

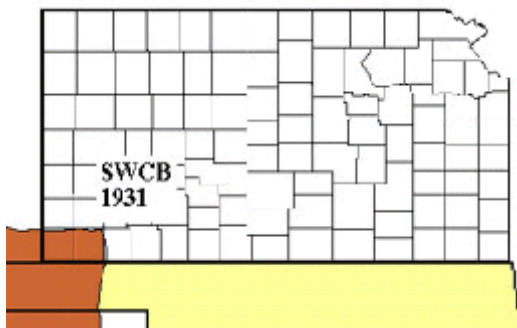
The Southwestern Corn Borer

- a threat to north central Kansas?

The bad news is that we have it—a new pest here in North Central KS (during the year 2000). If given the opportunity, SWCB can be a very destructive pest. How did this become a problem? To gain some insight, let's look at its history in the state.

History

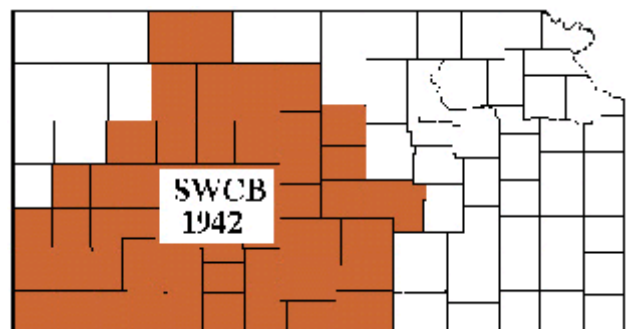
A native of Mexico, being of tropical origin, it thrives in warm weather, but has difficulty surviving the winter in northern areas. This is in contrast to the European corn borer, which being of European origin, is more tolerant of colder weather.



By 1913, the southwestern corn borer had crossed the Mexican border into Texas, Arizona and New Mexico. By 1931 it had worked its way into the Oklahoma Panhandle, into Stevens & Morton counties in Kansas and into some parts of southeastern Colorado.

USDA warned that if it continued its present course, it could soon reach the main areas of the corn belt - however this was the beginning of the dry thirties. Consequently, there was little if any corn produced during those years in most of the extreme parts of southwest Kansas so not surprisingly, the SWCB disappeared as well. But a decade later, in 1941, it reappeared in Oklahoma and Kansas. By the end of 1942, Harry Bryson, a K-State entomologist, had documented SWCB damage in 49 Kansas counties.

Photographs in our files taken in 1942 show damage in an Osborne County corn field. In 1943, it began to recede and was not a serious threat to corn production again until the early 1950's when another wave of infestation swept across northern areas of Kansas. During this time, reports of damage were observed by Dell Gates, Extension Entomologist, as far east as Brown



County. Dry weather in the mid-fifties led to another decline in dryland corn production especially in central and western areas of the state. Again SWCB disappeared everywhere except in the sandyland area south of Great Bend.

, Then in the 1960's and early 1970's as irrigation expanded, damage from the southwestern corn borer started becoming significant, first around St John and soon throughout the corn producing areas south of the Arkansas River, and SWCB exploded. Since then - for the last 30 years- it has been an established pest in the sand country south of the Arkansas river in central and southwest Kansas.

, At times during this period, moth flights have carried it northward where occasional fall infestations have appeared in some spots north of the Arkansas River, but it has seldom survived the winter well enough for us to find first generation infestations in those areas the following spring.

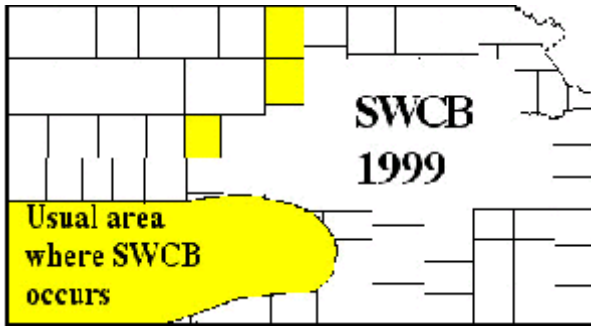
How does southwestern corn borer compare to the European corn borer?

, Its life and seasonal history, time of appearance, and damage it causes are all similar to ECB, but there are some distinct differences.

, It overwinters as a mature white larva below the soil line in the base of the stalk whereas ECB overwinters mostly above ground in the stalk itself. Like European, first generation larvae develop in whorl stage corn in June to early July. It tends to develop a few days later than ECB. Larvae feeding in the whorl give corn a shot-hole appearance. First generation infestations are usually light, and early planted corn is not usually seriously damaged. But in late plantings, the first generation larvae can tunnel deep enough to kill the growing point and cause deadheart.

, SWCB larvae are easy to separate from ECB. SWCB larvae are white with large black spots. These larvae then tunnel in the lower portion of the stalk, pupate and emerge as small white moths which lay eggs that will produce the second generation.

2nd generation egg laying usually coincides with silking stage corn. Heavy 2nd generation infestations (100% of plants infested & 2 to 3 larvae per plant) can



develop even in areas where first generation activity was relatively

low (less than 5 to 10% of plants infested).

