Insect Management in Field Corn – 2020

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Additional corn insect pest information can be found here:
https://www.udel.edu/academics/colleges/canr/cooperative-extension/sustainable-production/pest-management/vegetable-fruit-field/field-corn/

Note: The label is the law. Be sure to read the label for use rates, correct placement, days before harvest after application and other restrictions (including but not limited to interactions with certain herbicides). OLF=other labeled formulation.

Chlorpyrifos might not be legal in your state, check with your state's Department of Agriculture for registration status of chlorpyrifos products. Corteva will not be manufacturing Lorsban after 2020; other generic formulations may still be available after 2020. Combo chlorpyrifos products are available but not listed below.

Seed treatment efficacy on various pests has been rated in university trials and summarized by Kathy Flanders at Auburn University: https://blogs.ext.vt.edu/ag-pest-advisory/files/2014/10/Field-corn-insecticide-seed-treatment-chart.pdf.

Seedcorn Maggot (SCM)

There are no rescue treatments available for SCM control. Preventive treatment is advised on early and no-till plantings before soil is warm enough to promote quick germination. Old sod fields, pasture, recent cover crop incorporation, heavily manured fields and fields with previous histories of seed corn maggot damage should be treated regardless of planting time or type of tillage.

Seed Treatments: Commercial seed applied treatments including clothianidin, imidacloprid, thiamethoxam and combination of thiamethoxam + chlorantraniliprole are rated as providing excellent control at all rates in University trials. In some cases, the exception has been where manure/green manures are applied before planting. In those situations the higher rates provide better control.

At Planting: The following granular and liquid insecticides are labeled for at planting use on field corn. When allowable on the label, the best seed corn maggot control will be achieved when they are applied in-furrow.

Liquid Insecticides include beta cyfluthrin (Baythroid XL), bifenthrin (Capture LFR or OLF), and lambda-cyhalothrin (Warrior II or OLF)

Granular Insecticides include chlorpyrifos (Lorsban 15G), tefluthrin (Force 3 G) and terbufos (Counter 20G).

Insecticides Labeled for Control of Seed Corn Maggot At Planting – be sure to read the label for placement since varies with product					
Insecticide (Formulation)	**MOA Group**	**Amount product per 1000 row-ft.**	**Amount product per acre**	**PHI (days)**	**Signal Word**
terbufos (Counter 20G Lock 'N Load)	1B	4.5 to 6.0 oz.	4.9 to 6.5 lb. (for 30inch row spacing)	See Label	DANGER

beta-cyfluthrin (Baythroid XL)	3	0.12 to 0.16 fl. oz.	2.0 to 2.8 fl. oz./A (for 30 inch rows)	Grain or Fodder: 21 Green Forages: 0	WARNING
bifenthrin (Capture LFR) or OLF	3	0.2 to 0.78 fl. oz.	3.4 to 13.6 fl. oz.	See label	WARNING
lambda-cyhalothrin (Warrior II) or OLF	3	0.33 fl.oz. (for 30 –inch row spacing)	5.75 fl. oz. (for 30 inch rows)	21	WARNING
tefluthrin (Force 3G)	3	4.0 to 5.0 oz.	4.4 to 5.5 lb. (for 30 inch rows)	See Label	CAUTION

Wireworms (WW)

There are no rescue treatments available for WW control. The following sampling methods can be used to determine if an at-planting treatment is needed.

1. Sampling: *Early sampling before planting should include either bait stations or soil sampling.*

Bait Stations: Two paired bait stations per acre are made by placing 0.5 cup of an equal mixture of untreated corn and wheat in the soil 4 inches deep and 9 inches wide. Set bait stations in fields to be planted at least 3 weeks before the planting date. Check by digging in about 2 weeks and record the number of wireworms for each station.

Soil Sampling: Sample one square foot of soil 6 inches deep; one sample should be taken for each 10 acres with a minimum of 5 sites per field; field should not be tilled before samples are taken and soil temperature at 6 inches should be 45-50 degrees F.

2. Decision Making: Economic thresholds for wireworms have not been established on corn; however, the following guidelines can be used to make a management decision.

Bait Stations and Soil Sampling: If you find an average of 1 or more wireworms per bait station or per square foot of soil, a soil insecticide applied in the seed furrow and/or a seed applied treatment should be used to protect the germinated seed and newly-emerged seedlings.

