2009
Georgia Plant Disease Loss Estimates

Compiled by: Jean Williams-Woodward, Extension Plant Pathologist

It is estimated that 2009 plant disease losses, including control costs, amounted to approximately **$653.06** million. The value of the crops used in this estimate was approximately **$5887.33** million, resulting in an **11.09** 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: Georgia Agricultural Statistics Service, Georgia Farm Report, Volume 10-No. 1, the 2009 Georgia Farm Gate Value Report (AR-10-01), and 2009 Georgia Farm gate Fruits and Nuts Report (AR 10-04). Some estimates for fruits, ornamentals, and turf rely on specialists' knowledge of the industry and industry sources for information.

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2009 Plant Disease Clinics Annual Summary

Extension Plant Pathology maintains two plant disease clinics as educational resources for county Extension agricultural faculty to use to aid their clients in diagnosing and correcting disease-related plant problems. The Athens Plant Disease Clinic, which includes the Homeowner IPM plant disease clinic, is operated by Byron Candole and Jan Fowler and is located in 2405 Miller Plant Science Building. Commercial fruit, ornamentals and turf; Christmas trees and forestry; all homeowner samples; and legume forages, small grains, mushroom identification and wood rots are processed in the Athens Plant Disease Clinic. There is a $10 processing fee for all physical homeowner samples. There is no charge for commercial physical samples or digital diagnostic samples. Dr. Elizabeth Little joined Extension pathology in 2009 and is responsible for homeowner IPM sample recommendations.

In Tifton, the Plant Disease Clinic is run by Jason Brock in Room 116 of the Horticulture Building on the main Tifton Campus. Diagnoses and control recommendations for commercial samples of field crops, grain forages, pecans and vegetables are handled at this location.

Commercial sample numbers continue to increase each year (1,440 samples in 2008); however, overall sample numbers were down compared to 2008 (2,051 samples in 2008) because the homeowner clinic was closed and not receiving samples for much of the year due to personnel loss. The greatest increase in sample submission over 2008 was seen in commercial vegetables. Last year was very dry and many of the problems seen were not disease-related but rather environmental- or cultural-type plant problems.

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. Monthly homeowner reports are also available via our departmental clinic homepage (http://www.plant.uga.edu/Extension/Clinics/PDC.htm).

CLINIC SUMMARIES: 2009 PLANT SAMPLE SUBMISSION

Crop	Commercial Samples	Homeowner IPM Samples	Total
Field Crops	168	0	168
Vegetables	412	51	463
Fruits & Nuts	137	16	153
Herbaceous Ornamentals	140	20	160
Woody Ornamentals	130	77	207
Trees	86	47	133
Turf	481	132	613
Miscellaneous	6	12	18
Total	**1,560**	**355**	**1,915**

APPLE

The 2009 season was very wet for north Georgia. In one research trial, rain was recorded for 71 of 147 days in the trial. As a result, disease losses were relatively high for apples, but generally less than expected in commercial plantings. Fire blight was not prevalent, since early-season conditions were generally too cold, though rainfall was adequate. Summer rot diseases were prevalent, and bitter rot, as well as flyspeck and sooty blotch, did result in production losses. Overall disease pressure was moderate. 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 yet become an issue; currently, streptomycin is the only effective antibiotic for fire blight. If we lose this antibiotic due to resistance, apple production will be much more difficult. 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	72.4	80.0	152.4
Bitter Rot	5.0	361.9	100.0	461.9
Bot Rot	0.1	7.2	52.0	59.2
Black Rot	0.1	7.2	33.0	40.2
Alternaria Leaf Spot	0.1	7.2	0.0	7.2
Powdery Mildew	0.1	7.2	11.5	18.7
Sooty Blotch	0.1	7.2	0.0	7.2
Fly Speck	0.1	7.2	0.0	7.2
Cedar Apple Rust	0.01	0.7	0.0	0.7
Scab	0.01	0.7	0.0	0.7
Other Diseases	0.1	0.7	1.0	1.7
Total	**6.6**	**479.9**	**277.5**	**757.4**

