The Boll Weevil In Mississippi:

Gone, But Not Forgotten

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Although the boll weevil has been successfully eradicated from Mississippi cotton fields, it must never be forgotten! Both cotton growers and scouts must remain aware of how to identify boll weevils and the damage they cause, as well as how to scout for this pest. Continued vigilance is necessary because the boll weevil likely will return to the state from time to time, and unless these reinfestations are detected and eliminated promptly, large areas of the state could be quickly reinfested.

How did the boll weevil get to Mississippi?

Boll weevils are not native to Mississippi. Because cotton is the only host plant upon which the weevil can develop and reproduce, it was not until cotton production was established in the state that the weevil was able to invade and thrive here. Boll weevils first entered the U.S. around 1892 near Brownsville, Texas. By 1907, boll weevils had traveled an impressive distance and were damaging cotton grown in the Natchez area. By 1914, the weevil was present in northeast Mississippi, and by 1922, it had spread throughout the eastern cotton-growing states, all the way to Virginia. Therefore, from the time the weevil first entered the U.S. until it infested the entire eastern cotton belt, it spread at a rate of about 55 miles per year. The fact that it only took 7 years for the boll weevil to spread throughout Mississippi indicates how quickly reinfestation could occur.

It is likely that the boll weevil attained this rate of spread under its own power. Both male and female boll weevils are capable of long duration flight, and individual weevils can move surprising distances when carried by prevailing winds. In some studies, marked boll weevils have been recaptured as far as 63 to 169 miles from the point where they were released.

This information shows why it is so important to be vigilant for the reappearance of the boll weevil in the state. It made it to Mississippi once, and there is every reason to expect it can do so again if preventive steps are not taken.

Modern transportation greatly increases the potential for boll weevil reinfestations to occur. As a “stowaway” aboard a motorized vehicle, it only takes a matter of hours for a boll weevil to travel from a cotton field or from wild hosts in Mexico to a cotton field in Mississippi. If that weevil is a mated female, it may only take a few more hours for her to begin laying eggs. Such reinfestations have occurred rather frequently in eastern states after they had eradicated the boll weevil. Fortunately, these reinfestations were promptly detected and eliminated.

It is because of the tremendous ability of the boll weevil to travel, both under its own power and as a hitchhiker, that Mississippi growers must maintain a constant vigil for its return. Reinfestations will almost certainly occur. How promptly these reinfestations are detected and eliminated will determine whether the cost of eliminating them is a few thousand dollars or many millions.

How can boll weevils be prevented from reinfesting Mississippi cotton?

The first line of defense that Mississippi cotton growers have against boll weevil reinfestation is the Boll Weevil Eradication Maintenance Program that is supported by annual assessment fees paid by cotton growers. The key component of this program is the maintenance of boll weevil pheromone traps (Figure 1) in every Mississippi cotton field. These are the same traps that were instrumental in successfully eradicating the boll weevil. The synthetic pheromone in these traps is attractive to both male and female boll weevils, and these pheromone traps are especially effective when populations are low.

To be effective, boll weevil traps must be properly maintained and run on a regular basis. If boll weevils are caught in a pheromone trap, this indicates that the field may be infested. Infested fields will receive prompt insecticide treatments to eradicate the weevils from those fields, and trapping efforts will be intensified in surrounding fields.

When a boll weevil reinfestation is detected in a Mississippi cotton field, the Eradication Maintenance Program will promptly initiate an intensive eradication program on that field or infested area. Funds to support this effort must also come from annual assessment fees that growers pay to support the maintenance program. The goal of the maintenance program is to detect boll weevil reinfestations quickly and to eliminate reinfestations before they have a chance to spread.

Figure 1. Boll weevil pheromone traps are memorial monuments to one of Mississippi's most important insect pests. Without the pheromone trap, it would have been impossible to eradicate the boll weevil. Pheromone traps are also the most important tool for detecting boll weevil reinfestations. Consequently, Mississippi cotton growers should take care to avoid damaging traps that are being run in their fields.

