Georgia Entomological Society Arthropod Survey

2020

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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*) and Oriental fruit moth (*Grapholita molesta*) our key 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.

Brown marmorated stink bug (*Halyomorpha halys*) is readily observed in GA's mountain counties. Population numbers have been on the rise over the past few years, but fortunately, to date there has only been marginal issues due to BMSB in North GA apple and peach production.

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, known as rapid apple decline, has been observed in surrounding states, such as North Carolina. Thus, season-long activity was monitored in North GA orchards in 2020 to better understand the incidence of this pest. Several species of ambrosia beetles and bark beetles were recorded with the black stem borer (*Xylosandrus germanus*) the most abundant species. Although numerous beetles were collected during sampling, there were no reports of ambrosia beetle attacks or losses of trees due to rapid apple decline in North GA during 2020.

Blueberry

Spotted-wing drosophila (SWD) remains the key pest of blueberries in Georgia. The majority of 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 2020, gall midge, thrips, and scales were reported to be the major concerns. Other insect pests reported during 2020 included bud mites, cherry fruit worm, cranberry fruit worm, leafhoppers, whiteflies, and slugs. 2020 was first year since 2013 we had reports of slugs as a problem in blueberries at a couple of sites, but it is unclear whether or not slugs are causing economic damage. Statewide, a significant proportion of the blueberry acreage was treated with 1-3 insecticide applications to control these secondary insect pests.

Corn: No report submitted

Cotton

The 2020 production year will be remembered for seed coat fragments. Cotton yield forecasts were excellent in late summer, but weather events, primarily excessive moisture and lack of solar radiation, reduced both yield and quality. Cotton was harvested on 1.18 million acres with an average yield of 887 lbs. lint per acre. Average number of insecticide applications was 2.45 per acre, average yield loss due to insects was 2.6 percent, and the total cost associated with insect pests (losses plus control costs) was $77.25 per acre.

Thrips infestations were generally higher on April planted cotton compared with May and June planting dates. Most acres received an at-plant insecticide; however, 25 percent of the acres received a supplemental foliar application. Yield loss from thrips was minimal.

Tarnished plant bugs infested 60 percent of Georgia cotton and 11 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 infests most acres each year, this sucking pests rarely causes economic loss. However, growers treated 12 percent of acres for cotton aphid. Since the initial detection of Cotton leafroll dwarf virus (CLRDV) in Georgia during 2018, this virus which is vectored by cotton aphid has been observed in all cotton production regions in Georgia. Although CLRDV infections are common, yield loss has only occurred in a few fields during the last two years. Aggressive applications of effective aphid insecticides (weekly sprays following emergence) have not significantly impacted CLRDV plant infections or yield.

Over 99 percent of cotton planted in Georgia is Bt cotton. The industry is transitioning to 3-gene Bt cottons which were planted on 58 percent of the acres. This transition needs to continue, since laboratory bioassays suggests high levels of resistance to Cry1Ac (the first Bt trait introduced in 1996) and decreased susceptibility to Cry2Ab. The third Bt trait, Vip3A continues to be very active on CEW.

In spite of these concerns, only 2 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 77 percent of acres were treated for stink bugs; averaging nearly 2 applications per acre.

Approximately 40 percent of the acreage was infested with silverleaf whitefly (SLWF) and 22 percent of the acreage was treated an average of 1.7 times. SLWF infestations were high in localized areas near a source of SLWF. Growers were proactive with management and preserved yield and quality. SLWF infestations did not explode during late summer, due in part to proactive management by growers, rainfall events, and perhaps due to fungal infections by *Isaria*. Spider mites continue to be observed at low numbers in most fields. 35 percent of the acreage was considered infested with spider mites however only 2 percent was treated.

Forest

Over 27.7 million acres of Georgia (65%) is forested. Most of this forested land is classified as timberland, i.e., available for commercial use – the most in the nation. Georgia has been consistently ranked as the top timber state in the United States.

Numerous native and invasive forest insects are problematic in Georgia forests. Native forest pests include southern pine beetle (*Dendroctonus frontalis*), black turpentine beetle (*Decdroctonus terebrans*), Ips engraver beetle (*Ips calligraphus, I. grandicollis, I. avulsus*), and Nantucket pine tip moth (*Rhyacionia frustrana*). Invasive pests include emerald ash borer (*Agrilus planipennis*), redbay ambrosia beetle (*Xyleborus glabratus*), and hemlock woolly adelgid (*Adelges tsugae*).

Ips engraver beetle activity has been problematic in hurricane damaged stands after Hurricane Michael. Ips engraver beetles generally attack logging debris, damaged branches, and trees undergoing stress. Infestations are normally restricted to a few trees, but damage can be more widespread due to environmental stressors such as hurricanes, tornadoes, and droughts. Infestation data gathered from the Georgia Forestry Commission (GFC) in 2019 – 2020 showed an estimated 624 acres damaged by engraver beetles.