Seed Treatments: Commercial seed applied treatments including clothianidin, imidacloprid, thiamethoxam and combination of thiamethoxam + chlorantraniliprole are rated as providing good control at the low and medium rates and excellent control at the high rate in University trials. Under extremely high pressure, an at-planting insecticide may also be needed. Where data is available, hopper box treatments containing permethrin are rated as providing poor control, especially under heavy pressure.

At Planting: The following granular and liquid insecticides are labeled for at planting use on field corn. When allowable on the label, the best wireworm control will be achieved when they are applied in-furrow.

Liquid insecticides include beta cyfluthrin (Baythroid XL), bifenthrin (Capture LFR or OLF), and lambda-cyhalothrin (Warrior II or OLF)

Granular insecticides include chlorpyrifos (Lorsban 15G), ethoprop (Mocap 15G), phorate (Thimet 20G), tefluthrin (Force 3 G) and terbufos (Counter 20G).

Insecticides Labeled for Control of Wireworms At Planting - be sure to read the label for placement since varies with products *In fields with a history of problems, the highest labeled rates are often needed to achieve satisfactory control.*					
Insecticide (Formulation)	**MOA Group**	**Amount product per 1,000 row-ft.**	**Amount product per acre**	**PHI (days)**	**Signal Word**
phorate (Thimet 20G Lock 'N Load) or OLF	1B	4.5 to 6.0 oz.	4.9 to 6.5 lb. (30 inch rows)	See label	DANGER granule
terbufos (Counter 20G Lock 'N Load) or OLF	1B	4.5 to 6.0 oz.	4.9 to 6.5 lb. (30 inch rows)	See label	DANGER granule
beta-cyfluthrin (Baythroid XL)	3	0.12 to 0.16 fl. oz.	2.0 to 2.8 oz./A (30 inch rows)	Grain or Fodder: 21 Green forages: 0	WARNING liquid
bifenthrin (Capture LFR) (Capture 3RIVE 3D) or OLF	3	0.2 to 0.78 fl. oz. 0.23 to 0.92 fl. oz.	3.4 to13.6 fl. oz. 4.0 to 16.0 fl. oz.	See label	WARNING liquid
ethoprop (Mocap 15G Lock'N Load) or OLF	1B	8.0 oz.	8.8 lb (30 inch rows)	See label	DANGER granule
lambda-cyhalothrin (Warrior II [2.08]) or OLF	3	0.33 fl.oz. (for 30 –inch row spacing)	5.75 fl. oz. (30 inch rows)	21	WARNING liquid
tefluthrin (Force 3G)	3	4.0 to 5.0 oz.	4.4 to 5.5 lb. (30 inch rows)	See label	CAUTION granule

White Grubs (WG)

There are no rescue treatments available for WG control. The following sampling methods can be used to determine if an at-planting treatment is needed.

1. Sampling

Compact Method (CM) Fall and Spring Soil Sampling: A Compact Method (CM) Soil Sampling Strategy was developed in Virginia, but has not been evaluated in our area. The CM is based on an 8-inch square by 6-inch deep volume of soil that is hand-sifted for white grubs on a green plastic leaf collection bag placed on the ground next to the sample site. The CM is as accurate as the traditional 12-inch square/ standard method, but is about 57% faster. The CM soil sampling strategy was designed for fall sampling as a means to provide producers with a field-specific pest management tool for better managing white grubs on their farms. Using the CM for spring soil sampling of white grubs before planting corn is as useful as fall sampling with the CM. However, keep in mind that sampling in the fall gives more time to make a management decision.

Treatment Thresholds: The fall action threshold is ≥1.6 white grubs per CM soil sample. The spring action threshold is ≥1.04 white grubs per CM soil sample.

The following represents the minimum number of compact method samples needed to be 95 percent confident your sample average is within the specified percentage of the actual field mean:

25% 3 to 4 samples/field (about 10-15 minutes)
20% 5 to 6 samples/field (about 20-25 minutes)
15% 10 samples/field (about 30-40 minutes)
10% 22 samples/field (about ≥1.5 hours)

No data is available for muck soils.

Traditional 12-inch square/standard method: This method is most effective when soil temperatures have reached 50 degrees F. at 6 inches deep. This method is also only effective if done before soil is tilled. At each site, sample one square foot of soil area dug twelve inches deep. A minimum of two samples must be taken for every 10 acres and no less than 10 samples per field.