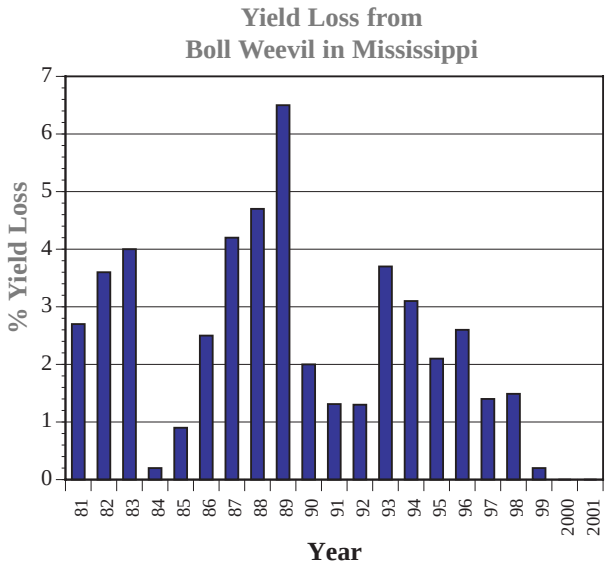

Figure 2. This graph records historical yield losses caused by boll weevils in Mississippi. Note that losses exceeded 5 percent in some years. Yield losses were lowest following unusually cold winters (1983-84 and 1989-90) because such winters result in high mortality of overwintering boll weevils.

What can growers and scouts do to keep boll weevils from returning?

To keep the boll weevil from returning to Mississippi, it is critical that Mississippi cotton producers support the Boll Weevil Eradication Maintenance Program. The annual assessment fees that growers pay to support the maintenance program represent only a fraction of the amount that growers spent to control boll weevils, and lost to boll weevils, before eradication.

It is especially important that growers do their part to assure that the pheromone trapping program operates efficiently. This includes the following:

1. Provide easy access to all cotton fields
   for personnel who are running pheromone traps.

2. Keep turn rows mown to improve trap efficiency and trapper access.
3. Avoid damage or destruction of traps by farm equipment.
4. Immediately report any apparent problems with improper or irregular trap service and maintenance.

It is also important for growers and scouts to continue to be alert for the presence of boll weevils or their damage and to report promptly any fields where boll weevils are detected. Pheromone traps are not foolproof. If a mated female boll weevil enters a squaring cotton field several hundred feet from the pheromone trap, she is more likely to begin laying eggs than to fly to the trap. Therefore, it is critical to continue training new cotton scouts to identify boll weevils and their damage and to encourage all scouts to continue scouting for this pest.

Growers must make sure that pheromone traps are present in each of their cotton fields and immediately report any fields that are not being trapped during the trapping season. This last point is critical because weevil reinfestations that occur in untrapped fields are likely to build to high numbers and spread to surrounding fields before they are detected.

Figure 3. The elongated snout of the boll weevil is the key characteristic that many people use to identify this pest. However, this elongated snout is a characteristic that the boll weevil shares with hundreds of other members of the weevil family.

A

B

Figure 4. Both the pecan weevil (A) and the billbug (B) have snouts, but they are not boll weevils.

What's at stake? Time and Money!

Mississippi cotton growers spent many years and more than $160 million to eradicate the boll weevil. In the 5 years before boll weevil eradication began, Mississippi growers spent an average of $21 million annually just to control boll weevils; yet despite this heavy cost of treatment, they still sustained a 2.6 percent average annual yield loss to boll weevils. As the graph in Figure 2 shows, statewide yield losses to boll weevils exceeded 5 percent in some years, and losses of more than 10 percent have been recorded for the hill region of the state. Yield losses to boll weevil were especially high in years following mild winters. In such years, some growers may have had to apply as many as 8 to 12 boll weevil sprays per field.

In addition, these treatments for boll weevils had the

undesirable effect of destroying beneficial insects that helped keep other cotton pests in check, such as tobacco budworms, bollworms, armyworms, and aphids. Consequently, the need to treat for boll weevils resulted in an increased number of treatments to control secondary pests and increased yield losses caused by these pests.

Eradication of the boll weevil has greatly simplified cotton insect management in Mississippi. Absence of the boll weevil provides growers with better opportunities to use naturally occurring beneficial insects to suppress populations of other pests. Absence of the boll weevil also enhances the value of new pest-control technologies, such as transgenic Bt cotton or new, more target-specific insecticides.

