Kansas State University Extension Entomology Newsletter

For Agribusinesses, Applicators, Consultants, Extension Personnel & Homeowners

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News Corner

- Western Corn Rootworm Egg Hatch Has Begun

Learning Corner

- Dung beetles are getting busy!

NEWS CORNER

Western Corn Rootworm Egg Hatch Has Begun

To date, corn rootworm degree day accumulation for the northern half of Kansas is ahead of the same time last year, and egg hatching should begin in one to two weeks in most locations. In the southern portion of the state degree day accumulation is slightly behind last year, but egg hatching is underway and peak hatch is likely two to three weeks (Table 1).

Western corn rootworm larvae (Anthony Zukoff).

Table 1. 2024 corn rootworm degree day accumulation compared to 2023 during the same time period. Calculated using 10 cm max/min ground temperatures provided by KSU Mesonet.

CRW Degree Day Accumulation as of May 19			
Location	**2023**	**2024**	**Difference**
Colby	189	255	+66
Hays	298	332	+34
Manhattan	306	356	+50
Garden City	451	428	-23
Meade	575	560	-15
Parsons	433	373	-60

Calculating Corn Rootworm Degree Days

As with all degree-day models, the base temperature, or developmental threshold, will be important for predicting rootworm hatch and emergence. Western Corn Rootworm eggs are laid in summer and overwinter in the soil. The following spring, a threshold soil temperature of 52°F or higher will trigger eggs to develop. This base temperature and the daily 10-cm high and low soil temperatures are used to monitor egg hatch using the formula below. It is important to note that degree day calculations for egg hatch should begin starting January 1 of the current year.

Calculating growing degree days for western corn rootworm egg hatch:

$$\left(\frac{(\text{Max. Daily 10cm Soil Temp.} + \text{Min. Daily 10cm Soil Temp})}{2}\right) - 52°\text{F}$$

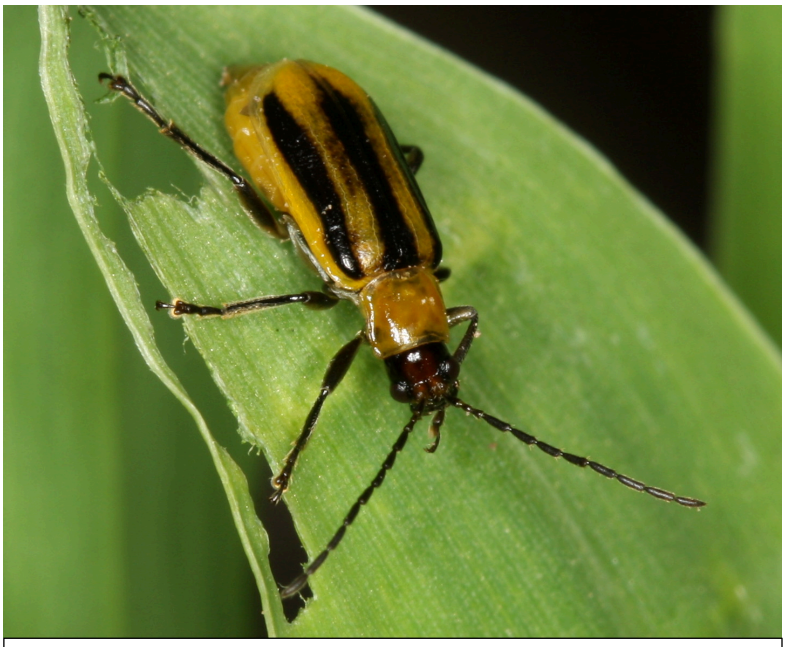
For example:

$$\frac{(58°\text{F} + 54°\text{F})}{2} = \frac{112}{2} = 56 - 52 = 4 \text{ degree days accumulated that day}$$

Eggs should begin hatching after approximately 380 degree days have accumulated. Peak egg hatch occurs between 684-767 accumulated degree days. Examining corn roots for damage 10 to 14 days following peak hatch is recommended since feeding damage will be fresh and easier to detect.

Why is it important to scout for root damage?

Western corn rootworm resistance to Bt corn continues to be an issue in continuous corn in the United States. Field-evolved resistance was first detected in 2009, and, to date, resistance to every commercially available Bt trait package has been detected in corn-producing areas of the country. However, resistance is not uniform across all corn-growing regions, so be sure to check local conditions when making planting decisions. Given this, evaluating corn roots for rootworm damage during the growing season is highly recommended. Doing so lets you know how well your rootworm management practices are working and provides a way to detect the presence of potential resistance to the Bt hybrid planted.



Adult western corn rootworm (Anthony Zukoff).