Treatment Threshold: As a general guideline, an at-planting treatment may be needed for white grubs if you find one white grub per square foot of soil.

Seed Treatments: Commercial seed applied treatments including clothianidin, imidacloprid, thiamethoxam and combination of thiamethoxam + chlorantraniliprole are rated as providing poor control at the low rates, good control at the medium rates and excellent control at the high rate in University trials. Under extremely high pressure and with certain grub species, an at-planting insecticide is needed to provide effective control. Where data is available, hopper box treatments containing permethrin are rated as providing poor control.

At Planting: The following granular and liquid insecticides are labeled for at planting use on field corn. When allowable on the label, the best white grub control will be achieved when they are applied in-furrow.

Liquid insecticides include beta cyfluthrin (Baythroid XL), bifenthrin (Capture LFR or OLF), and lambda-cyhalothrin (Warrior II or OLF)

Granular insecticides include chlorpyrifos (Lorsban 15G), tefluthrin (Force 3G) and terbufos (Counter 20G).

Insecticides Labeled for Control of White Grubs At Planting - be sure to read the label for placement since varies with products *In fields with a history of problems, the highest labeled rates are often needed to achieve satisfactory control*

Insecticide (Formulation)	MOA Group	Amount product per 1,000 row-ft.	Amount product per acre	PHI (days)	Signal Word
phorate (Thimet 20G Lock 'N Load) or OLF	1B	4.5 to 6.0 oz.	4.9 to 6.5 lb. (for 30 inch row spacing)	See label	DANGER
terbufos (Counter 20G Lock N Load)	1B	4.5 to 6.0 oz.	5.0 to 6.5 lb. (for 30 inch row spacing)	See Label	DANGER
beta-cyfluthrin (Baythroid XL)	3	0.14 to 0.16 fl. oz.	2.5 to 2.8 fl. oz. (for 30 inch row spacing)	Grain or Fodder: 21 Green forages: 0	WARNING
bifenthrin (Capture LFR) (Capture 3RIVE 3D) or OLF	3	0.2 to 0.78 fl. oz. 0.23 to 0.92 fl. oz.	3.4 to13.6 fl. oz. 4.0 to 16.0 fl. oz.	See label	WARNING

lambda-cyhalothrin (Warrior II) or OLF	3	0.33 fl.oz. (for 30 –inch row spacing)	5.75 fl. oz. (for 30 inch row spacing)	21	WARNING
tefluthrin (Force 3G)	3	4.0 to 5.0 oz.	4.4 to 5.5 lb. (for 30 inch row spacing)	See Label	CAUTION

Cutworm

Black cutworm outbreaks are favored by a combination of the following factors: late planting and planting into poorly drained soil, presence of heavy broadleaf weed growth before planting, planting no-till into soybean stubble, and reduced tillage. Although at planting materials can provide effective control, scouting will provide the best indication of whether an economic level is present.

1. Sampling: Corn fields should be checked twice a week from the spike through the 5th-leaf stage. Leaf feeding is the first sign that cutworms are present. Examine 10 plants in 10 locations for the presence of leaf feeding (small irregular holes from small larvae too small to cut plants) and cut plants. You should also look for live cutworms and estimate the average size of the larvae.

2. Decision Making: As a general guideline, a rescue treatment should be considered on 1-2 leaf stage corn when you find 3 % or more of the plants cut or 10% or more of the plants with fresh leaf feeding and larvae are present. At the 2 to 4 leaf stage, a rescue treatment should be considered when you find 5% of the plants cut and larvae are present.

