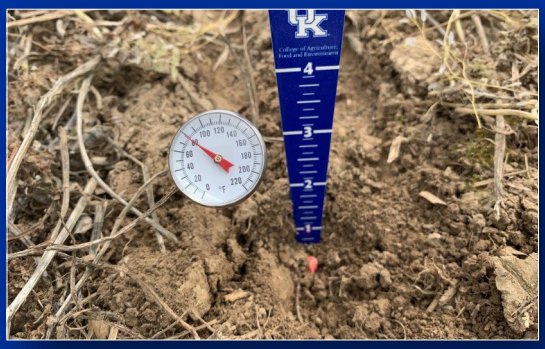

Corn & Soybean News

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COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT
Grain and Forage Center of Excellence

University of Kentucky

Annual Ryegrass Escapes Prominent in 2022

The number of phone calls, emails, and text messages I have received about annual ryegrass (aka: Italian ryegrass) failures prior to corn and soybean planting has been on the rise the last couple of years. This spring the gradual increase of calls from the last few years turned into an onslaught of inquiries. The sudden increase is not surprising as the 2022 spring has been a perfect storm for ryegrass burndown failures. The question has been why is this occurring and what do we do now?

Burndown failures in the spring of 2022

The combination of a cool, wet spring and a shortage of herbicides, most specifically glyphosate, has led to a scenario in which we have observed an exceptional number of burndown failures, especially on annual (Italian) ryegrass. In the February 2022 Corn and Soybean News we highlighted the ideal weather conditions for maximizing ryegrass burndowns, unfortunately those conditions rarely existed in the spring of 2022. Additionally, it is well known that there is an ongoing shortage of glyphosate, and many producers will have to limit their glyphosate usage this season. Despite our encouragement to not delete glyphosate from the burndown applications in fields that contained annual ryegrass, many were forced to try alternative burndown chemistries on ryegrass this spring due to herbicide shortages. Lastly, the compressed spring forced many producers to include their residual herbicides with their initial burndowns. Those burndowns in front of corn, almost always contained atrazine which antagonized the glyphosates efficacy on ryegrass and further expounded the failures. This combination of events has led to a large increase in cases of ryegrass burndown failures this year.

Additionally, in some cases we may be facing glyphosate-resistance in some select populations throughout the state. We have recently confirmed a second case of glyphosate-resistant ryegrass in central Kentucky and had at least three populations that had increase tolerance or were showing segregation of resistant and susceptible individuals from within the population which is the initial indication of a resistance event occurring.

Now that we know the failures have occurred, the question is: what now? In the following we will break down several scenarios.

Ryegrass burndown failure using a group 1 (Select, Assure, etc.), no crop planted, or crop has not emerged:

If there is a such a thing as a good situation during a burndown failure, this is likely it. It is not surprising that many of the group 1 herbicides failed to control ryegrass this spring. The group 1 herbicides are known for their slow activity in warm weather and that activity is slowed considerable when temps are as cold as they were this spring, so slow that in most cases they failed to control the targeted grass species (Photo 1). In this case we would suggest that a grower use the following treatment to regain control of their annual (Italian) ryegrass:

- 1.5 lb ae glyphosate (e.g. 40 fl oz Roundup PowerMax3) plus 1 fl oz Sharpen or 1 fl oz Reviton

The combination of 1.5 lb ae glyphosate and Sharpen has consistently been the most effective burndown combination against ryegrass in University of Kentucky trials over the last five years. This year we were able to confirm that Reviton is also a viable tank mix partner in a glyphosate burndown on Ryegrass similar to our previous findings with Sharpen. Initial results from our ryegrass burndown study in 2022 can be found in Figure 1. If the field will be planted to corn, the Sharpen or Reviton rate can go up to 3 fl oz, although we have not observed a benefit from this increased rate on ryegrass. Alternatively, you can replace Sharpen with Verdict if you are wanting to include some residual activity in the tank. No matter the situation you should not include atrazine with the mixture as it antagonizes glyphosate as you can observe in Figure 1 when atrazine was added to the glyphosate plus Verdict tankmix.

