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Potential for Lodged Corn in 2022

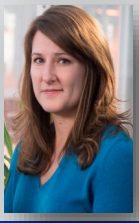
Scouting reports across Kentucky have indicated that farmers need to be aware of potential lodging issues as corn harvest gets underway. Pockets of fields scouted across the state show pre-harvest lodging and/or stalk strength tests have indicated a high potential for lodging to occur (Figure 1). It is important to identify fields that may have stalk rot issues or lodging potential to ensure timely harvest and minimize the impact of downed corn.

Figure 1. Lodged corn (photo by Kiersten Wise)

While stalk rot diseases can cause lodging, abiotic factors such as drought stress, nutrient deficiencies, and other stresses experienced in 2022 have greatly contributed to this year's lodging issues. Drought stress can cause the plant to divert carbohydrates from the lower stalk tissue up to the corn ear to finish grain fill, which in turn weakens the stalk. Secondary organisms can colonize weakened stalks giving the appearance of a disease problem even when abiotic factors are the primary cause of the weakened stalks.

Determine if lodging is a concern by scouting fields prior to harvest. Drought-prone areas of fields or fields that experienced drought and heat stress will often exhibit lodging earlier than areas with heavier soils that hold moisture. Within these areas and across a field, consider using a lodging severity test, such as the push test, to measure the degree of lodging concern. To conduct the push test, use your arm to push the corn stalk 30-degrees from vertical at face level, using moderate pressure. If the stalk does not return to upright after the push, it is considered lodged, and has failed the push test. If 10 out of 100 stalks tested in a field fail the push test (10%), consider prioritizing the field for harvest to prevent lodging and yield loss. Late-season storms or high winds can exacerbate lodging issues in fields with weak stalks, and timely harvest can prevent additional damage from occurring.

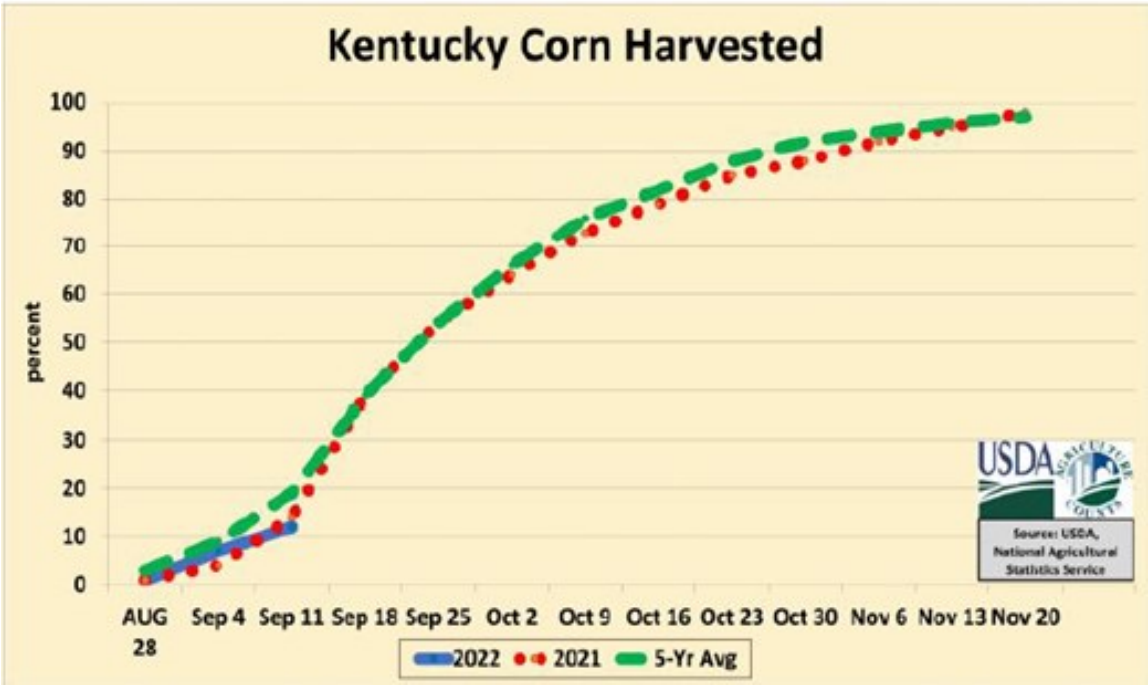
Stalk rots and lodging can be preventatively managed by planting hybrids resistant to stalk and foliar diseases, using crop rotation, ensuring adequate soil fertility, minimizing in-season stresses, and harvesting corn as soon as it is feasible.



