



K-STATE
Research and Extension

Extension Agronomy

eUpdate

08/30/2019

These e-Updates are a regular weekly item from K-State Extension Agronomy and Kathy Gehl, Agronomy eUpdate Editor. All of the Research and Extension faculty in Agronomy will be involved as sources from time to time. If you have any questions or suggestions for topics you'd like to have us address in this weekly update, contact Kathy Gehl, 785-532-3354 kgehl@ksu.edu, or Dalas Peterson, Extension Agronomy State Leader and Weed Management Specialist 785-532-0405 dpeterso@ksu.edu.

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1. In-furrow starter fertilizers for wheat.....	3
2. Reclaiming flooded land: Erosion and sediment management.....	7
3. Reclaiming flooded land: Woody debris.....	10
4. Grasshoppers - Eating their way through Kansas.....	11
5. Kansas insect activity update - August 29, 2019.....	14
6. Kansas Bankers Association Awards nominations due by November 4.....	18
7. Save the Date - 2019 Agronomy Fall Field Day, September 20 in Manhattan.....	19
8. Soil Health Summer Tour Field Day, September 3.....	20

1. In-furrow starter fertilizers for wheat

Wheat is considered a highly responsive crop to starter fertilizers, particularly phosphorus (P) and nitrogen (N). Application of P as starter fertilizer can be an effective method for part or all the P needs. Wheat plants typically show a significant increase in fall tillers (Figure 1) and better root development with the use of starter fertilizer (P and N). Winterkill can also be reduced with the use of starter fertilizers, particularly in low P testing soils.



Figure 1. Effects on wheat tillering and early growth with in-furrow P fertilizer on soil testing low in P. Photo taken in 2019 in Manhattan, KS. Photo by Chris Weber, K-State Research and Extension.

Starter fertilizer application

Phosphorus fertilizer application can be done through the drill with the seed. Starter fertilizer can be applied, depending on the soil test and recommended application rate, either in addition to or instead of, any pre-plant P applications. The use of dry fertilizer sources with air seeders is a very popular and practical option. However, other P sources (including liquid) are agronomically equivalent and decisions should be based on cost and adaptability for each operation.

When applying fertilizer with the seed, rates should be limited to avoid potential toxicity to the

seedling. When placing starter fertilizer in direct contact with wheat seed, producers should use the guidelines in Table 1.

Table 1. Suggested maximum rates of fertilizer to apply directly with the wheat seed

Row spacing (inches)	Pounds N + K ₂ O (No urea containing fertilizers)	
	<u>Medium-to-fine soil textures</u>	<u>Course textures or dry soils</u>
15	16	11
10	24	17
6-8	30	21

Air seeders that place the starter fertilizer and seed in a 1- to 2-inch band, rather than a narrow seed slot, provide some margin of safety because the concentration of the fertilizer and seed is lower in these diffuse bands. In this scenario, adding a little extra N fertilizer to the starter is less likely to injure the seed - but it is still a risk.

What about blending dry 18-46-0 (DAP) or 11-52-0 (MAP) directly with the seed in the hopper? Will the N in these products hurt the seed?

The N in these fertilizer products is in the ammonium-N form (NH₄⁺), not the urea-N form, and is much less likely to injure the wheat seed, even though it is in direct seed contact. As for rates, guidelines provided in the table above should be used. If DAP or MAP is mixed with the seed, the mixture can safely be left in the seed hopper overnight without injuring the seed or gumming up the works. However, it is important to keep the wheat mixed with MAP or DAP in a lower relative humidity. A humidity greater than 70% will result in the fertilizer taking up moisture and will cause gumming or caking within the mixture.

How long can you allow this mixture of seed and fertilizer to set together without seeing any negative effects to crop establishment and yield?

The effects of leaving DAP fertilizer left mixed with wheat seed for various amounts of time is shown in Figure 2. Little to no negative effect was observed (up to 12 days in the K-State study) as long as the mixture is stored at a relative humidity less than 70%.