* 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 of major consequence to losses observed, and limited research information is available for this expanding market. In 2009, cane blight caused significant damage in many locations. This disease is especially damaging when wet weather follows pruning operations. Viruses, many of which can't be readily detected, continue to make their way into the state and have also caused significant losses. Botrytis (gray mold) was also prevalent due to rainy weather, 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	5.0	472.8	1091.9	1564.7
Orange Rust	0.01	0.9	136.5	137.4
Cane and Leaf Rust	0.1	9.5	546.0	555.4
Double Blossom	0.1	9.5	273.0	282.4
Viruses	5.0	472.8	136.5	609.3
Phytophthora Root Rot	0.1	9.5	27.3	36.8
Cane Blight	5.0	472.8	273.0	745.8
Septoria Leaf Spot	0.1	9.5	109.2	118.6
Botryosphaeria	1.0	94.6	136.5	231.0
Total	**16.4**	**1551.7**	**2729.8**	**4281.5**

Estimate by Phil Brannen, Extension Plant Pathologist

BLUEBERRY

Blueberry production in 2009 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 as well, 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 2009, though it had resulted in significant losses in 2008; 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, which 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	1,17.2
Dieback	0.1	107.2	140.0	2,47.2
Phytophthora Root Rot	0.1	107.2	140.0	247.2
Total	**4.4**	**4716.0**	**2810.0**	**7526.0**

Estimate by Phil Brannen, Extension Plant Pathologist

BUNCH GRAPE

Grape diseases were prevalent in 2009. Powdery and downy mildews were observed where spray programs were not well administered, and downy mildew resulted in a 100% loss at one location. In addition, crown gall was very prevalent in some new plantings, and this appears to have been related to transmission in transplants. 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 that is 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, but the verdict is still out as to which is most important. However, we do know that 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 have observed substantial increases in vine death, even at higher elevations and longitudes. In some cases, producers have gone from losing less than ten vines per year to losses of several hundred vines, as observed in 2006 and 2007. Pierce's disease losses were generally less extensive in 2009; colder winters in 2007/2008 and 2008/2009, combined with more aggressive insect management for Pierce's disease vectors, likely resulted in reduced losses as compared to previous years. An initial survey of leaf roll virus diseases indicated that these are resulting in substantive losses in some vineyards, and the mealy bug vectors were also observed in these vineyards in 2009.

Disease	% Reduction in Crop Value	Damage ($ Thousands)	Cost of Control ($ Thousands)	Total ($ Thousands)
Botrytis	0.5	31.0	50.0	81.0
Downy Mildew	1.0	61.9	70.0	131.9
Black Rot	1.0	61.9	70.0	131.9
Powdery Mildew	3.0	185.7	20.0	205.7
Phomopsis Cane Blight	2.0	123.8	35.0	158.8
Crown Gall	0.5	31.0	5.0	36.0
Pierce's Disease	0.5	31.0	30.0	61.0
Leaf Roll Virus	0.01	0.6	5.0	5.6
Total	**8.5**	**526.9**	**285.0**	**811.9**

Estimate by Phil Brannen, Extension Plant Pathologist

CORN

In 2009, corn for grain was harvested from 377,752 acres in Georgia with an average yield of 150.5 bu/A. The 2009 crop was valued at $203,266,035. Although southern rust (*Puccinia polysora*) was a significant problem for many corn growers in 2008, it did not appear until later in the 2009 field season and did not cause as much damage to the crop. Additionally, a second virulent race of *P. polysora* that was confirmed in Georgia in 2008 and that is able to overcome the resistance in hybrids with the rpp9 gene for southern rust was also present in 2009. Rainfall was abundant during much of the 2009 season and temperatures were generally cooler than in recent years. Cooler temperatures and a lack of tropical storms to aid in spore dispersal may in part explain the low severity of southern rust in 2009. Cooler and wetter weather may have also helped to reduce levels of aflatoxin in the harvested grain. Northern corn leaf blight (*Exserohilum turcicum*) was quite severe in many fields in 2009. In one field where northern corn leaf blight was particularly severe, yield was less than 100 bu/A despite an anticipated yield of 200+ bu/A. Use of fungicides, especially strobilurin chemistries, was common in 2009.

