

**2015 Delaware Plant Diagnostic Clinic Report  
Department of Plant and Soil Sciences  
University of Delaware**

**Nancy F. Gregory, Plant Diagnostician  
Nathan Kleczewski, Extension Plant Pathologist  
Brian A. Kunkel, Ornamentals IPM Specialist**

The Plant Diagnostic Clinic at the University of Delaware is housed in the Department of Plant and Soil Sciences, and is located in Townsend Hall, Room 151. The clinic serves the public through Delaware Cooperative Extension, directly serving commercial growers, crop consultants, nurserymen, landscapers, public gardens, and private homeowners. Samples are also received through county offices, from Extension specialists, and the Master Gardener Program. The clinic is the National Plant Diagnostic Network (NPDN) laboratory for Delaware. The lab is also the plant pathology diagnostics survey laboratory for Delaware Department of Agriculture and USDA/APHIS CAPS for Delaware. The clinic operates with one full-time staff, the Plant Diagnostician, cooperating with the Extension Plant Pathologist and the Ornamentals IPM Specialist in Entomology, numerous Extension Agents, and one part time employee.

During 2015, the Plant Diagnostic Clinic processed approximately 630 non-survey routine clinic samples. A National USDA/APHIS PPQ CAPS karnal bunt survey in cooperation with Delaware Department of Agriculture for wheat seed samples from all grain elevator processing stations in Delaware included five composite aliquot samples. All samples examined for the presence of karnal bunt were negative, ensuring the safety of the Delaware wheat crop for trade and export. Nursery surveys for Delaware Department of Agriculture resulted in a few samples of boxwood and chrysanthemum. Other samples were diagnosed in field situations, and not brought in for analysis. Phone inquiries and e-mail requests for information accounted for undocumented samples in addition to physical specimens submitted to the lab. Delaware Cooperative Extension launched an online Ask an Expert service through eXtension.org, through which 69 questions were answered by Nancy via e-mail in 2015. Over 50 % of the total questions answered via Ask an Expert for Delaware involved trouble-shooting of possible disease or cultural issues with plants. Some soil samples for nematode assays and trouble-shooting plant samples for possible nematode infections were processed in the lab, but are not included in this report. The UD Plant Diagnostic Clinic no longer actively processes samples and reporting for the Nematode Assay Program.

Weather conditions in 2015 contributed to plant stress, favored pathogens on many hosts, and affected establishment of new plantings. Conditions during 2015 included fluctuating rainfall, which resulted in periodically saturated soils and sometimes droughty soils. Adding to root stress was a dry period for approximately five weeks during August and September. Adequate moisture early benefited many agronomic crops such as corn, soybeans, and vegetables, and resulted in lower foliar disease incidence later in the season. Moisture stress and compromised root systems were, however, an issue at times, especially in New Castle County, and will continue to lead to problems in the spring of 2016. Rainfall totals were compiled from the Delaware Environmental Observation System (DEOS), as follows:

**DEOS Summary 2015 - Rainfall in inches - Normal for Delaware is 40 inches/yr**

<b>2015</b>	<b>Newark</b>	<b>Dover</b>	<b>Georgetown</b>
<b>April</b>	<b>3.33</b>	<b>2.84</b>	<b>3.49</b>
<b>June</b>	<b>12.64</b>	<b>10.30</b>	<b>5.90</b>
<b>August</b>	<b>2.61</b>	<b>2.79</b>	<b>3.25</b>
<b>September</b>	<b>4.69</b>	<b>4.07</b>	<b>3.37</b>
<b>December</b>	<b>5.32</b>	<b>4.35</b>	<b>5.02</b>
<b>Yearly total</b>	<b>51.0</b>	<b>44.1</b>	<b>46.4</b>

Of the 630 routine samples received, the majority (515) were from within Delaware (85 %). Others were received from Maryland, Pennsylvania, and Virginia, totaling 130 samples, or 16 % from out of state. Almost all were physical samples (99 %), although several were digital images only. A few samples were processed for Delaware clients through Bartlett Tree Labs in North Carolina. Commercial samples received through Cooperative Extension accounted for 53 % of samples.

