UGA extension

2015 GEORGIA PLANT DISEASE LOSS ESTIMATES

Compiled by Elizabeth L. Little
Extension Plant Pathologist

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2015 plant disease losses, including control costs, amounted to an estimated $800 million. The value of the crops used in this estimate was approximately $5,385 million, resulting in a 13.8% relative disease loss across all crops included in this summary.

The estimated values for most crops used to compute these disease losses are summarized in the, "2015 Georgia Farm Gate Value Report," AR-16-01, from the UGA Center for Agribusiness and Economic Development. Some estimates for fruits, ornamentals, and turf rely on the specialist's knowledge of the industry and industry sources for information.

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2015 PLANT DISEASE CLINICS ANNUAL SUMMARY

Extension Plant Pathology maintains plant disease clinics in Athens and Tifton to aid county Extension faculty in diagnosing and correcting disease-related plant problems. Additionally, a laboratory for analysis for nematodes is maintained in Athens. The Plant Disease Clinic in Athens, operated by Ansuya Jogi, is located in Room 2405 Miller Plant Science Building. Samples analyzed in this clinic include commercial fruit, ornamentals, turf, Christmas trees and forestry; all homeowner samples; legume forages, small grains, grain forages and wood rots. The Plant Disease Clinic in Tifton, operated by Jason Brock, is located in Room 116 of the Horticulture Building. Crops analyzed in this clinic include pecans, field crops, and commercial vegetables. The Extension Nematology Lab, operated by Ganpati Jagdale, is located at 2350 College Station Rd. This clinic processes soil and plant samples for nematode analysis.

In 2015, 1383 physical and digital samples were processed for diagnosis in Athens and Griffin and 846 physical and digital samples were processed for diagnosis in Tifton. For the homeowners, 531 physical and digital samples were analyzed. A total of 5664 samples were analyzed for nematodes.

Diagnoses and educational recommendations are returned to the county faculty. All clinic samples are stored in Distance Diagnostics through Digital Imaging (DDDI), a web-based database administered and supported by Sherri Clark, the IT Associate Director for the Consortium for Internet Imaging and Database Systems (CIIDS).

2015 PLANT DISEASE CLINIC SAMPLE SUMMARIES

PHYSICAL and DIGITAL SAMPLES			
Crop	**Commercial Samples**	**Homeowner Samples**	**Total**
Field Crops	317	0	317
Fruits and Nuts	196	49	245
Miscellaneous	3	7	10
Ornamentals and Trees	382	248	630
Turf	233	153	386
Vegetables	567	74	641
Total	**1698**	**531**	**2229**

NEMATODE SAMPLES			
Crop	**Samples**	**Crop**	**Samples**
Field Crops	4669	Trees	22
Fruits and Nuts	90	Turf	350
Miscellaneous	255	Vegetables	96
Ornamentals	182		
Total of all nematode samples			**5664**

APPLE

Summer rots and fire blight are the major diseases consistently associated with economic losses to apple production in Georgia; however, although other diseases are generally controlled with good agricultural practices and fungicides, the cost of production is increased substantially in order to provide control of these less-aggressive diseases. Fire blight, a bacterial pathogen, was not prevalent, although sometimes observed. Disease losses and expenditures for controlling diseases were above average in 2015, as rainfall was prevalent throughout the growing season, allowing for disease establishment. Bitter rot, one of our primary summer rot diseases, caused more losses than average. There is still a strong need for more efficacious fungicides, especially for control of bitter rot. Cost of control included pesticide usage for fire blight, pruning costs, and summer rot control measures.

Disease	% Reduction in Crop Value	Damage ($ Thousands)	Cost of Control ($ Thousands)	Total ($ Thousands)
Fire Blight	2.00	276.6	90.0	366.6
Bitter Rot	3.00	414.9	140.0	554.9
Bot Rot	0.01	1.4	52.0	53.4
Black Rot	0.01	1.4	33.0	34.4
Alternaria Leaf Spot	0.01	1.4	0.0	1.4
Powdery Mildew	0.01	1.4	11.5	12.9
Sooty Blotch*	0.01	1.4	0.0	1.4
Fly Speck*	0.10	13.8	0.0	13.8
Cedar Apple Rust*	0.01	1.4	0.0	1.4
Scab*	0.01	1.4	0.0	1.4
Other Diseases	0.01	1.4	1.0	2.4
Total	**5.2**	**716.4**	**327.5**	**1043.9**

*Controlled with fungicides applied for other diseases.