Sharpen, Reviton, and Verdict can only be applied if either the crop has not been planted or has not emerged. Sharpen, Reviton, and Verdict will severely damage emerged corn and soybean.

Ryegrass burndown failure using glyphosate, no crop planted, or crop has not emerged:

The first question in this situation is whether the population is potentially glyphosate resistant. While the process of officially confirming glyphosate-resistance can take a year or more, there are a few signs you can look for to indicate if the population is potentially resistant. If you observe dead ryegrass plants next to live ryegrass plants and all other species are controlled this can be a good indication of possible resistance occurring within the field. The more likely scenario this spring is that the product just simply failed due to either low use rates and/or cold temperatures that are not conducive to effective ryegrass control. In this case you will find that the majority of ryegrass plants were not controlled and may find other species also surviving the burndown.

If you are concerned about or observing potential glyphosate resistance, we recommend the following:

- 4 pt Gramoxone (or 1 lb of equivalent paraquat product) + 1 lb atrazine (corn) or 8 oz metribuzin75DF (soybean) + 2,4-D or Dicamba if broadleaf pressure is present

This combination works best on smaller ryegrass plants, but in cases of potential glyphosate resistance this is the best non-glyphosate option (Figure 1).

If you suspect the failure is simply due to poor weather conditions, which is the case for most producers in Kentucky, we recommend that you apply the recommended 1.5 lb glyphosate plus Sharpen/Reviton/Verdict as recommended in the section above.

Ryegrass burndown failure and corn has emerged:

This is a worst-case scenario and unfortunately has/is occurring across the state of Kentucky this year. As mentioned above it is first important to determine if a glyphosate failure was due to poor conditions or possible resistance.

- If you feel that the failure occurred due to poor conditions, then glyphosate may still be your best option in Roundup Ready corn. The key is to use at least 1.5 lb ae glyphosate (e.g. 40 fl oz Roundup PowerMax3) and do not tank mix with any atrazine products as atrazine will antagonize glyphosate control on annual ryegrass.
- If the failure is due to possible glyphosate resistance or your corn hybrid is not Roundup Ready you have fairly limited options. The best option in this scenario is to use AccentQ or another product that contains nicosulfuron. We would recommend that you apply at the highest rate possible on the label (0.9 oz/A Accent Q). The expectation of these applications should be to suppress the ryegrass to give your corn crop a competitive edge, as it is unlikely that complete control will be accomplished in this scenario.
- If the failure is due to potential glyphosate-resistance and your corn hybrid contains Liberty Link traits, you can also use Liberty. Although Liberty (glufosinate) is not known for grass control it is one of the few options in this scenario that can provide suppression. We would recommend a combination of 32 fl oz Liberty (0.58 lb glufosinate) plus 0.9 oz Accent Q (or equivalent nicosulfuron product). Like the previous recommendation the expectation should be suppression rather than control.

Further research is being conducted and/or implemented at the University of Kentucky Research and Education Center to further understand how to achieve complete control of this increasingly problematic weed.

