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INSECT MANAGEMENT IN REDUCED TILLAGE SYSTEMS

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Abstract

Cotton grown in reduced tillage systems is becoming more popular because it decreases seedbed preparation, and thus, cost and soil erosion. Increased adoption of reduced tillage by growers is also driven by the availability of herbicide tolerant, transgenic cotton varieties that increase weed control options. A brief narrative and a list of relevant literature is presented that address the potential impacts of reduced tillage on insect pests and their management in cotton. Spring tillage rapidly controls weeds, usually well before planting. Herbicides such as glyphosate are used in lieu of tillage in reduced tillage systems and weed control is typically slower and more selective. Thus, there can be a significant difference between reduced and conventionally tilled systems in how long and what weeds persist in the field prior to planting. The literature and practical experiences suggest that, although some insect pest problems can be aggravated in by reduced tillage, insect pests should not limit the adoption of reduced tillage systems in most of the Cotton Belt. Most data indicates that in-season insect pest populations are minimally affected by tillage operations. Various species of cutworms are more problematic in reduced tillage systems, especially when preplant weed control (i.e., burndown) occurs within 21 days of planting. The use of certain cover crops such as clovers and vetch also elevates the risk of cutworm infestations. The literature indicates that populations of thrips are often unaffected or even lower in reduced tillage systems compared with conventionally tilled ones. Aphid populations tend to be higher reduced tillage systems. This effect appears most prevalent in parts of the Cotton Belt where fire ants are present. Fire ants are typically more numerous in reduced tillage systems, and they tend and protect aphids from predators and parasitoids. However, it should be noted that fire ants are themselves effective predators of other common cotton pests. Other beneficial arthropods are generally either not affected or positively affected by a reduction in tillage operations. Although a reduction in tillage may increase the overwintering success of tobacco budworm and bollworm, depending upon when the tillage is performed, most data suggests that a low proportion of the overall budworm/bollworm population actually overwinters in cotton fields. Thus, tillage should have a negligible impact on the size of moth populations that emerge in early spring. Grasshoppers are more likely to occur in damaging numbers in reduced tillage systems because overwintering egg masses, occurring in the soil, are left undisturbed. Other pests such as false chinch bugs, spider mites, and threecornered alfalfa hoppers are also more commonly observed when there is no spring tillage. This effect appears related to the lingering presence of some weeds common in reduced tillage systems, particularly when herbicidal burndown is done shortly before planting or herbicide tolerant weeds remain in the field. There are also reports of fire ants tending nymphs of the threecornered alfalfa hopper as they do aphids. Generally, insect management in reduced tillage cotton is similar to that in conventionally tilled fields. Growers and agricultural consultants should be aware that occasional pests such as aphids, grasshoppers, and threecornered alfalfa hopper have greater potential to cause damage when tillage operations are minimized. Specific, preventative management for these pests is generally not needed in reduced-till cotton; however, some risk is alleviated by applying burndown herbicides at least 3-4 weeks prior to planting. Most cotton growers tank-mix a pyrethroid insecticide with their burndown herbicide or apply a banded pyrethroid behind the planter to address the potential for cutworm infestations in reduced tillage systems. This appears to be a valid management option, particularly when burndown applications are not made until shortly before planting.

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