THE UNIVERSITY OF GEORGIA
COOPERATIVE EXTENSION

College of Agricultural and Environmental Sciences
College of Family and Consumer Sciences

2010 Georgia Plant Disease Loss Estimates

Compiled by Jean Williams-Woodward
Extension Plant Pathologist

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It is estimated that 2010 plant disease losses, including control costs, amounted to approximately $701.2 million. The value of the crops used in this estimate was approximately $4236.51 million, resulting in a 16.5 total percent disease loss across all crops included in this summary.

The estimated values for most crops used to compute these disease losses are summarized in: USDA National Agricultural Statistics Service, Georgia Farm Report, Volume 10-No. 02 and the UGA Center for Agribusiness & Economic Development, 2010 Georgia Farm Gate Value Report (AR-11-01). Some estimates for fruits, ornamentals and turf rely on specialists' knowledge of the industry and industry sources for information.

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2010 Plant Disease Clinics Annual Summary

Extension Plant Pathology maintains plant disease clinics at Athens and Tifton to aid county Extension faculty in diagnosing and correcting client disease-related plant problems. Additionally, a laboratory for analysis for nematodes is maintained at Athens. The Plant Disease Clinic at Athens, operated by Byron Candole, is located at 2405 Miller Plant Science Building. Samples analyzed in this clinic include commercial fruit, ornamentals and turf; Christmas trees and forestry; all homeowner samples; and legume forages, small grains, mushroom identification and wood rots. The Plant Disease Clinic at Tifton, operated by Jason Brock, is located in Room 116 of the Horticulture Building. Samples analyzed in this clinic include commercial samples of field crops, grain forages, pecans and vegetables. Soil and plant samples for nematode analysis are processed by Ganpati Jagdale in the Nematology Lab located in the Agricultural Services Complex in Athens.

In 2010, 891 commercial plant samples were processed for diagnosis in Athens and 605 commercial plant samples were processed for diagnosis in Tifton. Analysis of 387 samples was performed for homeowners. A total of 5,983 samples were analyzed for nematodes. In addition, 735 digital samples were evaluated and responded to by Extension plant pathology specialists.

Diagnoses and educational recommendations are returned to the county faculty. The clinics maintain a computerized database of samples and their diagnoses through the DDDI system.

2010 Plant Disease Clinic Sample Submission Summaries

Plant Samples for Disease Diagnosis			
Crop	**Commercial Samples**	**Homeowner IPM Samples**	**Total**
Field Crops	258	2	260
Vegetables	330	39	369
Fruits & Nuts	179	31	210
Herbaceous Ornamentals	81	20	101
Woody Ornamentals	85	103	188
Trees	82	34	116
Turf	475	121	596
Miscellaneous	6	10	16
Total	1,496	360	1,856
Samples for Nematode Diagnosis			
Crop	**Samples**	**Crop**	**Samples**
Field Crops	3,980	Ornamentals	275
Vegetables	399	Turf	1,008
Fruits & Nuts	263	Unknown host	58
		Total	**5,983**

Apple

This was a moderately wet season for north Georgia, but disease losses were high, especially to bitter rot, one of our primary summer diseases. Glomerella leaf spot was also present at the end of the season. Fire blight was not prevalent, since early-season conditions were generally cold, though rainfall was adequate. Summer rot diseases were very prevalent, and bitter rot, as well as flyspeck and sooty blotch, did result in production losses. Overall disease pressure was high. There is still a strong need for more efficacious fungicides, especially for control of bitter rot and other summer rot diseases. In addition, though not yet observed, we are concerned that streptomycin antibiotic resistance may become an issue; currently, streptomycin is the only effective antibiotic for fire blight. 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	1.0	81.4	80.0	161.4
Bitter Rot	5.0	406.8	100.0	506.8
Bot Rot	0.1	8.1	52.0	60.1
Black Rot	0.1	8.1	33.0	41.1
Alternaria Leaf Spot	0.1	8.1	0.0*	8.1
Powdery Mildew	0.1	8.1	11.5	19.6
Sooty Blotch	0.1	8.1	0.0*	8.1
Fly Speck	0.1	8.1	0.0*	8.1
Cedar Apple Rust	0.01	0.8	0.0*	0.8
Scab	0.01	0.8	0.0*	0.8
Other Diseases	0.01	0.8	1.0	1.8
Total	**6.6**	**539.4**	**277.5**	**816.9**
*Controlled with fungicides applied for other diseases.				
Estimate by Phil Brannen, Extension Plant Pathologist				