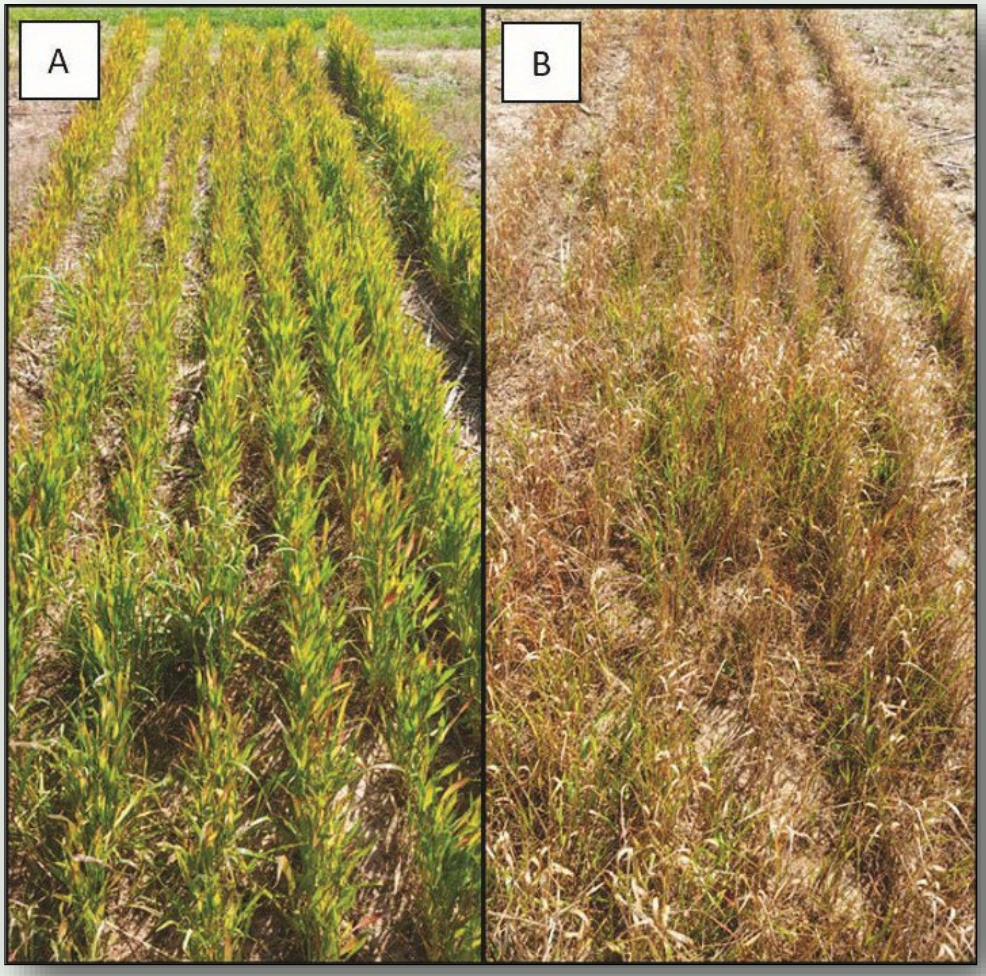
