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Producing sorghum (milo) for grain is important in many Kentucky farm management systems. Grain sorghum is subject to infestation by a variety of insect pests. However, following a few good production practices can greatly reduce insect pest infestations.

- To establish need and estimate proper timing for grain sorghum insect control, fields should be sampled at least weekly from emergence to maturity.
- Plant at the proper time, usually as soon as possible after the soil temperature reaches 65° - 70° F. (See AGR-18-Grain & Forage Crop Guide for Kentucky). Planting too early may result in infestation by greenbugs and chinch bugs, while late planting will increase problems with sorghum midge, fall armyworm, and sorghum webworm.
- Do not plant in fields infested with Johnsongrass.
- Do not make sequential plantings- strive for even bloom in fields.
- Know the difference between pest 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).

Additional Information

IPM-5, Kentucky IPM Manual for Grain Sorghum provides information about identification, life cycle, scouting techniques, and threshold values for the common pests. It is available at: <http://www.uky.edu/Agriculture/IPM/ipm.htm>.

Fact sheets on specific pests are posted at: <http://www.uky.edu/Agriculture/Entomology/entfacts.htm>

This publication and other educational materials are also available to the producer through your County Extension Office.

Using 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 is registered in Kentucky.

This publication is an abbreviated guide; it is not a substitute for a product label. Before using any pesticide, read the entire label. Note the sections containing directions for use, restrictions, and the warning and precautionary statements. The user takes full responsibility for any deviation from label directions. The user should be thoroughly familiar with the proper safety equipment required (i.e. goggles, protection suits, respirators, etc.) to afford maximum protection. It is a good idea for all persons to know exactly what is being applied and at what rate.

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 <http://pest.ca.uky.edu/PSEP/welcome.html> 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.

Multiple 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 (bifenthrin and imidacloprid), Hero (zeta-cypermethrin and bifenthrin), Endigo (lambda-cyhalothrin and thiamethoxam), Leverage (imidacloprid and cyfluthrin), Swagger (bifenthrin 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 differ 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.

Preplant Soil Treatments for Greenbugs

Greenbugs are rarely reported as pests in Kentucky, and if present, are usually the result of planting too early. Preventive treatments are not recommended unless recurrent problems develop. If a problem is anticipated the granular soil applied insecticide, **COUNTER**, and the seed applied insecticide Cruiser, Poncho and Concur are labeled for "at planting" use.

Aphids are almost never a problem on Kentucky grown sorghum (**But see "Sugarcane Aphid"!**). Corn leaf aphids are commonly found but do no damage; greenbugs, are rarely important on emerging plants during drought, and yellow sugarcane aphids though present have been of little importance to date. See IPM-5 (listed above) for description and treatment thresholds.

Foliar treatments

Foliar Treatments for Greenbugs

Insecticide	MOA	Rate per Acre	Days to Harvest or Forage
Dimethoate 4 E (dimethoate)	1B	1/2 to 1 pt.	28 (Grain, feed, graze)
Lorsban 4E (chlorpyrifos)	1B	0.5 to 2 pt.	30 (0.5 - <1pt.) or 60 (1-2 pt.) grain, forage, fodder, hay, silage

Treat plants from emergence to 6" when there is visual damage on all plants.

Foliar Treatments for Sorghum Midge

Insecticide	MOA	Rate per Acre	Days to Harvest/Forage
Asana XL (esfenvalerate)	3A	2.9 to 5.8 fl. oz.	21
Baythroid XL (cyfluthrin)	3A	1 to 1.3 fl. oz.	14
Dimethoate 4E (dimethoate)	1B	1/4 to 1/2 pt.	28 (Grain, feed graze)
Lannate SP (methomyl)	1A	1/4 to 1/2 lb.	14 Grain, grazing or feeding
Lorsban 4E (chlorpyrifos)	1B	1/2 pt.	30 grain, forage, fodder, hay, silage
Mustang Max (zeta-cypermethrin)	3A	1.28 to 4 fl. oz.	14 (Grain & stover) 45 (forage)
Warrior II (lambda cyhalothrin)	3A	0.96 to 1.28 fl. oz.	30 (Grain) Do not graze or harvest for feed

Begin scouting for midge as the panicles emerge from the boot. Control will be necessary if there is more than one per head during bloom. Johnson grass, late planting, continuous cropping and large numbers of rogues contribute to increasing sorghum midge numbers.

