

Georgia Entomological Society Arthropod Survey

2018

2018 Georgia Entomological Society

Arthropod Survey

CONTENTS

Commodity	Page
Apple.....	1
Blueberry.....	1
Corn	1
Cotton	2
Livestock, Poultry, and Pets.....	3
Peach	5
Peanut.....	5
Pecan	6
Sorghum.....	6
Soybean	7
Urban and Structural.....	7
Vegetables.....	8
Wheat	9

Contributors: Mark Abney (peanut), Angelita Acebes (pecan), G. David Buntin (corn, sorghum, wheat), Nancy Hinkle (livestock, poultry and pets), William Hudson (pecan), Brett Blaauw (apple, peach), David Riley (vegetables), Phillip Roberts (cotton, soybean), Ash Sial (blueberry), Alton Sparks (vegetables), Daniel Suiter (urban and structural)

Apple

Apple insect and mite IPM in GA has been and continues to be quite stable. In most GA apple orchards insecticide applications timed by temperature-driven developmental models still provide excellent control of codling moth (*Cydia pomonella*), Oriental fruit moth (*Grapholita molesta*), and tufted apple budmoth (*Platynota idaeusalis*) our key complex of fruit feeding lepidopterans. That said, significant GA apple acreage exhibits signs of resistance to phosmet (Imidan), methoxyfenozide (Intrepid) and/or novaluron (Rimon). Fortunately, orchards experiencing declining insecticide performance continue to get good to excellent codling moth and Oriental fruit moth control with pheromonal mating disruption.

A potential new pest(s) for the region is a complex of ambrosia beetles (subfamily Scolytinae). These small beetles excavate tunnels in stressed trees and inoculate the bored-out galleries with a fungus. The resulting injury, fungal infection, and secondary infections can rapidly kill trees. Such injury has been observed in surrounding states, such as North Carolina, and also at a few North GA orchards in 2018. Thus, season-long activity will be monitored in North GA orchards in 2019 to better understand the incidence of this pest. Management for these beetles is minimally effective and relies on trunk sprays with chlorpyrifos, painting trunks with diluted white latex paint, and/or removal of already infested trees, but keeping trees healthy and happy is really our best strategy.

The relatively new invasive brown marmorated stink bug (*Halyomorpha halys*) is readily observed in GA's mountain counties, but to date has not been a significant pest in northern apple or peach production.

Blueberry

Spotted-wing drosophila (SWD) remains to be the key pest of blueberries in Georgia. The majority of the growers followed management programs developed by the UGA Blueberry Entomology program and didn't experience any issues related to SWD infestation in their fruit. However, a few growers who weren't able to implement SWD management programs in a timely manner reported issues with SWD infestations in their fruit. Consequently, crop losses due to SWD infestations were very low. Overall, SWD management costs ranged from \$100-150 per acre.

Over the last couple of years, we have seen a significant increase in secondary pest problems likely due to multiple applications of broad-spectrum insecticides (OPs and pyrethroids) to control SWD. During 2018, gall midge, thrips, and scales were reported to be the major concerns. Other insect pests reported during 2018 included bud mites, cherry fruit worm, cranberry fruit worm, leafhoppers, bearberry whiteflies, and ground pearls. Statewide, a significant proportion of the blueberry acreage was treated with 1-3 insecticide applications to control these secondary insect pests.

Furthermore, a number of frost events during March 2018 caused significant damage to blueberry blooms. As a result, Georgia blueberry growers lost about 45-50% of the crop during 2018.