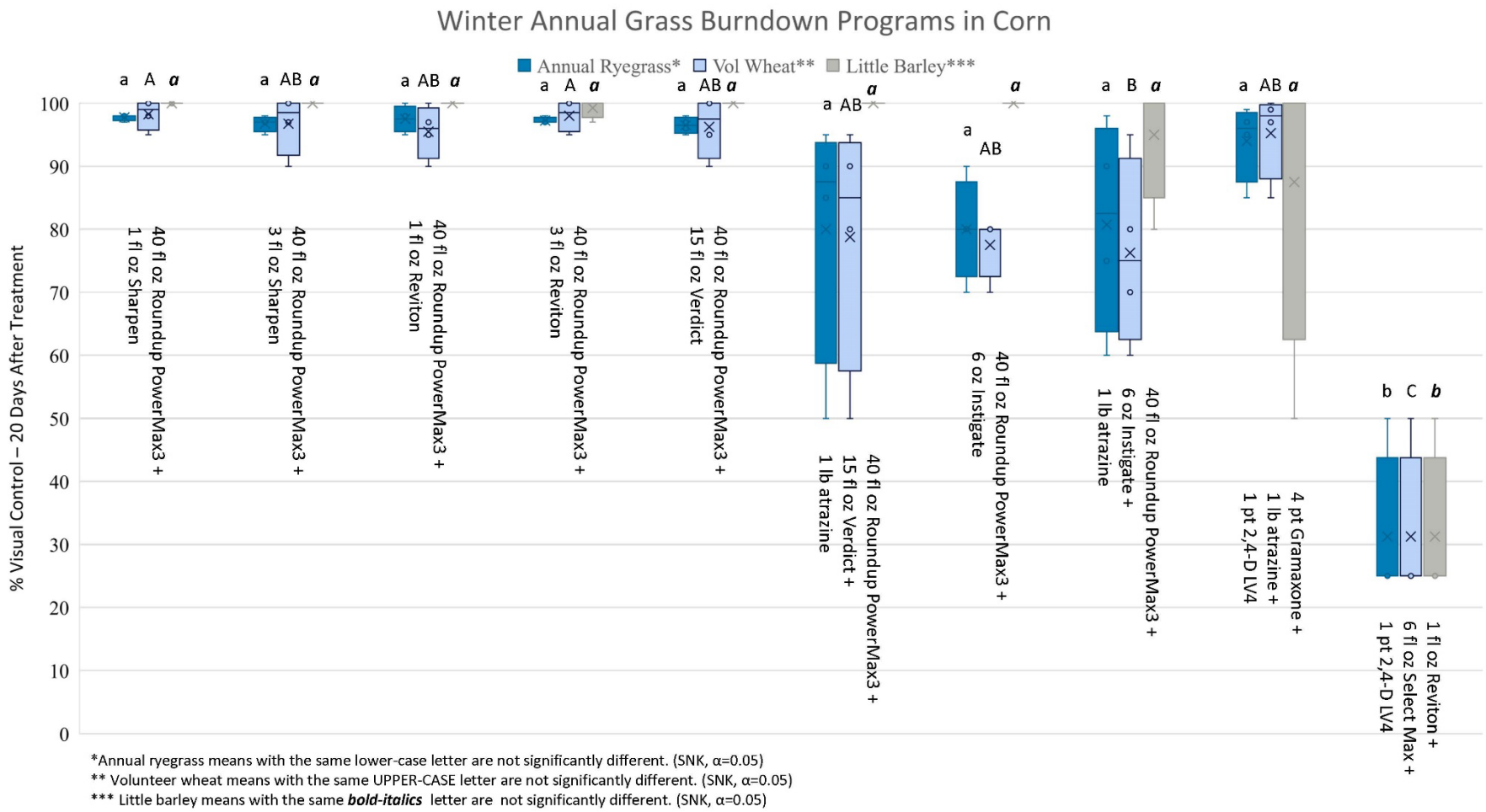