Details for the process of evaluating corn root damage can be found in the KSRE publication MF845 Corn Rootworm Management in Kansas Field Corn. In short, several plants should be dug up throughout the field, and their roots should be washed well for subsequent evaluation using the Iowa State University 1-3 Node Injury Scale. Digging roots will need to be timed after peak damage from rootworm larvae occurs but before roots begin to regrow, typically late June to early July. Corn rootworm resistance to a Bt protein should be considered if the node injury rating is 1.0 in a field with at least 2 consecutive years use of the same single corn rootworm Bt toxin or if the node injury rating is greater than 0.5 in a field with at least 2 consecutive years use of the same pyramided corn rootworm Bt toxins.

It is important to remember that the best management tool for western corn rootworm is rotation. In continuous corn production, this includes rotating Bt traits annually to help slow the evolution of resistance. Rotation to a non-Bt hybrid combined with soil applied insecticides would be another option for continuous corn. Both practices will be useful for prolonging the efficacy of currently available Bt traits.

Anthony Zukoff—Southwest Research and Extension Center – Garden City, KS

HOME

LEARNING CORNER

Dung beetles are getting busy!

As weather has been warming up, you may be noticing more dung beetle activity. Despite their small size, dung beetle's impact on the environment is profound and far-reaching. Dung beetles are essential for maintaining healthy ecosystems and perform vital ecological services including recycling nutrients from manure back into the soil, capturing carbon and nitrogen, enhancing soil fertility and promoting plant growth. Recycling of manure pats improves drainage, aeration and reduces pasture fowling in addition to controlling important parasites like flies and gastrointestinal nematodes.

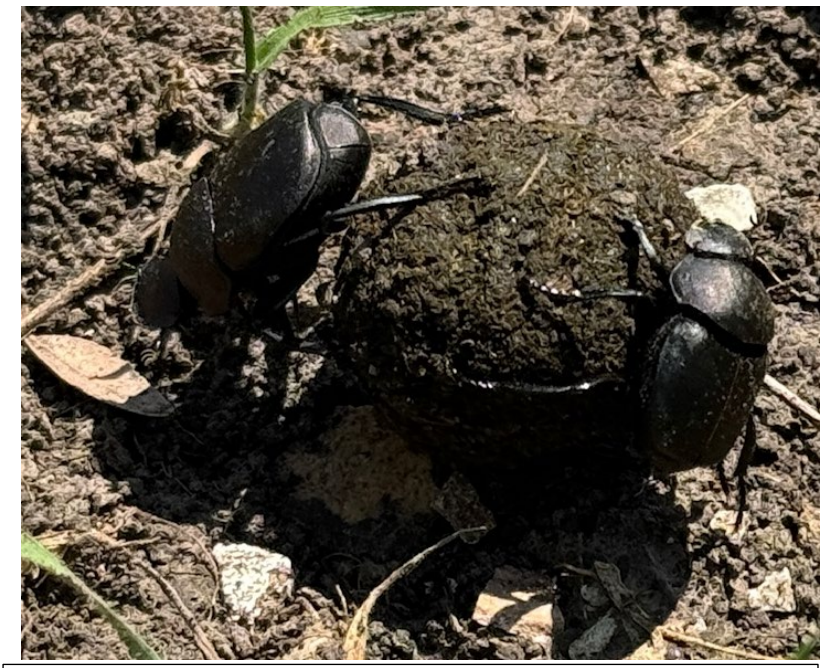


Figure 1: Rolling dung beetle species removing brood ball away from the manure pat to bury elsewhere (Cassandra Olds).

Manure is essential for the reproduction of dung beetles and some species continue to feed on it as adults. As adults, dung beetles are categorized into different guilds based on their feeding and manure burying behaviors. Tunneling dung beetles (tunnelers) create tunnels beneath dung pats, pack manure into balls (brood balls) and push them through the tunnel down into the soil for consumption or reproduction. Rolling dung beetles (rollers) are known for their distinctive behavior of shaping dung into balls and rolling them away from the dung pat before burying them (Figure 1). These beetles help to distribute the nutrient resources away from the dung pile.

Tunnelers and rollers are the most effective at manure redistribution but are also the most sensitive to human activities. Dwellers in contrast inhabit the dung pat itself instead of removing and burying dung. Dwellers play a crucial role in breaking down the dung and accelerating its decomposition. Evidence of their activity can be seen as little tunnels running through a dried-out pat.

Healthy dung beetle populations are essential for a grassland ecosystem to thrive. Unfortunately, some agricultural practices negatively impact dung beetle populations. The most significant impact comes from ivermectin use. Ivermectin is a broad-spectrum antiparasitic medication commonly used in veterinary medicine to treat internal

parasites in livestock. Ivermectin is fat soluble and is excreted from the animal over a long period of time. Beetles feeding on the manure or beetle larva growing in ivermectin contaminated brood balls die resulting in declining populations over time. Even sub-lethal doses can impair dung beetle behavior and reproductive success. To avoid this, producers can use ivermectin dewormers when dung beetle activity is low (in winter or early spring for example) or use dewormers which are safer for dung beetles like white wormers (Benzimidazoles).

Cassandra Olds – Veterinary Entomology

HOME

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Need an insect identified? Visit the Insect Diagnostics Program Website

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