Corn

Corn acreage in Georgia was 325,000 acres planted and 285,000 acres harvested which was more than 2017. Growing conditions generally were cooler and wetter than normal. Average grain yield was 176 bu/acre, which was greater than the year before, but many irrigated fields yielded 250-300 bu/acre. Average corn grain price received was \$4.47 per bushel. An additional 30,000 acres were harvested as silage with a yield of 21 tons per acre. All corn seed is treated with a neonicotinoid insecticide, so soil insect damage was very low. Stink bug infestations were low to moderate in 2017 in most areas,

although preventive sprays were still used widely. Fall armyworm infestations were low in on-time planted corn. Fall armyworm whorl infestations were severe in non-Bt corn in later planting. Corn earworm infestations were low to moderate in on-time planted corn, but increased to damaging levels in late-planted corn. Bt corn adoption is about 80% in the state. Cost of Bt technology was about \$16 to \$28 per acre depending on trait package. Bt products continue to provide very good control of stalk borer and fall armyworms in the whorl. More unexpected ear/kernel damage by corn earworm was observed in late planted Bt corn than a few years earlier suggesting that field-evolved resistance is occurring in some Bt trait products in Georgia. Studies in 2017 and 2018 indicate resistance in corn earworm populations to the Cry1A genes is now widespread in the southern U.S.

Cotton

The 2018 production year will be remembered as the year of the Hurricane Michael. Cotton yield forecasts were excellent as we entered October, perhaps a record breaking crop. However Hurricane Michael devastated the cotton crop with total losses estimated at over \$600 million. Cotton was planted on 1.43 million acres but only 1.35 million acres were harvested. Yield on harvested acres was only 693 lbs. lint/acre. Average insecticide applications were 2.4 per acre, average yield loss due to insects was 3.0 percent, and the total costs associated with insect pests (losses plus control costs) were \$83.31 per acre.

Moderate thrips infestations were observed on cotton planted in April followed by unusually low thrips infestations on cotton planted in May and June. Due to low populations, neonic seed treatments provided acceptable control, and relatively few foliar insecticide applications were needed to supplement at-plant treatments.

Tarnished plant bugs infested 55 percent of Georgia cotton, and 12 percent of the acres were treated for this pest. We continue to see a trend for increased numbers of tarnished plant bugs in cotton. Insecticide applications targeting plant bugs disrupt beneficial insects and have the potential to flare secondary pests. Although cotton aphid rarely causes economic loss, approximately 20 percent of acres were treated for cotton aphid. During the fall of 2018 a cotton virus which is vectored by cotton aphid was detected in multiple Georgia cotton producing counties. Only 1 percent of the cotton acreage was treated for spider mites.

Nearly all cotton planted in Georgia is Bt cotton. We continue to have concerns regarding corn earworm in Georgia and the Cotton Belt as a whole with decreased efficacy and resistance development to some Bt toxins. Lab bioassay data from corn earworm collected during 2018 indicated susceptibility of Cry 1Ac and Cry 2Ab toxins has eroded in corn earworm populations. In spite of these concerns, only 4 percent of the acreage was treated for corn earworm due to low corn earworm populations infesting cotton. Stink bugs continue to be the most common insect requiring treatment. Approximately 80 percent of acres were treated for stink bugs; averaging 1.2 applications per acre.