Estimated by Phil Brannen, Extension Plant Pathologist

BLACKBERRY

Blackberries are still a relatively new commodity for Georgia. Diseases have been a major reason for losses observed, and limited research information is available for this expanding market. In 2015, disease was minimal, although Botrytis fruit rot was observed in some locations. This disease is especially damaging when wet weather occurs during bloom. Viruses, many of which cannot be readily detected, continue to make their way into the state, and these have also caused significant losses. Fungicidal applications generally decreased losses. Cane diseases were not as prevalent in 2015, although cane blight still topped the list of diseases observed.

Disease	% Reduction in Crop Value	Damage ($ Thousands)	Cost of Control ($ Thousands)	Total ($ Thousands)
Botrytis	0.10	7.2	299.6	306.8
Orange Rust	0.01	0.7	37.5	38.2
Cane and Leaf Rust	0.01	0.7	149.8	150.5
Double Blossom	0.01	0.7	74.9	75.6
Viruses	2.00	144.6	37.5	182.0
Phytophthora Root Rot	0.01	0.7	7.5	8.2
Cane Blight	0.50	36.1	74.9	111.0
Septoria Leaf Spot	0.05	3.6	30.0	33.6
Botryosphaeria	0.05	3.6	37.5	41.1
Total	**2.7**	**198.1**	**749.0**	**947.1**

Estimated by Phil Brannen, Extension Plant Pathologist

BLUEBERRY

Blueberry production in 2015 was impacted dramatically by several diseases. Early-season freezes increased disease losses to mummy berry; however, losses were low to moderate where good fungicide programs were utilized. Phytophthora and other root rots continued to cause substantial mortality in some plantings. Rust disease continued to increase in 2015 and has now become an important leaf spot pathogen. Necrotic ring blotch virus was prevalent in some locations, but it was generally reduced and of minimal impact. Exobasidium leaf and fruit spot was not as prevalent as new disease management techniques were adapted by producers — a direct impact of research and Extension programs. However, some unsprayed sites were decimated by this disease. Bacterial leaf scorch, a recently identified bacterial disease of southern highbush blueberries, damaged numerous plantings in 2015. Nematodes in replant sites continued to decrease as an issue since educational efforts have resulted in fumigation prior to planting. Anthracnose was a major issue in some locations, and this is difficult to explain; fungicide resistance or climate change may be shifting the disease spectrum of concern in blueberries.

Disease	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Mummy Berry	0.2	0.5	6.0	6.5
Botrytis Blight	0.0	0.03	2.4	2.4
Foliar Disease	1.0	2.7	1.8	4.5
Rots	4.0	10.9	1.8	12.7
Bacterial Scorch	0.3	0.8	0.6	1.4
Dieback	0.1	0.3	0.6	0.9
Phytophthora Root Rot	0.5	1.4	0.6	2.0
Total	**6.1**	**16.6**	**13.8**	**30.4**

Estimated by Phil Brannen, Extension Plant Pathologist

BUNCH GRAPE

Rainfall was more than sufficient for disease development. Bunch grape diseases were extensive in 2015, and downy mildew was particularly observed where spray programs were not well administered. Virtually all vineyards lost production to downy mildew and various fruit rots and cane diseases. North Georgia is on the southern edge of the region where one can grow Vinifera (European) wine grapes; the limiting factor is Pierce's disease, a bacterial disease which is vectored by an insect, the glassy-winged sharpshooter. Cold winter temperatures kill the insect that transmits the disease, and low temperatures may actually prevent the bacteria from surviving from year to year in the plant. Cold temperatures therefore allow for production of Vinifera wine grapes, whereas warm winters result in increased disease. Pierce's disease losses were minimal in 2015, likely due to colder temperatures in the previous winters. An indirect result of Pierce's disease mortality has been an increase in leaf roll virus. This disease, caused by a complex of several viruses, was introduced through replanting of vines killed by Pierce's disease. Leaf roll virus, as well as other viruses, are becoming a major issue for the Georgia wine grape industry due to potential impact on wine quality.

