

Common Insects of Wheat in Kentucky

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Introduction

Kentucky is located in a unique ecological situation between the cold winters of northern prairie states and the very mild winters of the deep-south. Though cold enough to stop most insect activity during mid-winter, the great variation in date of first frost, fall onset of continuous cold, and spring onset of general warm weather makes it particularly difficult to predict insect impact in any given year.

In Kentucky wheat is grown as a “winter crop” planted in the fall, usually following corn, and harvested the following summer. Most often varieties which mature early enough to allow planting of “double-crop” soybeans are used. This production system divides the insect pests into three groups: those that infest in the fall, and that either do or do not over-winter, and those that infest in the spring. We will examine these pests in order of appearance through the production year.

Insect pests are common in Kentucky wheat. Typically, one can find all of these insects in almost every field every year, but rarely do their populations grow to economically important numbers. However, each pest has the potential to cause significant damage under appropriate conditions.

Insect Pests¹ in General Order of Appearance

Fall Only

The fall Armyworm, *Spodoptera frugiperda* (J.E. Smith), is a common pest of several late planted summer and early planted fall crops. Fall armyworm (FAW) cannot over-winter in Kentucky. FAW migrates into Kentucky from the gulf coast in mid-summer, initially infesting corn as its primary crop host. In late summer / early fall, as corn begins to mature, it colonizes newly seeded grasses. Damage is most common in lawns, reclaimed land, ditch banks, and roadsides, etc., but may also infest small grains. FAW can damage small grains (in fact any host) if it feeds on seedlings before roots are established, resulting in seedling death. If plants are established FAW feeding is rather more like grazing. FAW can remain active until the first killing frost and will survive longer where crop residue provides shelter from the cold.

¹ Common and scientific names of insects from: Common Names of Insects and Related Organisms. Entomological Society of America.

http://www.entsoc.org/pubs/books/common_names/index.htm#About_this_Publication

Infestation usually results from early planting. Often, planting after the Hessian fly free date (Johnson1993a) will avoid this situation. However, occasionally frost and onset of cold weather are late enough to allow infestation of small grains. Insecticidal control is relatively easy; however, there are no established thresholds. Damaged fields are sometimes replanted, but this is a risky technique. Many damaged plants will survive, thus, replanting may result in a denser than desirable stand.

Fall and Spring

The Hessian Fly, *Mayetiola destructor* (Say), is another common insect pest infesting small grains in the fall (Johnson1993a). See Cambron's treatment elsewhere in these proceedings. In general, planting after the "fly free" date will provide adequate control in Kentucky. Agronomic and cultural factors favoring strong stems and stand ability of the plant are preferred, but at last examination all resistance factors can be overcome by the biotypes present in the state. There are no rescue treatments (foliar applied insecticides), though use of systemic insecticides as seed treatments and fall / spring applications of the systemic insecticide disulfoton, (e.g., Di-Syston® 8 and generics), targeted at aphids may have some effect.

There is little doubt that the most important insects in Kentucky-grown wheat are a complex of cereal aphids, HOMOPTERA: Aphididae (Johnson and Townsend 1999). In Kentucky, this complex is primarily composed of the bird cherry-oat aphid, *Rhopalosiphum padi* (Linnaeus); English grain aphid, *Sitobion avenae* (Fabricius); corn leaf aphid, *Rhopalosiphum maidis* (Fitch) and greenbug, *Schizaphis graminum* (Rondani). In addition, the rice root aphid, *Rhopalosiphum rufiabdominalis* (Sasaki), is very likely playing an important role, though little is known of this aphid in Kentucky. It is interesting to note that these aphids are not important for their direct damage, but rather as vectors of the viral pathogens that result in Barley Yellow Dwarf (BYD).

The risk, real and perceived, of Barley Yellow Dwarf, and by association, the cereal aphid complex is without doubt the driver of insecticide use in Kentucky-grown wheat. Though other insects may require insecticidal control from time to time, only the cereal aphids are treated in a routine manner. Beginning in the early 1990's, increases in insecticide use, especially disulfoton, and then in the mid-90's the synthetic pyrethroid lambda-cyhalothrin (primarily Karate® and Warrior®) over the historic use pattern were quite evident (Sandell 2002). Additionally, there has been some use of systemic insecticide seed treatments, primarily imidacloprid (Gaucho®), but this use is very hard to measure.