Blackberry

Blackberries are 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 2010, cane blight caused damage in some locations. This disease is especially damaging when wet weather follows pruning operations. Several rust diseases were observed in 2010, including orange rust and cane and leaf rust. Viruses, many of which can't be readily detected, continue to make their way into the state, and these have also caused significant losses. Botrytis (gray mold) was also prevalent in some locations, but fungicidal applications generally decreased losses to low levels relative the total crop.

Disease	% Reduction in Crop Value	Damage ($ Thousands)	Cost of Control ($ Thousands)	Total ($ Thousands)
Botrytis	1.0	111.8	1,091.9	1,203.7
Orange Rust	0.01	1.1	136.5	137.6
Cane and Leaf Rust	0.1	11.2	546.0	557.1
Double Blossom	0.1	11.2	273.0	284.2
Viruses	5.0	559.1	136.5	695.6
Phytophthora Root Rot	0.1	11.2	27.3	38.5
Cane Blight	1.0	111.8	273.0	384.8
Septoria Leaf Spot	0.1	11.2	109.2	120.4
Botryosphaeria	1.0	11.2	136.5	147.7
Total	**7.5**	**839.8**	**2,729.8**	**3,569.6**
Estimate by Phil Brannen, Extension Plant Pathologist				

Blueberry

Blueberry production in 2010 was generally good, but excessive rainfall resulted in losses to molds that are generally not blueberry pathogens; surface molds, such as Cladosporium and yeasts, were observed on overripe fruit that could not be harvested due to excessive rainfall and wet fields. Necrotic ring blotch, a new suspected viral pathogen, was not prevalent, though red ringspot virus was observed. Powdery mildew and rust were also prevalent in some locations, though disease losses were not extensive. Exobasidium leaf and fruit spot were once again identified in one or two locations, and if this disease continues to be reported, it could become more of a production issue as opposed to a curiosity. Bacterial leaf scorch, a newly identified bacterial disease of Southern highbush blueberries, continued to cause extensive losses on several varieties. Mummy berry was observed, but did not result in significant losses. Botryosphaeria canker was not prevalent in 2010, though it resulted in significant losses in 2009. Reduction in nitrogen fertilization and optimal timing of fertilizer applications likely resulted in less disease, since Botryosphaeria canker is correlated with high nitrogen fertility levels that result in more succulent tissues for fungal invasion.

Disease	% Reduction in Crop Value	Damage ($ Thousands)	Cost of Control ($ Thousands)	Total ($ Thousands)
Mummy Berry	0.1	107.2	1,400.0	1,507.2
Botrytis Blight	1.0	1,071.8	560.0	1,631.8
Foliar Disease	1.0	1,071.8	420.0	1,491.8
Rots	2.0	2,143.6	140.0	2,283.6
Bacterial Scorch	0.1	107.2	10.0	117.2
Dieback	0.1	107.2	140.0	247.2
Phytophthora Root Rot	0.1	107.2	140.0	247.2
Total	**4.4**	**4,716.0**	**2,810.0**	**7,526.0**
Estimate by Phil Brannen, Extension Plant Pathologist				