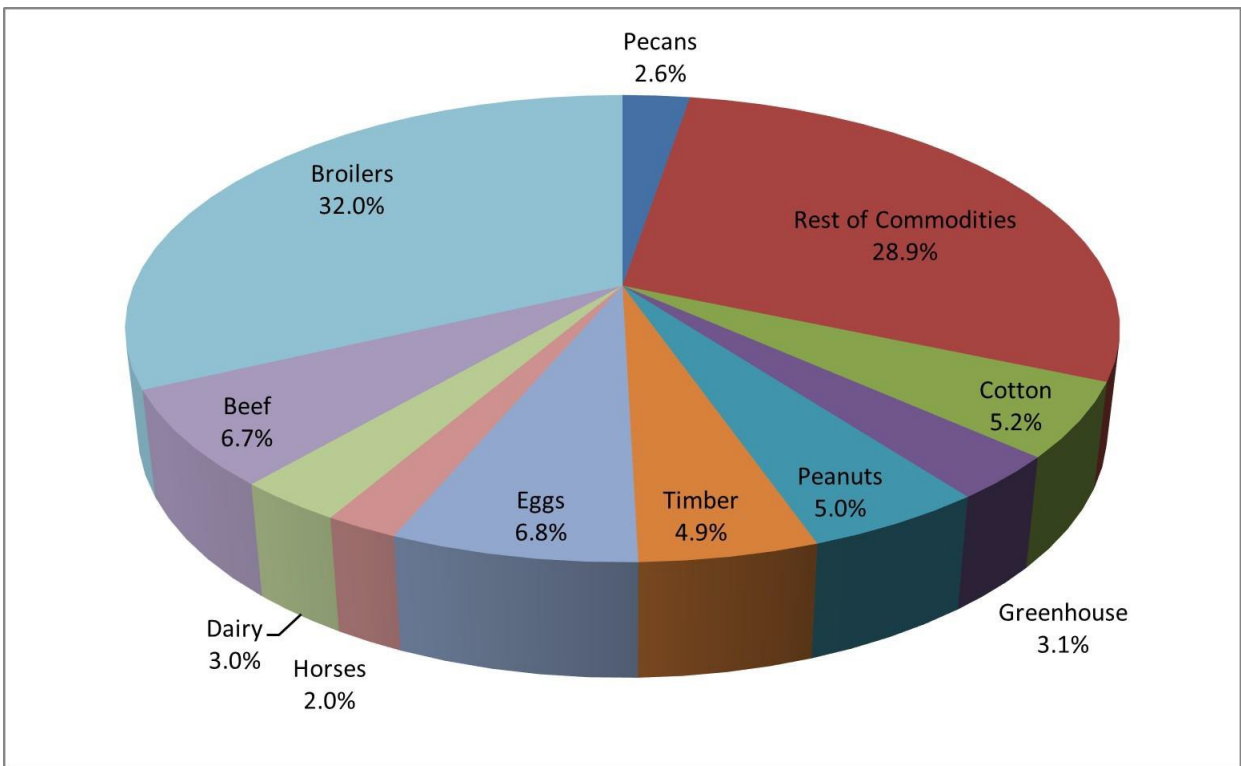
An outbreak of silverleaf whitefly (SLWF) occurred during 2017 causing significant yield loss and additional control costs. During 2018 SLWF populations were generally low, due in part to cold winter temperatures and a wet spring and summer which are not conducive for SLWF population survival and

development. Growers were also more aware of SLWF and employed management strategies such as natural enemy conservation to reduce the risk of SLWF. About 2 percent of the cotton acres were treated for SLWF during 2018 compared with over 80 percent during 2017. We continue to monitor and learn about SLWF population dynamics in the South Georgia farmscape.

Livestock, Poultry, and Pets

Among Georgia’s Top 10 agricultural commodities, five are animal agriculture – broilers, laying hens, beef cattle, dairy cattle, and horses. Combined, the farm gate value of these five commodities totals over half the state’s entire agricultural farm gate income, illustrating the significance of animal agriculture in the state.

Georgia Top Ten Agricultural Commodities



Beef Cattle

Georgia ranks 21st nationally in cattle production, with about a million head produced annually, amounting to a farm gate value of over a billion dollars. Horn flies (*Haematobia irritans*) are the main pest of pastured cattle, causing cattle irritation and aggravation by their blood-feeding habit. More significantly, the cow’s avoidance behaviors disrupt calf nursing, meaning calf weaning weights may be reduced by 18 pounds per calf compared with calves on mother cows with good horn fly control. Statewide, annual losses to horn flies on Georgia cow-calf operations are over \$14 million. Horn fly suppression is dependent on insecticides, although due to insecticide resistance there are few options that effectively reduce horn fly numbers for more than a few days. Stable flies, the other bloodsucking

fly attacking cattle, account for over \$15 million in losses for Georgia cattle herds. To control horn flies and stable flies (as well as other ectoparasites such as face flies, lice, etc.), Georgia cattlemen invest ca. \$5.9 million annually.

Broilers

Georgia continues to be the nation's number 1 broiler producing state. Broilers rank at the top of Georgia's agricultural commodities, bringing in \$4.4 billion annually, or 32% of the state's farm gate value.