Photo 1. Italian ryegrass and winter wheat burndown 28 days after application. **A.** Quizalofop plus 2,4-D **B.** 1.13 lb ae glyphosate plus 2,4-D. *Note that while both the wheat and annual ryegrass control was significantly greater in the plot with glyphosate, complete control of annual ryegrass was not achieved likely due to the combination of cool temperatures and a glyphosate rate less than 1.5 lb ae/A.*

Figure 1. Winter annual grass burndown efficacy 20 days after application.



*Annual ryegrass means with the same lower-case letter are not significantly different. (SNK, α=0.05)
** Volunteer wheat means with the same UPPER-CASE letter are not significantly different. (SNK, α=0.05)
*** Little barley means with the same ***bold-italics*** letter are not significantly different. (SNK, α=0.05)

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Some stink bugs in wheat may predict outbreaks that affect corn and soybean seedlings

The paragraphs written below were done for the Kentucky Pest News Blog before a conversation with colleagues that work in field crops in the North Central and Eastern U.S. and Canada. Coincidently, Dr. Dominic Reisig from NCSU had similar observations in the presence of stink bugs in wheat fields in the coastal plain of North Carolina. Then, here I hypothesize an event that may or may not happen this coming growing season.

During the last two weeks of April, I observed brown stink bugs (Euschistus spp.) (Figure 1) and green stink bugs (Nezara viridula) while scouting for aphids in wheat, but surprisingly I had not seen a single rice stink bug (Oebalus pugnax), usually a very abundant species in wheat (Figure 2). Boxelder bugs (Boisea trivittata) (Figure 3) were observed in these wheat fields. The numbers of stink bugs were not high (between 1 to 6) in three different fields nor the boxelder bugs. In addition, in western Kentucky we have seen a geographical spread of the brown marmorated stink bug (BMSB) (Halyomorpha halys) since 2020. Starting in the first days of April, BMSB were observed walking indoors in human dwellings or window screens coming out of their overwintering stage. These stink bugs will feed and then mate, and a new generation of stink bugs will begin colonizing fruit, vegetables, corn, soybeans, and other crops. The first peak population occurs from mid-June to the end of July, and the overwinter population that feeds on maturing pods or kernels occurs in mid-September to October.

Problem

This may be a personal perception after a hiatus from the COVID-19 pandemic, however, compared to previous years the presence of the brown and green stink bug in wheat seems early. Also, reports of BMSB observed in houses may imply the potential for an outbreak of the first-generation stink bugs during this coming season for field crops. Thus, feeding and damage to seedling corn and soybeans may occur. Likewise, boxelder bugs, a common pest of dwellings were seen in large numbers in the fall of 2021 in Minnesota and outbreaks occurred in March and April in 2022. In wheat, boxelder bugs do not cause any damage but contribute to the perception that a potential stink bug outbreak may happen as green, brown, and BMSB were very abundant in central and western Kentucky in 2021.

In the spring and fall seasons of 2021 in western and central KY, farmers, and county extension agents observed large populations of stink bugs. Furthermore, the entomology team of the UK-REC at Princeton provided numerical data from several counties and reported changes in species composition numbers between 2020 and 2021.

Stink Bug Damage to Corn and Soybean Seedlings

In corn, adult and nymph stink bugs feed on seedlings. The result of this feeding causes oblong holes with yellow margins in the leaves as they emerge from the whorl, as well as twisting of the whorl. If heavy feeding occurs, it can cause death of the growing point. In soybeans adult and immature stages feed on tender tissue. When stink bugs inject their digestive enzymes, they may cause delayed maturity and deformed leaf growth. In corn and soybeans, the most important damages occur during the reproductive stage of plants affecting kernels and pods, that can cause abortion of seeds, reduce yields, and affect seed quality.

Management

There are established thresholds for the number of stink bugs in corn and soybeans. There are several species in these crops, including the green stink bug (the most abundant), followed by BMSB, and the brown stink bug complex. Thus, tallies should include the mix of all adults and 3rd-4th instar nymphs of all these species to reach the thresholds for the different growth stages of corn or soybeans (Table 1). Also, little information is available about damages of BMSB in field corn and soybeans on damages caused by BMSB, however, the thresholds shown in Table 1 may be used for these crops in this coming season independently of the species composition. If thresholds are met, judicious use of conventional insecticides registered for stink bugs may be used.

Table 1. Thresholds for stink bugs in corn and soybeans

Crop	Plant stage	Thresholds
Corn	Before pollination	1 stink bug per 4 plants (25% infestations)
	Pollination to early dough stage	1 stink bug per 2 plants (50% infestations)
Soybeans	Bloom to R3 using sweep net	3 stink bugs per 25 sweeps
	R4 to R6 with using sweep net	9 stink bugs per 25 sweeps
	Reproductive stages using drop cloth	1 stink bug per row-foot

Figure 1. Brown stink bug (*Euschistus* sp.) inserting its piercing and sucking mouthparts in wheat grains. Feeding occurs injecting digestive enzymes, and removing fluids from plants. (Photo by Raul T. Villanueva)

Figure 2. Rice stink bugs (*Oebalus pugnax*) on a barley head. This species is usually abundant in May but it was not observed April 2022 in wheat fields. (Photo by Raul T. Vil- lanueva)