Bunch Grape

Grape diseases were prevalent in 2010. Powdery and downy mildews were observed where spray programs were not well administered, and downy mildew resulted in severe defoliation of leaves. The downy mildew epidemic was initiated later in the season, so fruit were not infected; however, defoliation resulted in poorer fruit quality where this occurred. In addition, Phomopsis cane and leaf spot were observed in some vineyards. North Georgia is on the southern edge of the region where one can effectively grow wine grapes, and this is related to Pierce's disease, a bacterial disease vectored by an insect, the glassy-winged sharpshooter. Cold winter temperatures either kill the insect that transmits the disease, or the temperatures may actually prevent the bacteria from surviving. Regardless, cold temperatures allow for production of Vinifera wine grapes, and we do not recommend that producers plant these at elevations below 1,300 feet. As a result of warmer winters, we observed substantial increases in vine death from Pierce's disease in 2006 and 2007. In some cases, producers had gone from losing fewer than 10 vines per year to losses of several hundred vines. However, colder winters in 2007/2008, 2008/2009 and 2009/2010, when combined with more aggressive insect management for Pierce's disease vectors, have resulted in reduced losses. Pierce's disease losses were minimal in 2010, and new infections from Pierce's disease have obviously slowed. An indirect result of Pierce's disease mortality has been an increase in leaf roll viruses. An initial survey of leaf roll virus diseases indicated that these have resulted in substantive losses in some vineyards. This disease was introduced extensively through replanting of vines killed by Pierce's disease in previous years, and leaf roll virus is now becoming a major issue for the Georgia wine grape industry, as plant destruction is the only option.

Disease	% Reduction in Crop Value	Damage ($ Thousands)	Cost of Control ($ Thousands)	Total ($ Thousands)
Botrytis	0.5	24.0	50.0	74.0
Downy Mildew	2.0	96.2	70.0	166.2
Black Rot	1.0	48.1	70.0	118.1
Powdery Mildew	3.0	144.3	20.0	164.3
Phomopsis Cane Blight	2.0	96.2	35.0	131.2
Crown Gall	0.5	24.0	5.0	29.0
Pierce's Disease	0.5	24.0	30.0	54.0
Leaf Roll Virus	0.01	0.5	5.0	5.5
Total	**9.5**	**457.3**	**285.0**	**742.3**
Estimate by Phil Brannen, Extension Plant Pathologist				

Corn

In 2010, corn for grain was harvested from 245,000 acres in Georgia with an average yield of 145 bu/A. The 2010 crop was valued at $227,327,894. Southern rust (*Puccinia polysora*) was a significant problem for many corn growers across Georgia in 2010. This disease was detected by mid-season and, fueled by warm temperatures, affected corn production across the state. Additionally, a second virulent race of *P. polysora*, one able to successfully infect even those hybrids with the rpp9 gene for resistance, was confirmed again in 2010. Northern corn leaf blight (*Exserohilum turcicum*) was common again in 2010 but losses were not as severe as in 2009. Warmer and drier conditions in 2010 were likely less favorable for the development of Northern corn leaf blight in 2010.

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.

Disease	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Root & Stalk Rot	0.1	0.2	0.0	0.2
Nematodes	5.0	11.4	1.0*	12.4
Mycotoxins	2.5	5.7	0.0	5.7
Southern Corn Rust	2.5	5.7	2.6**	8.3
Northern Corn Leaf Blight	1.0	2.3	--**	2.3
Other Leaf Diseases	trace	--	0.0	0.0
Total	**11.1**	**25.3**	**3.6**	**28.9**

* It is estimated that approximately 49,000 acres (20% of harvested acres) of corn were treated with 7 lb/A Counter insecticide-nematicide or a seed-treatment nematicide (AVICTA Complete Corn and Poncho VOTiVO) for control of nematodes.
** It is estimated that 175,000 acres of corn were sprayed with fungicides at least once during the 2010 season at a cost of $5/A for application and $10/A for cost of fungicide.

Estimate by Robert Kemerait, Extension Plant Pathologist

Cotton

It has been reported that cotton was harvested from an estimated 1,330,000 acres in 2010. The average lint yield was 821 lb/A. The crop was valued at $1.17 billion.

Losses to seedling disease, primarily Rhizoctonia seedling blight, or "soreshin," were moderate in 2010 and down from 2009. Stemphylium and Corynespora leaf spot diseases increased slightly in 2010 over 2009. Dry conditions during the season reduced the severity of boll rot.

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.