Dr. Kiersten Wise
Extension Plant Pathologist
(859) 562-1338
kiersten.wise@uky.edu

Decision Tool Predicts Local Field Drying Trends for Corn

Pre-harvest USDA estimates pegged Kentucky's corn crop at 200 million bushels this year (28% below 2021) and it's off to a similar, slow start. This week's USDA report showed the progress of corn harvest at 10% complete statewide, which is about the same as this time last year, but about half the 5-year average (~20%). On a positive note, field drying should have good potential across most of the state next week, so many farmers will likely ramp up harvest, quickly catch up to the 5-year average, and benefit from lower drying costs.



A web-based tool has been developed at Clemson University to calculate the equilibrium moisture content of grains at predicted temperature and relative humidity conditions with imbedded equations. The Clemson EMC Calculator pulls data from the National Weather Service that is available for each zip code and is reported at 3-hour intervals. Once logged in, the user enters the zip code and selects the type of grain and an equation to calculate corresponding grain moisture values at 3-hour intervals. Graphs are then shown for each variable during the period along with a table.

The EMC calculator was used to predict moisture changes of mature corn at four locations across Kentucky's production area for the next five days. Data from the output table was imported into an Excel spreadsheet to generate a trendline at each location and is shown in Figure 1. Since grain moisture doesn't change instantaneously, but lags in response to ambient conditions, this approach provides an indicator to illustrate whether conditions will favor drying or re-wetting during the period. Similarly, it can be used to guide harvest decisions for mature crops.

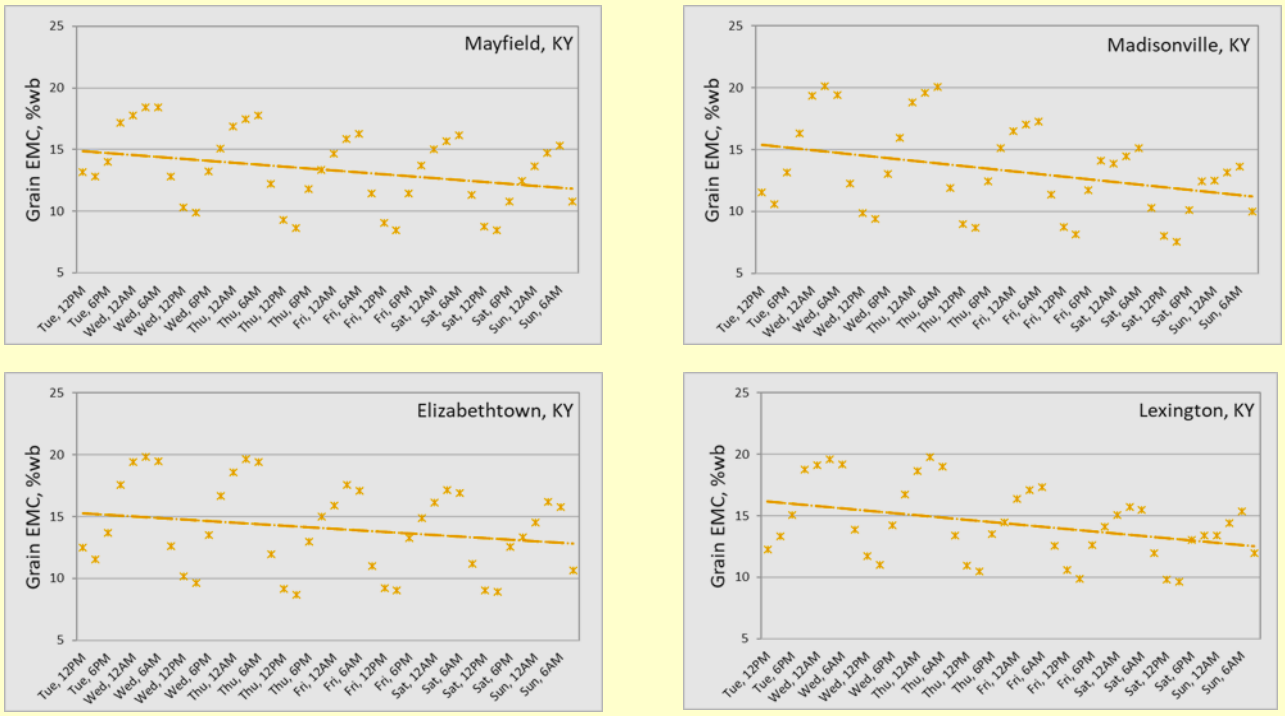


Figure 1. Field drying trends for mature corn in Mayfield, Madisonville, Elizabethtown, and Lexington from September 13 to 18 based on predicted ambient conditions. Source: Clemson EMC Calculator:

From September 13 to 18, the Clemson EMC Calculator predicts a grain moisture loss of about 2 to 3 percentage points for Mayfield, Madisonville, Elizabethtown and Lexington, KY, owing largely to the mild temperatures and below average relative humidity levels (Table 1). Bear in mind that this model provides an indication of either drying or re-wetting in the vicinity and does not account for cloud cover, wind speed, or rain showers. Still it can be a useful tool to predict changes in grain moisture for your area and can be accessed at ***Clemson EMC Calculator***: https://precisionag.sites.clemson.edu/Calculators/Grain_Storage/EMC_Calc/

Table 1. Average ambient conditions in Mayfield, Madisonville, Elizabethtown, & Lexington from September 13 to 18, 2022.

Location	Average Temp. F	Average RH, %
Mayfield	72	62
Madisonville	73	61
Elizabethtown	71	65
Lexington	69	67

Dr. Sam McNeill
Extension Agricultural Engineer
(859) 562-1326
smcneill@uky.edu

A Combination of Environmental Factors, Living Organism, and Lack of Scouting can Bring Disaster to Soybeans

On Thursday (9/1/22), I received a series of pictures showing a soybean field with small plants (shorter than the wheat residue), blank patches, soybean plants with severed stems by apparently feeding by deer, and stripped blister beetles feeding on the leaves (Figure 1). This was an initial observation based on the images. Then, I decided to visit this field the following day.

Figure 1. Images received to make a diagnostic of issues affecting a soybean field. (Photo: Matt Futrell, UK).

On Friday (9/2/22), I visited, walked, and inspected this 68-acre commercial, double-crop soybean field. The soybean plants were in a very bad shape:

- most of soybean plants were on the R6, and less than 4 ft tall (~10 cm), and rows with many skips, (Figures 2 and 3),
- most plants with stems cut by deer (stems cut with ragged appearance compared 45 degrees clean cuts made by rabbits) (Figure 3),
- abundant wheat stand residues with areas that have more than two-inch height straw "cushion" (Figures 1, 2, and 3),
- slugs found under this cushion of wheat residue (Figure 4)
- many vole mounds,
- foliage with holes caused by bean leaf beetles (Figure 3), and
- a good number of yellow stripped blister beetles.

Figure 2. Soybean field showing 4-inch-tall plants, abundant wheat residue, and rows with missing plants (Photo: Raul Villanueva, UK).

Figure 3. Soybean plants damaged by deer with developing pods close to the ground that will make difficult to harvest (Photo: Raul Villanueva, UK).

What caused all these problems? Solutions ….?

In this case, the identification of a single issue that caused such a devastation in this field was not possible. However, there are some issues that combined might have caused such type of injuries or disastrous damages to this field.

Environmental conditions: The absence of rains in Western Kentucky may have contributed to the size of the plants, rains were scarce in June and July causing delays on emergence, low seed emergence, and slow plant growth. Also, rains contributed to low production of forages or grasses that may have reduced the impact of deer feeding in soybeans.

Slugs: Wheat residue on this field may have contributed to the presence of slugs, although the farmer or the company that take care of this field did not report any damages by mollusks; the presence of rains by the end of July and beginning of August may contributed with a non-reported outbreak of slugs. We found between 3 to 6 slugs per sq/ft (Figure 4) while searching for slugs under wheat residues. The ground under the residue was moist and temperatures were probably 10 to 15 degrees lower than the air temperature (these temperatures are based on unpublished studies conducted by my group under similar circumstances in 2022). Under these conditions, slugs may have feeding on soybeans plants at night whereas during the day they were well protected under the wheat residue escaping from tallies conducted by scout agents.

Figure 4. Slugs found under a "cushion" of wheat residue in a double crop soybean field (Photo: Raul Villanueva, UK).

Figure 5. Mounds caused by voles in a soybean farm in Christian Co. Fields were heavily infested by this rodent (Photo: Joseph Fisk).

Rodents: Many rodent species such rabbits, groundhogs and voles may feed on soybeans, but here, voles had partial responsibility on plants skips. We found several mounds in this field. In addition, voles were reported in this same region (Christian County) causing severe damage to soybean fields (Figure 5).