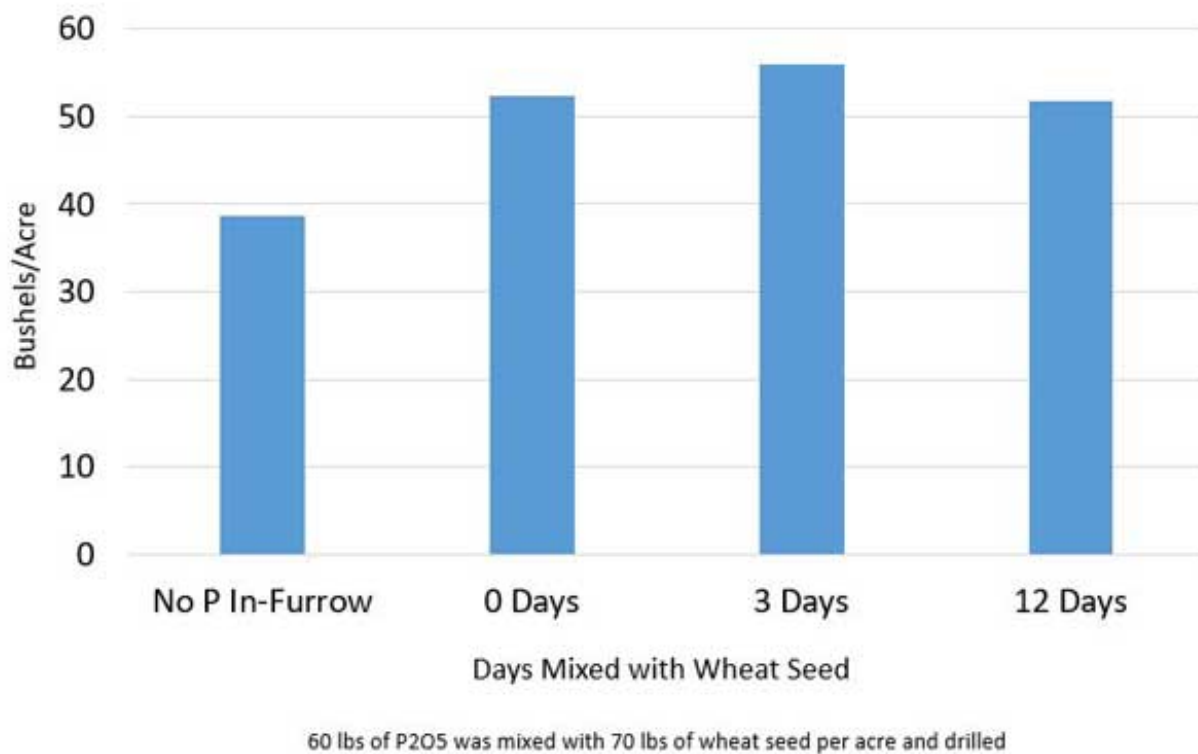


Figure 2. Effects on wheat yield from mixing P fertilizer with the seed. Study conducted in 2018-2019 at sites in Manhattan and Topeka. Graph by Chris Weber, K-State Research and Extension.

Although the wheat response to these starter fertilizer products is primarily from the P, the small amount of N that is present in DAP, MAP, or 10-34-0 may also be important in some cases. If no pre-plant N was applied, and the soil has little or no carryover N from the previous crop, the N from these fertilizer products could benefit the wheat.

Dual-placement of N and P (anhydrous ammonia or UAN plus 10-34-0 applied in the same band below the soil surface) is a fertilizer application method usually used in pre-plant applications. Ammonium-N has long been known to increase P uptake by crops, and dual-placement can be very effective. Sometimes, producers will use this method at planting time, trying to position the band to the side of each row of wheat seed. Be advised to use caution. If adequate separation of fertilizer and seed is accomplished, this is a good application method that fits into many farmers' overall no-till system. If adequate separation of the ammonia/UAN and seed is not accomplished, wheat germination/stand establishment can be affected.

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2. Reclaiming flooded land: Erosion and sediment management

When flood water recedes, a landowner may be surprised or even shocked at the damage left behind. Flood damage may range from erosion in some locations to sand and debris deposits in other areas (Figure 1). Bringing flooded land back to pre-existing production levels depends largely on the type and degree of damage. Before tilling agricultural land, check with the Natural Resources Conservation Service (NRCS) to determine whether the land is classified as highly erodible (HEL). The conservation compliance plan for your land may require residue cover. Failure to maintain proper residue levels for erosion control could result in a loss of USDA program benefits, including Conservation Reserve Program (CRP) and/or disaster aid payments.