Disease	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Boll Rot (lint)	1.0	11.7	0.0	11.7
Nematodes	**8.0**	**93.6**	**14.8[a]**	**108.4**
Southern Root-Knot	6.5	76.0	---	---
Reniform	1.5	17.5	---	---
Columbia Lance	0.5	5.9	---	---
Seedling Disease	1.0	10.7	1.3[b]	12.0
Fusarium Wilt	Trace	---	---	---
Ascochyta Blight	Trace	---	---	---
Stemphylium Leaf Spot	1.5	17.5	---	17.5
Corynespora Leaf Spot	1.0	10.7	0.2[c]	10.9
Total	**14.0**	**144.2**	**16.3**	**160.5**

[a] This figure is based on an estimation that approximately 35% of the cotton acreage in the state was treated with a nematicide rate of Temik (5 lb/A or greater), 20% with AVICTA Complete Pak or AERIS Seed-Applied System, and approximately 5.0% of the acreage was treated with Telone II.

[b] This figure is an estimate of the cost of fungicides, both in the seed treatments and additional hopper box and in-furrow applications, that are used to manage seedling diseases. For this figure, it is estimated that approximately 15% of the cotton acreage in Georgia was treated with a fungicide in addition to the seed treatment to manage seedling disease.

[c] This figure is based on an estimate that 1% of the cotton acreage in the state was sprayed with a fungicide in 2010 to manage foliar diseases of cotton.

Estimate by Robert Kemerait, Extension Plant Pathologist

Muscadine Grape

Disease pressure was minimal in most muscadine vineyards due to low rainfall in southern Georgia counties where muscadines are grown. Good spray programs further resulted in minimal losses. As a native grape, muscadines generally have less disease pressure than European bunch (Vinifera) grapes. Rot diseases resulted in more direct losses than any other disease category, but there are now multiple fungicides which adequately control these diseases. An active fungicide program is required, and where producers are unable to spray effectively, diseases can be significant. Dead arm diseases have increased, but these trunk diseases still result in relatively minor losses each year.

Disease	% Reduction in Crop Value	Damage ($ Thousands)	Cost of Control ($ Thousands)	Total ($ Thousands)
Bitter Rot	1.0	45.6	50.0	95.6
Macrophoma Rot	1.0	45.6	45.0	90.6
Ripe Rot	1.0	45.6	25.0	70.6
Angular Leaf Spot	0.5	22.8	10.0	32.8
Black Rot	1.0	45.6	0.0	45.6
Phomopsis Dead Arm	0.1	4.6	1.0	5.6
Total	**4.6**	**209.8**	**131.0**	**340.8**
*Controlled with fungicides applied for other diseases.				
Estimate by Phil Brannen, Extension Plant Pathologist				

Ornamentals

The 2010 farm gate value for ornamental horticulture (excluding turf) was estimated at $497.91 million, which represents an almost 12% decrease in value from 2009. The downturn in the economy and new house construction has contributed to the decrease in sales of ornamental plants. In addition, many ornamental plant producers have closed in recent years. The ornamental disease loss estimate is only for ornamental production and excludes the value-added service industries because the true value, disease loss and cost of control are not documented and vary greatly within the industry. This change was initiated in 2005, and is a major deviation from the disease loss estimates generated in years prior to 2005, as only farm-gate value of ornamental plant production is reported and used to develop the loss estimate.

Losses due to plant diseases were generally low. Root rot diseases still account for the largest percentage of disease loss in commercial ornamental production. Heat stress within containers contributed to additional root rot loss. Downy mildew diseases and needle blight on Leyland cypress continue to increase in occurrence and cost of control due to additional fungicide inputs and labor costs.