Insecticides Labeled for Control of Cutworms					
Insecticide (Formulation)	**MOA Group**	**Amount active ingredient acre**	**Amount product per acre**	**PHI (days)**	**Signal Word**
Pre-Emergence					
bifenthrin (Capture LFR) or OLF	3	0.04 to 0.16 lb.	3.4 to 13.6 fl. oz.	-----	WARNING
bifenthrin (Brigade) or OLF	3	0.04 lb.	2.56 fl. oz.	30	WARNING
permethrin (Perm-UP 3.2 EC) or OLF	3	0.1 to 0.15 lb.	4.0 to 6.0 fl. oz.	Grain or Fodder (Stover): 30	CAUTION
Post- Emergence					
beta-cyfluthrin (Baythroid XL)	3	0.007 to 0.013 lb.	0.8 to 1.6 fl. oz.	Grain or Fodder: 21 Green forages: 0	WARNING
bifenthrin (Brigade 2EC) or OLF	3	0.033 to 0.10 lb.	2.1 to 6.4 fl. oz.	30	WARNING
bifenthrin + zeta-cypermethrin (Hero)	3	0.025 to 0.06 lb.	2.6 to 6.1 fl. oz.	Grain and Stover: 30 Forage: 60	CAUTION
esfenvalerate (Asana XL)	3	0.03 to 0.05 lb.	5.8 to 9.6 fl. oz.	21	WARNING
lambda-cyhalothrin (Warrior II) or OLF	3	0.015 to 0.025 lb	0.96 to 1.60 fl. oz.	21	WARNING
permethrin (Perm-UP) or OLF	3	0.1 – to 0.15 lb.	4.0 to 6.0 fl. fl. oz.	30	CAUTION

zeta-cypermethrin (Mustang Maxx)	3	0.008 to 0.0175 lb.	1.28 to 2.8 fl. oz.	7	WARNING

True Armyworm

1. Sampling: No-till fields planted into a small grain cover crop, pastures, or weedy fields all have a high risk for armyworm infestation. Survey field edges where margins border small grains or large grassy areas and watch for damaged plants. Examine 10 plants at each of 10 locations within the field and record the percentage of damaged plants, the average size, and the severity of injury.

2. Decision Making: Armyworms can migrate from small grains starting in late May. Spot treatments may be warranted if infestations are confined to small areas. Control for armyworms is recommended if 25 percent or more of the plants are infested and larvae are less than 0.75 inch-long. Worms greater than 1.25 inches in length usually have completed their feeding.

Insecticides Labeled for Control of True Armyworm					
Insecticide (Formulation)	**MOA Group**	**Amount active ingredient acre**	**Amount product per acre**	**PHI (days)**	**Signal Word**
Pre-Emergence					
bifenthrin (Capture LFR)	3	0.04 – 0.16 lb.	3.4 - 13.6 fl. oz.	See label	WARNING
bifenthrin (Brigade 2EC) or OLF	3	0.04 lb.	2.56 fl. oz.	30	WARNING
permethrin (Perm-UP 3.2EC)	3	0.1 – 0.15 lb.	4.0 -6.0 fl. oz.	Grain or Fodder (Stover): 30	CAUTION
Post- Emergence					
beta-cyfluthrin (Baythroid XL)	3	0.013 to 0.022 lb.	1.6 to 2.8 fl. oz.	Grain or Fodder: 21 Green forages: 0 1st and 2nd instars only	WARNING
bifenthrin (Brigade 2EC) or OLF	3	0.033 to 0.10 lb.	2.1 to 6.4 fl. oz.	30	WARNING
bifenthrin + zeta-cypermethrin (Hero)	3	0.04 to 0.1 lb.	4.0 to 10.3 fl. oz.	Grain and Stover: 30 Forage: 60	CAUTION
esfenvalerate (Asana XL)	3	0.03 to 0.05 lb.	5.8 to 9.6 fl. oz.	21	WARNING
lambda-cyhalothrin (Warrior II [2.08EC]) or OLF	3	0.02 to 0.03 lb.	1.28 to 1.92 fl. oz.	21 higher rates for larger larvae	WARNING
methomyl (Lannate LV)	1A	0.45 lb.	1.5 pt.	Forage: 3 Ears and Stover: 21	DANGER

permethrin (Perm-UP 3.2EC)	3	0.1 to 0.15 lb.	4.0 to 6.0 fl. oz.	Grain or Fodder (Stover): 30	CAUTION
zeta-cypermethrin (Mustang Maxx)	3	0.02 to 0.025 lb.	3.2 to 4.0 fl. oz.	Grain, Stover, and Forage: 7	WARNING

Slugs

1. Sampling: Slugs can become serious pests in no-till fields during spring periods of cool, wet weather. Fields with heavy layers of manure, crop refuse, or thick weed cover are at higher risk from slugs. Because slugs feed at night and hide during the day in the mulch and surface trash near the seedlings, they often are not suspected of being the cause of the shredded leaves on the young corn seedlings. Examine 10 plants in 10 locations for the presence of feeding damage and slime trails; you will need to observe plants at night or during cloudy conditions to actually observe slugs feeding on plants. You should also check for slugs under surface trash and in open seed slots.