Boll weevil eradication provides tremendous economic benefit to Mississippi cotton producers, and it is important to all producers that this benefit be preserved.

Identification

One of the most distinguishing characteristics of the boll weevil is its elongated snout (Figure 3). However, this snout is not unique to boll weevils; rather, it is a characteristic of a group of beetles known as the Curculionidae, or weevil, family. There are more than 400 species of weevils in Mississippi. Just because a beetle has an elongated snout does not necessarily mean it is a boll weevil. The pecan weevil (Figure 4A) and the billbug (Figure 4B) have snouts and are both weevils, but they are not boll weevils.

Although it is critical that we detect and control any boll weevils that re-enter Mississippi cotton fields, it is also important not to misidentify other weevils as boll weevils. Such misidentifications can result in unnecessary increases in trapping and unnecessary control efforts that can be very costly.

How can boll weevils be distinguished from other types of weevils that may occasionally be found in a cotton field or pheromone trap? First consider the general appearance of the boll weevil (Figure 3). In addition to having an elongated snout, does the insect in question look like a boll weevil? Keep in mind, however, that boll weevils can vary considerably in size, ranging in length from one-eighth to one-third of an inch. Color can also vary. Newly emerged boll weevils are reddish brown in color and are sometimes referred to as “red” or “pink” weevils. Older weevils are usually grey in color, but darker colored boll weevils also occasionally occur.

The body of an adult boll weevil is sparsely covered with small, light-colored hairs. These hairs are especially dense near the center of the boll weevil’s thorax, the large segment just behind the head, creating the appearance of an indistinct light-colored stripe through the center of the thorax (Figure 5). This stripe is a useful characteristic in the initial sight identification of adult boll weevils.

The best way to distinguish boll weevils from other species of weevils in Mississippi is to examine the largest segment of the front leg (Figure 5). On a boll weevil, this segment, which is known as the femora, is large and club-shaped, and there are two distinct spurs on the inside or bottom edge of the club, with the innermost spur being about twice as long as the outer one**. These spurs are very good distinguishing characteristics of the boll weevil.**

Damage

Another way to identify boll weevil infestations is by the damage they cause. Boll weevils damage both squares and bolls. When squares are present, they are the preferred food source, but small bolls in the upper part of the plant are also readily attacked once square populations begin to decline in the latter part of the season. Both male and female boll weevils cause feeding damage by using the small mandibles located at the end of their snouts to chew into the fruit and feed on the inner portion. This creates a small hole in the fruit known as a feeding puncture (Figure 6A). While

feeding punctures are typical of boll weevil damage, they can also be confused with the damage caused by newly hatched caterpillar pests (Figure 6B).

After feeding in a square (or boll), female boll weevils usually deposit a single egg into the feeding puncture. Before leaving the square, the female boll weevil seals the hole with a glue-like substance produced specifically for this purpose, creating a raised, pimple-like scar (Figure 7). These oviposition, or egg-laying, punctures are unique from other types of insect damage and are a sure sign of an active, reproducing boll weevil infestation. **The presence of egg-laying punctures (Figure 7) in an eradicated area indicates a serious reinfestation that requires immediate attention.**

During the first days after a boll weevil has deposited an egg in a cotton square, the bracts of the square remain tightly closed around the floral bud, and the square appears normal. However, within a few days after the egg hatches and the small boll weevil grub begins to feed on the interior of the square, the bracts begin to spread away from the floral bud, resulting in what is referred to as a flared square (Figure 8). Damage by boll weevils is only one of many reasons that flared squares occur. Feeding by many other types of insects, such as caterpillars or tarnished plant bugs, will also cause squares to flare. However, when searching for signs of boll weevil infestation, you should closely examine any flared squares that may be encountered. **The presence of boll weevil egg-laying punctures on flared squares is a sure sign of a boll weevil infestation.**

Within a few days after squares flare, they normally are shed from the plant and fall to the ground. The small weevil larva is about one-half grown at this point. The remainder of the larva's development is completed inside the fallen square. Once the larva is fully mature, it molts into a pupa, which remains inside the fallen square. When the pupal stage is complete, in 4-7 days, the adult boll weevil chews its way from the square and begins to attack more squares and/or bolls.

