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REDBANDED STINK BUG–A GROWING MENACE TO MIDSOUTH SOYBEANS

The 2017 soybean growing season was one of the best ever in terms of yield. However, it also provided producers in a wide geographical area a challenge presented by the redbanded stink bug [RBSB, *Piezodorus guildinii*].

The RBSB is not a new pest, but its incursion into the upper reaches of the Midsouth is a relatively new occurrence. It is touted as a more destructive stink bug pest than those of other stink bug species such as the green [GSB–*Chinavia hilaris*], southern green [SGSB–*Nezara viridula*], and brown [BSB–*Euschistus servus*].

Researchers Depieri and Panizzi conducted laboratory studies [Neotropical Entomology 42:197-203, 2011] in Brazil to compare the damage caused by various stink bug species. Their study included the SGSB and the RBSB, plus the Neotropical brown stink bug [*Euschistus heros*–same genus as the BSB found in the US]. Important results from their research follow.

- Feeding time did not vary significantly between the SGSB and RBSB.
- Feeding by RBSB on mature soybean seeds resulted in the deepest seed damage.
- Histological damage by RBSB photographed by an electron transmission microscope was greater than that caused by the other species. This suggests that the deleterious effect of RBSB salivary enzymes to seed tissues is greatest for this species.
- The greater damage to seed caused by the RBSB is not related to the length of the stylets, since bugs of this species have shorter mouthparts than the other species, including SGSB, used in the study.
- Based on the above findings, the authors surmise from their data that the greater damage to soybean seed caused by the RBSB is due to the higher level of seed tissue damage caused by its saliva.

Click here to access the Aug. 5, 2017 MCS blog post by MSU researchers/extension specialists that contains up-to-date details about treatments that can be applied to prevent this insect pest from damaging developing seed late into the season. Important summary points from this post follow.

- With traditional stink bug species [SGSB, GSB, and BSB], the treatment threshold for soybeans is 9 per 25 sweeps until R6 stage. At R6, the recommended threshold is doubled until R6.5 stage when treatment can be terminated.
- Seed quality deductions [dockage] at the elevator resulting from traditional stink bug species [SBSB, GSB, and BSB] in Midsouth soybeans rarely occur after R6.
- With RBSB, the treatment threshold is 4 per 25 sweeps, which is roughly half that for the traditional stink bugs.
- The treatment threshold for RBSB is 10 per 25 sweeps from R6 to R7.
- Insecticide treatments for RBSB control cannot be terminated at R6.5 as with the traditional stink bugs.
- RBSB infestations can damage soybean seed [reduced test weight, reduced oil, reduced protein, and elevator dockage] as late as R7 [one pod on main stem at mature pod color].

An Aug. 2017 RBSB Forum held in Stoneville, Miss. provided up-to-date information about the RBSB. Producers who did not attend this meeting are encouraged to view the video of this program, especially the presentation by Dr. Jeff Davis, LSU Assoc. Professor. The RBSB arrived in Louisiana in 2000, reached north Louisiana in 2006, and is a constant problem for Louisiana soybean producers.

Dr. Davis provides results from LSU research that was conducted to determine treatment thresholds for the RBSB, its overwintering capability that is dependent on the number of consecutive hours of below-freezing temperatures, and the efficacy of various insecticides against this pest.

Other important points from his presentation are:

- Weather injury and RBSB injury appear similar.
- Below-threshold numbers of RBSB can reduce yield if present over a long period.
- Soybean varieties differ in their susceptibility to RBSB.
- RBSB only feeds on legumes.
- RBSB moves into soybean from legumes where it overwinters, and will feed on stems of pre-reproductive soybeans.
- RBSB females must be controlled early to reduce the number of eggs; i.e., more eggs = more RBSB.
- The majority of RBSB is found in the lower portion of the soybean canopy. Thus, sweep net sampling may underestimate RBSB numbers
- Insecticide effectiveness will depend on ground speed and volume of the spray solution [i.e., slower speed and greater volume will enhance control].
- Three insecticide applications should be budgeted for RBSB control in years when they are anticipated to occur.
- RBSB resistance to insecticides is developing, and will be permanent where it develops. Thus, rotation of insecticide chemistries is paramount.
- Soybean is still susceptible to RBSB damage even after harvest aids are applied. Control after this point is necessary to prevent seed weight loss and movement out of an infested field, and to reduce overwintering populations.

- Since legumes are the exclusive feeding source for RBSB, a cover crop mix that includes a legume will increase RBSB populations. This is especially so for a mix that includes crimson clover since it is the preferred overwintering host for this insect [see below addendum].

Again, producers should view the presentations made at this forum to get up-to-date information about the RBSB so that they will be prepared to manage this pest if/when it occurs.

EFFECT OF TEMPERATURE ON OVERWINTERING OF RBSB

It is known that the RBSB is a tropical insect that does not survive well in locations with cold temperatures. A Jan. 20, 2018 post on the MCS blog site offers perspective about how winter temperatures may affect RBSB populations that would be available to infest the following soybean crop. MSU Entomologists Drs. Catchot, Cook, and Gore used the harsh temperatures in the 2017-2018 winter season as an opportunity to instrument protected hiding places that were known to be inhabited by RBSB. This allowed them to monitor ambient temperatures for extended periods to determine the length of time that temperatures in these habitats were below the 23°threshold known to kill the RBSB.