2. Decision Making: Although no precise thresholds are available for slug management, populations of 3 to 5 slugs around each plant at the spike through 3rd-leaf stage may be economic, especially if injury is heavy, plant growth is slow, and cool, wet conditions prevail. Also, corn seedlings that have reached the 3rd-leaf stage of growth generally are able to outgrow feeding damage by slugs.

Mollusicides Labeled for Slug Control				
Insecticide (Formulation)	**Amount active** ingredient	**Amount product per acre**	**PHI (days)**	**Signal Word**
metaldehyde (Deadline M-Ps) or OLF	-----	Up to 25 lb. (corn)	0	CAUTION
iron phosphate (Sluggo)	-----	20 to 44 lb.	0	CAUTION OMRI approved
sodium ferric EDTA (Iron Fist)	-----	10 to 40 lb.	see label	CAUTION

European Corn Borer

Most Bt hybrids provide excellent control of European corn borer such that populations have decreased significantly in the region. ECB's significance in vegetables has also declined markedly. An updated list of Bt traits, their proteins, and target pests can be found at https://agrilife.org/lubbock/files/2020/02/BtTraitTable_FEB_2020.pdf. Due to regional suppression, timely planted corn will most likely not benefit from Bt traits because of low to little pressure. Late planted corn however should be planted with a Bt trait. Silage corn rarely needs to be treated for ECB.

There are two generations of European corn borer. Borers overwinter as mature larvae in stalks and other hosts (at least 200 are known). Begin checking for whorl feeding damage when plants are greater than 18 inches tall. ECB generally does not establish well on shorter corn due to corn metabolic defenses. Select 5 sets of 20 consecutive plants from random locations in the field. Determine the percentage of plants with fresh whorl feeding (window panes, shot holes) and dissect plants to determine if live larvae are present. Control is recommended if 80% of plants exhibit whorl feeding and if 80% of damaged plants have 1 live larvae per plant.

Second generation corn borer should be scouted for starting around the end of June through the end of July. Examine 5 sets of 20 consecutive plants for egg masses. Egg masses appear as flat, fish scale-like

clusters on the undersides of leaves, and generally 2 or 3 leaves below the ear. A treatment is recommended if 1/3rd of plants that are pretassle or later have at least 1 egg mass per plant.

Expected yield reductions from fields averaging one or more tunnels per stalk is 5%.

Insecticides Labeled for Control of European Corn Borer					
Insecticide (Formulation)	**MOA Group**	**Amount active ingredient per acre**	**Amount product per acre**	**PHI (days)**	**Remarks**
chlorpyrifos (Lorsban 4E)	1B	0.5 to 1.0 lb.	1.0 to 2.0 pt.	21	RESTRICTED USE WARNING Direct applications into the whorl
chlorpyrifos + zeta-cypermethrin (Stallion)	1B + 3	0.22 to 0.28 lb	9.25 to 11.75 fl. oz	30	RESTRICTED USE WARNING
beta-cyfluthrin (Baythroid XL)	3	0.013 to 0.022 lb.	1.6 to 2.8 fl. oz.	21	RESTRICTED USE WARNING
bifenthrin + zeta-cypermethrin (Hero)	3	0.04 to 0.10 lb.	4.0 to 10.3 fl. oz.	30	RESTRICTED USE CAUTION
esfenvalerate (Asana XL)	3	0.04 to 0.05 lb.	7.8 to 9.6 fl. oz.	21	RESTRICTED USE WARNING
lambda-cyhalothrin (Warrior II)	3	0.02 to 0.03 lb.	1.28 to 1.92 fl. oz.	21	RESTRICTED USE WARNING
zeta-cypermethrin (Mustang Maxx)	3	0.017 to 0.025 lb.	2.72 to 4.0 fl. oz.	7	RESTRICTED USE WARNING
spinosad (Blackhawk)	5	0.038 to 0.074 lb.	1.67 to 3.3 fl. oz.	28	GENERAL USE CAUTION Must be applied before borers enter stalks, 25 GPA minimum
methoxyfenozide (Intrepid 2F)	18	0.06 to 0.25 lb.	4.0 to 16.0 fl. oz.	21	RESTRICTED USE CAUTION Must be applied before borers enter stalks, 25 GPA minimum
chlorantraniliprole (Coragen 1.67 SC) (Prevathon)	28	0.045 to 0.098 lb. 0.047 to 0.067 lb.	3.5 to 7.5 fl. oz. 14.0 to 20.0 fl. oz.	14	GENERAL USE CAUTION