Examination of fallen squares can occasionally be helpful in scouting for boll weevil infestations, or in assessing how extensive an infestation might be. Any fallen squares that bear an egg-laying puncture probably contain boll weevil larvae or pupae (Figure 9). **Detection of boll weevil larvae or pupae in fallen squares is a sign of a severe reinfestation that will require repeated applications of insecticide to eliminate.**

Biology

The boll weevil, *Anthonomus grandis grandis*, belongs to a special group of beetles known as weevils (Family: Curculionidae). The weevils are characterized by having elongated snouts as adults. Usually, the larvae of weevils feed inside the fruiting structures of their host plants.

The boll weevil is not native to the United States and did not appear in the country until shortly before the beginning of the 20th century. The boll weevil is native to Mexico and other parts of South America where it exists on several species of native plants that are related to cotton. However, cotton is the only major host plant in the United States on which the boll weevil is able to live and reproduce.

The boll weevil is a tropical/sub-tropical insect that is not adapted to survival in areas of severe winter temperatures. However, by entering a state of reproductive diapause, the boll weevil can successfully overwinter in most regions of the United States where cotton is grown. Boll weevils are stimulated to enter diapause by the shorter day lengths of late summer and early fall. Adult boll weevils prepare for overwintering in late summer and fall by feeding heavily on cotton so they can accumulate a large store of fat. Overwintering boll weevils then move into habitat, such as hardwood leaf litter, where they enter diapause, a state of suspended development and reduced metabolic activity that is similar to hibernation in certain mammals. While preparing for diapause and searching for late-season

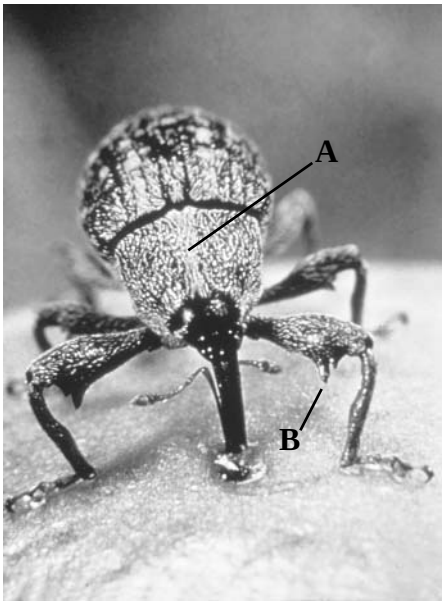

Figure 5. Characteristics that can be used to identify boll weevils include the faint light strip through the center of the thorax (A) and the two spurs that are present on the large club-shaped segment of each front leg (B). Note that the inside spur is about twice as long as the outer spur.

food sources and overwintering sites, boll weevils may engage in dispersal flights that can result in long-range movement.

Although most of the boll weevils that enter overwintering quarters each year do not survive until the following season, a percentage of the population does survive. Survival of overwintered boll weevils is historically higher following mild winters, such as the winter of 1988-89, and lower following severe winters, such as 1983-84, (Figure 2). Research shows that when temperatures at the site where the weevil is diapausing drop below 10 ºF, mortality is extremely high. However, hardwood leaf litter and other materials in which weevils overwinter provide considerable insulation, and the presence of snow or ice only serves to increase the insulating effect. Consequently, overwintered boll weevils are capable of surviving brief episodes of ambient temperatures near 0 ºF.

A significant portion of overwintering female weevils will mate before entering diapause; sperm are stored in a special storage sac. This means that the only requirement for these weevils to begin a new generation the following spring is a supply of adequately sized squares of cotton. Female weevils that did not mate before entering diapause will mate the following spring. Female weevils emerging in the spring are responsive to pheromone, produced either from traps or from male boll weevils, regardless of their mating status.