Figure 1. Flood damage from 2015 on field situated along the Little Blue River near Hanover, KS. Fast-moving flood water stripped away some of the soil profile and left behind large amounts of sand deposits. Photos taken by Cathryn Davis, former K-State graduate student.

On upland soils, severe erosion such as gullies, rills, and terrace breaks may have occurred. Contact your NRCS/Conservation District office before tilling or making repairs because cost share may be available. In stream valleys high in the watershed where slopes are steeper, scouring in the floodplain is common. If these soils have eroded, reclamation may require some earth moving – possibly extensive. In river valleys, sand deposits are common. When sand deposits are thin, reclaiming land with tillage equipment or an on-farm earthmover is usually possible and practical. However, if the layer is deeper and more widely spread across the field, you may need deep plowing or even removal

of deposits. The economic aspects will have to be considered before reclaiming land.

Incorporating sand deposits into underlying soil may make the soil more susceptible to future wind and water erosion than the original soil would have been. A cover crop, strips of tall vegetation, or a wind break will help protect soil from wind erosion during the winter and early spring.

Dealing with sand deposits

Depending on the duration, velocity, and extent of flooding, millions of tons of sand can be deposited in floodplains. Water-sorted sand deposits typically have low water-holding capacity with low organic matter and nutrients. These deposits can greatly impact soil productivity. When the farm is affected by sand deposits, producers need to assess conditions of each field (or areas of a field) separately. The depth of sand deposits, total area affected, and texture of underlying soil layers are critical factors. Soil surveys, along with knowledge of the farm, are useful in assessing pre-flood soil conditions. Contact your local NRCS office for assistance in obtaining a soil map for your property, or view soil survey information online using the NRCS Web Soil Survey at:

<http://websoilsurvey.nrcs.usda.gov/app>.

Shallow deposits. For deposits of less than 4 to 6 inches, a chisel with twisted points or a moldboard plow can be used for incorporation. A moldboard plow should adequately incorporate deposits in one pass, while the chisel may require multiple passes. Tillage depth for either implement should be 10 to 12 inches. When deposits are deeper than 4 inches, but only cover a limited area of the field, the sand should be spread over an area large enough that the depth does not exceed 4 inches. The sand is then incorporated into the underlying soil.

Deep deposits. If a large area or the entire field is covered with more than 4 to 6 inches of sand, normal farm-tillage tools generally will not do the job. The deposits can either be removed, or a large inverting/incorporating plow (operating much deeper — 2 to 5 feet) can be used. If the sand deposits are uneven, spreading them prior to tillage typically reduces the necessary tillage depth and cost.

Suggested Plowing Depth to Incorporate Flood-Deposited Sand

Texture of soil layer beneath the sand	Thickness of sand deposit (inches)						
	2	4	6	12	18	24	30
Clay, Silty Clay, Sandy Clay	4	8	12	25	37	50	62
Clay Loam, Sandy Clay Loam, Fine Sandy Loam	4	7	11	22	33	44	55
Loam, Silty Clay Loam, Very Fine Sandy Loam	3	6	9	18	28	37	46
Silt Loam	3	6	8	17	25	33	42
Sandy Loam	6	12	19	37	56	74	–

Note: When the underlying soil is a sand or loamy sand texture, tillage will not improve the water holding capacity.

The table above shows suggested plowing depths based on depth of sand and the underlying soil texture. The power required for deep tillage is related to tillage depth and speed and can be extremely high. Plowing five feet deep at three mph requires approximately 400 horsepower for steel-tracked tractors, while plowing two feet deep requires about 150 horsepower. Agricultural tractors

are not recommended for deep plowing because they have difficulty generating traction on deposits and they are usually not designed for slow speed lugging. These tractors typically operate at higher speeds (4-6 mph). Construction machines are a better choice because they are designed to operate under high loads at low speeds. Operating agricultural tractors at low speeds and with high drafts can lead to drive-train failure.

Summary

Flooded land can be reclaimed and put back into production, but the cost to do this can become quite expensive. Evaluate each field or area independently and consider all options before making any decisions. Check with your NRCS/ Conservation District and Farm Service Agency offices for information concerning compliance with farm programs and availability of cost share. Carefully evaluate the cost before committing to restoration.

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3. Reclaiming flooded land: Woody debris

After a flood event, a landowner may find that some new “organic matter” has been deposited on the field, but in the form of woody debris, which may cause some problems in future field operations. This woody debris can easily be up to 2 to 3 inches in diameter, or more. In many cases, the debris will be too scattered to burn.