Foliar Treatments for Corn Earworm, Sorghum Webworm, Fall Armyworms

Insecticide	MOA	Rate per Acre	Days to Harvest/Forage
Baythroid XL (cyfluthrin)	3A	1.3 to 2.8 fl. oz.	14
"B.t." (<i>Bacillus thuringiensis</i>)	11A	Aid in control of caterpillars can be obtained using many products containing "B.t.". Some examples are Javelin, Dipel and Lepinox. Check labels for details. Days to Harvest = 0.	
Belt SC (♦ read note below) (flubendiamide)	28	2 to 4 fl. oz.	14 (grain / stover, 3 forage)
Sevin 4F (carbaryl)	1A	1 to 2 qt.	21(grain & fodder) 14 (Forage & Silage)
Lannate SP (methomyl)	1A	¼ to 1/2 lb.	14 Grain, grazing or feeding
Lorsban 4E (chlorpyrifos)	1B	1 pt. (Webworm) 2 pt. (CEW)	30(1pt.) 60(>pt.) grain, forage, fodder, hay, silage
Mustang Max (zeta-cypermethrin)	3A	1.76 to 4 fl. oz.	14 (Grain & stover) 45 (forage)
Tracer (spinosad)	5	1.5 to 3 fl. oz.	7(Grain or fodder) 14(forage or hay)
Warrior II (lambda cyhalothrin)	3A	1.28 to 1.92 fl. oz.	30 (Grain) Do not graze or harvest for feed

♦ As EPA has issued a notice to cancel all flubendiamide registrations in 2016, growers can still use existing stocks following directions specified on its label until December 31, 2019.

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
Baythroid XL (cyfluthrin)	3A	2 to 2.8 fl. oz.	14
Sevin 4F (carbaryl)	1A	0.5 to 1.5 qt.	21(grain & Fodder) 14 (Forage & Silage)
Dimethoate 4 (dimethoate)	1B	1 pt.	28 (grain, feed, graze)
Lorsban 4E (chlorpyrifos)	1B	0.5 to 1 pt.	30 grain, forage, fodder, hay, silage
Mustang Max (zeta-cypermethrin)	3A	3.2 to 4 fl. oz.	14 (Grain & stover) 45 (forage)
Warrior II (lambda cyhalothrin)	3A	1.28 to 1.92 fl. oz.	30 (Grain) Do not graze or harvest for feed

These insects are primarily head feeders, though some foliage feeding may occur. Treatment is warranted if populations reach 3 small sorghum webworm or 1 corn earworm or fall armyworm per head; Or if 50% of the plants are infested with fall armyworm feeding in the whorl pre bloom. Lorsban is not labeled for fall armyworm control.

Sugarcane Aphid

Sugarcane aphid is a new and potentially very important pest of milo in Kentucky. First noticed as a major pest in the south in 2014 and first recorded in the commonwealth during the 2015 grain production season, this pest has shown the ability to reach the Purchase, Pennyrile, Green River and Mammoth Cave regions of Kentucky. At present this is believed to be an annual migrant overwintering in southern Texas. There is much to be learned about this pest; it is certainly important in the Mississippi River valley the southeast, and from central Texas through central Kansas. This aphid can reduce grain yields by feeding on the plant and its sugary, sticky excrement can be a hindrance to harvest.

See: [Sugarcane Aphid occurrence in 2017](#) for the latest information.