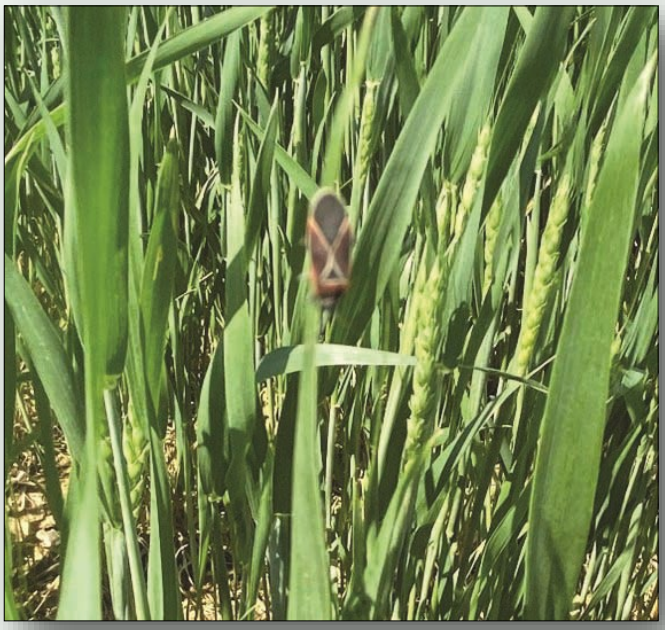

Figure 3. Boxelder bug (*Boisea trivittata*) in wheat field. (Photo by Raul T. Villanueva) Feeding by this insect was not observed in wheat.

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Update of Operations for the University of Kentucky Plant Disease Diagnostic Lab in 2022

The Princeton Plant Disease Diagnostic Laboratory (PDDL), located at the University of Kentucky Research and Education Center (UKREC) was destroyed in the December tornado that damaged many areas in western Kentucky. Rebuilding the UKREC will take time. In addition, the diagnostician at the Princeton PDDL retired earlier this year and has not yet been replaced. Currently we are awaiting temporary facilities and structures, and will not have a functioning Princeton PDDL in 2022.

Shown above is the aftermath of destruction following the Dec. 10, 2021 tornado at the University of Kentucky Research and Education Center (UKREC) at Princeton. The Princeton Plant Disease Diagnostic Laboratory (PDDL) was located inside the facility.

The Princeton PDDL will be unable to accept any samples for diagnosis until further notice. Clientele with walk-in samples at the UKREC will be asked to contact their local County Agent. Samples that arrive via mail at the UKREC will not be processed.

The Lexington PDDL will still be open, however **all samples that need a physical diagnosis should be submitted through a County Agent.** County Agents will know the appropriate process to get a fast and accurate diagnosis. Samples that are **not** submitted through a County Agent may have a delayed diagnosis since County Agent samples are prioritized. We will attempt to diagnosis as many samples as possible with the limited facilities and resources available. We appreciate your understanding and patience as we work to provide quality service under challenging circumstances.

—Authors: The Extension Plant Pathology Team

2022 Corn and Soybean Fungicide Efficacy Guides now available

The 2022 fungicide efficacy tables for foliar diseases of corn and soybean, and for soybean seedling diseases have been updated, and are now available through the Crop Protection Network website: https://cropprotectionnetwork.org/

These tables are updated annually based on data provided by United States Extension plant pathologists, with efficacy determined through replicated research trials across a broad geographic area. Kentucky research trial data are included in the development of these national fungicide efficacy ratings.

The ratings in these guides reflect the efficacy of a fungicide against a given disease, and are not rating yield response to a fungicide. It is an applicators legal responsibility to read and follow label directions. Updated tables include:

- Fungicide Efficacy for Control of Corn Diseases
- Fungicide Efficacy for Control of Soybean Seedling Diseases
- Fungicide Efficacy for Control of Soybean Foliar Diseases

Southern rust of corn, caused by the fungus *Puccinia polysora*, was confirmed in Union County, Ky. on July 12, 2021.