Click here to see pictures of the monitored habitats and graphs of the temperatures that were recorded in them. According to these data, it is likely that RBSB populations will be drastically reduced in 2018. These data and the resulting documentation of RBSB populations in early-season hosts and soybeans in the 2018 growing season will provide valuable insight into the effect of these temperatures on RBSB in the following season.

USE OF DITCHBANK SURVEYS TO PREDICT RBSB INTENSITY

In 2017, MSU entomologists were able to accurately predict the impending threat of RBSB to the 2017 soybean crop based on ditch bank sampling that was conducted in the spring of 2017. During those samplings, they were commonly finding fairly high numbers of RBSB in crimson clover well above Highway 82, which roughly bisects the state. They also documented reproduction of the insect as early as March 2017. They surmised that these ditch bank samples were a strong indicator of the potential problem arising from RBSB infestations, which did in fact occur.

During the week of May 7-11, 2018, ditch bank surveys were again conducted around the state. At this time, RBSB numbers were found to be quite low. These data were used to surmise that soybeans that were planted in the normal planting window in Mississippi in 2018 will likely have a very low incidence of RBSB presence since it takes a considerable amount of time for their numbers to build to threatening levels. Furthermore, they predicted that only very late-planted soybeans were likely to experience problem levels of RBSB in 2018.

In a May 1, 2020 post on the MCS blog site, the authors of the article on 2020 ditchbank surveys stated that "We have sampled enough areas at this point to feel reasonably certain that some areas will experience issues with RBSB this season. To what extent is yet to be determined." Thus, it appears that soybean producers, especially those with later-than-normal plantings, should be extra diligent for this insect in 2020. This possible RBSB infestation that is predicted will be monitored to see if it does in fact occur as the survey numbers predict.

Dr. Whitney Crowe, MSU Ext. Entomologist, has posted 2022 RBSB Ditch Bank Survey results on the Miss. Crops.com website (click here, here, and here for results through Apr. 22, 2022). Go to the MCS website for survey results from future years.

RBSB AND COVER CROPS

In this section, more details are provided on one of the points covered in a presentation made at the Aug. 2017 Emergency Forum on Redbanded Stink Bug [RBSB]. All of the presentations made at the Forum can be found here.

In his presentation, Dr. Jeff Davis, LSU Assoc. Professor, made a point about the RBSB only feeding on legumes. Also, he stated that the RBSB, unlike many other insect species common to the Midsouth, does not go through diapause; i.e., this insect does not go through a dormant or arrested development period. In other words, this insect maintains activity year-round and therefore must have a food source during the winter months in the Midsouth if it is not killed by cold temperatures [generally several hours at ≤23 deg. F].

Since the RBSB feeds only on legumes, this means that any legume such as clovers, peas, and vetches that are often used as components of a winter cover crop will provide an alternate food source for RBSB during the winter months when soybeans are not available. Thus, the touted use of cover crops in a soybean production system (either monocropped or rotated) will provide a habitat for the overwintering RBSB if the cover crop contains a legume.

So here are some guidelines for using cover crops in a

soybean production system when RBSB has been or is predicted to be present.

- Starting no later than R3, monitor soybean fields for the presence of RBSB, and make/keep a record of infested fields.
- In infested soybean fields, control/eradicate adult RBSB populations up to harvest to prevent their movement out of the infested field and to reduce overwintering populations.
- If cover crops are to be planted following soybean harvest in monocropped soybean fields, do not include legume species in the cover crop mix if the fields have a history of RBSB presence.
- In a biennial corn-soybean rotation system, plant a cover crop that contains a legume species only after the soybean crop since corn, which is a non-host, will follow the cover crop. It also will be a good idea to control/eradicate an overwintering RBSB population in this cover crop to prevent RBSB infestations in soybean fields that may be in close proximity the following summer.
- When a cover crop mix does contain a legume species, monitor the stand for RBSB so that the overwintering population can be controlled/eradicated if necessary.

There is no doubt that cover crops can provide benefit in agricultural settings, but their species makeup must take into account how they will affect/promote damaging insect populations such as the RBSB.

According to insect damage surveys, the importance of the RBSB in 2017 was manifested in subsequent years only in Louisiana. However, this stinkbug species will still warrant special attention in future years' soybean crops in states where it has had a significant presence in the past or is expected to have a significant future infestation. The stink bug complex (brown, green, and southern green) in general has had a major impact on soybean yield loss in all midsouthern states in years subsequent to 2017.

JUNE 2023 UPDATE

The RBSB, like all stink bugs, feeds mainly on pods and seeds–i.e., they aren't really an issue until reproductive stages, or about R3 through R7. Spray applications made at R3 will not control the RBSB.

Several insecticide mixes can be used to control RBSB. The pyrethroid bifenthrin [Group 3A] + acephate [Group 1B–e.g. orthene] applied at least 8 hours before an expected rain can be effective. Elevest, a combination of bifenthrin + chlorantraniliprole [Group 28], can be used to target RBSB plus a wide array of Lepidopteran species such as armyworms, corn earworm, and soybean looper. It is rainfast when dry.

Click here to access the latest Insect Control Guide from Miss. State Univ.

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