Insects: We observed several bean leaf beetles and a little higher number of stripped blister beetles during the time we stay in this field. Blister beetles feed on the foliage but in addition larvae of these insects are predators of grasshopper eggs. However, foliage was not heavily damage by feeding of any of these insects. The impact of insects on the state of this field may be minimal to none.

Final thoughts.

Although there is a chance that plants may grow, the pods and flowers in these plants are near the soil (Figure 3), and number of pods per plant are low; as a consequence, combines won't be able to harvest this field.

For the management of voles there is no products that are currently registered in Kentucky. Disking or some minimal tillage may be an option to reduce or disrupt nests.

Cover crop is important for soil conservation, prevents soil erosion and protects water quality, keep soils moist, reduces soil compaction with fewer trips and less tillage, saves fuel, labor, and time with reduced field operations, and sequesters carbon in the soil. However, for full season or double crop soybeans, residue management from previous crop is critical. Mollusks (snails and slugs) were observed causing severe injuries to several soybean fields, even when environmental conditions were not feasible for their development (see Snail Outbreak during the Drought and Hot Conditions Affect Soybeans). Mollusk found very good environmental conditions under residues from the previous crop (corn, wheat, or cover crops), these conditions are conducive to cause outbreaks that affect soybean fields if residues are not properly managed.

All the combination of issues described above may have contributed to the bad conditions observed in this field. Thus, yield from this field may be entirely lost, in this particular case if we calculate the entire loss of yield at 55 Bu/A, and $15.49/Bu (price of 9/12/22) of the 68 acre-field, the total amount to be lost will be around $58,000.

More information

Conducive Weather for Seedcorn Maggot & Slugs Outbreaks in Field Crops. Kentucky Pest News University of Kentucky

Striped Blister Beetles Defoliate Tomatoes & Potatoes. Kentucky Pest News University of Kentucky

Blister Beetles Predatory Behavior Outweigh Their Feeding in Soybeans in Kentucky. Kentucky Pest News University of Kentucky

Dr. Raul Villanueva
Extension Entomologist
(859) 562-1335
raul.villanueva@uky.edu

Misidentification of Corn Leaf Aphid May Have Caused Some Concern to Sorghum Growers

The corn leaf aphid, *Rhopalosiphum maidis* (Hemiptera: Aphididae), is a native insect and present across the entire United States and in Canada. This insect feeds on corn, sorghum, small grains, and several grasses. Population outbreaks occurred some years, but they hardly cause significant damage in corn or sorghum. In small grains, high populations can occur in the fall or early spring, this insect vectors barley yellow dwarf virus.

These aphids vary from bluish grey to green and they occur in very dense clusters on plants (Figure 1) or whorls (Figure 2). Aphids in these cluster are composed by wingless specimens, but under heavy aggregation, winged individuals appear to move to new sites.

Figure 1. Corn leaf aphids on the upper surface of a sorghum leaf. (Photo by Alex Teutsch)

Figure 2. Corn leaf aphids on the whorl of sorghum. (Photo by Raul Villanueva)

In Kentucky, in 2022, several reports on corn aphid presence occurred since mid-June in corn and sorghum. Heavy feeding on young plants can stunt plants, and in some fields of forage sorghum, this may have especially happened in areas under drought this year.

While feeding, aphids excrete a substance known as "honeydew." The accumulation of this sticky material enhances the presence of a black sooty fungus that develops and thrives on the honeydew excreted by the aphids.

The havoc caused by the sugarcane aphid (*Melanaphis sacchari*) (Figure 3) in all types of sorghum since 2013 causes some anxiety or concern to sorghum growers, and some farmers in 2022 were ready to pull the trigger to control the corn leaf aphid. However, this is not the sugarcane aphid. Many growers were able to recognize the pest (or consult county Extension agents and other consultants) and avoided an unnecessary expense. Corn leaf aphid rarely causes economic losses, and they are controlled by several natural enemies (lady beetles, syrphid fly larvae, parasitoids, entomopathogens, lacewing adults and larvae) or environmental conditions, such as heavy rains.