Southern pine beetle (SPB) damaged 318 acres in 2019-2020. Southern pine beetle can attack healthy trees, and damage can cover hundreds of acres. Engraver beetle and SPB damage numbers are lower than in previous years due to COVID-19 restrictions on beetle surveys. Thinning and prescribed burning are normal forest management practices that contribute to overall stand health and reduced bark beetle issues when stands are healthy enough to withstand the stress of these activities.

Nantucket pine tip moth (NPTM) continues to be a problem in young (1-5 year) pine stands, causing delays in growth and tree form issues. The economic value of injury caused by this pest is unknown; the trees are harvested approximately 20 years after the damage to young trees occurred. Current control methods include contact insecticide sprays timed to coincide with early instar larvae and limited use of systemic insecticides. Pine tip moth control is an area of ongoing University of Georgia research.

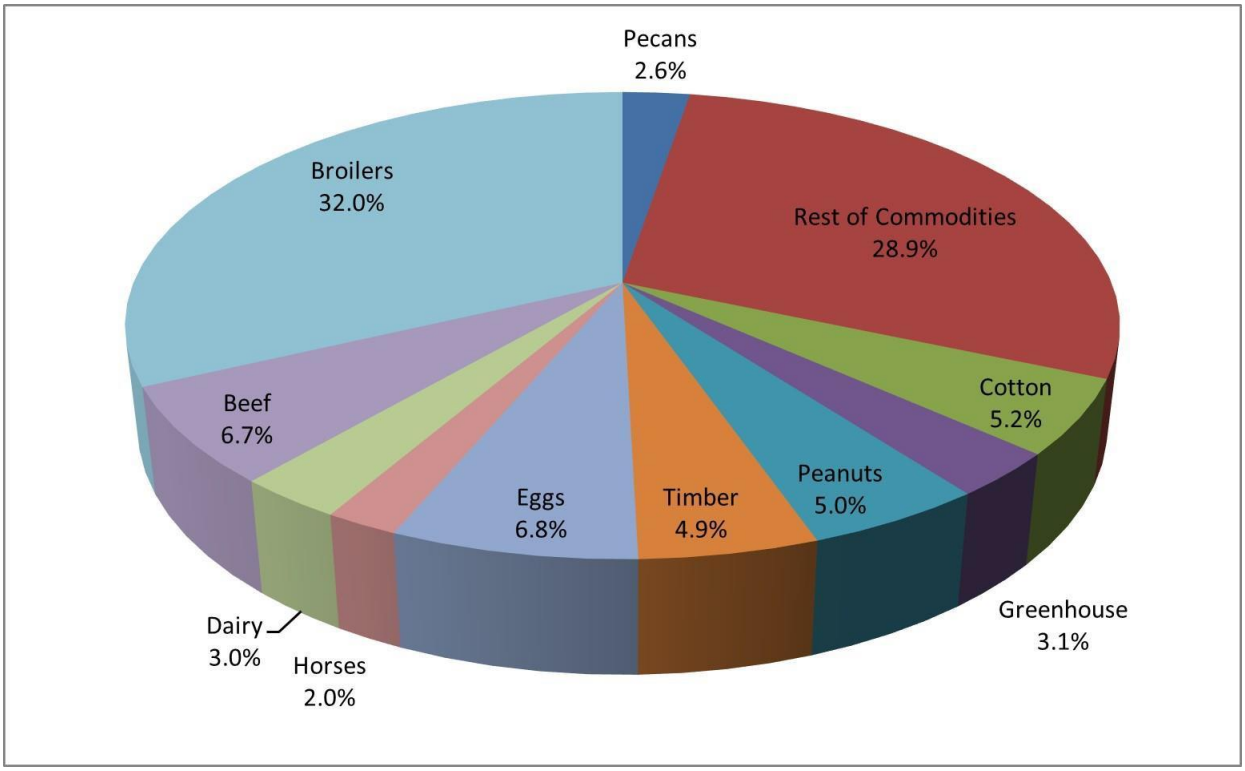
Emerald ash borer (EAB) was first detected in Georgia in 2013. In 2020 EAB was present in 37 Georgia counties, up from 23 counties in 2017. The USDA Animal and Plant Health Inspection Service (APHIS) removed the domestic EAB quarantine, effective January 14, 2021. The agency is transitioning from a regulatory EAB program to an EAB suppression program. Systemic insecticides (imidacloprid, dinotefuran, emamectin benzoate) can be used to protect ash trees with control that ranges from 1 – 3 years, depending on the active ingredient. Insecticide protection is generally only used in valuable landscape settings and for select conservation areas.