Disease	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Bacterial Diseases (Fire Blight, Leaf Spots)	0.2	1.0	0.8	1.8
Fungal Leaf Spots, Stem Cankers, Needle Blights	1.5	7.47	6.5	13.97
Root and Crown Rots	4.0	19.92	8.5	28.42
Powdery Mildew	0.8	3.98	2.2	6.18
Botrytis Blight	0.2	1.0	1.4	2.4
Virus (TSWV, INSV, Hosta Virus X)	0.02	0.10	0.1	0.2
Minor Diseases (Rust, Downy Mildew, Nematode)	0.8	3.98	2.8	6.78
Total (Ornamental Production)	**7.52**	**37.45**	**22.3**	59.75

Production Category (2010 Farm Gate Value)	% Reduction in Crop Value[1]	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Field Nursery ($78.76 M)	3.8	2.98	1.9	4.88
Container Nursery ($170.65 M)	13.1	22.30	11.6	33.90
Floriculture (Greenhouse) ($248.49 M)	4.9	12.17	8.8	20.97
Total (Ornamental production)	**7.52**	**37.45**	**22.3**	**59.75**
[1] Column is not additive because disease losses are weighted according to production category.				
Estimate by Jean Williams-Woodward, Extension Plant Pathologist				

Peach

Peach production was good to excellent in 2010. Conditions were relatively dry for most of the season, and brown rot and scab diseases were of minimal consequence due to adequate fungicide programs. Extensive surveys indicated that brown rot fungicide resistance was 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 prevalent on some susceptible varieties, but due to cooler early conditions, it was less prevalent than expected based on early-season rainfall. *Armillaria* continued to be a major, expanding problem in replant peach production.

Disease	% Reduction in Crop Value	Damage ($ Thousands)	Cost of Control ($ Thousands)	Total ($ Thousands)
Brown Rot	1.0	480.1	1,750.0	2,230.1
Scab	0.1	48.0	1,110.0	1,158.0
Bacterial Spot	0.01	4.8	20.0	24.8
Phony Peach	0.1	48.0	230.0	278.0
Gummosis	0.1	48.0	20.0	68.0
Armillaria Root Rot	1.0	480.1	50.0	530.1
Phomopsis Constriction Canker	0.01	4.8	10.0	14.8
Total	**2.3**	**1,113.9**	**3,190.0**	**4,303.9**
Estimate by Phil Brannen, Extension Plant Pathologist				

Peanut

In 2010, peanuts were harvested from approximately 555,000 acres. Yields in 2010 averaged 3,530 lb/A for a total production valued at $474,635,151. Tomato spotted wilt was very light again in 2010 for reasons that likely include continued use of Peanut Rx (risk index) and peanut varieties with improved resistance to the disease. White mold (stem rot) was severe in 2010 and was fueled by very warm soil temperatures beginning early and continuing through much of the season. Early and late leaf spot diseases were a problem for some growers and were especially severe in fields where peanuts were planted on a short rotation. Nematodes (especially the peanut root-knot nematode) remain a problem in the south-central and southwestern regions of the state. Development and spread of Cylindrocladium black rot (CBR) and Rhizoctonia limb rot was slight in 2010 due to very warm temperatures during the season. For this same reason, Aspergillus crown rot was a bit more severe this season than in 2009.

As the popular fungicide tebuconazole became available in generic formulations, growers using the generic formulations were able to realize less expensive fungicide programs. However, growers must realize that other fungicides may provide better value by providing improved disease control.

Disease	% Reduction in Crop Value [a]	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Leaf Spots	1.5	7.1	26.1[b]	33.2
White Mold	8.0	38.0	19.0[c]	57.0
Limb Rot	0.25	1.2	----[d]	1.2
Pod Rot	0.5	2.4	----[e]	2.4
Nematodes	2.5	11.8	4.2[f]	16.0
Cylindrocladium Black Rot	Trace	---	---	---
Seedling Disease	0.5	2.4	0.3[g]	2.7
Tomato Spotted Wilt	0.25	1.2	0.0	1.2
Diplodia Collar Rot	Trace	----	---	0
Total	**13.5**	**64.1**	**49.6**	**113.7**

[a] The total value of the crop was $474,635,151, according the Georgia Farm Gate Value report.
[b] It was estimated that 55% of peanut acreage in Georgia received some irrigation and that most of this acreage was sprayed with fungicides seven 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 four to five 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, tebuconazole or flutolanil to control soilborne diseases at some point during the season.
[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 15.0% of the acreage in Georgia was treated at a cost of $50/A.
[g] It was estimated that the cost to treat seed with fungicides was about $0.50/A.