Figure Sugarcane aphid on the bottom side of a sorghum leaf. (Photo by Raul Villanueva)

More information:

Corn Leaf Aphid, University of Kentucky

Corn Leaf Aphid on Field Corn, PennState Extension

Status of Several Aphid Species in Grain, Forage, and Sweet Sorghum in 2021, KPN - University of Kentucky

Sugarcane Aphid: Occurrence in August 2017, Misidentification, and Insecticides Registered for Grain, Forage and Sweet Sorghum. KPN - University of Kentucky

Dr. Raul Villanueva
Extension Entomologist
(859) 562-1335
raul.villanueva@uky.edu

Ryegrass Control Should Start in the Fall

Italian ryegrass escapes prior to corn and soybean planting in the spring have been on the rise over the past several years. During the 2022 spring season we received significantly more calls and reports about ryegrass escaping spring burndowns than in previous years. A number of factors likely contributed to this increase in 2022 including increased ryegrass pressure across the state, herbicide shortages, and poor applications conditions in the spring of 2022. While we certainly cannot predict the upcoming spring weather and can only estimate herbicide shortage affects, the one known factor is that ryegrass will continue to be present on Kentucky corn and soybean fields prior to planting. For those farmers who have been dealing with ryegrass and have known problematic fields it may be pertinent to start planning for ryegrass control with a fall residual herbicide application.

Italian ryegrass is a winter annual that emerges in the fall and then matures and produces seed in the spring/early summer of the following year. Ryegrass has traditionally been a problematic weed primarily in wheat because of their similar lifecycle, but it is becoming more problematic in corn and soybean especially with trends pushing to earlier planting dates in the spring. The lifecycle of ryegrass though, may be an area that can be exploited on corn and soybean acres with the use of residual herbicides to control ryegrass as it emerges in the fall. There are several herbicides containing group 15 that are labeled for fall applications to control winter annual weeds such as Italian ryegrass. There has also recently been a 24(c) label approved in Kentucky specifically for control of glyphosate resistant ryegrass.

The products that are either labeled for fall applications for control of fall emerging weeds, winter annuals, or fall applications specifically for glyphosate-resistant ryegrass control are listed in Table 1 along with the label details for each product. All products listed can be applied in the fall prior to corn or soybean planting.

When planning a fall application of a residual herbicide for control of emerging ryegrass, keep the following in mind.

- Applications should occur following crop harvest and should ideally be prior to ryegrass emergence.
- If ryegrass emergence has occurred at the time of application, an effective foliar herbicide will be needed to kill emerged ryegrass. Many labels suggest the use of Gramoxone (paraquat) for glyphosate-resistant ryegrass populations, although most Kentucky populations remain glyphosate susceptible and a rate of 1.25 to 1.5 lb ae glyphosate per acre will control small glyphosate-susceptible ryegrass.
- One of the labeled herbicides contains metribuzin which can assist in controlling emerged ryegrass, although metribuzin alone should not be relied on for foliar control. Ideally, products containing metribuzin should be sprayed with paraquat to control ryegrass as the two actives are synergistic, whereas glyphosate and metribuzin can be antagonistic on ryegrass control.

Lastly, while a residual herbicide applied in the fall can help with ryegrass control, it should not be expected to completely control the ryegrass population in each field. Some ryegrass plants may emerge after the residual herbicide has degraded or may even emerge in the spring. Also, similar to all residual herbicide applications, rainfall is needed to fully activate the herbicide and in the absence of rainfall ryegrass control will be minimal.

Even under the best of conditions, one should not expect a fall residual herbicide to completely control ryegrass and should plan accordingly for a spring burndown application. The use of a residual herbicide should be considered as a component of a larger ryegrass management program that reduces the number of plants needing to be controlled in the spring prior to corn and soybean planting. Additionally, the use of a fall residual lowers the potential of continuing to select for herbicide-resistance with the addition of sites of action in the fall application.

Table 1. Herbicide labeled for fall applications for controlling weeds germinating in the fall/winter annual weeds or fall applications for control of glyphosate-resistant ryegrass prior to corn and/or soybean planting the following spring.