Foliar Treatments for Sugarcane Aphid

Insecticide	MOA	Rate per Acre	Days to Harvest/Forage
Sivanto 200 SL (flupyradifurone)	4D	4 to 7 fl. oz.	PHI- 7 days- forage; 21 days- dried grain, stover or straw
The Sivanto label for sugarcane aphid on sorghum is a FIFRA Section 2ee Recommendation issued by Bayer CropScience. Applicators MUST have a copy of this label in hand when the application is made. You may obtain this label from the web pages listed immediately above or from the Bayer CropScience web pages.			
Transform WG (sulfoxaflor)	4C	0.75 to 1.5 oz/A. Do not apply more than a total of 3.0 oz per acre per year This product received a Section 18 Emergency Exemption label for use during 2017. <u>This label expired on November 30, 2017</u> , and may not be used unless a new Section 18 Emergency Exemption is sought by the KDA, Div. of Environmental Services and granted by the US-EPA for 2017. If a use is granted, applicators MUST have a copy of this label in hand when the application is made. Check the website listed immediately above for the most recent information and if granted a copy of the 2016 label. PHI- 14 days- grain or straw harvest; 7 day -for grazing, forage, fodder, or hay harvest	
Various products containing chlorpyrifos or dimethoate are labeled for control of "aphids" or "yellow sugarcane aphid" but are not know to be effective in controlling sugarcane aphid.			

Products for Control of Insect Pests in Stored Grain Sorghum

(See: Controlling Insects in Stored Grain. Entfact – 145. <http://entomology.ca.uky.edu/ef145>)

Information in these tables is subject to change at any time. Always check the label of the product to insure that you use it correctly. There are other brand names and formulations of the products listed below. These are only the most common forms. If you wish to use a similar product check the label to insure it is registered for the intended use.

PESTICIDES APPLIED ON /IN STORAGE FACILITIES AND EQUIPMENT

"Clean-out" Fumigant

To be 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 to140 / 1000 cubic feet.

Note: Applied by volume NOT by bushels.

pellets 150 to700 / 1000 cubic feet

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.

Empty Bin Surface Applications To treat 1,000 ft. sq. of bin surface in empty bins.

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

PESTICIDES APPLIED DIRECTLY ON THE GRAIN

Grain Protectants

Apply directly to stored grain sorghum. Do not use the same compound for both Bin Surface and Grain protection.

Amount per 1,000 bushels

Actellic 5E (pirimiphos-methyl)	9.2 to 12.3 fl. oz.
Centynal (deltamethrin)	8.53 fl. oz. in 5 gal. water
Diacon-D IGR (S-methoprene)	8 to 10 lbs.
Insecto (silicon dioxide, from diatomaceous earth) ...	1 to 2 lbs. <u>per Ton ← Note different standard.</u>
Pyronyl (pyrethrin).....	1 pint in 3-5/8 gal. water
Sensat (spinosad).....	9.8 fl. oz. in 5 gal. water
Storcide II (chlorpyrifos-methyl + deltamethrin).....	11.6 fl. oz.

Grain Surface "Cap Out" Treatments

Applied directly to the top surface of stored Grain Sorghum for control of Indian Meal Moth.

Do not use the same compound for Bin Surface, Grain protection and Cap Out treatments. Rotate insecticide use.

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

Actellic 5E (pirimiphos-methyl)	3 fl. oz.
Biobit HP (<i>Bacillus thuringiensis</i> , kurstaki)	3 oz.
Dipel DF (<i>Bacillus thuringiensis</i> , kurstaki).....	1/2 lbs.
Diacon-D IGR (s-methoprene)	8 lbs.
Pyronyl (pyrethrin)	1 pint in 2-3/8 gal. water. Apply 1 to 2 gal.
.....	of mixture and rake in to a depth of 4 in.
Sensat (spinosad).....	2.6 fl. oz. in 2 gal. water

Note: Indian meal moth larvae can be controlled by many products containing the active ingredient *Bacillus thuringiensis* "B.t.". Biobit and Dipel are examples. 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 To be applied / 1,000 bu. stored grain sorghum.

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

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 / fumigation manual 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.