Worldwide, darkling beetles (*Alphitobius diaperinus*), whose larvae are known as lesser mealworms, are the primary pest of broiler production. These insects burrow into insulation to pupate, damaging facilities and lowering insulative capacity. Costs of heating during winter and cooling houses in summer significantly increase production costs. When litter is removed and applied to pastures or fields as soil amendment, beetles are distributed and may migrate to nearby homes, creating neighborhood friction. Lesser mealworms feed on dead birds and feces, thereby acquiring numerous pathogens which they can transfer to uninfected birds when consumed. They also maintain Salmonella in their guts during pupation, so that newly emerged adult beetles are infectious to chickens. Chickens are predators and prone to eating insects; filling their digestive tracts with indigestible beetles prevents their consuming nutritious feed and gaining weight, as meat birds are intended to do. *Alphitobius* populations worldwide have been shown resistant to most of the pesticides registered for their suppression, so management strategies are extremely limited. Suppression efforts have some effect on beetle numbers, but there are no tactics that significantly reduce beetle populations.

All 13,000 Georgia broiler houses are infested with darkling beetles, and broiler producers spend approximately \$11 million annually for *Alphitobius* suppression. Statewide, losses to the beetles are estimated at \$4.6 million annually, for lost production and control costs totaling ca. \$15.6 million annually in the state. Again, even the most conscientious and strategic intervention strategy is ineffective at suppressing *Alphitobius* beetles with current products and technology.

Caged Layers

Table eggs are Georgia's third most lucrative commodity, with an annual value to the state of over \$851 million (ranking Georgia 6th nationally). The principal pest in caged layer houses is the house fly (*Musca domestica*), which causes spotting of eggs, degradation of equipment through fecal contamination, and neighborhood consternation when flies migrate away from the poultry farm to nearby residences. Because of suitable conditions inside layer houses, house flies can be a year-round problem. Producers use manure and water management, trapping, biological control (fly parasitoids and predators), and various pesticides to suppress house flies around caged layer operations. Worldwide, house flies have been shown resistant to most insecticides, so control is seldom adequate. Losses due to flies combined with costs of management are estimated to total over \$7 million annually.

Northern fowl mites (*Ornithonyssus sylviarum*) are the second most significant pest in layer flocks. These mites are bloodsuckers that spend their entire life cycle on the chicken host, causing itching, scabbing, anemia, and general bird discomfort and lack of thriftiness. Losses due to reduced feed conversion efficiency and reduced egg production are estimated at \$1.8 million annually, while

suppression costs (primarily acaricides) are about \$1.7 million per year, totally \$3.5 million statewide annually.

Pets

Approximately 2.5 million Georgia households have dogs and cats. The three major arthropod pests affecting pets are fleas, ticks, and mosquitoes. Because fleas transmit tapeworms, ticks transmit pathogens such as *Ehrlichia*, and mosquitoes carry heartworm, pest suppression is essential for disease prevention and to maintain pet health. In Georgia, expenditures for ectoparasite control on dogs and cats amount to over \$128 million annually.

Peach

Pest pressure from fruit-attacking insect pests, such as plum curculio (*Conotrachelus nenuphar*), Oriental fruit moth (*Grapholita molesta*), assorted stink bugs, and green June beetles in peach orchards across GA & SC was light to moderate in 2018, in part due to the substantial crop loss in the previous year (due to freeze damage) across the Southeast. Premature tree decline associated with scale, lesser peachtree borer, and peachtree borer continues to cause serious losses. Cover sprays do little to control/suppress these key tree pests. Scale insects, such as San Jose scale (*Comstockaspis perniciosus*) in particular, are increasingly damaging. Scale control is very demanding but doable with rigorous application of dormant oils followed by block-specific responses with an insect growth regulator application for scale outbreaks through October. Regardless, every orchard needs to receive two dormant, dilute oil applications each year. Growers that apply their dormant oil applications at higher volumes, 150-175 gal/acre, are seeing improved scale management, but not complete control.