Estimate by Robert Kemerait, Extension Plant Pathologist

Pecan

Leaf scab incidence and severity remained relatively low. Nut scab pressure was low-to-moderate, depending on location. In University of Georgia fungicide trials in Tift County, non-treated controls of the cultivar 'Desirable' had nut scab severity ratings of 45% and 54% by early September. In addition to scab, anthracnose was a problem in many areas. Most occurrences of anthracnose were on the leaves, with fruit infection being less common. Most cultivars were affected, but 'Desirable' seemed to be most sensitive. The impact of anthracnose is difficult to quantify, although quality and yield were likely impacted.

In 2010, pecan acreage was estimated to be 144,407 acres in Georgia with a total farm gate value of $233,941,289.

Disease	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Scab	2.0	4.6	20.8	25.4
Anthracnose	0.5	1.1	0.0	1.1
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	**2.5**	**5.7**	**20.8**	**26.5**
[1] Eight treatments on 144,407 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.				
Estimate by Jason Brock, Extension Plant Pathologist				

Soybean

Though much anticipated, Asian soybean rust, *Phakopsora pachyrhizi*, was not of significant importance to most growers in 2010. Very warm temperatures during the growing season and a lack of tropical storms during the 2010 hurricane season certainly reduced the potential for damage from rust. Diseases that were of increased importance this season included Southern blight (*Sclerotium rolfsii*), anthracnose and Phomopsis pod and stem blight. Plant parasitic nematodes (especially the Southern root-knot nematode) continued to cause significant damage to the soybean crop in numerous fields across Georgia. In 2010, soybeans were harvested from 255,000 acres with an average yield of 26 bu/A. The total soybean production for Georgia in 2010 was valued at $113,640,059.

Disease	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Soybean Cyst Nematode[1]	Trace	---	---	---
Root-Knot Nematodes	3.5	4.0	0.3	4.3
Other Nematodes[2]	1.5	1.8	---	1.8
Asian Soybean Rust	Trace	---	0.4	0.4
Anthracnose	0.5	0.6	0	0.6
Brown Leaf Spot	Trace	---	0	---
Charcoal Rot	Trace	---	0	---
Diaporthe/Phomopsis Complex	Trace	---	0	---
Downy Mildew	0.0	0.0	0	0.0
Frogeye Leaf Spot	Trace	---	0	---
Red Crown Rot	Trace	---	0	---
Pod and Stem Blight	3.0	3.4	0	3.4
Purple Stain	Trace	---	0	---
Seedling Diseases (*Rhizoctonia/Pythium/Fusarium*)	0.25	0.3	0.1	0.4
Southern Blight	0.5	0.6	0	0.6
Stem Canker	0.0	0	0	0
Fusarium Wilt	0.0	0	0	0
Virus Diseases	0.0	0	0	0
Bacterial Diseases	0.0	0	0	0
Total	**9.75**	**10.7**	**0.8**	**11.5**

[1] Resistant varieties are used to manage most nematode and disease problems, though Temik 15G is applied on occasion. Here it is estimated that Temik 15G (5 lb/A) was applied to 20,000 acres. It is estimated that fungicides were applied to 25,000 acres for management of foliar diseases and were used as seed treatments to reduce seedling diseases on a small portion of the planted acreage.
[2] "Other nematodes" includes reniform, sting and Columbia lance nematodes.

Estimate by Robert Kemerait, Extension Plant Pathologist

Strawberry

Disease pressure was moderate in 2010. Overall, it was a good year for strawberry production. Angular leaf spot was observed, as was Botrytis (gray mold) disease, though fungicides did give adequate control where they were well utilized. Phytophthora root rot was also occasionally damaging. Anthracnose was also found in transplants, and there is still concern that the strobilurin fungicides, which are heavily and virtually exclusively utilized for control of anthracnose, may be developing resistance. 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	1.0	69.0	310.0	379.0
Fungal Leaf Spots	1.0	69.0	100.0	169.0
Anthracnose	1.0	69.0	100.0	169.0
Root Rots & Nematodes	2.0	138.0	170.0	308.0
Angular Leaf Spot	0.5	34.5	10.0	44.5
Total	**5.5**	**379.5**	**690.0**	**1,069.5**
Estimate by Phil Brannen, Extension Plant Pathologist				