Stink Bugs

Three species of stink bugs can be found in corn fields: brown, green, and brown marmorated. The brown stink bug is the most common species. First generation brown stink bug develops in small grain and typically migrates into corn when small grains are harvested. Corn bordered by small grains should be scouted just before small grain harvest to about 2 weeks after harvest. Stink bug congregations on the edges of fields may last a couple of weeks before bugs disperse into the field interior. There is no evidence that treating wheat will prevent stink bug migration into corn, in part because pyrethroids have such long pre harvest intervals and brown stink bugs are much less susceptible to pyrethroids. Stink bugs in wheat do not necessarily mean they will move into corn. Many will disperse and stay in weedy ditch banks or other vegetated barrier. If scouting wheat, keep in mind that another species of stink bug, the rice stink bug, is common but not a pest of either wheat or corn. It looks similar to brown stink bug but is a

little paler, skinnier, and has pointy, forward facing shoulder spines.

Another place to look for stink bugs are field edges, particularly wooded edges in fields planted after a previous soybean crop. Stink bugs that developed in last year's soybean will overwinter in woods and congregate on the edges of fields first. Scout wooded edges from V1 through R4. The most sensitive and effective time for a later treatment (between V14 and VT) is before the primary ear emerges.

At each sample site, check at least 10 corn plants. Stink bugs typically hide in leaf collars and in whorls. Apply insecticides to stages just prior to tasseling. Recent threshold work has been published from North Carolina State University (https://entomology.ces.ncsu.edu/2018/04/new-stink-bug-thresholds-in-corn/).

Growth Stage	Do NOT treat if % infest plants is less than…	Fixed threshold (treat at or above % infested plants)	Treat (% infested plants)
V1 to V6	6	8	11
V14 to VT	16	21	26
R1 to R4	30	36	43

Aerial application efficacy is variable; sprays can be effective or result in very poor control. Brown stink bus are more difficult to control with pyrethroids. Brown marmorated stink bugs are generally more susceptible to bifenthrin than other insecticides. Recent university trials suggest bifenthrin more efficacious on brown stink bugs and brown marmorated stink bugs than other pyrethroids.

Insecticides Labeled for Control of Stink Bugs					
Insecticide (Formulation)	**Mode of Action Group**	**Amount active ingredient per acre**	**Amount product per acre**	**PHI (days)**	**Remarks**
methomyl (Lannate LV)	1A	0.45 lb	1.5 pt	Forage: 3 Grain and stover: 21	RESTRICTED USE DANGER brown marmorated stink bug only
chlorpyrifos (Vulcan)	1B	0.94 lb.	2 pt.	21	RESTRICTED USE CAUTION brown marmorated stink bug only
beta-cyfluthrin (Baythroid XL)	3	0.013 to 0.022 lb.	1.6 to 2.8 fl. oz.	21	RESTRICTED USE WARNING
bifenthrin (Brigade 2EC)	3	0.033 to 0.10 lb.	2.1 to 6.4 fl. oz.	30	RESTRICTED USE WARNING
Bifenthrin + zeta-cypermethrin (Hero)	3	0.04 to 0.10 lb.	4.0 to 10.3 fl. oz.	30	RESTRICTED USE CAUTION
cyfluthrin (Tombstone)	3	0.025 to 0.044 lb.	1.6 to 2.8 fl. oz.	21	RESTRICTED USE DANGER
lambda-cyhalothrin (Warrior II)	3	0.02 to 0.03 lb.	1.28 to 1.92 fl. oz.	21	RESTRICTED USE WARNING
zeta-cypermethrin (Mustang Maxx)	3	0.017 to 0.025 lb.	2.72 to 4.0 fl. oz.	7	RESTRICTED USE WARNING

Grasshoppers

Sampling and Decision Making: No sampling and treatment thresholds are available for our area. This information from VA can be used as a guideline for making a treatment decision.

Examine fields next to pastures and other grassy areas where grasshoppers overwinter and develop. Treat field margins when young grasshoppers enter the field from roadsides. Treatment of entire field is seldom necessary; however, sprays may be justified when 5 to 8 grasshoppers per square yard are present during the silking period.