Lesser peachtree borer (*Synanthedon pictipes*) control is stable where dilute, pre-bloom chlorpyrifos sprays are complimented by in-season cover sprays and a post-harvest application of chlorpyrifos. Peachtree borer (*Synanthedon exitiosa*) infestations are worsening. Peachtree borer populations (univoltine) are showing the same upward population trends previously seen with the multivoltine lesser peachtree borer. Mating disruption utilizing the female sex pheromone of lesser peachtree borer is a highly effective management strategy in the Mid-Atlantic and Upper Mid-Western peach production areas, but this technology has previously failed with the higher pest abundance and longer, warmer growing seasons of the Southeast. Cottrell et al. at the USDA-ARS have worked for years to adapt mating disruption to the Southeastern lesser peachtree borer and peachtree borer complex. As such, the Southeastern-formulated mating disruption pheromone, Isomate-LPTB Plus, was registered for use in Georgia and South Carolina for the 2018 season, and deployed on approximately 3,000 acres.

The abundance of the invasive brown marmorated stink bugs (*Halyomorpha halys*) was observed to be increasing in Fort Valley, the key peach growing region of GA. Population numbers were highest post-harvest and there was no reported crop loss/injury due to this pest. The brown marmorated stink bug will continue to be monitored in 2019 in GA peaches.

Peanut

Georgia's statewide average peanut yield in 2018 was 4450 pounds per acre on 650,000 harvested acres. Above average rainfall was generally favorable for high yields but also led to widespread rootworm (southern corn rootworm and banded cucumber beetle) infestations. Damage from these pests was reported from areas with historically high populations (heavy clay soils) but also from fields with lighter, sandier soils where rootworm is not typically found. According to tonnage reports, the

proportion of the Georgia crop graded segregation 2 (damaged) was low in 2018, so rootworm injury did not have a direct negative effect on crop quality. Rootworm impact on yield is unknown.

Populations of other pest arthropods were generally low and manageable. Lesser cornstalk borer and twospotted spider mite thrive in hot, dry conditions, and neither were abundant in peanut. None of the foliage feeding caterpillars reached outbreak status in 2018. Caterpillar populations reached thresholds in some fields, but growers had no problem managing them with available insecticides. Garden fleahopper was present across a large portion of the crop. This insect has become common in peanut in recent years, though its pest status is unclear. Insecticide efficacy trials show that pyrethroids are not effective against garden fleahopper in peanut; acephate and imidacloprid applications result in significant reduction in pest density. Thrips and threecornered alfalfa hoppers are present in nearly every peanut field in Georgia every year. Populations of these insects in the 2018 crop were similar to previous years.

The organophosphate insecticide chlorpyrifos continued to face regulatory challenges in 2018. The US Court of Appeals for the 9th Circuit instructed the US EPA to revoke all tolerances for the active ingredient. Chlorpyrifos is currently the only insecticide with proven efficacy against peanut burrower bug and southern corn rootworm in peanut. As of March 2019, tolerances remained in effect, and the product was legal to use on registered crops.

Pecan

Overall, the arthropod pest situation for pecans in Georgia was normal apart from sporadic outbreaks of minor pests (e.g., pecan leaf phylloxera and fall webworm). In the Spring of 2018, there were reports of ambrosia beetle infestations in young orchards but tree loss was minimal. Pecan leaf phylloxera outbreaks were reported by some growers in early summer. Fall webworm infestations were unusually high in several pecan orchards in 2018. The most common pests that growers treated were yellow aphids, blackmargined aphids and black pecan aphids, requiring 1-3 sprays throughout the season. Apart from these pests, growers also reported spraying for pecan leaf scorch mites, nut casebearers, shuckworms, pecan weevils, phylloxera, fall webworm and stink bugs.

Perhaps the major loss suffered by the pecan industry in 2018 was due to hurricane Michael, and many growers, particularly in southwest Georgia, were not able to harvest their crops. For the 2018 production, there was an estimated \$100M crop loss attributed to hurricane Michael. Additionally, ~27,500 acres of pecan trees (17% of the state's pecan acreage) were lost due to the hurricane. This translates to \$260M tree loss and future income loss of \$200M.

