Georgia Entomological Society Arthropod Survey

2015

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Contributors: Mark Abney (peanut), G. David Buntin (corn, sorghum, wheat), Nancy Hinkle (livestock, poultry and pets), Dan Horton (apple, peach), William Hudson (pasture and hay fields, pecan), 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 for several years been quite stable. Jim Walgenbach at NCSU continues to provide the research base for extension apple arthropod IPM programs at UGA and other southeastern landgrant institutions. Resistance problems with codling moth (CM, *Cydia pomonella*) and Oriental fruit moth (OFM, G*rapholita molesta*), both key fruit-attacking pests, are evident but continue to be seen as slowly unfolding, farm-specific processes. In most GA apple orchards insecticide applications timed by temperature-driven developmental models still provide excellent control of OFM, CM and tufted apple budmoth (*Platynota idaeusalis*) our key complex of fruit feeding lepidopterons. 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 have gotten good to excellent CM/OFM control with pheromonal mating disruption.

Brown marmorated stink bug is readily evident in GA's mountain counties, but to date has not been problematic in apples, peaches, strawberries or vegetables.

Wooly apple aphid (WAA, *Eriosoma lanigerum*) had been well controlled in GA apples for at least 30 years, but in recent years it became very problematic in isolated blocks. Use of spinetoram (Delegate), especially in early- or mid-season has been closely tied to WAA outbreaks in GA, likely as a result of this compound's non-target impact on the WAA parasitoid *Aphelinus mali*. In this case work by Betsy Beers, WSU, translated very well to southeastern apples. Elimination of spinetoram use, or restricting its use to late-season, seems to be allowing re-establishment of WAA biocontrol in GA apples, WAA infestations have receded to almost pre-spinetoram levels.

Blueberry

Since its first detection in the state of Georgia in 2011, spotted wing drosophila (SWD) remains the key pest of blueberries. However, as a result of the research and extension efforts of UGA Blueberry Entomology program aimed at educating blueberry growers, crop losses were significantly lower during 2015 than any of the previous years since 2011. On average, SWD management costs around $100-150 per acre to blueberry growers.

Due to multiple applications of primarily broad-spectrum insecticides (OPs and pyrethroids) to control SWD, there has been a significant increase in secondary pest problems with scales being the most serious concern. Other secondary pests reported during 2015 include aphids, flower thrips, blueberry gall midges, and bud mites. This year a significant proportion of the blueberry acreage was treated with 1-2 insecticide applications to control these secondary insect pests. Unfortunately, the secondary pest problems will most likely get worse until alternative control strategies for SWD are developed.

Corn

Corn acreage in Georgia was 265,000 acres in 2015 which is lower than 2014 due to wet conditions at planting and lower commodity prices. Average grain yield was 180 bu/acre, but many irrigated fields yielded 250-300 bu/acre. All corn seed is treated with a neonicotinoid insecticide so soil insect damage was low. Very low infestations of stink bugs occurred in 2015, although preventive sprays were still used widely. Fall armyworm whorl infestations were very low and no treatments were needed. 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 75% in the state. Cost of Bt technology was about $16 to $28 per acre depending on trait package. Southern rust levels were high requiring one or more fungicide applications.

Cotton

Seedling thrips and stink bugs continued to be the primary insect pests infesting cotton during 2015. Average insecticide applications were 2.5 per acre, average yield loss was 2.6 percent per acre, and the total losses plus control costs were $69 per acre. Thrips infestations were relatively normal, moderate to high infestations were observed on cotton planted in April and early May and much lower infestations were observed in late May and June plantings. Neonicotinoid seed treatments (NSTs) are the industry standard for preventive thrips control. Historically NSTs require a supplemental foliar spray when infestations are high and this continued in 2015. Based on declining performance of NSTs in other parts of the US, we participated in monitoring program to bioassay thrips susceptibility to NSTs. In total 8 populations were bioassayed in 2014 and 2015, and 50 percent of those populations were classified as resistant to NSTs. We continue to see thrips activity in the field but have observed more variability in performance. We will continue to monitor this closely. During recent years we have seen an increase in tarnished plant bug populations. Approximately 12 percent of the acreage was treated for tarnished plant bug during 2015. This is a disturbing trend especially since plant bug sprays are typically made early to mid-season when disruption of beneficial insects can have more detrimental effects to the system compared with late season sprays for stink bugs. As in previous years, the most common insect pest treated in cotton was stink bugs. Other pests observed included Heliothines, cotton aphids, and spider mites.