Larvae cause extensive tunneling up and down

in the stalk. Usually these larvae remain in the stalk after they mature and gradually work



SWCB larva

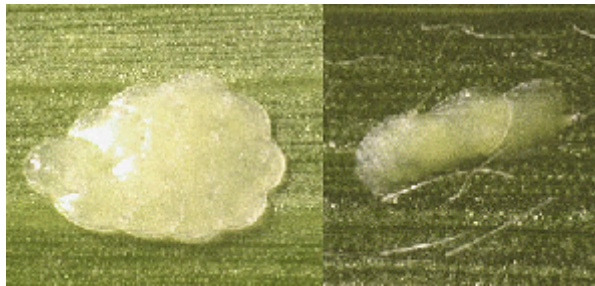
their way down to the base of the plant. By September, they construct a hibernation cavity below the soil line. Then, in late September to early October and triggered at least in part by day length, they crawl back up a few inches just above the soil line and chew their way around the inside perimeter of the stalk, leaving just a tissue thin layer of the outer rind intact (a few plants in an infested Mitchell County field were already girdled by August 22, 2000). By mid to late October, these girdled plants began to fall flat on the ground making them next to impossible to harvest.

Typical feeding signs of 1st gen. SWCB



Signs of entry on lower portion of stalk.

Scouting for SWCB - Focus on the amount of 2nd generation egg laying at silking time. ECB eggs are white, laid in masses overlapped like fish scales. SWCB eggs are also white, but laid singly, or in chains of two or more eggs each.



ECB eggs

SWCB eggs



Red-bar stage SWCB eggs

After three to four days, faint red bars appear on the egg shell, signaling the onset of hatching. Eggs are laid on both upper and lower leaf surfaces. Treatment is generally applied when 20 to 25% of the plants are infested with eggs.

Recent History

- < In 1998 for the first time in a number of years, we received reports of some second generation infestations in Ellis County, and also in 1999.
- < Then around September of 1999, as consultants begin to examine stalks for ECB tunneling, they begin to find SWCB larvae in certain fields in Mitchell and Jewell counties. At the time, we thought the risk that the larvae would be able to successfully overwinter was quite low.
- < **Trapping for first generation moths.**
 - As it turned out, the winter was unusually mild. Bob Gilbert, a consultant in Republic County, was concerned, and with help of Dr. Buschman of Garden City, put out pheromone traps to see if they could trap overwintering moths. The traps in Republic County caught more than those placed at Garden City.
- < **First & Second Generations in 2000.**
 - It came then as no surprise that we began to see some first generation SWCB infestations in Jewell, Mitchell, Cloud and Republic counties. By mid-July, moths were emerging to begin second generation egg laying, necessitating treatment of irrigated non-Bt corn in certain fields.
 - **SWCB in Sorghum**
 - In July, Brad Johnson with Farmway Coop at Beloit reported first generation SWCB infestations in grain sorghum in southern Mitchell County. In the main field as well as in two or three neighboring fields, infestation ranged from 10 to 40% of plants with shot hole feeding. In the main field sorghum had been planted no-till into corn stubble. When the old corn stubble was examined, it appeared that about 20% of the plants had been girdled by SWCB during the fall of 1999. Apparently many of

these larvae overwintered successfully and as moths emerged in June, many remained in the field and laid their eggs on mid-whorl stage sorghum. Moths that would produce the second generation were beginning to emerge on July 19 and probably reached a peak during the following week. Sorghum was heading at this time. When we revisited this site on August 22, there were very few signs of second generation infestation in the sorghum, although 30 to 40% of the plants in a nearby corn field were infested with SWCB larvae.



Sorghum planted no-till into 1999 infested corn stubble



SWCB larva in sorghum



1st generation feeding on sorghum

Management Considerations

- ! The easiest option is to plant Bt corn, the same hybrids that have good ECB resistance are also resistant to SWCB.
- ! On non-Bt corn, consider chemical treatment when 20-25% of plants are infested with 2nd generation eggs. Careful scouting and proper timing is critical. Often a 2nd application applied at 7-10 days later is advisable especially if significant levels of egg laying continue after the first application has been applied.
- ! Early planting tends to enable a plant to tolerate damage better, but does not necessarily result in reduced infestation levels.
- ! In infested non-Bt untreated fields, early harvesting before girdled plants start falling is very important. In southern Kansas corn needs harvested by early October.
- ! Overwintering survival is highest where the stubble is left undistributed. No-till producers need to be aware of the increased risk.

Future Expectations

- ! The logical assumption at this time is that the appearance of SWCB into northern areas of KS is due to our recent history of unusually mild winters. For instance in February, 2000, both greenbugs and parasites were still actively feeding and reproducing in several areas of northwest Kansas - a condition that would be unusual even in southern Kansas. We have experienced SWCB in the northern areas of Kansas before. Each time, it has disappeared. We expect it will happen this time as well. Whether that will be this year, next year, or the year after, is not known. People have been surprised by this pest before, and it could happen again.
- ! Infestation on sorghum is rare, it is unlikely that the insect is experiencing a change in its food habits. There is nothing at this time to indicate that this is anything other than a very occasional problem.

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Department of Entomology, Kansas State University, September, 2000.