Hemlock woolly adelgid (HWA) is an invasive insect that kills both hemlock species native to eastern North America, eastern and Carolina hemlock. HWA is present in the entire natural range of hemlock in North Georgia. Hemlock trees can be conserved using systemic insecticides. Please see the Warnell School of Forestry and Natural Resources Outreach Webpage for hemlock guidance.

Livestock, Poultry, and Pets

Among Georgia's Top 10 agricultural commodities, five are animal agriculture – broilers, egg-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. Due to a mild winter in 2019-2020, cattlemen in south Georgia claimed that they had horn flies on their animals continuously, with some treating as early as February. Statewide, annual losses to horn flies on Georgia cow-calf operations were over **$15.4 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, another 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. **$6.1 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 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, and chickens eat more in cold weather to maintain body heat. 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 **$12.5 million** annually for *Alphitobius* suppression. Statewide, losses to the beetles are estimated at **$4.9 million** annually, for lost production and control costs totaling ca. **$17.4 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 $804 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 aggravation 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 **$8.1 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 **$1.9 million** annually, while suppression costs (primarily acaricides) are about **$1.8 million** per year, totally **$3.7 million** statewide annually.

Pets

In the past year, due to the coronavirus pandemic, people have been working from home, so more people have adopted dogs, increasing the numbers of pet-owning households in Georgia. Approximately

2.7 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. Recent advances in ectoparasite control have yielded flea and tick control products with enhanced efficacy and concomitant premium prices. In Georgia, expenditures for ectoparasite control on dogs and cats amount to over **$135 million** annually.

Future

Currently populations of the exotic invasive Asian Longhorned Tick (*Haemaphysalis longicornis*) are located in Tennessee, North Carolina, and South Carolina less than 50 miles from the Georgia state line, so we anticipate invasion of the state shortly. In monitoring north Georgia beef herds for the past year we have found only lone star ticks (*Amblyomma americanum*) and American dog ticks (*Dermacentor variabilis*) on the animals. Unfortunately the Asian longhorned tick prefers cattle (although it has an extensive list of acceptable hosts including most mammals and numerous avians), so it likely will significantly impact Georgia beef production as it moves in. It has one particular feature that makes it particularly successful; it is parthenogenetic, and each individual is able to produce over 2,000 eggs, leading to rapid population increases.

Peach

Pest pressure from fruit-attacking insect pests, such as Oriental fruit moth (*Grapholita molesta*), assorted stink bugs, and green June beetles in peach orchards across GA was light to moderate in 2020. We anticipated high pressure from plum curculio (*Conotrachelus nenuphar*) during the 2020 season, but levels were relatively low and management with primarily pyrethroids and phosmet kept injury below levels of economic loss.

Premature tree decline associated with scale, lesser peachtree borer, and peachtree borer continued to cause serious losses in 2020. Cover sprays do little to control/suppress these key tree pests. 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 2020 season, and deployed on approximately 6,000 acres.

A supplemental and/or alternative method of management for borers is with entomopathogenic nematodes. Shapiro et al. at the USDA-ARS have developed methods to manage peachtree borer using nematodes with control levels that are better than the grower standard of chlorpyrifos trunk sprays.

While nematodes have not been adopted by commercial growers, the interest and need for alternative management options for borers is crucial. It is expected that adoption of this practice will occur within the next couple of years.

Scale insects, particularly San Jose scale (*Comstockaspis perniciosus*), are continuing to cause significant damage to trees and fruit in Middle GA. 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, and including an insect growth regulator, such as pyriproxyfen, are seeing improved scale management, but not complete control. With the mild winter, the 2020 season was considerably bad in terms of San Jose scale pressure. Even in orchards under "good" management programs, scale numbers on average were 2 to 30 times higher in 2020 compared to 2019.

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 bugs will continue to be monitored in 2021 in GA peaches.

Peanut

Peanut was produced on 810,000 acres in Georgia in 2020, and the average yield was reported as 4,100 pounds per acre. The 2020 growing season was generally favorable in spite of some early season cool weather and spotty drought conditions in mid-summer. Thrips pressure varied widely by location and planting date. Widespread skippy stands associated with poor seed quality exacerbated thrips injury in some fields and contributed to increased incidence of TSWV in peanut. A survey of 292 commercial peanut fields in 34 counties revealed an average TSWV incidence of 10%. Phorate was applied in-furrow in 53.8% of surveyed fields, and imidacloprid was applied in furrow in 31.1% of surveyed fields. There were no widespread outbreaks of severe pests in 2020, though lesser cornstalk borer, spider mites, and peanut burrower bug were present at economic levels in some fields. Rootworms (southern corn rootworm and banded cucumber beetle) continued to cause problems for growers in fields with irrigation and heavy clay soils. Granular chlorpyrifos remained the only consistently efficacious insecticide for rootworm management. Large populations of velvetbean caterpillar (VBC) occurred across much of the peanut growing region of Georgia from mid-August through September. The insect was easily controlled with insecticides when infestations were discovered and treated in a timely manner. Fields treated with long residual insecticides like chlorantraniliprole earlier in the season were typically free of VBC. The growth regulator diflubenzuron provided good efficacy against established VBC infestations at low use rates in UGA Peanut Entomology trials. Other caterpillar species were present in peanut, but populations were generally below economic thresholds. The risk of regulatory action against chlorpyrifos remained a serious concern for the industry as it is the only active ingredient registered for use in the crop with adequate activity against rootworm species and peanut burrower bug.