Disease	% Reduction in Crop Value	Damage ($ Thousands)	Cost of Control ($ Thousands)	Total ($ Thousands)
Botrytis	1.0	53.9	80.0	133.9
Downy Mildew	8.0	431.3	120.0	551.3
Black Rot	2.0	107.8	70.0	177.8
Powdery Mildew	3.0	161.7	20.0	181.7
Phomopsis Cane Blight	2.0	107.8	35.0	142.8
Crown Gall	0.01	0.5	1.0	1.5
Pierce's Disease	1.00	53.9	10.0	63.9
Leaf Roll Virus	0.10	5.4	5.0	10.4
Total	**17.1**	**922.4**	**341.0**	**1263.4**

Estimated by Phil Brannen, Extension Plant Pathologist

CORN

In 2015, corn for grain was harvested from 342,954 acres in Georgia with an average yield of 182.7 bu/A. The 2015 crop was valued at $253.0 million. The 2015 field season started out with plenty of moisture, but throughout much of the corn-growing season, conditions were hot and dry. Southern rust (*Puccinia polysora*) had been detected across much of the Coastal Plains by early June; however, the disease failed to develop as quickly and aggressively as it did in 2014. Conditions were generally unfavorable for northern corn leaf blight (*Exserohilum turcicum*) and losses associated with this disease were low. However, these same hot and dry conditions were very favorable for aflatoxin, especially in non-irrigated fields. Diplodia ear rot, so important in 2013, was not observed in 2014 nor in 2015.

The importance of damage from nematodes, e.g. sting, stubby root and southern root-knot nematodes, continues to become more apparent as growers, consultants, and Extension agents are better able to diagnose symptoms in the field. Heat and drought exacerbated losses to plant-parasitic nematodes in 2015. Elevated losses to nematodes are largely the result of 1) lack of nematode-resistant hybrids and 2) lack of use of nematicides in affected fields.

Disease	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Root & Stalk Rot	0.5	1.3	0.0	1.3
Nematodes	6.5	16.4	1.3**	17.7
Mycotoxins	0.4	1.0	0.0	1.0
Southern Corn Rust	2.0	5.1	5.1***	10.2
Northern Corn Leaf Blight	0.5	1.3	--***	1.3
Other Leaf Diseases*	trace	0	--***	--
Diplodia Ear Rot	---	0	0.0	--
Total	**9.9**	**25.1**	**6.4**	**31.5**

*"Other leaf diseases" primarily includes southern corn leaf blight (*Bipolaris maydis*) but may include diseases such as gray leaf spot as well.
** It is estimated that approximately 71,084 acres (20% of harvested acres) of corn were treated with 5 lb/A Counter insecticide-nematicide or a seed-treatment nematicide (AVICTA Complete Corn and Poncho VOTiVO) for control of nematodes.
***It is estimated that 50% of the corn acreage was sprayed with fungicides once during the 2015 season and 25% twice at a cost of $5/A for application and $10/A for cost of fungicide.

Estimated by Robert Kemerait, Extension Plant Pathologist

COTTON

Cotton was planted to an estimated 1,173,914 acres in 2015. The average lint yield was 995 lb/A. The crop was valued at $713,144,293 million. Mid-to-late season conditions were dry for many cotton growers in 2015 and temperatures were generally very warm. Losses to seedling disease, primarily Rhizoctonia seedling blight or "soreshin," were similar to what they were in 2014. For the same reason, early-season outbreaks of Ascochyta leaf blight were much less common in 2014 and 2015 than in 2013. "Target spot" and boll rot diseases were less problematic in 2015 because of dry conditions during much of the season. Late-season rains with the onset of "El Niño" significantly increased losses to boll rot. The 2015 season was the first in many years where losses to bacterial blight have been reported. While seemingly not widespread in 2015, losses did occur in fields planted to very susceptible varieties.

Losses to nematodes, primarily southern root-knot nematodes, continue to be one of the most important problems for cotton growers in Georgia. Until growers are able to practice effective crop rotation and increase the number of years between cotton crops in a field, the losses and damage from parasitic nematodes will continue to increase unless growers use nematicides effectively. Loss of Temik 15G from the growers' arsenal has increased the difficulty in control of nematodes; however, availability of Velum Total helped to manage this important pest.

Disease	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Boll Rot (lint)	4.0	28.5	---	28.5
Nematodes	**10.0**	**71.3**	**60.8***	**132.1**
Southern root-knot	(7.5)	(53.5)	---	---
Reniform	(2.0)	(14.3)	---	---
Columbia lance	(0.2)	(1.4)	---	---
Sting	(0.3)	(2.1)		
Seedling Disease	1.0	7.1	6.0**	13.1
Fusarium Wilt	0.1	0.7	---	0.7
Ascochyta Blight	Trace	---	---	---
Stemphylium Leaf Spot	0.3	2.1	---	2.1
Target Spot	0.2	1.4	2.4***	3.8
Bacterial Blight	0.2	1.4		1.4
Total	**15.8**	**112.5**	**69.2**	**181.7**

*Based upon an estimation that approximately 55% of the cotton acreage in the state is treated with AVICTA Complete Pak, AERIS Seed-Applied System or Velum Total, and approximately 5.0% of the acreage was treated with Telone II.
**Estimate of the cost of additional fungicide seed treatments used to manage seedling diseases. Approximately 10% of the cotton acreage in Georgia is treated with a fungicide in addition to the base seed treatment (or seed-treatment nematicide) to manage seedling disease. ***Based upon estimate that 10% of the cotton acreage was sprayed with a fungicide in 2015 to manage foliar diseases.