There were many different diagnoses, from different crop areas, and 91 % of samples were submitted for Disease ID. The crop sources for those were, in order of predominance: Ornamentals (55 %), Vegetables (22%), Field Crops, Fruit, Turf, Insect ID, Fungal ID, and Christmas trees. The diagnosis categories ranked in incidence as follows:

- Environmental/Physiological
- Fungal Diseases
- Bacterial Diseases
- Viral Diseases
- Nematodes

Insect (Damage and ID's)  
 Plant/Weed ID  
 Fungal ID

Percentages were not determined for diagnoses, due to multiple diagnoses for many samples. For example, insect damage and fungal dieback were common on physiologically stressed trees. Numbers show that physiological and environmental stresses are primary or play a role in over 40% of samples received, and was the primary diagnosis in 30% of samples. The diagnosis of environmental stress, when communicated, can save growers and landscapers money and time when they avoid unnecessary spray treatments. Accurate diagnosis is central to maintaining good plant health. The most common specific diagnoses were environmental stress, root rot, and crown rot.

One USDA quarantine pest was detected, chrysanthemum white rust, which is under review by USDA/APHIS PPQ for a change in actionable status. Bacterial black leg (*Pectobacterium*) and possible *Dickeya* species were found on potato, and later determined to be part of a larger problem with potato seed piece infection in several states. Ongoing research is being done to determine the exact pathogens involved, the source, and the extent of the problem. The status of *Dickeya* on potato remains under discussion in USDA/APHIS. Boxwood was monitored in retail sites, and several boxwood blight detections made and stock destroyed. One sample of downy mildew on sweet basil was confirmed and entered in the Cornell database.

New reports for the year 2015 included:

- 1) Eastern ash bark beetle *Hylesinus aculeatus*, on ash
- 2) Blueberry Stemgall Wasp *Hemadas nubilipennis* on highbush blueberry
- 3) Downy mildew *Plasmopara halstedii* on Black-eyed Susan
- 4) Downy mildew *Peronospora lamii* on Coleus
- 5) Bacterial Blight *Dickeya (Erwinia) chrysanthemi* on snap bean
- 6) Stubby-root Nematodes *Trichodorus sp./spp.* on boxwood

**First State Report Data for Delaware 2015 (first time entered in database, may not be first occurrence)**

Sample Date	State	Diagnostic Lab	Pest	Host
2015-11-20	DE	0830 (DE)	Darkwinged Fungus Gnat [ <i>Bradysia</i> sp./spp. ]	Houseplants; Potted Plants
2015-10-18	DE	0830 (DE)	Unspecified Pathology [ <i>Paecilomyces</i> sp./spp. ]	Structural Wood
2015-10-16	DE	0830 (DE)	Deer Damage [ Abiotic disorder ]	Yoshino Cherry
2015-10-03	DE	0830 (DE)	Culicid Mosquitos [ Family Culicidae ]	Household; Domestic Dwellings