Livestock, Poultry, and Pets

Beef cattle

Nationwide, Georgia ranks 30th in cattle production, with just over a million head produced annually, amounting to a farm gate value of over a billion dollars. Horn flies are the main pest of pastured cattle, causing irritation and aggravation to cattle because of their blood-feeding habit. Statewide, annual losses to horn flies on Georgia cow-calf operations are over $10 million. Horn fly suppression is dependent on insecticides, although 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. $5.7 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 $4.5 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 wooden building structures and

insulation to pupate, damaging facilities and lowering insulative capacity. Costs of repairs and insulation replacement 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. 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 Georgia broiler houses are infested with darkling beetles and broiler producers spend approximately $7.2 million annually for Alphitobius suppression. Losses to the beetles are estimated at $3.5 million annually, for a total cost of lost production and control ca. $10.5 million annually in the state.

Caged Layers

Table eggs are Georgia's 4th most lucrative commodity, with an annual value to the state of over $798 million (ranking Georgia 7th nationally). The principal pest in caged layer houses is the house fly, 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 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 $6.97 million annually.

Northern fowl mites 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 $1.75 million annually, while suppression costs (primarily acaricides) are about $1.7 million per year, totally $3.45 million statewide annually.

Pets

Approximately 3.5 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 treatments and disease preventatives amount to over $128 million annually.

Pasture and hay fields

Bermudagrass stem maggot (BSM) was a problem for growers producing hay for the horse market in August and September, with many fields receiving a pyrethroid application (or 2). Army worm pressure was relatively light but some fields were sprayed. Overall, the insect situation was less severe for most growers than is usual.

Peach

Pest pressure from fruit-attacking insect pests [plum curculio (*Conotrachelus nenuphar*), assorted stink bugs, green June beetles] in peach orchards across GA & SC was light to moderate in 2015. 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 in particular are increasingly damaging. Scale control is very demanding but doable with rigorous application of dormant oils, followed by block-specific responses to scale through October. Every acre needs to receive two dormant, dilute oil applications (200 gals/acre) applied at a low tractor speed (2-3 mph). Prompt, aggressive, often multi-step follow ups are required where ever control breaks are observed. Lesser peachtree borer control is stable where dilute, pre-bloom chlorpyrifos sprays are complimented by cover sprays and post-harvest chlorpyrifos. Peachtree borer infestations are worsening. Peachtree borer populations (univoltine) are now showing the same upward population trends previously seen with the multivoltine lesser peachtree borer. Utilization of safer, but less effective, organophosphate-replacement cover sprays for the past 15+ years appears to be the key element in the emergence of these previously well-controlled species as primary tree-killing pests.

Pheromonal mating disruption of peachtree & lesser peachtree borers is effective in the Mid-Atlantic and Upper Mid-Western peach production areas, but this technology has struggled or failed with our higher pest abundance, and longer, warmer growing seasons. Cottrell et al. have worked for years to adapt mating disruption to the southeastern lesser peachtree borer/peachtree borer complex. There is optimism that Shin-Etsu's newest dispensers will last long enough to work under our conditions. In late winter of 2015 Cottrell initiated an 800+ acre, on-farm lesser peachtree borer/peachtree borer mating disruption trial in central GA. Preliminary evaluations of this multi-year, area-wide study are very promising.

A sap beetle (*Carpophilus* spp.)/picnic beetle (*Glischrochilus* spp.) complex has emerged in recent years as an occasional, but where severe, damaging and difficult to control pest of sound, ripening mid- and late-season peaches. Problems seem to be more severe in wet years. Support from the South Carolina Peach Council has facilitated preliminary work on insecticide bioassays, survey and implementation of sap beetle pheromone trap-and-kill technology used on stone fruit in Western Australia. Initial trap-and-kill trials showed promise. Work examining the potential effect of orchard floor sanitation will begin in 2015.