When they first emerge from diapause in the spring, boll weevils may feed on the pollen of a number of plants, as well as on the foliage of seedling cotton. However, boll weevils cannot begin reproducing until cotton squares that have a floral bud diameter of at least one-fourth of an inch are present. This need to have ¼-inch diameter squares present before it can reproduce is a weak link in the biology of the boll weevil that can be used in eradication and control efforts.

One of the unique features of the emergence of

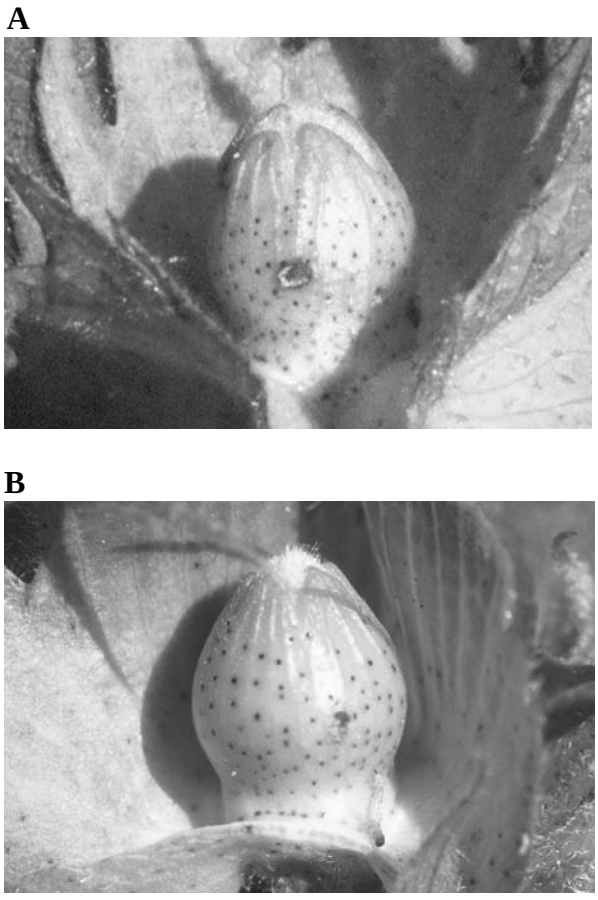

Figure 6. Feeding punctures (A) which are made by both male and female boll weevils, are easily confused with feeding damage caused by small caterpillar larvae (B).

Figure 7. The raised, pimple-like oviposition puncture caused by female boll weevils is a sure sign of boll weevil infestation.

Figure 8. Flared squares can be caused by many different insects, including boll weevils.

overwintered boll weevils is that emergence occurs over an extended period of time. A very small portion of the overwintered boll weevil population may emerge as early as March, while a few individuals may not emerge until July or August. This extended emergence is a survival mechanism that helps the species survive adverse conditions. In most years, the peak emergence of overwintered boll weevils will occur in late May to early June, to coincide with the onset of squaring. However, during dry springs, peak boll weevil emergence may be delayed, and a significant portion of the population may not emerge until after cotton has begun to square. Following dry periods, it is common to observe a flush of overwintered weevil emergence a few days after a significant rainfall, as evidenced by a sharp increase in pheromone trap captures.

As soon as suitable-sized squares are available in late May to early June, female boll weevils begin laying eggs. Only one egg is deposited in a square, but during mid and late season, when egg laying occurs in bolls, multiple eggs may be deposited within a boll or even within a single lock of a boll. Female weevils lay about 12 eggs per day over an approximate 12-day period, so the average number of eggs deposited per female is about 150.

Because the immature stages of the boll weevil are well protected as they develop inside squares and bolls, and because boll weevils have few natural enemies, the reproductive potential of the boll weevil is extremely high. The information in Figure 10 shows the theoretical number of female boll weevils that could result from a single female boll weevil after just five generations, if each female produced 75 adult female progeny. Although boll weevils experience some natural mortality because of environmental factors such as heat, and are preyed upon by some predators, such as fire ants, this theoretical example emphasizes just how quickly a field or area can become reinfested.