Estimated by Robert Kemerait, Extension Plant Pathologist

MUSCADINE GRAPE

Disease pressure, especially fruit rots, was average in 2015. Good fungicidal spray programs generally resulted in minimal losses. As a native grape, muscadines generally have less disease pressure than European bunch (Vinifera) grapes, so fungicides are more effective when applied to muscadines. An active fungicide program is required, and where producers are unable to spray effectively, diseases can be significant.

Disease	% Reduction in Crop Value	Damage ($ Thousands)	Cost of Control ($ Thousands)	Total ($ Thousands)
Bitter Rot	1.0	46.7	65.0	111.7
Macrophoma Rot	0.6	28.0	50.0	78.0
Ripe Rot	1.0	46.7	35.0	81.7
Angular Leaf Spot	0.6	28.0	10.0	38.0
Black Rot*	0.6	28.0	0.0	28.0
Phomopsis Dead Arm	0.5	23.3	1.0	24.3
Total	**4.3**	**200.7**	**161.0**	**361.7**

*Controlled with fungicides applied for other diseases.

Estimated by Phil Brannen, Extension Plant Pathologist

ORNAMENTALS

The 2015 farm gate value for ornamental horticulture (excluding turf) was estimated at $669.79 million, which is a significant increase of $179.6 million over 2014 values. Field nursery, container nursery, and greenhouse (floriculture) production increased by $12.37, $4.56, and $162.65 million, respectively, in farm gate value over 2014. Ornamental production value is closely tied to the economy and new home and business construction. The ornamental disease loss estimate includes only commercial plant production and excludes the value-added service industries because the value, disease loss, and cost of control are not documented and vary greatly within the industry.

Root diseases still account for the largest percentage of disease loss in commercial ornamental production. Boxwood blight, caused by *Calonectria pseudonaviculata*, continues to affect the industry. Where the disease was found within commercial production nurseries, it was on brokered material imported into the state. *Rose rosette virus* continues to increase in landscapes across northern Georgia. The disease has not been detected in production nurseries. Wet conditions in 2015 contributed to an increase in downy mildew and root diseases. Sclerotinia stem blight on *Abelia* was problematic in some nurseries.

Disease	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Bacterial diseases (fire blight, leaf spots)	0.3	2.01	1.01	3.02
Fungal leaf spots, stem cankers, needle blights	2.9	19.42	9.35	28.77
Root and crown rots	4.1	27.46	8.91	36.37
Powdery mildew	0.5	3.35	2.00	5.35
Downy mildew	1.0	6.70	4.20	10.90
Botrytis blight	0.3	2.01	1.20	3.21
Virus (TSWV, INSV, Rose Rosette, Hosta Virus X)	0.5	3.35	0.30	3.65
Minor diseases (rusts, nematodes)	0.5	3.35	1.05	4.40
Total	**10.1**	**67.65**	**28.02**	**95.67**

Production Category (2015 Farm Gate Value)	% Reduction in Crop Value[a]	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Field Nursery ($90.36 M)	1.66	1.50	2.10	3.60
Container Nursery ($151.38 M)	9.17	13.88	12.52	26.40
Floriculture (Greenhouse) ($428.05 M)	12.21	52.26	13.40	65.66
Total	**10.1**	**67.65**	**28.02**	**95.67**
[a] Column is not additive because disease losses are weighted according to production category.				
Estimated by Jean Williams-Woodward, Extension Plant Pathologist				

PEACH

Peach production was excellent in 2015. Due to adequate fungicide programs, brown rot and scab diseases were of minimal consequence. Recommended fungicides worked remarkably well. Extensive surveys have indicated that brown rot fungicide resistance is prevalent in many locations, but field surveys allowed for prescription fungicide management (selection of fungicide classes for which resistance was not observed). Bacterial spot was also not prevalent, again indicating that the bacterial control recommendations are relatively effective, even under excessive rainfall conditions. Armillaria continued to be a major, expanding problem in replant peach production. Of concern, phony peach, caused by the bacterium *Xylella fastidiosa*, increased in production orchards, possibly as a result of overall warming temperatures. This disease takes trees out of production, so an increase in prevalence was particularly troubling.