The true importance of damage from nematodes, e.g. sting, stubby root and southern root-knot nematodes, is becoming more apparent as growers and county agents become more familiar with the symptoms.

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	10.1	1.1*	11.2
Mycotoxins	2.0	4.1	0.0	4.1
Southern Corn Rust	1.0	2.0	1.7**	3.7
Northern Corn Leaf Blight	1.5	3.0	—**	3.0
Other Leaf Diseases	trace	—	0.0	0.0
Total	**9.6**	**19.4**	**2.8**	**22.2**

* It is estimated that approximately 55,000 acres of corn were treated with 7 lb/A Counter insecticide-nematicide for control of nematodes.

** It is estimated that 110,000 acres of corn were sprayed with fungicides at least once during the 2009 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 1,027,175 acres in 2009. The average lint yield was 956.6 lb/A. The crop was valued at $712,666,755.

Losses to seedling disease, primarily Rhizoctonia seedling blight, or "soreshin," were moderate in 2009. Stemphylium leaf spot, a significant problem in 2008, was less of a problem in 2009 due to increased rainfall and better transport of potassium to the foliage. A newly identified disease in Georgia, Corynespora leaf spot, was a significant problem in a number of fields in southwestern Georgia and resulted in premature defoliation where the disease was severe.

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. Abundant rainfall in 2009 did help to reduce the overall damage that could be attributed to nematodes.

Disease	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Boll Rot (lint)	1.5	10.7	0.0	10.7
Nematodes	**7.0**	**49.9**	**10.6[a]**	**60.5**
Southern Root-knot	5.0	35.6	—	—
Reniform	1.5	10.7	—	—
Columbia Lance	0.5	3.6	—	—
Seedling Disease	1.5	10.7	1.3[b]	12.0
Fusarium Wilt	trace	—	—	—
Ascochyta Blight	trace	—	—	—
Stemphylium Leaf Spot	1.0	7.1	0.3[c]	7.4
Corynespora Leaf Spot	2.0	14.2	—	14.2
Total	**13.0**	**92.6**	**12.2**	**104.8**

[a] This figure is based upon an estimation that approximately 35% of the cotton acreage in the state is treated with a nematicide rate of Temik (5 lb/A or greater), 20% with AVICTA Complete Pak, and approximately 2.0% 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 is treated with a fungicide in addition to the seed treatment to manage seedling disease.

[c] This figure is based upon an estimate that 3% of the cotton acreage in the state was sprayed with a fungicide in 2009 to manage foliar diseases of cotton.

Estimate by Robert Kemerait, Extension Plant Pathologist

MUSCADINE GRAPE

Disease pressure was increased in most muscadine vineyards due to rainfall. Despite the increased moisture, good spray programs resulted in minimal losses. As a native grape, muscadines generally have less disease pressure than European grapes. Rot diseases result in more direct losses than any other disease category, but there are now multiple fungicides that adequately control these diseases. An active fungicide program is required, and diseases can be significant where producers are unable to spray effectively.

Disease	% Reduction in Crop Value	Damage ($ Thousands)	Cost of Control ($ Thousands)	Total ($ Thousands)
Bitter Rot	1.0	59.4	50.0	109.4
Macrophoma Rot	1.0	59.4	45.0	104.4
Ripe Rot	1.0	59.4	25.0	84.4
Angular Leaf Spot	0.5	29.7	10.0	39.7
Black Rot	1.0	59.4	0.0	59.4
Phomopsis Dead Arm	0.1	5.9	1.0	6.9
Total	**4.6**	**273.1**	**131.0**	**404.1**

* Controlled with fungicides applied for other diseases.