Life Cycle

The life cycle and rate of development of the boll weevil are illustrated in Figure 11. As with all insects, the rate of development is strongly influenced by temperature. The development rates shown here are typical of those for normal summer conditions, but

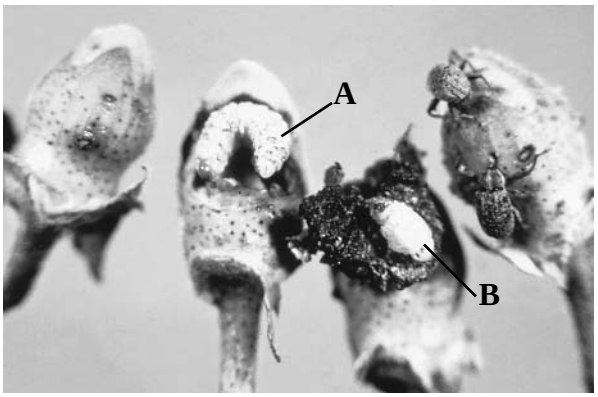

Figure 9. Detection of a boll weevil larva (A) or pupa (B) is a sign of boll weevil infestation.

development rates can be much longer at cooler temperatures. Boll weevils normally complete about five generations per year in Mississippi.

Egg – On average, a female boll weevil lays about 150 eggs during her life. The eggs are deposited inside squares or bolls where they hatch in 3 to 5 days. The small, oval-shaped eggs are deposited singly. Female weevils will lay only one egg per oviposition site, and there usually will be only one oviposition site per square. However, multiple oviposition sites may occur on bolls, and even a single lock of a boll may support development of more than one larva. Normally, squares do not flare as a result of egg deposition and, if the egg fails to hatch, the square often will survive and produce a bloom.

Larva – The larval stage (Figure 9A) normally lasts about 7 to 14 days. The legless larvae are white c-shaped grubs having a light brown head capsule. There are three larval instars, which means that the larva molts or sheds its skin three times during its development. Once the larva hatches and begins to feed on the contents of the square, the plant initiates the physiological process to abort the affected square. This causes the bracts to fold away from the floral bud, resulting in a flared square (Figure 8). Squares normally begin to flare 2 to 3 days after the larva hatches and are usually shed from the plant within 2 to 3 more days. Bolls, however, do not normally shed from the plant as a result of boll weevil infestation. Depending on whether they are in squares or bolls, larvae complete their development either inside fallen fruit on the ground or inside bolls on the plant.

Pupa - The pupal stage (Figure 9B) lasts 3 to 5 days. Boll weevil larvae pupate inside the same square or boll in which they developed. During the pupal stage, the legless larva changes into a fully formed adult boll weevil. Once the weevil is mature, it chews its way out of the square or boll in which it developed.

Adult - When adult boll weevils first emerge, their skin is not fully hardened, and they have a reddish coloration. Newly emerged adult boll weevils often rest

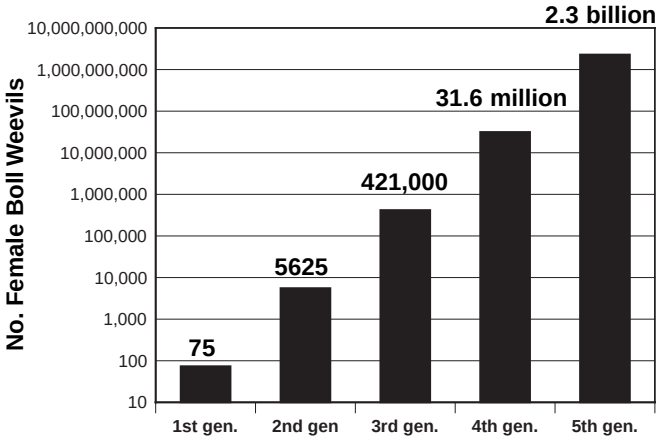

Figure 10. This graph shows the number of female boll weevils that could potentially result after five generations if all progeny from a single female boll weevil survived and reproduced (assuming each female has 150 offspring, half of which are females). While such high survival rates would never occur naturally, this example emphasizes the high reproductive potential of the boll weevil and the need for early detection of reinfestations.