Peanut

The 2015 peanut crop in Georgia experienced its fair share of insect and mite pressure, though the pests and the intensity of infestations varied by region and field. Tobacco thrips, *Frankliniella fusca,* were present in most fields in 2015. Thrips pressure was described as moderate to heavy in many areas, though reports of damage were not as widespread as in 2013 or 2014. Most growers used at plant insecticides to manage thrips infestations on peanut in 2015. Granular phorate, liquid imidacloprid, and thiamethoxam seed treatment were the most commonly used insecticides.

Some lesser cornstalk borer, *Elasmopalpus lignosellus*, activity was observed in the crop in early June, but populations generally either disappeared or remained below economic threshold. Rainfall was

adequate for peanut production in non-irrigated fields for much of the growing season. Nevertheless, damaging populations of two-spotted spider mite, *Tetranychus urticae*, did occur in a number of fields across the state in August where moisture was lacking. The peanut burrower bug, *Pangeaus bilineatus*, is favored by dry soil conditions, and while damage was reported in 2015, losses were not as great as in 2014.

Foliage feeding caterpillars were abundant in many counties, but population density and species composition varied from field to field. Velvetbean caterpillar (VBC), *Anticarsia gemmatalis*, and soybean looper (SBL), *Chrysodeixis includens*, were the two most common lepidopteran pests in 2015. Velvetbean caterpillar was observed from June until October, and numbers were very high in some fields. Growers were able to control VBC populations effectively with pyrethroids. Control of SBL was occasionally problematic in 2015. High temperatures and rank vine growth combined with high sprayer speeds, low application volumes, and high boom heights resulted in poor insecticide coverage in many fields.

Garden fleahopper (GFH), *Halticus bractatus*, was observed in Georgia peanut in late summer in 2014 and 2015. The insect's feeding results in stippling of the leaves much like that caused by spider mites. Though not reported as a pest of peanut in the literature, some fields experienced significant leaf drop due to GFH feeding in 2015 and were treated with an insecticide. Anecdotal reports indicated that pyrethroid insecticides provided fair to good control, but that rapid re-infestation of treated areas was common.

Georgia's overall peanut yield was excellent in 2015; the state-wide average was reported to be 4400 pounds per acre. Quality was generally good, though harvest season rainfall contributed to an increase in "segregation 2" grades. No official distinction is made in tonnage reports, but weather related grade reduction should not be confused with reductions caused by insect damage.

Pecan

Ambrosia beetle losses in the spring were significant, with some growers losing up to 25% of newly planted trees. Most new plantings (less than 3 years old) received 1-3 applications of a pyrethroid insecticide during the spring green-up period. Crop quality was affected severely by weather in the fall, during the critical nut filling period. Extended periods of cloudy weather and warmer than usual temperatures during the pre-harvest time resulted in kernel rot and premature sprouting. Late season aphid populations required treatment, but overall insect pressure during the growing season was a little less severe than usual.

Sorghum

Sorghum acreage in 2015 was 34,000 acres for grain production and 12,000 acres for forage/silage production. Sugarcane aphid (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. A Section 18 emergency use exception was obtained for use of Transform WG on sorghum for SCA control with a maximum of two applications per season. Almost all acres were treated 2 to 4 times with either Transform WG or Sivanto 200SL. Some field also were treated with chlorpyrifos (Lorsban Advanced,

Nufos etc) @ 2 pints per acre before flowering because of a 60 day preharvest interval. Estimated cost of insecticide application for sugarcane aphid control was about $5,370,000 for product alone which does not include additional application costs. About 10% of field were severely damaged and abandoned. Sorghum midge occurred in late planted fields and was controlled with tank mix of a pyrethroid plus Transform insecticide. 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. No insecticides are labeled use for SCA control on sweet sorghum. Most sweet sorghum fields were completely destroyed by SCA.