Estimate by Phil Brannen, Extension Plant Pathologist

ORNAMENTALS

The 2009 farm gate value for ornamental horticulture (excluding turf) was estimated at $564.28 million, which represents a 3.8% increase in value from 2008. The abatement of landscape irrigation restrictions may have helped sales; however, farm gate value is still less than it has been in recent years, most likely due to a reduction in the construction market and landscape installation. 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	1.13	0.8	1.93
Fungal Leaf Spots, Stem Cankers, Needle Blights	1.1	6.20	6.5	12.70
Root and Crown Rots	4.0	22.57	8.5	31.07
Powdery Mildew	0.6	3.39	1.8	5.19
Botrytis Blight	0.2	1.13	1.2	2.33
Virus (TSWV, INSV, Hosta Virus X)	0.2	1.13	0.1	1.23
Minor Diseases (Rust, Downy Mildew, Nematode)	0.8	4.51	2.6	7.11
Total (Ornamental production)	**7.1**	**40.06**	**21.5**	**61.56**

Production Category (2009 Farm Gate Value)	% Reduction in Crop Value[1]	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Field Nursery ($90.64 M)	3.1	2.98	1.9	4.88
Container Nursery ($210.44 M)	13.1	27.50	11.3	38.80
Floriculture (Greenhouse) ($263.20 M)	3.6	9.58	8.3	17.88
Total (Ornamental Production)	**7.1**	**40.06**	**21.5**	**61.56**

[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 2009. Even though conditions were wet, brown rot and scab diseases were of minimal consequence on fruit 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 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	5.0	3,225.6	1,750.0	4,975.6
Scab	0.1	64.5	1,110.0	1,174.5
Bacterial Spot	1.0	645.1	20.0	665.1
Phony Peach	0.5	322.6	230.0	552.6
Gummosis	0.1	64.5	20.0	84.5
Armillaria Root Rot	1.0	645.1	50.0	695.1
Phomopsis Constriction Canker	0.01	6.5	10.0	16.5
Total	**7.7**	**4,973.9**	**3,190.0**	**8,163.9**

Estimate by Phil Brannen, Extension Plant Pathologist

PEANUT

In 2009, peanuts were harvested from approximately 529,293 acres. Yields in 2009 averaged 3,766 lb/A for a total production valued at $401,198,028.

Tomato spotted wilt was very light again in 2009 for reasons that likely include continued use of Peanut Rx (risk index) and peanut varieties with improved resistance to the disease. Severity of spotted wilt was much lower in 2006 (2.5% estimated reduction in crop value), 2007 (1.5% estimated reduction in crop value) and in 2008 (1.0% estimated reduction in crop value) and in 2009 (0.5% estimated reduction in crop value) than in 2005. White mold, while always a problem for peanut growers in Georgia, was less severe in 2009 than in 2008. However, white mold was certainly severe in fields across the state. 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. It appears that leaf spot became a problem in some fields when frequent rain events kept growers from making timely fungicide applications. Abundant rainfall slightly increased losses to Rhizoctonia limb rot and leaf spot diseases; however, it seemed to help reduce losses to peanut root-knot nematodes.

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	6.0	26.8[b]	32.8
White Mold	6.0	24.1	17.4[c]	41.5
Limb Rot	1.5	6.0	—[d]	6
Pod Rot	0.5	2.0	—[e]	2
Nematodes	2.5	10.0	4.9[f]	14.9
Cylindrocladium Black Rot	1.0	4.0	0.02[g]	4.02
Seedling Disease	0.2	0.8	0.5[h]	1.3
Tomato Spotted Wilt	0.5	2.0	0.0	2
Diplodia Collar Rot	trace	—	0.0	0
Total	15.7	54.9	49.62	104.5

[a] The total value of the crop was $324.3 million, according to the National Agricultural Statistics Service.

[b] It was estimated that 55% of peanut acreage in Georgia receives some irrigation and that 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, 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% of the acreage in Georgia is treated at a cost of $50/A.

[g] It was estimated that approximately 1% of the total peanut acreage is treated with metam sodium to control CBR at $50/A.

[h] It was estimated that the cost to treat seed with fungicides is about $0.50/A and that approximately 5% of the peanut acreage is treated with an in-furrow fungicide at planting at $10/A.