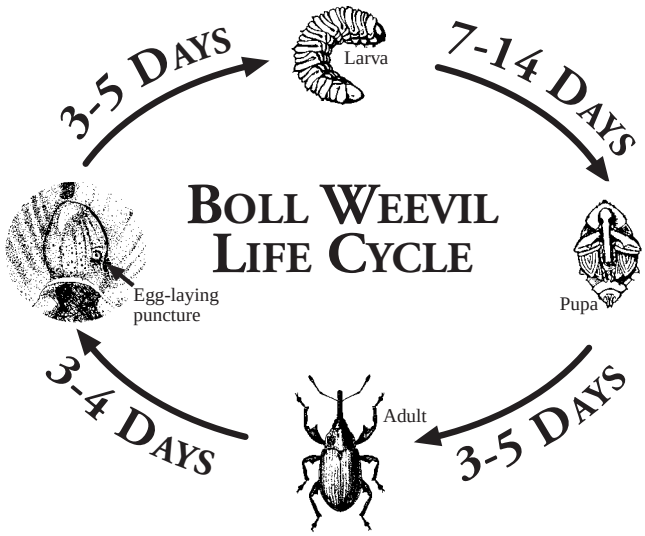

Figure 11. A boll weevil can complete all four stages of its life cycle in about 3 weeks. There are about five generations per year.

in open blooms where they can feed on pollen while their skin completes the hardening process; this takes about 24 hours. Mating also frequently occurs in blooms. Therefore, when scouting a field suspected of having a boll weevil infestation, be sure to check in white blooms for adult weevils. Once this skin-hardening process is complete, the weevil assumes its normal grayish color. Female weevils are not capable of laying eggs until 3 to 5 days after they emerge. During this time, which is known as the pre-oviposition period, the females feed and mate, and their developing eggs mature.

Pheromone and Pheromone Traps

Male boll weevils produce a pheromone in their frass, or excrement, that is attractive to members of both sexes. This pheromone is a volatile substance that attracts receptive boll weevils once they have "smelled" it with their antennae. It serves as both an aggregation pheromone, to attract other weevils to a food source, and as a mating pheromone, to help the two sexes locate one another. Research has shown that this pheromone is capable of attracting boll weevils from as far as 500 feet.

Grandlure is a synthetic version of the pheromone produced by male boll weevils. It is produced commercially for use in the pheromone traps (Figure 1) that are so critical to successful boll weevil eradication efforts and to maintaining eradication once it is achieved. However, it is not odor alone that makes the pheromone trap so effective. The "day-glow green" color of the trap body is also visually attractive to boll weevils and induces them to alight on the trap body from where they ultimately move up into the trap cone and cylinder. It is important that the area around traps be kept clear of tall weeds that interfere with dispersal of the pheromone scent plume and prevent weevils from seeing the trap.

When boll weevil populations are low, pheromone traps are extremely attractive to any boll weevils that happen to be in the area. Consequently, pheromone traps are a highly effective way to survey for boll weevil reinfestations in areas where eradication has been achieved. In eradicated areas, pheromone traps can also provide a significant level of boll weevil control by trapping newly arrived weevils before they have a chance to reproduce. However, because the traps are not 100 percent effective, it is important that producers and cotton scouts continue to be alert for boll weevils or boll weevil damage.

Control: Before Eradication

Historically, Mississippi cotton growers controlled boll weevils by applying repeated insecticide sprays on a 3- to 5-day schedule. It was common for growers in heavily infested areas to make as many as 8 to 12 sprays specifically to control boll weevils. These repeated treatments were necessary because only adult boll weevils are exposed to control. The immature stages are protected inside squares or bolls. The 3- to 5-day schedule was necessary because adult female weevils will begin depositing eggs within 3 to 5 days after emerging as adults. If they are not controlled before they lay eggs, the infestation cycle will continue.

The insecticides recommended for control of boll weevils in 1999, which was the last year that a portion of Mississippi was not involved in boll weevil eradication, are listed in Table 1. These insecticides were highly effective against boll weevils but had the undesirable effect of destroying beneficial insects. This destruction of beneficial insects often allowed populations of other cotton pests to increase at a faster rate than they would have under normal beneficial insect populations. Therefore, boll weevil was considered a "key pest" of Mississippi cotton because the insecticide treatments applied for its control often "unlocked" the potential for greater problems with other pests.