Sorghum

Sorghum acreage in 2018 was 15,000 acres for grain production and 8,000 acres for forage/silage production. Grain yield averaged 53 bu/acre. Price received is not available for 2018 but averaged \$7.96 per 100 lb seed in 2017. Acreage was lower than 2016 due to lower commodity prices and cost of controlling the sugarcane aphid (SCA). SCA infestations were first detected in late April in southern GA and throughout the state by the end of June. SCA occurred on about every acre of sorghum. Virtually all grain sorghum hybrids were pretreated with the neonicotinoid insecticides clothianidin, thiamethoxam

or imidacloprid which provided good control for SCA for 30-35 days after planting. A Section 18 emergency use exemption was obtained again for use of Transform WG on sorghum for SCA control with a maximum of two applications per season. Almost all acres were treated once and some fields were treated twice with either Sivanto prime 200SL or Transform WG. Estimated cost of insecticide application for sugarcane aphid control was about \$15 to \$20 per acre. Some fields or portions of fields were severely damaged and abandoned. Sorghum midge infestations were absent or very low. Some later planted fields were treated for fall armyworm in the whorl or headworms (fall armyworm, corn earworm and/or sorghum webworm) on the grain heads. Control of SCA in silage and forage sorghum is problematic. About 105 acres of sweet sorghum is grown in Georgia for syrup production with a retail value of about \$5,000 per acre. A Section 18 label also was obtained for Sivanto prime for use on sweet sorghum for syrup production, which prevented severe damage in most sweet sorghum fields in 2018.

Soybean

Insect pest problems in soybean were relatively minor during 2018. Foliage feeding caterpillars, including soybean looper and velvetbean caterpillar, and stink bugs were the most common pests infesting fields and requiring treatment. Soybeans were planted on 145,000 acres during 2018. An average yield of 40 bushels per acre was achieved on 135,000 harvested acres. Average insecticide application was 1.2, average yield loss was 4.4 percent, and the total cost associated with insect pests (losses plus control costs) was \$28.49 per acre.

Urban and Structural

The tawny crazy ant, *Nylanderia fulva*, has shown up in Dougherty and Lee counties (Albany, GA) in August 2013, Camden and Glynn counties along I-95 exits coming from Florida (August 2014), and Chatham (Garden City, GA), Lowndes (Valdosta, GA), and Brooks (Quitman, GA) Counties in 2015. There have been no detections in Georgia since. Our belief is that this major nuisance ant pest will be restricted to the lower half to one-third of GA and coastal GA. In our studies in Chatham County, at the Port of Savannah, we are seeing the rapid displacement of the red imported fire ant, *Solenopsis invicta*, by *N. fulva*. Control of *N. fulva* is much like that for the Argentine ant, *Linepithema humile*. Fipronil (Termidor SC) used close to the structure only and applied directly to trailing ants is the best method to date, to control *N. fulva*. Elimination of excessive trash and debris is also critical, as it eliminates nesting sites.

Several changes to insecticide labels (pyrethroids and neonicotinoids) have occurred over the past several years. For pyrethroids, changes (in OTC and professional markets) restrict where products can be applied. To prevent water contamination, for instance, they cannot be applied to hard surfaces, cannot be applied more than 3 feet high, must be applied crack and crevice, and must be applied over overhangs when applied to soil. For neonicotinoids, new labels have a pollinator protection box with language mandating that products not be applied to plants with flowers on them.

Although bed bug problems continue to be common in Georgia (mainly in commercial accounts), many companies (including some large ones) not equipped to handle them (multiple visits and labor intensive), or averse to the liability, are not pursuing bed bug work. Although bed bugs garner lots of attention, termites and ants are still more profitable for most companies, especially those small to mid-sized companies which make up more than three-fourths of the industry (Suiter's estimate). On the pest control side, ants (Argentine ants) are arguably the number one pest encountered by companies who conduct residential pest control (most of them) in GA. A major problem that has emerged for those

people who have been unfortunate enough to have found themselves with a bed bug infestation is the cost to remedy the problem. The cost of a bed bug treatment, over the past decade, has reached the cost of a residential termite treatment. And many residents, especially those living in low-income environments, are simply not fortunate enough to be able to afford to hire a pest management company to solve their problem. This, coupled with virtually no over-the-counter remedies, is fueling the search for low-cost, effective remedies available to homeowners.

