wheat Only) (dimethoate)	1B	3/4 pt.	35 (Grain) 14 (Grazing)
<b>Fastac EC</b> (alpha-cypermethrin)	3A	3.2 to 3.9 fl oz	14 day PHI
<b>Mustang Max</b> (Wheat Only) (zeta-cypermethrin)	3A	3.2 to 4 fl. oz.	14 (Grain, forage & hay)
<b>Warrior II</b> (lambda-cyhalothrin)	3A	1.28 to 1.92 fl. oz.	30 (Grain & hay)

**Fall Armyworm (FAW)** is an occasional pest of wheat especially if planted early. If infestation occurs FAW may be expected to remain active until the 1<sup>st</sup> "Killing" frost. If the population exceeds four larvae per square foot, control is advised. Baythroid, Mustang Max, and Warrior and their generics are labeled for use on wheat. Consult the label for specific application information.

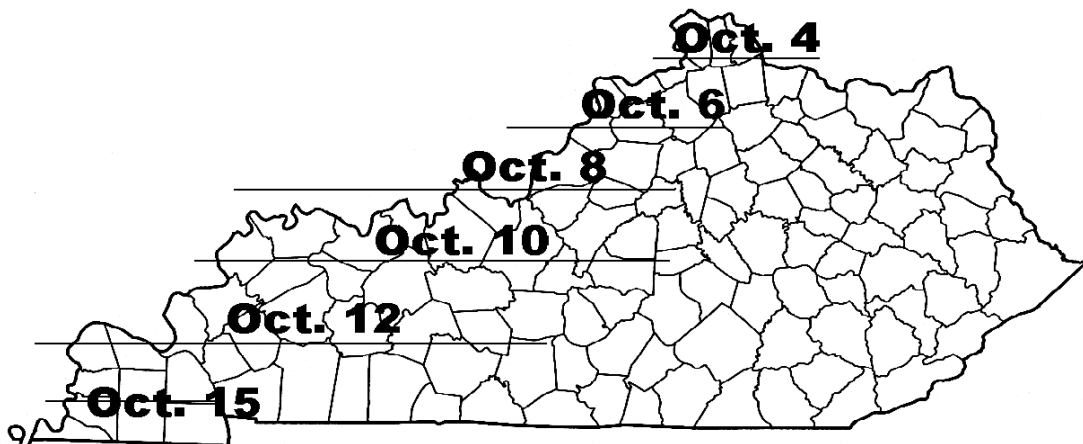
**HESSIAN FLY**

See: Hessian Fly in Kentucky Wheat. Entfact-101:

<http://entomology.ca.uky.edu/ef101>

Delay in planting until October 10 (north) or October 15 (south) will control this fly. No chemical treatments are recommended.

Map showing normal safe dates for sowing wheat to escape injury by the Hessian fly. These are approximate and will vary some from year to year.



## Products for Control of Insect Pests in Stored Small Grains

(See: Controlling Insect in Stored Grain. Entfact-145.  
<http://www.uky.edu/Agriculture/Entomology/entfacts/pdfs.entfa145.pdf>)

The availability of stored grain insecticides is undergoing continuous change. Always check the label of the product to ensure that you use it correctly

### “Clean-out” Fumigant

Applied to boots of elevators, beneath false floors, etc. This is an “empty” space fumigation targeted at the space beneath the perforated floor in a metal grain bin. Fumigant is applied on a volume not bushel basis.

See the **WARNING** below.

**Phostoxin, Fumitoxin, etc.** (aluminum phosphide)                      tablets 30-140 / 1000 cubic feet.  
    pellets 150-700 / 1000 cubic feet

Note: Applied by volume NOT by bushels.

Aluminum phosphide is not significantly heavier than air. Because of its light and penetrating nature very close attention must be paid to sealing the area to be treated.

### Bin Surface Applications

Enough spray to treat **1,000 ft.sq. of bin surface**. Use only in empty bins.