Estimate by Robert Kemerait, Extension Plant Pathologist

PECAN

Rain events in 2009 returned to a more normal pattern following a three-year period of drought-like conditions. There were frequent rains and cool weather during April and May that made it difficult for growers to apply fungicides in a timely manner.

Leaf scab incidence and severity remained relatively low, but nut scab pressure increased through the summer. In University of Georgia fungicide trials, nontreated controls of the cultivar 'Desirable' had a nut scab severity rating of 44.2% by early September. In addition to scab, anthracnose was a problem in most areas in Georgia. Most cultivars were affected, but 'Desirable' seemed to be most sensitive and defoliation was observed as early as late July. The impact of anthracnose is difficult to quantify. Many trees put on new foliage and were able to produce a crop, although quality and yield were likely impacted. The results of the premature defoliation might carry over into the 2010 crop due to a reduction of carbohydrate reserves.

In 2009, pecan acreage was estimated to be 144,407 acres in Georgia with a total farm gate value of $170,979,661.

Disease	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)[1]	Total ($ Millions)
Scab	3.0	5.1	23.4	28.5
Anthracnose	2.0	3.4	0.0	3.4
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	**5.0**	**8.5**	**23.4**	**31.9**

[1] Nine treatments on 144,407 acres @ $18.00/A; scab sprays 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

The recurrence of soybean rust, *Phakopsora pachyrhizi,* in Georgia was an important disease issue for soybean producers in 2009, especially since the disease was detected earlier (late May) than it had been in 2006, 2007 or 2008. A lack of tropical storms during the 2009 hurricane season certainly reduced the potential for damage from rust. Although much of the acreage in Georgia was treated with fungicides at least once during 2009, some losses to rust did occur. It is estimated that at least 70 percent of the growers in Georgia applied at least one fungicide spray for management of rust. Rainfall was fairly abundant during the 2009 growing season and this likely explains both the outstanding yields and the increased severity of both anthracnose and Phomopsis pod and stem blight in a number of fields. Plant parasitic nematodes (especially the southern root-knot nematode) continue to cause significant damage to the soybean crop in numerous fields across Georgia.

In 2009, soybeans were harvested from 451,285 acres with an average yield of 38.9 bu/A. The total soybean production for Georgia in 2009 was valued at $168,450,779.

Disease	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Soybean Cyst Nematode[1]	Trace	—	—	—
Root-knot Nematodes	3.5	5.9	1.3	7.2
Other Nematodes[2]	1.5	2.5	---	2.5
Asian Soybean Rust	0.5	0.8	3.2	4.0
Anthracnose	2.0	3.3	0	3.3
Brown Leaf Spot	trace	—	0	—
Charcoal Rot	trace	trace	0	—
Diaporthe/Phomopsis Complex	2.0	3.3	0	3.3
Downy Mildew	0.0	0.0	0	0.0
Frogeye Leaf Spot	trace	—	0	—
Red Crown Rot	1.0	1.7	0	1.7
Pod and Stem Blight	5.0	8.4	0	8.4
Purple Stain	trace	0	0	—
Seedling Diseases *(Rhizoctonia/Pythium/Fusarium)*	0.3	0.5	0.1	0.6
Southern Blight	0.5	0.8	0	0.8
Stem Canker	NA	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	**17.3**	**27.2**	**4.6**	**31.8**

[1] Resistant varieties are used to manage most nematode and disease problems. Typically, the only fungicides used are seed treatments to reduce seedling diseases.
[2] "Other nematodes" includes reniform, sting and Columbia lance nematodes.

