INSECT MANAGEMENT IN NO-TILL

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Insect management in no-till cropping varies from conventional tillage operations. Our research in Georgia over the past eight years, and studies in other states, indicate that the pest potential of certain insects is increased with no-till cropping. Involved are primarily soil pests or insects that attack young crop seedlings. Most reports of pest problems in no-till systems have been with corn (Zea mays L.).

(1) Southern corn billbug (SCB) (Sphenophorus callosus Oliver)

SCB damage has been consistently greater in no-till compared to conventionally tilled corn in five years of tests in Georgia. Damage often is high in early planted corn and injury is compounded with droughty weather. High populations of SCB are often found in fields with nutsedge (Cyperus spp. L.) and certain grass weeds. Control with insecticides is effective in no-till, especially with Counter at planting time with banded applications of 2 lbs active ingredient per acre. Research also demonstrates that in-furrow subsoiling is a cultural practice that aids plant recovery from SCR injury.

(2) Armyworm **(AW)** (Pseudaletia unipuncta Haworth), Black cutworm (BC) (Agrotis ipsilon Hufnagel), and Sugarcane beetle (SB) (Euetheola rugiceps Leconte).

AW, BC, and SB infestations have been observed in no-till corn in various locations. However, little quantitative information is available demonstrating an increased hazard in no-till compared to conventional

tillage. Information is also not available on whether the infestations are associated with other environmental conditions. Recommended control procedures for AW, BC, and SB in conventional tillage systems also are effective in no-till.

(3) Maize chlorotic dwarf (MCD) and maize dwarf mosaic (MDM) are insect-transmitted virus diseases of corn and are increased in no-till cropping. This is especially evident when johnsongrass (Sorghum halepense (L.) Pers.), the overwintering host of the pathogens, is present. Use of disease-resistant hybrids and early planting is central to management of MCD and MDM. However, research indicates that the Systemic insecticide carbofuran, at a rate of 2 lb active ingredient per acre, controls the insect vectors of MCD and can produce a substantial increase in yield of no-till corn in areas with a high disease hazard. In the three following situations, the environment created in no-till cropping is beneficial to insect pest management.

(1) Lesser cornstalk borer (LCB) (Elasmopalus lignosellus Zeller)
LCB infestations are reduced in no-till as compared to conventional tillage. This has been demonstrated with corn, sorghum (Sorghum bicolor (L.) Moench), and soybeans (Glycine max (L.) Merr.). However, sporatic infestations can occur in no-till, especially when the crops are planted late and drought conditions occur. The insecticides chlorpyrifos and fonofos are effective in suppressing LCB damage when used at 1 to 2 lb active ingredient per acre.

(2) Fall armyworm (FAW) (Spodoptera frugiperda J. E. Smith)
FAW can cause serious damage in no-till crops of corn and sorghum when these crops are used in late planted multiple cropping systems. However, in corn tests comparing no-till and conventional tillage, it

was observed that seedlings in no-till were not heavily attacked until they grew above the mulch. Thus, a delay of about seven days occurred before the seedlings in no-till began receiving heavy FAW oviposition as compared to conventional tillage. This could benefit pest management by allowing more time for seedling establishment, and by reducing the number of insecticide applications required to protect seedlings.

(3) Carabid beetles and other predatory insects typically have higher populations in no-till compared to conventional tillage. Thus, the potential for enhanced biological control is increased in no-till. However, the quantitative level of enhancement of natural biological control in no-till systems is unknown, nor is it known whether pest populations can be held at subeconomic levels.

Our research indicates that most insect pests that attack the latter growth stages of no-till crops have similar infestations as those planted with conventional tillage. These include the corn earworm (Heliothis zea Boddie), European corn borer (Ostrinia nubilalis Hubner), Southwestern cornstalk borer (Diatraea grandiosella Dyar) and others.

Possibly the most important consideration in insect pest management in no-till crops is the relationship of planting date and pest hazard. Many no-till systems use multiple cropping practices (e.g. double cropping of winter grains followed by a field crop such as corn, sorghum, or soybeans) which involves later planting of the field crop than in monocropping. Most of the pest problems discussed previously are substantially increased with later planting, especially for corn. In comparisons of corn, sorghum, and soybeans, it has been demonstrated that, from the viewpoint of pest management, it is the least hazardous to use soybeans in multiple cropping with no-till, followed by sorghum. Corn

has greater vulnerability to several pests. Corn growers should have increased concern for pest monitoring and should anticipate the need for chemical control applications in these cropping systems.