Table 1: Insecticides recommended for control of boll weevils in Mississippi in 1999 [1]

Insecticide	Lb ai/acre
Dicrotophos (Bidrin®)	0.4 to 0.5
Malathion	0.94 to 1.25
Malathion ULV (Fyfanon ULV®)	0.76 to 1.22
Methyl parathion	0.25 to 0.5
Oxamyl (Vydate C-LV®)	0.25 to 0.33

[1] These materials were recommended specifically for control of boll weevils. The pyrethroid insecticides (bifenthrin, cyfluthrin, cyhalothrin, cypermethrin, deltamethrin, esfenvalerate, tralomethrin, and zetamethrin) are also effective against boll weevils, but were not recommended when boll weevil was the only target pest.

Source: *Publication 343 Cotton Insect Control Guide, 1999*, Mississippi State University Extension Service

Control: Post-Eradication

At first the concept of "post-eradication boll weevil control" may seem illogical. However, it is extremely important to have an established plan for promptly eliminating any reinfestations that may occur. This plan is a key component of the Boll Weevil Eradication Maintenance Program.

When a boll weevil reinfestation is found in an eradicated area, the goal is to completely eliminate that infestation as quickly as possible to prevent the spread of weevils to other fields. This requires the application of multiple foliar insecticide treatments and intensified pheromone trapping. Trapping must be intensified both in the infested field and in nearby cotton fields in order to determine the extent of the infestation. Insecticide treatments must be applied at closely-spaced intervals until the infestation is eliminated.

Growers who have fields that are reinfested and require multiple applications of insecticides should be aware that such treatments will increase the potential for outbreaks of secondary pests, such as tobacco budworms, bollworms, armyworms, aphids, or whiteflies. The earlier in the season that such boll weevil treatments are begun, the greater the risk of secondary pest problems. Therefore, intensify scouting for such pests on fields that have to be treated for boll weevil reinfestations, and apply effective treatments promptly if pest populations exceed economic thresholds. It is important that growers realize that while the boll weevil eradication maintenance program will be responsible for making all necessary boll weevil treatments, the grower is responsible for controlling any other pests that may occur in the field.

Boll Weevil Facts

- Boll weevils are not native to the United States.
- Boll weevils are native to Mexico, where they exist on wild plants related to cotton.
- Boll weevils first appeared in Texas cotton around 1892.
- Boll weevils were first detected in Mississippi in 1907.
- Cotton is the only host plant on which boll weevil can reproduce in Mississippi.
- Boll weevils usually cannot reproduce on cotton until squares ¼ inch in diameter or larger are present.
- Boll weevils overwinter as adults in a state of suspended development, known as diapause.
- Some female boll weevils mate before overwintering.
- Hardwood leaf litter is a favored overwintering site.
- Pine straw is not a favored overwintering site.
- Boll weevils usually suffer significant mortality during the winter.
- Overwintering boll weevils suffer very high mortality at temperatures below 10 ºF.
- Survival of overwintered boll weevils is relatively high following mild winters.
- Leaf litter, snow, and ice help insulate boll weevils.
- Individual boll weevils can migrate at least 169 miles by wind-assisted flight.
- Boll weevils can travel for hundreds of miles in just a few hours when traveling as stowaways on motorized vehicles.
- Boll weevils have a pair of mandibles, used for chewing, at the end of their snouts.
- Female boll weevils produce about 150 eggs during their lifetimes.
- Boll weevil eggs hatch in 3-5 days.
- The boll weevil larval stage lasts about 7-14 days.
- The boll weevil pupal stage usually lasts 3-5 days.
- Adult weevils that are soft and reddish in color are young adults that have recently emerged from the pupal stage.
- The skin of newly emerged boll weevils hardens and turns grey within 24 hours.
- Newly emerged boll weevils often congregate in open blooms.
- Adult female boll weevils begin laying eggs 3 to 5 days after emergence.
- Because they are inside squares or bolls, immature boll weevils are protected from foliar insecticide treatments.
- Successful treatment of an established boll weevil infestation requires multiple insecticide applications made on a 3- to 5-day schedule.

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