Disease	% Reduction in Crop Value	Damage ($ Thousands)	Cost of Control ($ Thousands)	Total ($ Thousands)
Brown Rot	0.1	49.7	2075.0	2124.7
Scab	0.01	5.0	1550.0	1555.0
Bacterial Spot	0.01	5.0	30.0	35.0
Phony Peach	0.3	149.2	230.0	379.2
Gummosis	0.1	49.7	20.0	69.7
Armillaria Root Rot	1.0	497.4	50.0	547.4
Phomopsis Constriction Canker	0.01	5.0	10.0	15.0
Total	**1.5**	**761.0**	**3965.0**	**4726.0**

Estimated by Phil Brannen, Extension Plant Pathologist

PEANUT

In 2015 peanut was harvested from 783,122 acres. Yields in 2015 averaged 4534.7 lb/A for a total production valued at $684.6 million. Conditions during the 2015 growing season were wet early in the season, which got the crop off to a good start. Mid-to-late season was dry in some areas although there was enough moisture for white mold to develop. Infrequent rains inhibited movement of fungicides to the crown of the plant, increasing severity of white mold, especially in non-irrigated fields. Such conditions also increased severity of pod rot. As in 2014, severity of tomato spotted wilt virus (TSWV) in 2015 remained at 3% estimated yield loss. This was a 50% increase over estimated losses in 2013 (2%). Loss to TSWV in 2013 was an 8X increase from 2012.

Environmental conditions throughout much of the 2015 field season favored white mold (stem rot) and the "underground" form of the disease. Early and late leaf spot diseases were generally not a significant problem for most growers, except where highly susceptible varieties like 'Georgia-13M' and 'TUFRun™'511' were grown. The peanut root-knot nematode remained a problem in the south-central and southwestern regions of the state. Losses to nematodes increased slightly as use of Temik 15G was greatly restricted. However, availability of Velum Total for management of nematodes helped to manage this problem. Development and spread of *Cylindrocladium* black rot (CBR) was slight in 2015.

Disease	% Reduction in Crop Value[a]	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($Millions)
Leaf spots	1.25	8.6	35.5[b]	44.1
White mold (*Sclerotium*)	6.0	41.1	18.6[c]	59.7
Limb Rot (*Rhizoctonia*)	0.1	0.7	---[d]	0.7
Pod Rot	Trace	---	---[e]	---
Nematodes	2.75	18.8	5.8[f]	24.6
Cylindrocladium Black Rot	Trace	---	---	---
Seedling Disease	0.5	3.4	---[g]	3.4
Tomato Spotted Wilt Virus	3.0	20.5	---	20.5
Diplodia Collar Rot	Trace	0	---	---
Total	**13.6**	**93.1**	**59.9**	**153.0**

[a] The total value of the crop was $684.6 million according the Georgia Farm Gate Value report.
[b] An estimated 55% of peanut acreage in Georgia receives some irrigation and most of this acreage was sprayed with fungicides 7 times during the season. Fungicide treatments for leaf spot control alone are about $8/acre per application. Growers usually sprayed non-irrigated fields less often, perhaps 4-5 times per season. This figure is based upon the cost to growers if they ONLY used fungicides (e.g. chlorothalonil) for leaf spot control. Only the approximate cost of the fungicide is factored into this figure.
[c] This figure reflects the additional cost BEYOND control of leaf spot if growers chose to use products such as azoxystrobin, prothioconazole, tebuconazole, or flutolanil to control soilborne diseases at some point during the season. For non-irrigated fields, four applications were calculated at $3.00/A. For irrigated fields, four applications at $9.00/A were calculated.
[d] Cost of control for limb rot is included in treatments for white mold.
[e] The cost of gypsum treatments applied to reduce pod rot has not been estimated.
[f] For the cost of nematode management, it was estimated that 10.0% of the acreage in Georgia is treated at a cost of $80/A.
[g] The cost of the fungicide seed treatment is absorbed in the cost of the seed.

Estimated by Robert Kemerait, Extension Plant Pathologist

PECAN

Frequent rain events led to a wet early growing season with high leaf scab potential. Fortunately, it was fairly dry later until the fall harvest season. Overall, the early rains and inoculum from last year led to very heavy pecan scab pressure. Most commercial growers in the southern part of the state sprayed more than ten times to control scab successfully. In University of Georgia fungicide trials in Tift County, non-treated controls of the cultivar 'Desirable' had nut scab severity ratings of 88.0% and 87.3% in early September. This level of scab on the fruit would result in a near 100% loss.