2015-09-27	DE	0830 (DE)	Darkling Beetles [ Family Tenebrionidae ]	White Oak
2015-09-16	DE	0830 (DE)	Poor Growing Conditions [ Abiotic disorder ]	Rhododendron
2015-09-16	DE	0830 (DE)	Tomato Hornworm [ Manduca quinquemaculata ]	Bell Pepper
2015-09-16	DE	0830 (DE)	Tomato Hornworm Braconid [ Cotesia congregata ]	Bell Pepper
2015-09-03	DE	0830 (DE)	Jimsonweed [ Datura stramonium ]	Plant Id Request
2015-09-02	DE	0830 (DE)	Seed Bugs [ Family Lygaeidae ]	Insect Id Request
2015-08-29	DE	0830 (DE)	Threadwaisted Wasps [ Subfamily Sphecinae ]	Insect Id Request
2015-08-18	DE	4304 (NC)	Grapevine Beetle [ Pelidnota punctata ]	Unknown; No Site Specified
2015-08-10	DE	0830 (DE)	J-Root / Incorrect Planting [ Abiotic disorder ]	European Grape
2015-07-23	DE	0830 (DE)	Downy Mildew [ Plasmopara halstedii ]	Blackeyed Susan
2015-07-23	DE	0830 (DE)	Whitefly [ Bemisia sp./spp. ]	Blackeyed Susan
2015-07-21	DE	0830 (DE)	Bacterial Blight [ Dickeya (Erwinia) chrysanthemi ]	Snap Bean; Green Bean
2015-07-15	DE	0830 (DE)	Fruit Rot [ Unidentified Agent ]	Cantalope; Cantaloupe
2015-07-09	DE	0830 (DE)	Bacterial Leaf Spot [ Pseudomonas syringae ]	Snap Bean; Green Bean
2015-07-09	DE	0830 (DE)	Blueberry Stemgall Wasp [ Hemadas nubilipennis ]	Highbush Blueberry
2015-06-12	DE	0830 (DE)	Chicken of the Woods [ Laetiporus cincinnatus ]	Oak
2015-05-28	DE	0830 (DE)	Branch Canker and Dieback [ Unidentified Agent ]	Pin Oak
2015-05-29	DE	4304 (NC)	Eastern Ash Bark Beetle [ Hylesinus aculeatus ]	Ash
2015-05-28	DE	0830 (DE)	Hibiscus Sawfly (Hollyhock) [ Atomacera decepta ]	Hibiscus
2015-05-21	DE	0830 (DE)	Whitefly [ Trialeurodes sp./spp. ]	Eggplant
2015-05-21	DE	0830 (DE)	Flies [ Order diptera ]	Home and Garden
2015-05-18	DE	0830 (DE)	Daylily Rust [ Puccinia hemerocallidis ]	Daylily
2015-05-15	DE	0830 (DE)	Dryad's Saddle; Pheasant's Back [ Polyporus squamosus ]	Maple
2015-05-12	DE	4304 (NC)	Black Vine Weevil [ Otiorhynchus sulcatus ]	Cherry-laurel
2015-05-01	DE	0830 (DE)	Pillbugs; Sowbugs [ Order Isopoda ]	Insect Id Request
2015-04-23	DE	0830 (DE)	Scat; Dung; Droppings [ Identification Analysis ]	Saucer Magnolia
2015-04-19	DE	0830 (DE)	Hollow Heart [ Abiotic disorder ]	Potato
2015-02-09	DE	0830 (DE)	Scale Insect [ Saissetia sp./spp. ]	Oleander
2015-01-06	DE	4304 (NC)	Stubby-root Nematodes (Trichodorids) [ Trichodorus sp./spp.]	Boxwood

Agronomic Crops – Fewer samples were received in 2015 due to field visits and determinations made by field pathologists, so observations were limited. Soybean vein necrosis (SVNV) was scattered throughout the state in 2015. Soybean sudden death syndrome caused by *Fusarium virguliforme* was not diagnosed due to warmer soil temperatures early in the season. Foliage diseases of soybean, such as downy mildew, Septoria brown spot, bacterial blight, Phyllosticta leaf spot, frog-eye leaf spot and Cercospora blight were seen on soybean during the season but were not yield-limiting. Green stem was a problem for growers late in the season as beans were drying down.

Weather conditions in the spring of 2015 were favorable for seedling diseases such as damping off and *Pythium* root rot in early planted agronomic crops. Mesocotyl rot of corn seedlings caused by a complex of *Fusarium*, *Pythium*, and bacteria was diagnosed in several fields. Barley yellow dwarf was rarely observed in wheat and barley. There were few samples of head scab on wheat and barley. Foliar diseases on corn included anthracnose, northern corn leaf blight (NCLB), and gray leaf spot. Charcoal rot, *Diplodia* stalk rot, and *Fusarium* stalk rot were diagnosed. Late season lodging was observed in some corn stalks, from poor root systems that did not establish well in saturated soils in the spring.