The main risks of woody debris include damage to harvest equipment and during planting operations. Larger diameter branches (>3 inches) will not readily decompose and might wedge into the planter units. Also, short logs could pose a hazard to combines.

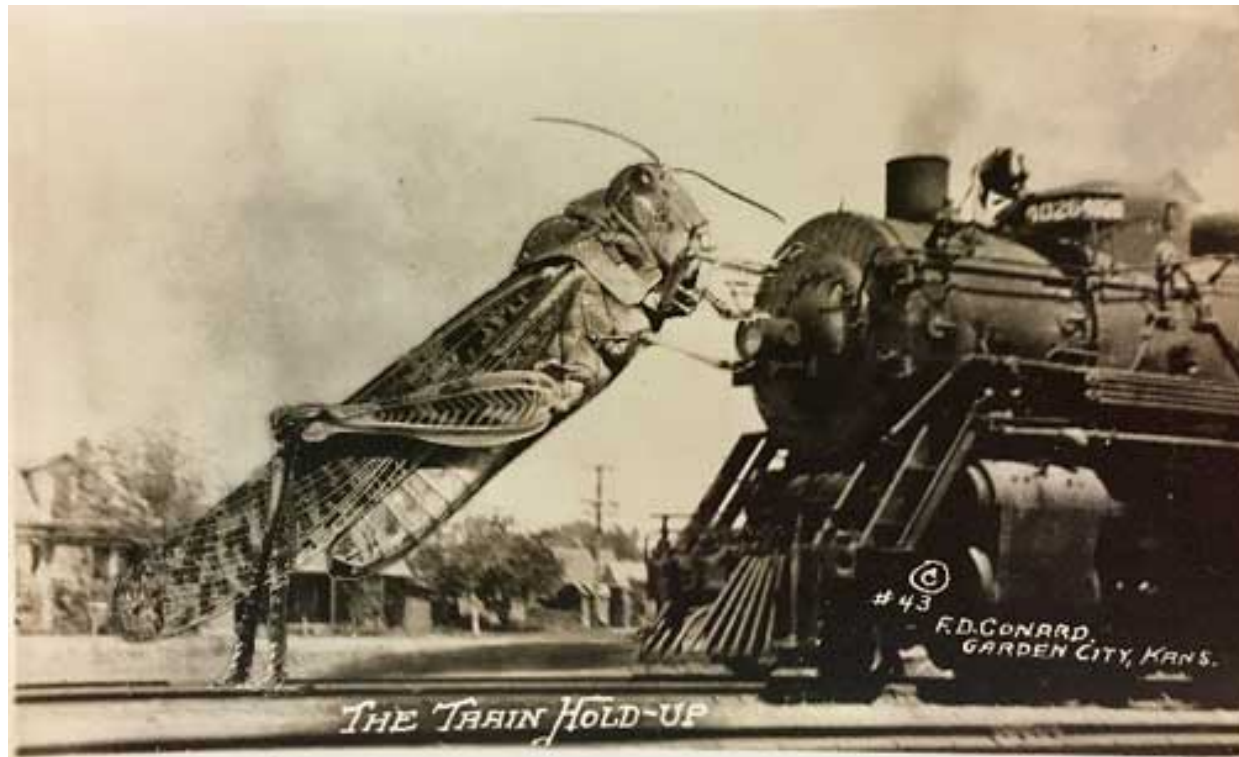
Some possible solutions include:

1. Residue managers or row cleaners on the planter might be able to move the smaller debris out of the way. Take the planter to the field as early as possible to test whether or not it can open and close the furrow without plugging repeatedly. Strip-tillage equipment may also be able to move woody debris out of the row.
2. Flood-deposited debris is often oriented in one direction, so it might be possible to plant the rows in a direction that is not perpendicular to the flood debris.
3. If all else fails, and it is not at all practical to pick up the residue manually, a harrow or drag could be used to collect or windrow the debris into piles for collecting later, or perhaps burning in place.
4. If none of the above options are workable or appealing, some type of cutting tillage (e.g. disk) may be the only alternative.