In 2015, pecan acreage was estimated to be 165,301 acres in Georgia with a total farm gate value of $361,301,753.

Disease	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)[a]	Total ($ Millions)
Scab	12.0	43.4	22.6	65.0
Anthracnose	0.0	0.0	0.0	0.0
Brown Spot	0.0	0.0	0.0	0.0
Downy Spot	0.0	0.0	0.0	0.0
Powdery Mildew	0.0	0.0	0.0	0.0
Zonate Leaf Spot	0.0	0.0	0.0	0.0
Phytophthora Shuck and Kernel Rot	0.0	0.0	0.0	0.0
Total	12.0	43.4	22.6	65.0

[a] Eight treatments on 156,823 acres @ $18.00/A; scab fungicide programs are also effective against anthracnose, downy spot, brown spot, and powdery mildew in most cases; number of sprays varied by location.

Estimated by Jason Brock and Tim Brenneman, Extension Plant Pathologists

SOYBEAN

Conditions in the 2015 field season were wet early in the season but became generally hot, dry and unfavorable for the development and spread of Asian soybean rust. Because threat from Asian soybean rust, *Phakopsora pachyrhizi,* was low, many producers did not apply fungicides this season. Plant parasitic nematodes (especially the southern root-knot nematode) continued to cause damage to the soybean crop in numerous fields across Georgia.

In 2015, soybeans were planted to a reported 321,869 acres with an average yield of 44.52 bu/A. The total soybean production for Georgia in 2015 was valued at $128.5 million.

. **Disease**	**% Reduction in Crop Value**	**Damage ($ Millions)**	**Cost of Control ($ Millions)**	**Total ($ Millions)**
Soybean cyst nematode*	0.1	0.1	--	0.1
Root-knot nematodes	3.0	3.9	0	3.9
Other nematodes**	0.25	0.3	---	0.3
Asian soybean rust	Trace	---	0.8	0.8
Anthracnose	0.25	0.3	0	0.3
Brown leaf spot	----	---	0	0.0
Charcoal rot	Trace	---	0	0.0
Diaporthe/Phomopsis complex	---	---	0	0.0
Downy mildew	---	---	0	0.0
Frogeye leaf spot	Trace	---	0	0.0
Red crown rot	Trace	---	0	0.0
Pod and stem blight	1.0	1.3	0	1.3
Purple stain	Trace	---	0	0.0
Seedling diseases *(Rhizoctonia/Pythium/Fusarium)*	0.1	0.1	0.1	0.2
Southern blight (*Sclerotium*)	0.25	0.3	0	0.3
Stem canker	Trace	---	0	0
Fusarium wilt	---	---	0	0
Virus diseases	---	---	0	0
Bacterial diseases	---	---	0	0
Total	**5.0**	**6.3**	**0.9**	**7.2**

*Resistant varieties are used to manage most nematode and disease problems; Temik 15G is generally no longer available. Fungicides were applied to an estimated 50,000 acres for management of foliar diseases and were used as seed treatments to reduce seedling diseases on a small portion of the planted acreage. Each foliar fungicide application is estimated to cost growers $15.00/A.
**"Other nematodes" includes reniform, sting, and Columbia lance nematodes.

Estimated by Robert Kemerait, Extension Plant Pathologist

STRAWBERRY

Foliar and fruit disease pressure was moderate in 2015. Botrytis (gray mold) was a limited issue, even though resistance to numerous fungicides was reported in multiple locations. *Phytophthora*, *Pythium*, and *Rhizoctonia* root rots were sometimes damaging. Leaf scorch and significant anthracnose were observed in some locations. Overall, it was an excellent year for strawberry production. There is concern that the pathogens causing anthracnose (*Colletotrichum* spp.) are developing resistance to some fungicides, but no resistance was confirmed where severe disease pressure was observed. There is a strong need for fungicides with different modes of action if we are to continue strawberry production in Georgia.

Disease	% Reduction in Crop Value	Damage ($ Thousands)	Cost of Control ($ Thousands)	Total ($ Thousands)
Gray Mold	0.1	8.0	335.6	343.6
Fungal Leaf Spots	0.1	8.0	104.4	112.4
Anthracnose	0.3	24.0	111.9	135.9
Root Rots & Nematodes	2.0	160.0	186.5	346.5
Angular Leaf Spot	0.0	0.8	7.5	8.3
Total	**2.5**	**200.8**	**745.9**	**946.8**