Centynal (deltamethrin) ..... 0.25 to 1.5 fl. oz. in 1.0 gal  
 Diacon-D IGR (S-methoprene) ..... 1.5 oz.  
 Pyronyl (pyrethrin)..... 1-1/3 pint in 9.6 gal. water  
 Storcide II (deltamethrin + chlorpyrifos-methyl)..... 1.8 fl. oz. in 1 gal  
 Tempo SC Ultra (cyfluthrin) ..... 0.27 fl. oz. **(Do NOT apply to grain.)**  
 Insecto, etc. ....1 lb.  
 (silicon dioxide, from diatomaceous earth)

### Grain Protectants

Applied directly to stored small grains.  
 Do not use the same compound for both Bin Surface and Grain protection.

**Amount per 1,000 bu.**

	Wheat	Barley	Oats
Centynal (deltamethrin)	9.14 fl. oz.	7.31 fl. oz.	4.88 fl. oz. in 5.0 gal.
Diacon-D IGR (s-methoprene)	8-10 lb.	8-10 lb.	8-10 lb.
Insecto (silicon dioxide, from diatomaceous earth)	1 to -2.0 lb. / Ton	1 lb. / Ton	1 to -2 lbs. /Ton
<b>Note: Change in standard tons not bushels!</b>			
Pyronyl (pyrethrin)	1 pint in 3-5/8 gal.	1 pint in 3-5/8 gal.	1 pint in 3-5/8 gal
Sensat (spinosad)	10.5 fl. oz.	8.2 fl. oz	5.9 fl. oz. in 5.0 gal. water
Storcide II (deltamethrin + chlorpyrifos-methyl)	12.4 fl. oz.	9.9 fl. oz.	6.6 fl. oz.

### Grain Surface "Cap Out" Treatments

Applied directly to the top surface of stored small grains for Indian Meal Moth control.

1,000 ft. sq. (mixed to 4 inches deep)

Biobit HP (B.t.).....	3.0 oz.
Dipel DF (B.t.) .....	0.5 lb.
Diacon-D IGR (s-methoprene) .....	8.0 lb.
Pyronyl (pyrethrin) .....	1 pint in 2-3/8 gal. water. Apply 1 to 2 gal.
.....	of mixture and rake into a depth of 4 in.
Sensat (spinosad) .....	2.6 fl. oz. in 2.0 gal

Indian meal moth larvae can be controlled by many products containing the active ingredient *Bacillus thuringensis* "B.t.". Biobit, Dipel and Javelin are just examples of these products. B.t. products will not control beetles and weevils.

Note: Indian meal moth adults may be controlled by hanging DDVP Resin strips (Vapona) in the head space over the grain mass. Use 1 strip for each 1,000 cubic feet of air space over the grain. One treatment will last about 3 months.

### Bulk Grain Fumigation

Amount of Fumigant to be applied/1,000 bu. stored small grains.

<b>Phostoxin, Fumitoxin, etc.</b> (aluminum phosphide)	tablets	40 to 180 / 1,000 bu.
	pellets	200 to 900 / 1,000 bu.

Note: Economic thresholds are hard to determine for stored grain, but these numbers should provide a guide to when fumigation will be profitable. Rice weevil or lesser grain borer 1 insect / qt of grain. Red flour beetle, rusty grain beetle and other bran bugs 5 insects / qt of grain. Successful fumigation includes consideration of many variables, use these fumigant amounts as guide and consult the label of the product you choose.

**WARNING:** Fumigation is a complicated and dangerous technique. If at all possible, hire a commercial fumigator. If a commercial fumigation is not possible consult the label of the product you have chosen to use and follow it to the letter. Note that the Aluminum phosphide label underwent major revision in recent years and now contains significant requirements for pre-planning and documentation of the fumigation and access to considerable safety equipment. In addition, this product is currently undergoing another review and may have additional changes in the near future.

**Note:** Diacon-D IGR and Insecto are dust-based formulations. Wear dust appropriate mask, gloves, and protective clothing when handling or applying.