Attractants for bed bug traps is an active area of research. The "ClimbUp" pitfall trap continues to be the industry standard for traps as monitors. Traps are not used as a pest control tool, but are good monitors. Heat continues to be used to control bed bugs, mainly as an alternative to pyrethroid resistant populations; pyrethroid resistance in bed bugs is severe and widespread. There are few chemicals on the horizon that will alleviate this situation; however, chlorfenapyr (Phantom, BASF) is a fairly widely incorporated residual, as is silica gel and diatomaceous earth (Cimexa dust and Mother Earth dust). Essential oils are being looked at, but are not promising. Heat, when used improperly, can worsen bed bug problems by driving bugs from heated premises. Dogs as inspection tools are variable when it comes to efficiency; the handler has proven to be a key to the success of dogs as inspectors. Information about bed bugs, in the form of webinar archives, can be viewed at www.gtbop.com. Viewing is free.

Persons holding a Commercial and/or Private Pesticide Applicators license may acquire category credits (CEUs), for most categories, through their local county extension agent. Although pest management professionals are exempt from acquiring HPC and WDO credits, they may acquire Category 41 (Mosquito) hours in this manner. Licensees should contact their county extension office by calling 1-800-ASK-UGA1 to arrange for viewing one or more for-credit recordings. In short, recordings must be watched in the presence of a county extension agent or their designee. This will require the licensee to travel to the county agent's office. The licensee will sign an Agent-produced sign in sheet (downloaded from gtbop.com), pay the agent, watch the recording, and get a copy of the sign in sheet from the agent. The Agent scans and emails the sign in sheet to the Center for Urban Agriculture at gtbop.com. The Center adds information to the sheet and sends it to the Georgia Department of Agriculture for credit assignment.

Vegetables

Spring crops were produced with greater insect pest pressure than 2017, but still relatively minor. Thrips were light in onions. Diamondback moth were more broadly distributed and presented severe control issues because of resistance to multiple insecticide modes of action. Other caterpillar pests were relatively light in most crops. Thrips densities were high in multiple crops but occurred later in the spring.

Production of summer and fall crops presented multiple severe pest problems in vegetables.

The cowpea curculio remains as a crop-threatening pest in cowpeas. No legal control methods that will provide adequate control have been identified.

Silverleaf whitefly and associated viruses occurred later in 2018, with a more "normal" distribution (as compared to 2017). Growers in the Tift and Colquitt Counties area were most severely impacted; later planted squash and snap beans experienced the greatest losses. The hurricane (Michael) reduced issues with whitefly, but decimated many of the crops.

Pepper weevil was of major concern in 2018. Pheromone trap data indicated that weevil adults overwintered in southern Georgia, necessitating extensive insecticide inputs by pepper growers to manage this pest. Growers appeared to be successful in the spring crop with few control issues reported; however, isolated incidence of severe problems were reported in the fall. These problems were generally attributed to inadequate management measures.

Sweetpotato growers have reported inadequate control of soil insects, primarily wireworms, with their management programs. While Georgia did obtain a 24C registration to allow for chlorpyrifos PPI application with a 60 day PHI (previous 120), this product is under court order to be eliminated.

Wheat

Harvest wheat acreage in 2018 was about 200,000 acres planted and 70,000 acres harvested with average statewide yield of 54 bu/acre at \$4.10/bu. Acreage was lower than previous years due to poor conditions at planting time and low commodity prices, and harvested acreage was lower due to wet weather at harvest. Nevertheless, some farmers harvested 80-100 bu/acre if the crop was harvested in mid-May before an extended rainy period in late May and June. Resistant varieties continue to be the main line of defense against the Hessian fly. Some fields of susceptible varieties had significant Hessian fly damage in the spring. Aphids and barley/cereal yellow dwarf disease levels were generally low to moderate in the coastal plain region but caused some damage in northern Georgia. Cereal leaf beetle infestations were low but some fields were treated in east-central Georgia. Scab disease was a major concern but was not as severe as the previous season.