Estimated by Phil Brannen, Extension Plant Pathologist

TURFGRASS

In 2015 in Georgia, there were an estimated 2.2 million acres of turf encompassing all turfgrass industries (golf, sport fields, sod production, lawncare, commercial landscapes) with a maintenance value of $1.90 billion. There were 25,707 acres used for sod/stolon production in the state, yielding a farm gate value of $109.7 million. Unusually warm winter/spring temperatures prolonged several turfgrass disease infection periods for over six months. Among the diseases driven by these temperatures were large patch of warm season grasses caused by *Rhizoctonia solani,* dollar spot caused by *Sclerotinia homoeocarpa,* and bipolaris leaf spot caused by *Bipolaris* spp. and *Drechslera* spp. *Rhizoctonia solani* infections on warm season grasses were continuous, ubiquitous and severe through fall 2014, winter and spring 2015. *Sclerotinia homoeocarpa* (dollar spot) was severe and widely prevalent throughout the state in most turfgrass species. *Bipolaris* spp. and *Drechslera* spp were particularly problematic on bermudagrass and annual ryegrass during the spring and fall of 2015. *Gaeumannomyces* spp. (causal agent of root decline or take all root rot/root decline of warm season grasses and bermudagrass decline) continued to be prevalent throughout the state. *Ophiosphaerella* spp. (spring dead spot) infections on bermudagrass were low in the Piedmont and Blue Ridge areas of the state. High summer temperatures exerted severe stress on bentgrass and tall fescue. Pythium root and crown rot as well as anthracnose (*Colletotrichum cereale*) were ubiquitous. There were 386 turfgrass samples received at the UGA plant disease clinic during 2015, with warm season grasses forming the large majority. There were 350 soil samples submitted to the UGA nematology laboratory for nematode analysis from both warm and cool-season swards.

Turf Diseases	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Soil-borne and Crown Diseases	3.5	66.5	28.50	95.0
Foliar Diseases	1.2	22.8	13.30	36.1
Nematodes	0.3	5.7	5.70	11.4
Total	**5.0**	**95.0**	**47.5**	**142.5**
Estimated by Alfredo Martínez-Espinoza, Extension Plant Pathologist				

VEGETABLES

Approximately 150,000 acres of vegetables were grown in Georgia in 2015 worth a total value of ca. $1.09 billion. The wet conditions during the spring and the mid-fall growing seasons, especially during harvest, exacerbated plant diseases. Phytophthora fruit rot (*Phytophthora capsici*), downy mildew (*Pseudoperonospora cubensis*) and *Pythium* spp. caused greater losses than normal in cucurbit crops. Downy mildew in particular was severe on watermelon, cucumbers, squash, and cantaloupe. Fusarium wilt of watermelon (*Fusarium oxysporum* f. sp. *niveum*) caused considerable economic losses early in the season. Potyviruses also caused economic losses in squash crop planted in the fall. Center rot (*Pantoea ananatis*) and post-harvest rot (bacterial and fungal origin) problems in onion were observed resulting in economic losses. Black rot (*Xanthomonas campestris* pv. *campestris*) in cruciferous crops has been a growing concern for vegetable growers. For tomato, southern blight (*Sclerotium rolfsii*) and *Tomato yellow leaf curl virus* caused economic losses. Several outbreaks of *P. capsici* and bacterial spot (*Xanthomonas euvesicatoria*) in bell and specialty peppers caused moderate economic losses.

Major Vegetable Crops	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Watermelon	18.0	22.4	12.0	34.4
Squash (yellow + zucchini)	8.0	4.1	4.0	8.1
Tomato	2.0	1.1	3.1	4.2

Other Vegetable Crops	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Pepper (bell)	2.0	2.4	2.2	4.6
Cucumber	8.0	5.3	3.8	9.1
Snap Bean	2.0	0.4	2.6	3.0
Greens	1.5	0.7	1.7	2.4
Cabbage	2.0	1.0	1.2	2.2
Onion (dry)	2.3	3.4	3.7	7.1
Cantaloupe	2.7	0.5	2.9	3.4
Eggplant	0.6	0.2	0.4	0.6
Total	**3.4[a]**	**41.5**	**37.6**	**79.1**

[a] This column is not additive because disease losses are weighted according to production category.