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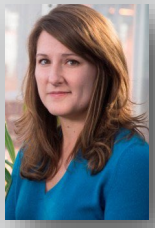

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Fast runners and beautiful predacious Tigers of the Soil and description of larval behavior

To our knowledge, beetles (Order Coleoptera) are the most diverse group of insects on the planet. Just in the United States, there are 30,000 described species. Such species diversity comes along with so many morphological, behavioral, and ecological differences. All that means coleopterans display different sizes, food, and habitat preferences. As you may guess, there is plenty of information about beetles (see the suggested reads in this document) so you will be surprised of how funky and fascinating some species are.

Among the 155 families of beetles found in the eastern United States, ground beetles (family Carabidae) are considered among the largest families in species numbers. Carabids are known to be important predators of agricultural pests. Most species are generalist and opportunistic predators, but there are some members of the family that feed on slugs, springtails or even have omnivorous feeding habits.

Tiger beetles (subfamily Cicindelinae), are ferocious predators during both larvae and adult stages. As the name suggests, adults are equipped with an acute sight and strong mandibles. Moreover, they are fast runners (Figure 1).

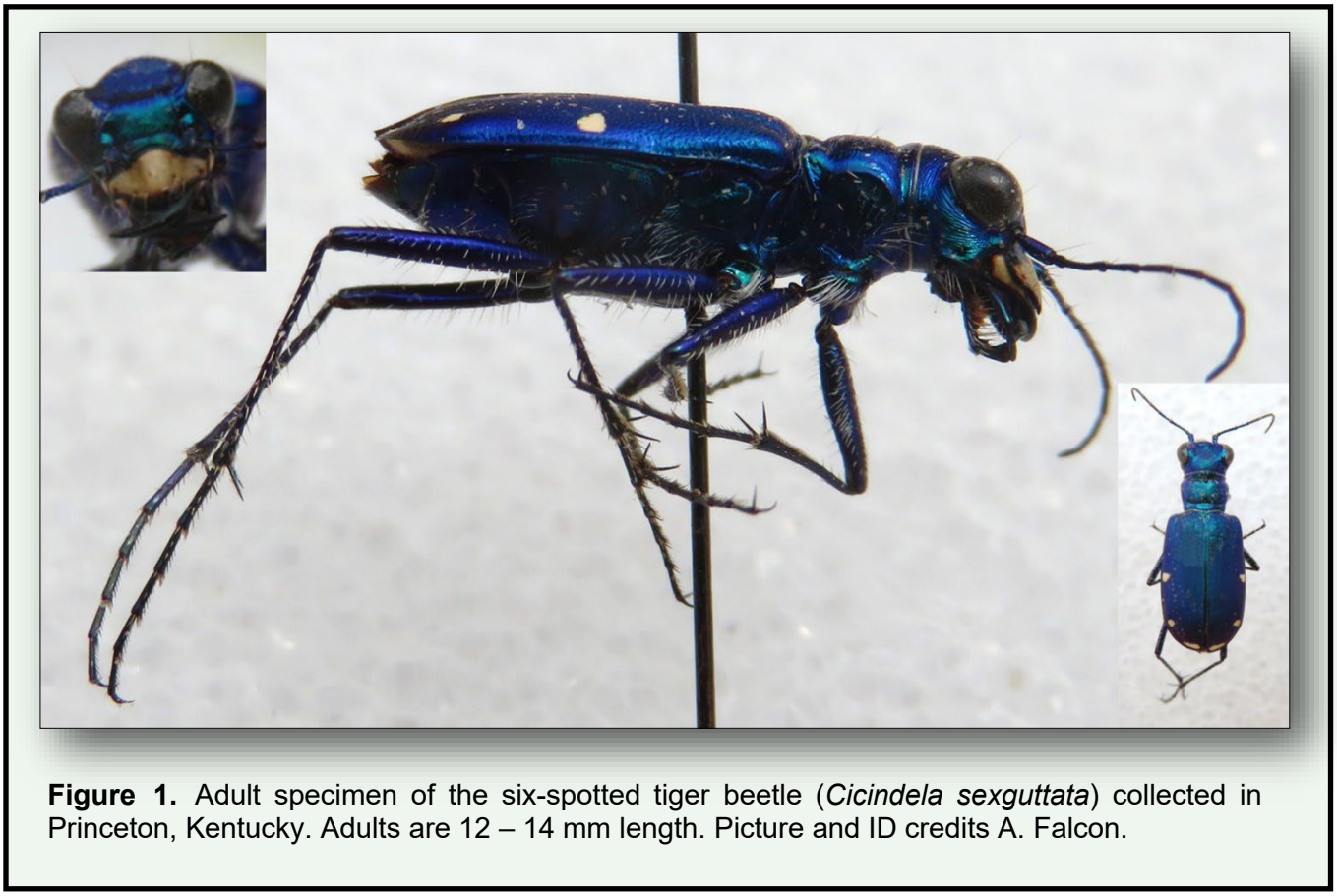

Figure 1. Adult specimen of the six-spotted tiger beetle (*Cicindela sexguttata*) collected in Princeton, Kentucky. Adults are 12 – 14 mm length. Picture and ID credits A. Falcon.

If you think some insects can have bizarre appearances, it is time to take a look at the larvae of tiger beetles (Figure 2). Whereas common ground beetle larvae can be found actively looking for prey on debris or plants, tiger beetle larvae make vertical burrows in the soil and wait to capture prey wandering in the ground such as incautious beetles, caterpillars, ants, or anything they can catch. During the scouting of alfalfa fields at the UK Research and Education Center in Princeton, we found several tiger beetle larvae in their tunnels about 10 inches in depth. The larva uses its head to plug the entrance of the tunnel and then just waits to attack the prey with its powerful mandibles.

Figure 2. Larva of a tiger beetle found at the UK Research and Education Center in Princeton. The red arrow shows a modified dorsal segment bearing hooks used to move back and forth across the tunnel. Picture credits A. Falcon.