Turfgrass

The professional and landscape industry has an annual economic impact of $3.7 billion. The golf course industry contributes $2.4 billion to Georgia's economy. It is estimated that there are 1.98 million acres of turf with a maintenance value of $1.7 billion in Georgia. The turfgrass farm gate value for 2010 was $84.6 million. In 2010, a record-setting heat wave plagued the entire nation during the summer. In Georgia, this extreme weather condition had severe adverse effects on the maintenance and survival of cool season grasses, especially *Agrostis* sp. (bentgrass). There were more than 65 days with temperatures well above 90°F. In a survey carried out by the USGA, golf course superintendents expressed that a majority of golf greens were "thinning" or "severely stressed." Ninety-five percent of golf superintendents surveyed described the 2010 summer as "the worst" or "one of the worst" they had ever seen for managing bentgrass. Many golf courses in Georgia had to close greens due to heat stress. Heat stress-related problems as well as anthracnose (*Colletotrichum cereale*) were diagnosed most commonly at the UGA plant disease clinic. Pythium was frequently observed on bentgrass under heat stress. Nematodes have been attributed to increased damage and promoting stress on turfgrass. Nematode infections and outbreaks were also severe on heat-stressed bentgrass greens. Severe outbreaks of *Ophiosphaerella* spp. (spring dead spot) affecting *Cynodon* spp. (bermudagrass) were observed in the northern portion of Georgia. Outbreaks of large patch (*Rhizoctonia solani*) were common in spring and fall. Zoysiagrass and centipedgrass were the most affected turfgrass species. *Gaeumannomyces* spp. (causal agent of root decline of take-all root rot/root decline of warm season grasses/bermudagrass decline) was severe and prevalent throughout the state. *Pythium* spp. and *Rhizoctonia* infections were common on *Festuca arundinacea* (tall fescue) during the summer of 2010. Foliar diseases continued to be problematic in 2010. *Sclerotinia homoeocarpa* was present throughout the state in several turfgrass species. *Bipolaris* spp. was particularly problematic on bermudagrass during the fall. Minor incidences of *Puccinia* spp., *Curvularia* spp. and *Pyricularia grisea* infections were observed in 2010.

Turf Diseases	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Soil-Borne and Crown Diseases	3.9	66.3	49.5	115.8
Foliar Diseases	1.0	17.0	15.8	32.8
Nematodes	3.0	51.0	19.9	70.9
Total	**7.9**	**134.3**	**85.2**	**219.5**
Estimate by Alfredo Martínez-Espinoza, Extension Plant Pathologist				

Vegetables

About 150,000 acres of vegetables were grown in Georgia in 2010 worth a total of ca. $700 million. Rainfall was relatively less than average and many diseases did not manifest to cause significant losses. Fusarium wilt of watermelon continues to increase in incidence and caused some early season losses. Losses to *Phytophthora capsici* on bell pepper and cucurbits was below average. The most prevalent disease on tomatoes and peppers was bacterial spot, caused by *Xanthomonas campestris* pv. *vesicatoria*. This disease continues to plague growers because it is difficult to prevent and remedial disease management tools are generally suppressive at best.