Pecan

In 2020, the arthropod pest situation for Georgia pecan production followed the same trends as previous years, for the most part. Early in the Spring, there were reports of ambrosia beetle infestations in young orchards located in South Georgia, but only minimal tree losses were reported. Notably, the infestations were associated with trees covered with a certain tree guard/protector that encouraged infestations on the trunks, which then promoted soil accumulation on the trunks. Unsurprisingly, most of the ambrosia beetle reports were related to stress-inducing factors such as water saturated conditions and transplant stress. Most growers with ambrosia beetle problems primarily used pyrethroid materials for management.

There were reports of pecan bud moth infestations on young orchard trees in the spring and early summer. Contrary to the 2019 season, pecan nut casebearer infestation was low in 2020.

A unique issue reported by several pecan growers was snail infestation in which snails where found in high numbers on young trees. The snails did not appear to be feeding on the trees. However, they caused problems by blocking irrigation emitters in the orchards.

Similar to other years, growers managed for yellow aphid complex and black pecan aphids, applying 1-2 sprays throughout the season. In 2020, pecan weevil emergence was low similar to 2019 observations.

Sorghum: No report submitted

Soybean

Insect pest problems in soybean were relatively minor during 2020. Velvetbean caterpillar, stink bugs, soybean looper, and kudzu bugs were the most common pests treated; 48, 22, 14, and 4 percent acres treated respectfully. Soybeans were harvested on 95,000 acres with an average yield of 41 bushels per acre during 2020. Average insecticide applications per acre was 0.91, yield loss was 3.25 percent, and the total cost associated with insect pests (losses plus control costs) was $25.26 per acre.

Turfgrass

In Georgia, several species of arthropod pests invade turfgrass. The major pests include mole crickets, *Neoscapteriscus vicinus* Scudder and *Scapteriscus borellii* Giglio–Tos, whitegrubs such as Japanese beetle, *Popillia japonica* Newman and hunting billbug, *Sphenophorus venatus vestitus* Chittenden, black cutworm, *Agrotis ipsilon* (Hufnagel), fall armyworm, *Spodoptera frugiperda* (JE Smith), southern chinch bug, *Blissus insularis* Barber, bermudagrass mite, *Eriophyes cynodoniensis* (Sayed), and rhodesgrass mealybug, *Antonina graminis* (Maskell).

Fall armyworm remains the major problem, with infestations starting mid-July and intensifying by late August and September. In 2019 and 2020, the incidence of fall armyworms was moderate as the growing season began with mild temperatures up to mid-summer. The landscape management companies and golf courses used pyrethroids for management. Most of the applications were made preventatively, which started in August. In sod farms, fall armyworm infestations were observed from

the edge of the field. In fall, cutworms were observed causing damage but were managed using pyrethroids.

Mole cricket continues to be a threat to golf courses, athletic fields, and sod farms. Most of the facilities used acephate and fipronil for management and were applied preventatively. Chinch bugs can cause devastating damage to the lawn, and affected grass is killed. In 2019, I had a couple of calls where the lawns were decimated after chinch bug infestation. Monitoring for the pest, especially on St. Augustinegrass is essential when the forecast predicts temperatures above 95 °F with no rain for 3-4 days. The homeowners did not monitor for the pest. It is manageable using any pyrethroid insecticide if detected early. In 2020, I did not receive any calls on chinch bug problems.

Hunting billbug was a severe problem in a few sod farms. The sod producers adopted a multi-year program approach to manage billbugs. Systemic insecticides, such as diamides and neonicotinoids, were used to target larval stages. Two-lined spittlebug pressure was low in 2019 and 2020. Similarly, minor issues with whitegrubs were observed in some golf courses in 2020.

Rhodesgrass mealybug was found in two golf courses in southern Georgia. In 2020, the feeding damage was not noticeable until late September. In 2018 and 2019, this pest was causing yellowing on the greens from late July in affected golf courses. Currently, neonicotinoids are recommended for rhodesgrass mealybug control. In 2020, bermudagrass mite problems were observed on bermudagrass in southern Georgia golf courses.

Urban and Structural: No report submitted

Vegetables: No report submitted

Wheat: No report submitted