Insecticides Labeled for Control of Grasshoppers					
Insecticide (Formulation)	**MOA Group**	**Amount active ingredient acre**	**Amount product per acre**	**PHI (days)**	**Signal Word**
chlorpyrifos (Lorsban 4E)	1B	0.25 to 0.5 lb	0.5 to 1.0 pt	Grain: 35 Silage and forage: 14	WARNING
beta-cyfluthrin (Baythroid XL)	3	0.017 to 0.022 lb.	2.1 to 2.8 fl. oz.	Grain or Fodder: 21 Green forage: 0	WARNING
bifenthrin (Brigade 2EC) or OLF	3	0.033 to 0.10 lb.	2.1 to 6.4 fl. oz.	30	WARNING
bifenthrin + zeta-cypermethrin (Hero)	3	0.025 to 0.06 lb.	2.6 to 6.1 fl. oz.	Grain and Stover: 30 Forage: 60	WARNING
esfenvalerate (Asana XL)	3	0.03 to 0.05 lb.	5.8 to 9.6 fl. oz.	21	WARNING
lambda-cyhalothrin (Warrior II) or OLF	3	0.02 to 0.03 lb.	1.28 to 1.92 fl. oz.	21	WARNING
zeta-cypermethrin (Mustang Maxx)	3	0.017 to 0.025 lb.	2.72 to 4.0 fl. oz.	Grain, Stover and Forage: 7	WARNING
Chlorantraniliprole (Prevathon)	28	0.027 to 0.067 lb.	8.0 to 20.0 fl. oz.	Ears: 14 d Forage, Silage, Stover: 1ch	CAUTION
Chlorantraniliprole + lambda-cyhalothrin (Besiege)	28 + 3	0.065 + 0.033 lb.	10 fl. oz.	21	WARNING

Spider Mite

Sampling and Decision Making: No sampling and treatment thresholds are available for our area. This information from VA can be used as a guideline for making a treatment decision.

Spider mite populations often seem to explode as plants reach the grain-fill period, especially during extended hot, dry weather when the plants are stressed. If corn has not dented, treatment may be warranted if mite colonies are present along the midribs on the lower surfaces of one-third to one-half of the leaves on 50 percent of the plants.

Insecticides Labeled for Control of Spider Mites					
Insecticide (Formulation)	**MOA Group**	**Amount active ingredient acre**	**Amount product per acre**	**PHI (days)**	**Signal Word**
bifenthrin (Brigade) or OLF	3	0.10 lb.	6.4 fl. oz.	30	WARNING
bifenthrin + zeta-cypermethrin (Hero)	3	0.10 lb.	10.3 fl. oz.	Grain and Stover: 30 Forage: 60	CAUTION
etoxazole (Zeal SC)	10B	0.045 to 0.135	2.0 to 6.0 fl. oz.	21	CAUTION
Fenpyroximate (Portal XLO)	21A	0.1 lb	2 pts	14	WARNING
spiromesifin (Oberon 2SC)	23	0.089 to 0.25 lb.	5.7 to 16.0 fl. oz.	Forage or silage: 5 Grain or Stover: 30	CAUTION

Japanese Beetles

1. Sampling: *Examine 10 plants in each of 10 locations in the field to determine the stage of pollination, the number of beetles per plant, and the percentage of plants with silks cut back to 1/2 inch or less.*

2. Decision Making: Treatment may be needed if silks are clipped back to less than 1/2 inch before 50% pollination and beetles are present and actively feeding and there is an average of more than 3 Japanese beetles per silk. Pollen shed for an individual tassel generally takes 2-7 days to complete and 1-2 weeks for an entire field.

Insecticides Labeled for Control of Japanese Beetles					
Insecticide (Formulation)	**MOA Group**	**Amount active ingredient acre**	**Amount product per acre**	**PHI (days)**	**Signal Word**
beta-cyfluthrin (Baythroid XL)	3	0.013 to 0.022 lb.	1.6 to 2.8 fl. oz.	Grain or Fodder: 21 Green forage: 0	WARNING
bifenthrin (Brigade 2EC) or OLF	3	0.033 to 0.10 lb.	2.1 to 6.4 fl. oz.	30	WARNING
bifenthrin + zeta-cypermethrin (Hero)	3	0.04 to 0.1 lb.	4.0 to10.3 fl. oz.	Grain and Stover: 30 Forage: 60	CAUTION
esfenvalerate (Asana XL)	3	0.03 to 0.05 lb.	5.8 to 9.6 fl. oz.	21	WARNING
lambda-cyhalothrin (Warrior II) or OLF	3	0.02 to 0.03 lb.	1.28 to 1.92 fl. oz.	21	WARNING
zeta-cypermethrin (Mustang Maxx)	3	0.017 to 0.025 lb.	2.72 to 4.0 fl. oz.	7	WARNING