Major Vegetable Crops	**% Reduction in Crop Value [1]**	**Damage ($ Millions)**	**Cost of Control ($ Millions)**	**Total ($ Millions)**
Watermelon	1.5	1.4	6	7.4
Squash (Yellow + Zucchini)	1.5	0.6	1.4	2.0
Tomato	2.0	0.5	2.8	3.3

Other Vegetable Crops	**% Reduction in Crop Value [1]**	**Damage ($ Millions)**	**Cost of Control ($ Millions)**	**Total ($ Millions)**
Pepper (Bell)	5.0	3.8	1.9	5.7
Cucumber	2.5	1.1	1.8	2.9
Snap Bean	3.0	0.5	1.3	1.8
Greens	2.0	0.8	1.3	2.1
Cabbage	2.0	0.7	0.7	1.4
Onion (Dry)	1.8	1.3	2.1	3.4
Cantaloupe	2.5	0.7	2.3	3.0
Eggplant	1.0	0.35	0.4	0.75
Total	**2.0[1]**	**11.75**	**22**	**33.75**

[1] This column is not additive due to the way losses for vegetables are tabulated.
Total values for vegetable commodities are taken from the 2010 farm gate values (AR-11-01).

Estimate by David B. Langston, Jr., Extension Plant Pathologist

Wheat

The farm gate value of wheat in 2010 in Georgia was $62,406,656. The fall of 2009 brought difficult planting conditions to the state. Excessive rainfall delayed previous crop harvest and made land preparation for small grain planting difficult. Many growers planted late in the season or not at all; some growers were observed planting in January. As a result, small grain acreage in Georgia was the smallest in several years. Excessive rain and cold temperatures continued from fall into late winter, restricting crop growth. Presence of stripe rust (*Puccinia striiformis*) was minimal in the state. Leaf rust (*Puccinia triticina*) was observed late in the season but did not pose a serious risk to the crop. Powdery mildew (*Blumeria graminis* f. sp *tritici*) was almost nonexistent in 2010. Barley Yellow Dwarf Virus (BYDV) was observed at high levels across the state. State wheat trials at Tifton, Plains and Griffin had the highest disease pressure in recent years, with the highest disease levels observed at Plains. The decreased wheat acreage seemed to have an aphid-concentrating effect on the wheat plots at all locations. *Stagonospora* leaf and glume blotch were at moderate levels across the state due to the moist early spring conditions. Minimal and/or sporadic outbreaks of Soilborne Wheat Mosaic Virus (SB) and Wheat Spindle Streak Mosaic Virus (SS) infections were observed in central Georgia. The reduced wheat acreage in the state limited field-to-field movement of foliar disease, preventing the development of large-scale disease epidemics.

Wheat Diseases	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Leaf Rust/Stripe Rust	0.1	0.06	0.31	0.37
Glume Blotch	0.1	0.06	0.05	0.11
Powdery Mildew	0.1	0.06	0.28	0.34
Barley Yellow Dwarf Virus	0.7	0.44	0.93	1.37
Stinking/Loose Smut	-----	-----	-----	-----
Total	**1.0**	**0.62**	**1.57**	**2.19**
Estimate by Alfredo Martinez-Espinoza, Extension Plant Pathologist				

Summary of Total Losses Due to Disease Damage and Cost of Control in Georgia – 2010

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	8.17	6.6	0.5394	0.28	0.817	10.0
Blackberry	11.19	7.5	0.84	2.73	3.57	31.9
Blueberry	142.58	6.3	8.98	2.81	11.79	8.3
Bunch Grape	4.81	9.5	0.4573	0.29	0.74	15.4
Corn	227.33	11.1	25.3	3.60	28.9	12.7
Cotton	1,166.53	14.0	144.2	16.3	160.5	13.8
Muscadine Grape	4.56	4.6	0.2098	0.13	0.34	7.5
Ornamentals	497.91	7.52	37.45	22.3	59.75	12.0
Peach	48.43	2.3	1.11	3.19	4.30	8.9
Peanut	474.64	13.5	64.1	49.6	113.7	24.0
Pecan	233.94	2.5	5.7	20.8	26.5	11.3
Soybean	113.64	9.75	10.7	0.80	11.5	10.1
Strawberry	6.90	5.5	0.3795	0.69	1.07	15.5
Turf	1,700.00	7.9	134.3	85.2	219.5	12.9
Vegetable	700.0	2.0	11.75	22.0	33.75	4.8
Wheat	62.41	1.0	0.62	1.57	2.19	3.5
TOTALS	**4,236.51**	**11.06**	**468.9**	**232.3**	**701.2**	**16.5**

[1] This column is not additive.

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

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