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4. Grasshoppers - Eating their way through Kansas

Although troublesome at times, grasshoppers really are fascinating and important creatures in our prairie ecosystem. There are over 100 species of grasshoppers in Kansas and only a handful of these cause problems in crop fields. The rest make up a large part of the food chain and are eaten by other insects, birds, mammals, reptiles, amphibians, and some crazy entomologists.



The USDA samples the High Plains every year to help predict grasshopper outbreaks, and their 2019 grasshopper hazard map for Kansas (Figure 1) is pretty close to what we are seeing right now. During dry spells like western Kansas has been experiencing the last few weeks, grasshoppers have their compound eyes set on greener areas like emerging alfalfa and wheat seedlings as the mixed forb and grassy areas around crops die back. But it's not just crops that are being mowed by grasshoppers right now, CRP, pastures and rangeland are also on their menu (Figure 2). See UNL's excellent guide to rangeland grasshopper control here for more information: <http://extensionpublications.unl.edu/assets/pdf/g1630.pdf>

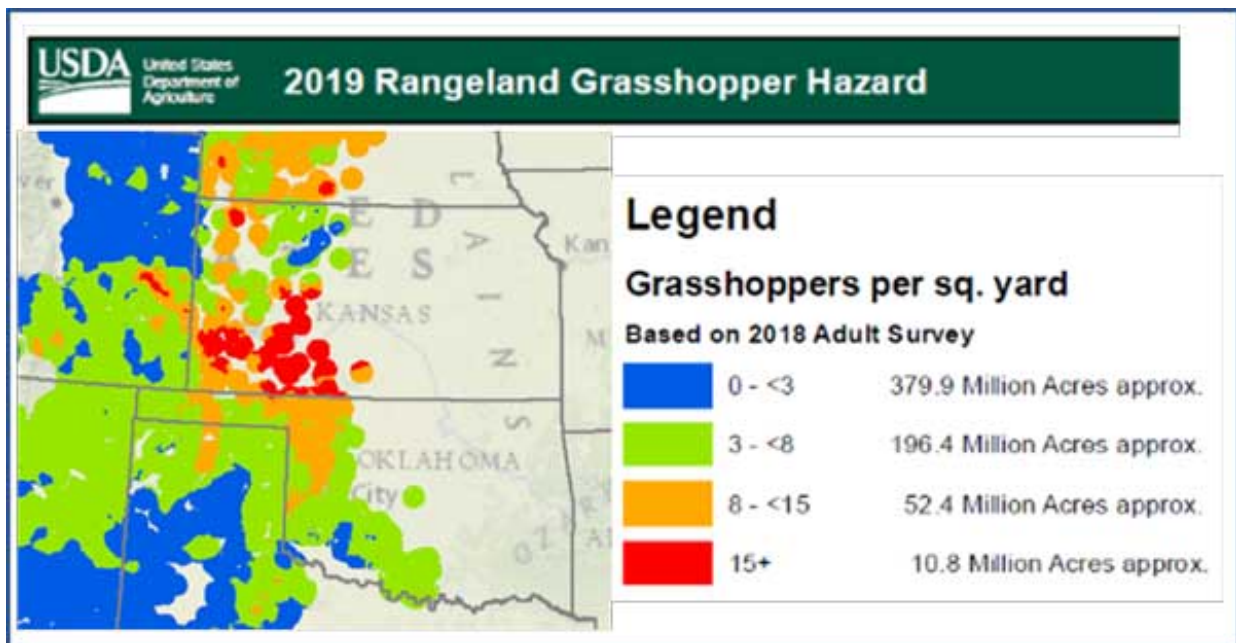


Figure 1. Grasshopper Hazard predictions for 2019 based on 2018 surveys. Map from https://www.aphis.usda.gov/plant_health/plant_pest_info/grasshopper/downloads/hazard.pdf.



Figure 2. Examples of rangeland that has been stripped of vegetation by grasshoppers. Photos by Justin Waggoner, K-State Research and Extension.

It's usually a combination of several species that will move into crops and most are full grown by this time of year which makes them tricky to control. Grasshoppers will hatch starting in spring and may continue hatching until early July. After ~5 molts and 40-60 days later, they develop into adults. Since grasshoppers can eat half their body weight in vegetation every day, it's important to keep an eye out for these gluttons around field edges and ideally treat before the 'hoppers reach adulthood and

prior to them moving into the crops.

Recent questions concerning grasshoppers

Q. Will grasshoppers move out of a crop field and into the surrounding pastures? (A recent disagreement occurred between two neighboring farms over this very question.)