Estimate by Robert Kemerait, Extension Plant Pathologist

STRAWBERRY

Disease pressure was relatively severe in 2009, since it was a very wet year. Angular leaf spot was also observed. Botrytis (gray mold) disease was frequently observed, though fungicides did give adequate control where they were well utilized. Phytophthora root rot was also frequently damaging, as wet conditions encourage this disease. However, overall, it was a good year for strawberry production. 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	52.1	310.0	362.1
Fungal Leaf Spots	1.0	52.1	100.0	152.1
Anthracnose	1.0	52.1	100.0	152.1
Root Rots & Nematodes	2.0	104.1	170.0	274.1
Angular Leaf Spot	0.5	26.0	10.0	36.0
Total	**5.5**	**286.4**	**690.0**	**976.4**

Estimate by Phil Brannen, Extension Plant Pathologist

TURFGRASS

It is estimated that there are 1.98 million acres of turf with a maintenance value of $1.80 billion in Georgia. There were 33,986 acres used for producing sod/stolons, which represents a reduction of 17.6% compared to 2008. In 2009, record rainfall levels were observed in the state. While these weather patterns erased the effects of the 2007-2008 severe droughts; they brought about flooding and turfgrass disease epidemics. Severe outbreaks of *Rhizoctonia solani,* the causal agent of large patch, were common in the spring and fall of 2009. St. Augustinegrass and centipedgrass were the most affected turfgrass species, followed by zoysiagrass and bermudagrass. Severe but isolated infections of *Rhizoctonia zeae,* which causes a disease called mini-ring, were observed in 2009 on bermudagrass greens. *Gaeumannomyces* spp. (causal agent of take-all root rot and bermudagrass decline) was also severe and prevalent throughout the state. Higher incidences of the disease were present in the coastal and southern areas of Georgia. *Pythium* spp. was observed throughout the state in 2009, especially on bentgrass greens, and infection was common on bermudagrass and zoysiagrass. Incidences of *Magnaporthe poae* (summer patch) and *Ophiosphaerella spp* (spring dead spot) were common in 2009. Foliar diseases continued to be problematic in 2009. *Sclerotinia homoeocarpa* was present throughout the state and present in several turfgrass species. *Bipolaris spp* was particularly problematic on bermudgrass during the fall. Nematodes have been attributed to increased damage and promoting stress on turfgrass. Mixed infections of nematodes and *Pythium* were common in 2009. Minor incidences of *Puccinia* spp, *Curvularia* spp., *Colletotrichum* and *Pyricularia grisea* infections were registered in 2009.

Turf Diseases	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Soil-borne and Crown Diseases	3.5	69.3	43.5	112.8
Foliar Diseases	1.5	29.7	23.7	53.4
Nematodes	2.6	51.4	9.9	61.3
Total	**7.6**	**150.4**	**77.1**	**227.5**

Estimate by Alfredo Martínez, Extension Plant Pathologist

VEGETABLES

About 161,000 acres of vegetables were grown in Georgia in 2009 worth a total of ca. $915 million. Near normal rainfall conditions were present and many diseases that require moisture caused considerable damage in a few fields where growers didn't use remedial disease control methods effectively. Fusarium wilt of watermelon continues to increase in incidence and caused some early season losses. Losses to *Phytophthora capsici* on bell pepper and cucurbits were below average. The most prevalent disease on tomatoes and peppers again 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. The fall produced periods of weather that were favorable for bacterial spot and some pepper fields experienced total losses. Cost of control for watermelons was lessened due to registration of tebuconazole, which is very inexpensive yet very effective against gummy stem blight.

Major Vegetable Crops	% Reduction in Crop Value[1]	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Watermelon	2.0	2.72	6	8.78
Squash (Yellow + Zucchini)	2.0	0.65	1.4	2.05
Tomato	3.0	1.91	2.8	4.71

Other Vegetable Crops	% Reduction in Crop Value[1]	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Pepper (Bell)	5.5	7.11	1.9	9.01
Cucumber	3.0	1.57	1.8	3.37
Snap Bean	3.1	1.09	1.3	2.39
Greens	2.4	1.14	1.3	2.44
Cabbage	2.1	0.79	0.7	1.49
Onion (Dry)	2.0	2.52	2.1	4.62
Cantaloupe	2.9	0.84	2.3	3.14
Eggplant	2.0	0.31	0.4	0.71
Total	**2.9[1]**	**20.7**	**22**	**42.74**

[1] This column is not additive due to the way losses for vegetables are tabulated.
Total values for vegetable commodities are taken from the 2009 farm gate values (AR-10-02).