Implications for biological control

Tiger beetles are generalist predators, so they may catch different arthropods including insects and spiders. It is unclear how much they can contribute to the control of pests, but you will find these beetles are active in searching and capturing bugs in agricultural fields of Kentucky during spring and summer.

Interesting facts about tiger beetles

- There are over 100 species of tiger beetles in the Unites States. Cicindela sexguttata (the one show in Figure 1) is a relatively common species across the eastern half and also southeastern Canada.
- Depending on the species, the larval stage can last from 2 to 3 years before becoming adults.
- Larvae can survive flooding conditions.
- Tiger beetles are known by their astonishing running speed. They can reach 5.5 mph, which would be equivalent to a human running at 720 mph!

Suggested reads

Arnett, R. H. 1968. The Beetles of the United States (A Manual for Identification). American Entomological Institute, Ann Arbor, Michigan.

Dillon, E. S. & Dillon, L. S. 1961. A Manual of Common Beetles of Eastern North America. Row, Peterson and Co., Evanston, Illinois.

Downie, R. H. & Arnett, R. H. 1996. The Beetles of Northeastern North America, Volumes 1 and 2. Sandhill Crane Press, Gainesville, Florida.

White, R. E. 1983. A Field Guide to the Beetles of North America. Houghton Mifflin, Boston.

Tiger beetles, in Kentucky Critter Files

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College of Agriculture, Food and Environment

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An intensive prep course to obtain a drone pilot license

Course:

June 28 and 29, 2022

8:30am- 3:30 pm each day

(Lunch will be provided both days)

Derrickson Agricultural Complex
(Arena Classroom)
25 MSU Farm Drive
Morehead, KY

Course: $400

Exam:

The exam takes approximately 2 hours and appointments will be scheduled for **June 30**

Exam: $175

For more information and to register contact:

Lori Rogers *lori.rogers@uky.edu270-625-2143*

OR

Jacob Ison *jacobison@uky.edu 606-738-6440*

Class size is limited!

CCA: pending

Course will be taught by Mandy Briggs, Certified Flight Instructor

2022 Upcoming Events

Date	Event
July 21 or 26	Corn, Soybean & Tobacco Field Day

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