Soybean

Foliage feeding insects, primarily soybean looper (SBL) and velvetbean caterpillar (VBC), were the primary pests of soybeans during 2015. Both SBL and VBC were first observed in mid-July, which is earlier than normal, and built to economic levels in many fields. VBC was relatively easily and economically controlled with foliar insecticides. However, control of SBL was more challenging. Diamide insecticides are commonly used for control of SBL and grower expectation is high since these products are premium priced. In some areas growers were not satisfied with control and suspected resistance. However, UGA entomologists believe the primary reason for poor performance was lack of adequate coverage when making insecticide applications. Many of the problem fields were irrigated and had rank growth making it difficult to achieve coverage in the lower canopy where soybean loopers are commonly found. However, we will continue to monitor susceptibility of SBL to this important class of chemistry. Stink bug numbers were typical and significant acreage was treated during later reproductive stages. Very few, if any, soybeans were treated for kudzu bug. Although we are unsure the exact reason(s) kudzu bug populations have crashed, we do know that significant egg parasitism by *Paratelenomus saccharalis* is occurring in both kudzu and soybean and that significant infections by *Beauvaria bassiana* are occurring in both kudzu and soybeans as well.

Urban and Structural

The tawny crazy ant, *Nylanderia fulva*, has shown up in Dougherty county (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. 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*.

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 intense),

or averse to the liability, are not pursuing bed bug work. Although bed bugs get a lot of attention, termites and ants are still more profitable for most companies. On the pest control side, ants (Argentine ants) continue to be the number 1 pest encountered by companies who conduct residential pest control in GA. Bed bugs show up mainly in commercial accounts. Moreover, the bed bug problem in the south and southeast is not as bad as it is in the midwest and northeast. Attractants for bed bug traps is an active area of research. The "ClimbUp" pitfall trap continues to be the industry standard for traps. 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 no chemicals on the horizon that will alleviate this situation soon. 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 all over the map when it comes to efficiency; the handler has proven to be a key to the success of dogs as inspectors.

Complaints about kudzu bugs were lower than previous years. Certainly the cold winter the past couple years has helped.

Vegetables

Vegetable crops in Georgia remained very diverse in 2015 and even expanded with renewed interest and expanded acreage in sweet potatoes and minor acreage in new crops such as Brussels sprouts. With this wide variety of crops, there are always insect pest problems of some type. Those situations that were generally more severe than normal include diamondback moth in cole crops, cowpea curculio in southern pea, broad mite in peppers, flea beetle in eggplant, and garden fleahopper in a variety of vegetable. The diamondback moth (DBM) was primarily a problem in the spring crop, and growers and consultants reported poor control with all insecticides labeled for this pest. Group 28 diamide insecticides, which had been effective, are currently not providing DBM control at some locations in the Southeast. Bt insecticides continue to play an important role in management of this pest when resistance becomes severe. DBM pest pressure was less severe in the fall.

Diamondback moth and damage

Cowpea curculio continued to decimate most of the cowpea crop in 2015. Insecticide resistance has resulted in no effective control measures for this pest, and the lack of control presents a threat to eliminate this industry in South Georgia, if not the southeastern US.

Broad mites were an issue in the fall crop of peppers. While this has become an almost annual event, we experienced control issues for the first time in 2015. Normally, broad mites are controlled with one, or possibly two, applications of an effective acaricide. In 2015, there were multiple fields reported to be treated 4 and 5 times with products that should have eliminated the problem. A bioassay did show good activity with most of the products. This situation will bear close attention in 2016.

Flea beetles continue to present problems in eggplant. While once easily controlled with most any pyrethroid insecticide, a bioassay conducted in 2015 showed little to no control with all registered insecticide classes for this pest.

Garden fleahopper occurred in large numbers in multiple crops in the fall throughout South Georgia. Fortunately damage by this pest was limited mostly to foliage and it did not appear in the leafy vegetables. A bioassay showed susceptibility to multiple insecticides; however, field experience suggests that reinfestation was extremely rapid because of the extreme populations throughout the area.

Wheat

Some fields of susceptible varieties had significant Hessian fly damage in the spring. Aphids and barley/cereal yellow dwarf disease levels were low across the state.