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

WHEAT

Wheat was harvested from 287,277 acres with an average yield of 50.2 Bu/Acre. The farm gate value of wheat in 2009 was $57,489,981. Acreage planted in 2009 accounted for a decrease of 28% compared to 2008. An early and severe epidemic of *Puccinia striiformis* (stripe rust) was observed in the southwestern-most parts of the state. A timely notification was issued to county Extension agents who implemented control strategies. Fungicide applications were made in areas that warranted the application. These actions averted widespread damage from *P. striiformis* in the state. Early infections of *Blumeria graminis f. sp tritici* (powdery mildew) were also registered in the southern part of the state. Powdery mildew disease pressure was high on wheat research plots in Tifton and Plains, Ga. Fungicide applications made for *P. striiformis* control helped against powdery mildew. Weather conditions later in the season ultimately held the disease in check. The cool and dry grain-filling period of April held *Puccinia recondita* (leaf rust) back in wheat critical physiological stages. *P. recondita* increased late in the season but had no effect on yield. Cooler temperatures and moist conditions in late winter encouraged soilborne mosaic virus to develop throughout the state. Barley Yellow Dwarf Virus (BYDV) was moderate with higher infection levels noted at the research plots located at the Calhoun research center. *Gaumannomyces graminis var. tritici* (take-all) was sporadically found in central and south Georgia and may have contributed to the early decline of some fields. *Stagonospora* (Glume blotch on heads and leaves) incidence was low in 2009. Minor incidences of loose smut caused by *Ustilago tritici* were registered and observed in localized areas. An important piece of the disease management strategy was the use of disease-resistant cultivars in 2009 and the use of fungicides.

Wheat Diseases	% Reduction in Crop Value	Damage ($ Millions)	Cost of Control ($ Millions)	Total ($ Millions)
Leaf Rust/Stripe Rust	1.0	0.57	1.14	1.71
Glume Blotch	0.1	0.05	0.05	0.10
Powdery Mildew	1.0	0.57	0.28	0.85
Barley Yellow Dwarf Virus	0.4	0.20	0.28	0.48
Stinking/Loose Smut	—	—	—	—
Total	**2.5**	**1.39**	**1.75**	**3.14**

Estimate by Alfredo Martinez, Extension Plant Pathologist, Griffin

Summay of Total Losses Due to Disease Damage and Cost of Control in Georgia – 2009

Crop or Commodity	Estimated Crop Value*	% Reduction in Crop Value[1]	Value of Damage*	Cost of Control*	Total Disease Loss* (Damage & Control)	Total % of Loss [1, 2]
Apple	6.76	6.6	0.479	0.277	0.757	11.1
Blackberry	7.90	16.4	1.551	2.729	4.281	54.1
Blueberry	102.46	4.4	4.716	2.810	7.526	7.3
Bunch Grape	5.67	8.5	0.527	0.285	0.812	14.3
Corn	203.26	9.6	19.4	2.8	22.2	10.9
Cotton	712.66	13.0	92.6	12.2	104.8	14.7
Muscadine Grape	5.66	4.6	0.273	0.131	0.404	7.1
Ornamental	564.28	7.1	40.06	21.5	61.56	10.9
Peach	59.54	7.7	4.973	3.190	8.164	13.7
Peanut	401.20	15.7	54.9	49.62	104.5	26.0
Pecan	170.98	5.0	8.5	23.4	31.9	18.6
Soybean	168.45	17.3	27.2	4.6	31.8	18.9
Strawberry	4.92	5.5	0.286	0.690	0.976	19.8
Turf	1,800.0	7.6	150.4	77.1	227.5	12.6
Vegetable	915.0	2.9	20.7	22	42.74	4.7
Wheat	57.49	2.5	1.39	1.75	3.14	5.5
TOTALS	**5,887.33**	**7.3**	**427.95**	**225.08**	**653.06**	**11.09**

* $ Millions

[1] This column is not additive.

[2] Total % loss for each crop and the grand total is figured on the basis of: (Value of Damage + Cost Control) ÷ 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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