Control of the cereal aphid complex is relatively easy to obtain. It is, as with most other insect pests of wheat, **IF** treatment is warranted that is hard to decide. The difficulty of finding aphids, combined with the small number required for application, the relative inexpensiveness of insecticides and the fear of catastrophic loss to BYD probably results in more insecticide use than is needed to mitigate the risk.

Spring Only

The armyworm, *Pseudaletia unipuncta* (Haworth), also known as the “True armyworm”, is usually the first pest of wheat to appear in the spring (Johnson 1994a). Armyworm (AW) makes its annual appearance each spring in “flights” of the adult moths. These flights can be monitored by capturing males using pheromone baited traps (Johnson 1994b, Johnson and McNeill 1993). The numbers caught using this technique can provide an advanced warning of the insect, allow calculation of when the damaging stage (worm) will appear (Johnson, Bessin and Townsend 1998) and can be compared to trap capture data from previous years (Lucas 2004).

AW is very common in Kentucky but only rarely does sufficient damage to warrant control. However, spectacular outbreaks of this pest do occur. One recent outbreak occurred in 2001. In this year our early “peak” trap captures were more than three times the “average” (Lucas 2004). Very large populations appeared first in the south, then progressively through the Midwest into Canada. Considerable damage was done to the first cutting of grass hay in Kentucky. However, effects on small grains are debatable because of the late occurrence of the infestation.

AW is most often controlled by naturally occurring predators and parasitoids. For example, eggs of tachinid flies (DIPTERA: Tachinidae) are commonly found just behind the head on armyworm larvae. Very dense stands and especially lodging, along with cool cloudy springs, favor AW populations. Insecticidal control is relatively easy, if necessary.

The cereal leaf beetle, *Oulema melanopus* (Linnaeus), was first noted feeding in south central Kentucky in the mid-1980s (Johnson 1993b). Since that time it has moved generally westward to the Mississippi River counties. Cereal leaf beetle (CLB) is a sporadic pest with a tendency to damage the later maturing varieties.

Control of CLB is relatively easy. However, determining the need to control in a timely fashion is the more important decision. Work done in the late 1990’s on thresholds for this insect (Herbert and VanDuyn 1999) produced scouting procedures and thresholds that are currently in use. However, this insect is so rarely a problem it is likely the “old” threshold of one CLB per head bearing stem is most often used, except in the most highly managed wheat.

Pests Associate with Particular Events

The wheat curl mite, *Aceria tosichella* Keifer, is a common pest of wheat in Nebraska and other plains states but is rarely a problem in Kentucky (Townsend, Johnson and Hershman 1995). Wheat curl mite (WCM) was first noticed in Kentucky in 1987 with a larger outbreak in 1988. Since that time significant infestation of WCM mite occurred in south central Kentucky in 2000.

It was first believed that outbreaks of this pest were the result of mites carried in on winds from more western production areas. Though this is possible, and wind is a method of dispersal, it appears more likely that this outbreak occurred because of the lack of weed control (thus increase in volunteer wheat) in soybeans during the preceding

summer. Volunteer wheat provides a “green bridge” that may have allowed the WCM to “over-summer” and build into much larger than normal numbers. This is the normal cause of economic problems with WCM in the western states. Normally in Kentucky there would be no green bridge. However, in some poor soybean production years, weed control is reduced or abandoned and, thus, volunteer wheat remains in fields.

Natural Controls

There are many natural control agents operating in the small grain fields of Kentucky. As previously mentioned, caterpillars parasitized by tachinid flies, plus braconid wasps (HYMENOPTERA: Braconidae), and infections by fungal and viral pathogens are often seen. Braconid parasitoids in the genus *Aphidius* have been collected from the grain aphids. In addition there are a plethora of predators, e.g., ground beetles, (COLEPTERA: Carabidae) and syrphid flies (DIPTERA: Syrphidae), easily observed. Though often given short shrift, these natural controls, combined with good cultural practices, probably account for much of the insect pest control in Kentucky wheat.

References²

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² The Entfacts may be found at: <http://www.uky.edu/Agriculture/Entomology/entfacts/eflists.htm>. Other on-line references contain direct links.

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