A. The grasshoppers could hatch out of no-till fields if eggs were laid the previous season, but most often eggs will be laid in the areas surrounding crop fields and will move into fields after the vegetation around the field has either been sprayed with herbicide, if it dries down in hot, dry weather, or if the populations get too crowded in those areas.

Q. Do grasshoppers need to be controlled in grain sorghum?

A. Grasshoppers may need to be controlled in sorghum, especially young sorghum with 5-8 grasshoppers/square yard. There is no hard threshold for sorghum in grain fill, but older sorghum can take more pressure. As a general rule for all our crops, 15+ in field and 41+/square yard along the field margin would justify treatment (see "Sorghum Insect Management Guide" here for chemical control of grasshoppers: <https://www.bookstore.ksre.ksu.edu/pubs/mf742.pdf>)

Q. Should I spray grasshoppers before or after planting alfalfa?

A. If there are more than 20-40 grasshoppers/square yard before planting, consider treatment. Keep in mind growth regulators like dimilin and prevathon take a few days to a week to kill nymphs. Once planted, watch carefully for migration into the field and consider treatment if 3-5 grasshoppers/square yard are found in the seedling alfalfa field.

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5. Kansas insect activity update - August 29, 2019

Sorghum pests – cattail caterpillars, sugarcane aphids, and headworms

Cattail caterpillars are still abundant throughout north central Kansas causing considerable leaf feeding (Figure 1). Sugarcane aphids are still migrating into Kansas. However, up to now, only small colonies and sporadic infestations have been reported. Every report to date also has reported good numbers of beneficials and seemingly reducing the colonies that do get established. These aphids will probably continue to migrate into the state for some time yet but, hopefully, the beneficials will keep them under control.

Sorghum “headworm” populations are really becoming active. If fields are treated with a conventional insecticide, it will probably kill the headworms, any sugarcane aphids that may come into contact with a treated surface, and most, if not all of the beneficials. Yes, the conventional insecticides used for “headworms” will kill the sugarcane aphids. However, there are some problems with this. First, many of the aphid colonies will be on the undersides of the leaves and many of these leaves will be in the middle region of the plant, somewhat sheltered by higher leaves. Second, these insecticides are contact insecticides, thus, they need to contact the insect to kill it. However, all the beneficials will be very active searching for aphids, thus they have a high probability of coming into contact with, and being killed by, the insecticide. Third, the aphids reproduce parthenogenically thus these populations will increase quite rapidly if there are no beneficials hindering them. So, they will re-colonize much quicker than the beneficials and thus start stressing the plants. However, “headworms” cause 5% loss/worm/head and they feed on the marketable product, thus if they get to the treatment threshold something needs to be done.



Figure 1. Cattail caterpillar. Photo by K-State Extension Entomology.

Now, there is a product available that uses a virus that is relative specific for corn earworms (Heligen) or fall army worms (Fawligen). If you are not sure which species is present in your field, you can mix these two products together. These two products could be an alternative to the conventional synthetic organic insecticides and thus, spare the beneficials to help control sugarcane aphids if they do start to migrate into Kansas in large numbers.

These products do need to be treated a little differently than the more common insecticides. Timing is very important in any management program but even more so with these products than the regular insecticides. These virus compounds take a few days to actually work on the pest versus the common insecticides which kill on contact. Thus, the Heligen or Fawligen compounds need to be applied as soon as the first (Figure 2). hopefully, very small worms are detected to give it a chance to work before the worms cause too much damage. This then highlights one of the problems with these products, i.e., detecting the very small larvae in your bucket (see Figure 2) because they blend in very well with all the pollen, florets, etc. that shake loose.



Figure 2. Example of 3-day old larvae (smaller ones) and 6-day old larvae (larger one). Photo by K-State Extension Entomology.

Also, these products are more sensitive to sunlight which can deactivate the virus within 24 hours after application. Virus containers that are sealed should not be exposed to direct sunlight for more than 2 hours, or in temperatures over 95 degrees F. Product should be mixed in water with a pH of \leq 8.0, and enough carrier used to adequately spread the product over the entire target. If you decide to try these products, it is best to leave an untreated check strip – which you should do with any product.

Soybean update – soybean aphids

Soybean aphids continue to migrate into the state and with the predicted cooler temperatures may be able to successfully colonize. Thus, monitoring should continue until /or if hotter temperatures return.