Fall Armyworm

1. Sampling: Examine 10 consecutive plants at each of 10 locations in the field for the presence of whorl feeding. Larvae feed in the whorls of the plants causing a shredded or ragged appearance. They may burrow deep into the whorls and feed on the growing tips.

2. Decision Making: Plants infested with fall armyworms often recover and grow normally without any significant effect on yield. Control at the whorl stage is usually not practical, particularly by air, and should not be attempted unless 75 percent of the plants exhibit whorl feeding and one or more larvae per plant are found. This threshold drops to 50 percent if 2 or more larvae per plant are found.

Insecticides Labeled for Control of Fall Armyworm					
Insecticide (Formulation)	**MOA Group**	**Amount active ingredient acre**	**Amount product per acre**	**PHI (days)**	**Signal Word**
methomyl (Lannate LV)	1A	0.225 to 0.45 lb.	0.75 to 1.5 pt.	Forage: 3 Ears and Stover: 21	DANGER
chlorantraniliprole (Coragen 1.67 SC) (Prevathon)	28	0.045 to 0.098 lb. 0.047 to 0.067 lb.	3.5 to 7.5 fl. oz. 14.0 to 20.0 fl. oz.	Coragen: 14 Prevathon: Ears:14, Forage, Fodder, Silage, Stover: 1	CAUTION
lambda-cyhalothrin + chlorantraniliprole (Besiege)	3 + 28	0.019 + 0.039 to 0.033 + 0.065 lb.	6.0 to 10.0 fl. oz.	21	WARNING
Some Bt hybrids are available that control fall armyworm. Please check the following link for available varieties https://agrilife.org/lubbock/files/2020/02/BtTraitTable_FEB_2020.pdf					

Other Labeled Formulations of Commonly Used Insecticides Include But Not Restricted To:

Insecticide*	**OLF trade name**	
Bifenthrin	Annex LFR (Tenkoz) Bi-Dash 2 E (Sharda USA) Bifen 2AG Gold (Direct AG Source) Bifender FC (Vive Crop Protection) Bife nture 2 EC and LFC (UPL) Bifenthrin 2 EC (Aceto) Discipline 2 EC (Amvac)	Fanfare 2 EC (Adama) Frenzy Veloz (Real Farm) Ruckos LFR (Helena) Slugbug (Real Farm) Sniper (Loveland) Tundra 2 EC (Winfield) Xpedient Plus (Amvac)
Lambda-cyhalothrin	Grizzly Too and Grizzly Z (WinField United) Kendo 22.8 CS (Helm Agro US) L-C Insecticide (Drexel) Lambda T (Helena) Lambda-Cy AG (WinField United) Lambda-Cy EC Insecticide-RUP (UPL) LambdaStar (LG Life Sciences)	Nufarm Lambda-cyhalothrin 1EC (Nufarm) Paradigm (Adama Paradigm VC (WinField United) Province II (Tenkoz) Ravage (Innvictis Crop Care) Silencer (Adama) Willowood Lambda-Cy (Willowwood)

Permethrin	Arctic 3.2EC (WinField) PermaStar AG (LG Life Sciences) Permethrin (Loveland)	Permethrin 3.2 EC (Helena) Perm-Up (UPL)

*OLFs label rates and restrictions may differ from those listed in this guide. Consult label carefully before making application.

For further information on Bt trait efficacy on various worm and rootworm pests, please see the 'Handy Bt Trait Table' at https://agrilife.org/lubbock/files/2020/02/BtTraitTable_FEB_2020.pdf. It should be noted that corn earworm populations have developed resistance to most Lepidopteran Bt traits. However, this insect is rarely an economic pest in timely planted corn, and insecticide treatment is not recommended. Once worms have reached the ear, no treatment will reach larvae. Insecticides for corn earworm have very limited residual activity and will not prevent an infestation. This is why sweet corn is treated 3 – 6 times per season.