Vegetables – *Pythium*, *Fusarium*, and *Phytophthora* from crown, root and stem rots were recovered from pepper, tomato, snap bean, spinach, squash, and a number of annual bedding plants such as begonia, phlox, pansy, petunia, and periwinkle. Common scab was confirmed on potato. *Septoria* leaf blight was very problematic on home garden tomatoes, due to high moisture and humidity in June. Bacterial pith necrosis of tomato caused by *Pseudomonas corrugata* was identified, and bacterial leaf spot was confirmed several times on tomato and pepper. *Cercospora* leaf spot was confirmed on beet. Watermelon samples were also confirmed for bacterial fruit blotch, gummy stem blight, anthracnose, *Alternaria* leaf spot, and other foliar spotting, as well as crown rots and fruit rots, but no fruit blotch was found. Downy mildew on cucumber appeared in June, and was later reported on other cucurbits, including watermelon. *Phytophthora capsici* was confirmed on pepper stems and cucurbit fruit in Sussex County, but not with severe incidence reported. Bacterial leaf spot due to *Pseudomonas* was identified on cantaloupe. Downy mildew, pod rot, anthracnose, bacterial leaf spot (*Pseudomonas*), root knot nematode, *Pythium* blight, and stink bug injury were diagnosed on lima beans and pole limas.

Fruit – Notable diseases on fruit included downy mildew, anthracnose, *Botrytis* blight, and *Phomopsis* twig and cane dieback on grape, and *Monilinia* blight on peach and plum twigs and fruit. Cold injury was common on blackberry and raspberry canes. Strawberry plants were diagnosed with *Fusarium* crown rot, *Gnomonia* blight, anthracnose, *Pseudomonas* angular leaf spot, *Botrytis* blight, *Phomopsis* blight, cold injury, and unidentified virus infections.

Ornamentals – Following the detection of boxwood blight in a retail nursery and a residential planting in Sussex County Delaware in 2013, numerous boxwood samples were received. One detection was made in a big box retail setting and plants destroyed.

Thousand cankers disease of walnut was confirmed in Cecil County, Maryland, very close to the Delaware border. A beetle very similar to the walnut twig beetle was found in a

trap in the Wilmington area, and sent to an expert for identification, but was identified as *Pseudopityophthorus pubescens*. TCD has not been detected in Delaware to date.

Winter injury and saturated soil led to root death and root rot on many ornamental plants, resulting in dieback on evergreens, and leaf scorch symptom on hardwoods such as maples. Winter injury was severe on crape myrtle. Evergreen ornamentals suffered tip and twig dieback, often found in association with environmental stress or on newly established plantings, and *Diplodia*, *Phomopsis* and *Pestalotiopsis* were among the pathogens found. Seiridium canker and abiotic stress continues to affect Leyland cypress, as over-crowded trees mature. Phytophthora root rot was diagnosed on arborvitae, hollies of various species, maple, concolor fir, Douglas fir, rhododendron, spruce, *Zelkova*, and white pine, mostly in areas with poor drainage. Gymnosporangium rusts appear to be on the increase, in pear, hawthorn, serviceberry, and other Rosaceaceous hosts. The leaf rust on callery pear is presumed to be pear trellis rust caused by *G. sabinae*, as that rust has been detected in other states in the region. Monilinia blight was problematic on flowering (Kwanzan) cherry for the fourth year in a row.

Other interesting pathogens on ornamental plants included downy mildew of impatiens and balsam, although the decreased planting of impatiens appears to have slowed the recent epidemic. Downy mildew was confirmed on *Rudbeckia* and *Coleus*. Heterosporium leaf spot was common on iris, and *Colletotrichum* was confirmed on iris. Late season fungal leaf spots were common on privet, hydrangea, and other hosts. Bacterial leaf scorch is widespread in the landscape on northern red oak and pin oak, and was confirmed on flowering dogwood. Rose rosette virus continues to spread in cultivated rose plantings, and was confirmed by PCR at Oklahoma State University. Several weedy plants were submitted for identification, including bluegrass and jimson weed.

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