Trade Name Product	Active Ingredients (Site of Action Group #)	Labeled Application Timing	Fall application Rate (Medium Soils)[ab]	Replant Restrictions	Label Restrictions specific to fall applications
Anthem Maxx	Pyroxasulfone (15) + fluthiacet-methyl (14)	Fall applications for controlling weeds germinating in the fall or winter annuals	Corn – 4 to 5 fl oz/a Soybean – 3.5 to 4.5 fl oz/a	Corn & Soybean – 0 Months	- Do Not exceed 2-inch incorporation if tilled after application - Do Not Apply to frozen or snow-covered soil - Do Not make fall applications on coarse soils
Boundary	S-metolachlor (15) + metribuzin (5)	Control of glyphosate-resistant Italian ryegrass in the fall prior to soybean or corn planting the following spring (*24c Special Needs Label*)	Corn & Soybean – 1.8 to 2 pt/a	Corn – 4 Months Soybean – 0 Months	- Apply September 1 to November 30 - Do Not apply Boundary to Frozen Ground - Tillage may occur following application but may not exceed 2 to 3 inches - Do Not Make more than one fall application of Boundary
Dual II Magnum[c]	S-metolachlor (15)	Fall application for residual control of glyphosate resistant Italian ryegrass in corn and soybean -	Corn & Soybean – 1.33 to 1.67 pt/a	Corn & Soybean – 0 Months	- Apply from September 1 to December 1 after harvest and prior to ryegrass emergence - Tillage may occur following application but may not exceed 2 to 3 inches
Zidua SC	Pyroxasulfone (15)	Fall/Winter application for controlling weeds germinating in the fall, or winter annual weeds	Corn & Soybean – 3.25 to 5 fl oz/a	Corn & Soybean – 0 Months	- Do Not apply to frozen or snow-covered soil - If tillage is used following application tillage may not exceed 2 inches.

[a] Check the herbicide label for product rates to use on fine and coarse soils
[b] Refer to label for maximum seasonal/yearly rate allowance for each active ingredient.
[c] Numerous generic formulations of S-metolachlor and metolachlor exist on the market. Check product label to assure fall applications for control of ryegrass are labeled for each specific product prior to use.

Dr. Travis Legleiter
Assistant Extension Professor - Weed Science
(859) 562-1323
travis.legleiter@uky.edu
@TravisLegleiter

Opportunistic Secondary Pests on Field Corn: Sap Beetles

During the last week of August, I received a corn sample that had an infestation of whitish color larvae on the ears. These larvae were feeding in the ears and making holes in intact kernels as shown in Figures 1 and 2. Also small size, dark brown color beetles were found in this sample. These specimens were identified as the dusty corn sap beetle. Sap beetles are secondary pests of corn. They are opportunistic invaders that detect damages in by other pests. Adult sap beetles feed on corn silk and pollen, and chew on tassels, and larvae feeds in kernels as described above. There are studies that showed high numbers of sap beetles in ears damaged by corn earworm. Corn earworms and other pests (i.e., Japanese beetles) provide entry sites for the sap beetles.

Description of sap beetles and life cycle

The larva of corn sap beetle is approximately 1/4 inch long, white, with a light brown head and hardened projections from the end of their abdomens that are species specific (Figure 2). Adult sap beetles can be recognized by the dark brown color and short wings that do not cover the entire length of the abdomen, near 1/8 in. long, and eleven segmented antennae (Figures 3A and 3B). The club-shaped antennae are slender except for the last few segments, which are distinctly enlarged into a club (Figure 3).

Figure 1. Sap beetle larvae and injures in kernels (Photo: Raul Villanueva, UK).

These beetles overwinter as adults on sheltered areas, and in the spring, eggs are laid on decomposing vegetation or in the ground. Sap beetles can complete their life cycle from 20 to 45 days depending on temperatures, and there can have many generations per year.

Figure 2. Sap beetle larva approximately 1/6 inch in length
(Photo: Raul Villanueva, UK).

Figure 3. Dusty sap beetle approximately 1/4 inch long. Notice the clubbed antennae and that the elytra does not cover the entire length of the abdomen (Photo: Raul Villanueva, UK).

Management

Economic losses due to sap beetle damages are minimal, and the use of insecticides for the control of sap beetles on field corn are not practical. In areas where the problem is frequent, plowing under crop debris will reduce overwintering and breeding sites for sap beetles.

More information

Dowd P. F. 2000. Dusky sap beetles (Coleoptera: Nitidulidae) and other kernel damaging insects in Bt and non-Bt sweet corn in Illinois. J. Economic Entomology. 93(6):1714-20.

Utah State University. Sap Beetles

Dr. Raul Villanueva
Extension Entomologist
(859) 562-1335
raul.villanueva@uky.edu

UPCOMING EVENTS

Jan 5, 2023	**UK Winter Wheat Meeting**
Jan 19, 2023	**KY Commodity Conference - Bowling Green**
March 9-11, 2023	**National Commodity Classic - Orlando FL**
May 09, 2023	**UK Wheat Field Day**
Jul 25, 2023	**UK Corn, Soybean and Tobacco Field Day**

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