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6. Kansas Bankers Association Awards nominations due by November 4

Nominate a deserving Kansas producer or landowner for the 2019 Kansas Bankers Association Conservation Awards Program. This year, the Kansas Bankers Association, K-State Research and Extension, and the Kansas Department of Wildlife, Parks, and Tourism have announced six award categories:

- **Energy Conservation**
- **Water Quality**
- **Water Conservation**
- **Soil Conservation**
- **Windbreaks**
- **Wildlife Habitat**

The purpose of this program is to stimulate a greater interest in the conservation of the agricultural and natural resources of Kansas by giving recognition to those farmers and landowners who have made outstanding progress in practicing conservation on their farms. Last year 199 Kansas producers and landowners were recognized through this program.

Nominations can be made by any person in the county. They should be sent to the County Extension Agricultural Agent or the Kansas Department of Wildlife, Parks, and Tourism District Biologist by November 4, 2019.

The K-State Extension agent for Agriculture and Natural Resources, or the Extension Coordinator, is designated Chairperson of the committee to select persons to receive awards.

For more information, see:

<http://www.agronomy.k-state.edu/extension/kansasbankersaward/kansas-bankers-awards.html>

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7. Save the Date - 2019 Agronomy Fall Field Day, September 20 in Manhattan

The 2019 growing season presented many weather-related challenges to producers in Kansas and neighboring states. In response to these challenges, the focus of the 2019 Agronomy Fall Field Day is **“Building Resiliency in Agronomy”**. The field day is scheduled for **Friday, September 20**, from 9:00 a.m. to 1:00 p.m. at the Agronomy North Farm in Manhattan. The event is free to attend and will conclude with a sponsored lunch for all attendees.

Topics will focus on understanding how different agronomic practices and technologies can aid producers in building a more resilient production system. An overview of the topics includes:

- Resilient soils through conservation practices
- Wheat genetics and technology
- Sorghum genetics and resiliency: Delivering traits from seed bank to seed bag
- Crop physiology and extreme temperatures
- Managing variability in the field
- Kansas Mesonet and climate data in Kansas

More detailed information concerning the program topics, speakers, and sponsors will be featured in an upcoming eUpdate. The online registration link is now open at: <http://bit.ly/AgronFieldDay2019>

For more information, please contact Dorivar Ruiz Diaz at 785-532-6183 or ruizdiaz@ksu.edu

8. Soil Health Summer Tour Field Day, September 3

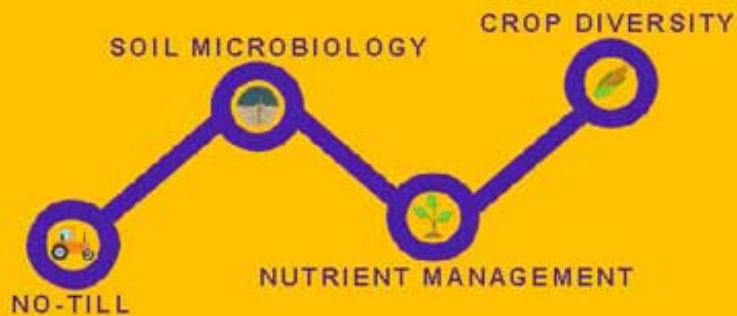
The Department of Agronomy at K-State is teaming up with several partners including The Soil Health Partnership, Kansas Corn, Palen Family Farms, and Kansas Wheat to host a Soil Health Field Day on Tuesday, September 3. The event is split between two locations in Mitchell County. The first event begins at 10:00 a.m. at Mike Jordan's farm, 831 280 Rd., Beloit, KS. The second event begins at 11:50 a.m. at Palen Family Farms, 1031 180 Rd, Glen Elder, KS.

Topic areas that will be featured include: no-till management, soil microbiology, nutrient management, and crop diversity.

For more information and to register for the event, please visit: <https://kscorn.com/soilhealth>.

SUMMER TOUR 2019
FIELD DAY

SOIL HEALTH



September 3, 2019

Register at
kscorn.com/soilhealth

10 AM
MIKE JORDAN'S FARM
831 280 Rd, 67420
Beloit - KS

11:50 AM
PALEN FAMILY FARMS
1031 180 Rd, 67446
Glen Elder - KS