Estimated by Bhabesh Dutta, Extension Vegetable Pathologist

WHEAT

Wheat farm gate value in 2015 in Georgia was $45.2 million. Wheat was harvested from 211,321 acres with an average yield of 46.18 bu/acre. The top five wheat-producing counties (by area) were Dooly, Pulaski, Jefferson, Miller, and Laurens. Winter 2014/spring 2015 was one of the warmest in decades. Therefore, poor vernalization was a detrimental factor throughout the state. These warm temperatures allowed aphid populations to develop in large numbers, consequently resulting in high levels of *Barley yellow dwarf virus* (BYDV) across the state. For the second year in a row, Fusarium head blight (FHB/Scab) was the single most important and devastating disease on wheat. Environmental conditions at the time of wheat flowering in 2015 provided conditions conducive for FHB infections and the economic losses from this disease were high. Pockets of infection were common across the state. For example, surveyed fields in Sumter County had a severity value of 50-60%. However, while widespread across the state in 2015, FHB incidence and severity was not as high as in 2014. Powdery mildew (*Blumeria graminis* f. sp *tritici*), stripe rust (*Puccinia striiformis)* and leaf rust (*Puccinia triticina*) infections were minimal in 2015. Stagonospora spot blotch, tan spot, and wheat streak mosaic were observed at low levels. Oat crown rust (*Puccinia coronata*) was observed at devastatingly high levels throughout the state.

Wheat Diseases	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Leaf Rust/Stripe Rust	0.0	0.00	0.00	0.00
Glume Blotch	0.0	0.00	0.00	0.00
Powdery Mildew	0.0	0.00	0.00	0.00
Fusarium Head Blight	5.0	2.25	0.90	3.15
Barley Yellow Dwarf Virus	2.0	0.90	0.45	1.35
Soilborne Wheat Mosaic /Spindle Streak Mosaic Virus	0.0	0.00	0.00	0.00
Total	**9.0**	**3.15**	**1.35**	**4.50**
Estimated by Alfredo Martinez-Espinoza, Extension Plant Pathologist				

SUMMARY OF TOTAL LOSSES DUE TO DISEASE DAMAGE AND COST OF CONTROL IN GEORGIA – 2015

Crop or Commodity	Estimated Crop Value ($ Millions)	% Reduction in Crop Value[1]	Value of Damage ($ Millions)	Cost of Control ($ Millions)	Total Disease Loss (Damage & Control) ($ Millions)	Total % of Loss [1, 2]
Apple	13.11	5.2	0.72	0.33	1.05	8.0
Blackberry	7.03	2.7	0.19	0.75	0.95	13.5
Blueberry	255.71	6.1	16.6	13.8	30.4	11.9
Bunch Grape	4.47	17.1	0.92	0.34	1.3	29.1
Corn	252.97	9.9	25.1	6.4	31.5	12.5
Cotton	713.14	15.8	112.5	9.2	181.7	25.5
Muscadine Grape	4.47	4.3	0.2	0.16	0.36	8.1
Ornamentals	669.79	10.1	67.65.	28.0	95.67	14.28
Peach	48.98	1.5	0.76	4.0	4.7	9.6
Peanut	684.63	13.6	93.1	59.9	153.0	22.3
Pecan	361.30	12.0	43.4	22.6	65.0	18.0
Soybean	128.49	5.0	6.3	0.9	7.2	5.6
Strawberry	7.80	2.5	0.20	0.75	0.95	12.2
Turfgrass	1,097.10	5.0	95.0	47.5	142.5	13.0
Vegetable	1,091.19	3.4	41.5	37.6	79.1	7.2
Wheat	45.17	9.0	3.15	1.35	4.5	10.0
TOTALS	**5385.35**	**---**	**439.64**	**233.60**	**799.88**	**13.80**

[1] This column is not additive.

[2] Total % loss for each crop and the grand total is figured on the basis of: $\frac{\text{Value of Damage + Cost Control}}{\text{Crop Value}}$

ATTENTION!
Pesticide Precautions

1. Observe all directions, restrictions, and precautions on pesticide labels. It is dangerous, wasteful and illegal to do otherwise.

2. Store all pesticides in original containers with labels intact and behind locked doors. KEEP PESTICIDES OUT OF THE REACH OF CHILDREN.

3. Use pesticides at correct label dosage and intervals to avoid illegal residues or injury to plants and animals.

4. Apply pesticides carefully to avoid drift or contamination of non-target areas.

5. Surplus pesticides and containers should be disposed of in accordance with label instructions so that contamination of water and other hazards will not result.

6. Follow directions on the pesticide label regarding restrictions as required by State or Federal Laws and Regulations.

7. Avoid any action that may threaten an endangered species or its habitat. Your county Extension agent can inform you of endangered species in your area, help you identify them, and through the Fish and Wildlife Service, identify actions that may threaten endangered species or their habitat.

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Annual Publication 102-8 **August 2017**

Published by the University of Georgia in cooperation with Fort Valley State University, the U.S. Department of Agriculture, and counties of the state. For more information, contact your local UGA Cooperative Extension office.