A Compilation of Plant Diseases and Disorders in Indiana—1985

Gail E. Ruhl, Paul C. Pecknold, Donald H. Scott and Richard X. Latin
Department of Botany and Plant Pathology
Purdue University
West Lafayette, Indiana 47907

Introduction

The Plant Diagnostic Clinic in the Department of Botany and Plant Pathology at Purdue University is a service of the Cooperative Extension Service, Purdue Agricultural Experiment Station. Plant disease diagnosis and weed identification are gratuitous services offered by the clinic. Of the 1300 specimens received annually, approximately 85% are submitted by county extension agents. The remainder of samples come directly from commercial growers, homeowners, private consultants and other interested persons. This paper is a summary of the major plant diseases and disorders which were diagnosed in the clinic and observed throughout the state in 1985.

Methods

Plant specimens are submitted to the Plant Diagnostic Clinic from county extension agents, homeowners, growers, nursery operators, consultants, and others. Specimens are diagnosed visually or by culturing the pathogen on selected media. Some virus diseases ae diagnosed by the leaf dip (negative stain) technique utilizing the electron microscope. Once a disease or disorder is diagnosed, appropriate control measures are suggested. A summary of the samples diagnosed from January 1 through November 21, 1985 is given in Table 1.

Results

Numerous diseases were influenced by environmental conditions during the 1985 growing season. Weather and site-related problems were commonplace. Very dry spring weather resulted in lower incidences of leaf diseases except in the southern half of the state. Both disease incidence and disease severity were more severe in the southwest portion of the state where spring rainfall was excessive.

Shade and Ornamental Trees

Diseases: Apple scab did not appear until late spring and then only caused moderate damage to the more highly susceptible crabapples. Anthracnose of sycamore, white oak, and ash was almost nonexistant due to the early dry conditons. Similarily, rust on hawthorn and crabapples was of minor importance. Diplodia tip blight continued to devastate pine plantings throughout the state. Austrian and scotch pine were especially susceptible. While early season applications of Benlate are reported to control the problem, it is difficult to get homeowners and commercial applicators to spray early enough to be effective. Few new reports of pine wood nematode were recorded during the past year, however, extensive surveying for the disease was not done. Compared to 1983 and 1984, white oak 'tatters' did not appear as widespread and prevalent. Surveys of two woods in Pulaski county found one woods without any 'tatters' when it was present on the trees in 1984 and a second woods having much less symptoms compared to 1984. Surveys of white oak plantations have found 'tatters' to still be predominantly confined to the northern third of the state. 'Tatters' has also been found on shingle oak, cherrybark oak, and hackberry. This is the first report of 'tatters'

TABLE 1. Plant samples received in the Purdue Plant Diagnostic Clinic Jan 1 through Nov 21, 1985.

Plant Specimen	Number of Samples	Diseases[1]	Disorders[2]	Chem.[3]	Nutr.[4]	Insect[5]	Other[6]
AGRONOMIC							
Corn	123	49	24	23	29	12	16
Soybeans	114	67	10	27	10	5	17
Small Grain	34	25	5	3	8	0	3
Forage Grasses and Legumes	22	9	4	3	5	0	2
ORNAMENTAL							
Trees-Shade and Ornamental	325	71	175	22	14	49	43
Shrubs and Groundcover	105	34	55	7	3	14	11
Flowers	94	56	11	4	4	8	15
House plants	26	4	13	2	1	3	3
FRUIT							
Tree Fruit	63	28	28	3	2	11	5
Small Fruit	37	9	13	8	4	1	6
VEGETABLE	134	51	27	24	13	22	16
TURFGRASS	49	34	13	0	3	0	7
PLANT IDENTIFICATION	208	—	—	—	—		
TOTAL	1334	437	378	126	94	132	144

[1] Problems caused by an infectious disease causing agent, e.g. fungus, bacterium, virus, mycoplasma, nematode.
[2] Problem caused by noninfectious environmental stress, e.g. wind, drought, heat, soil compaction.
[3] Problem caused by herbicide/pesticide misuse.
[4] Problem caused by a nutrient imbalance.
[5] Problem caused by an insect. Does not include samples submitted to Entomology Diagnostic Clinic.
[6] "Other" includes the casual agent categories: No disease, and inadequate sample for diagnosis.

being found outside the oak genus. The cause of 'tatters' is still unknown. Thrips have been suggested as a possible cause by the forest pest specialists from Vermont and Pennsylvania.

Disorders: Numerous maple, oak and ash trees of all ages died or showed extensive decline over the past year. Injury was most extensive in northern Indiana counties but the problem occured state-wide. Cause of the death/decline in these and other trees is attributed to the successive summer drought periods over the past three year period. Another contributing factor has been the severe cold of the past two winters. Sassafras across the state were very slow to leaf-out again this spring. In some trees, dieback resulted. The cause of the dieback is attributed to the drought of 1983 and 1984 and the following hard winters. These two events have combined to cause root and twig dieback that resulted in the slow flush of foliage. Winter desiccation was prominant on white and scotch pine. Many white pine in the Indianapolis area died of apparent winter injury in combination with summer drought stress.

Ornamentals

Diseases: Kabatina twig blight of juniper was recorded for the first time. It is most likely that Kabatina is not a new disease to Indiana but has been confused with

Phomopsis twig blight of juniper, a similar appearing disease. Botrytis blight of marigold and other flowers was common during May and early June in the extreme southern area of the state which experienced above normal rainfall during this period. Powdery mildew was severe during the late summer period on lilac, zinnia, dahlia and numerous other susceptible hosts. Bacterial blight of geranium (*Xanthomonas pelargonii*) was the most frequently recorded disease of greenhouse crops and continues to be of major concern to commercial growers.

Disorders: Extensive browning and death of Arborvitae was widespread throughout middle and northern Indiana. Cause of injury was thought to be due to winter cold and desiccation.

Tree Fruits

Diseases: Apple scab, cedar apple rust and fire blight were of minor occurrance due to persistant dry weather throughout the growing season. A number of cases of black rot (*Phylospora obtusa*) caused extensive cankering of apple trees in northern Indiana were reported. The increase in limb damage from black rot is correlated with extensive winter injury over the past two years.

Disorders: Extreme winter cold caused extensive injury to peach bud and wood tissue and resulted in a complete crop loss except for a few protected locations. Substantial winter damage to trunks of several apple cultivars (Turley and Prima) was widespread in most all apple growing areas of the state. It is uncertain if the majority of trunk damage occurred this past winter or from the previous winter of 1983-84.

Small Fruits

Diseases: Orange rust of blackberries and raspberries was common during the late spring period. Leather rot of strawberry was frequently isolated from random plantings but did not cause extensive economic loss.

Disorders: Extensive cold damage occurred to buds of French hybrid grapes, in some cases resulting in extensive dieback of canes. Cold injury was also common on many brambles.

Vegetables

Indiana vegetable crops suffered many of the familiar diseases that occur each year (1,2,3,4,5) however, two diseases are worth special mention because of their severity and widespread occurrance in 1985 and the management problems these diseases pose for the future.

Gummy Stem Blight of Muskmelons and Watermelons

Gummy stem blight on cucurbits also is referred to as black rot on pumpkins and squash. In the previous five years this disease was diagnosed infrequently on melons, in south central Indiana. In 1985 gummy stem blight was identified on melons all over the state. It was first diagnosed on early muskmelons in mid-June in Knox and Sullivan counties. Because infected plants produce spores that are rain-splashed to other plants, the disease spread quickly to later planted muskmelon fields and to watermelon fields. Farmers who did not inlcude Benomyl in their periodic fungicide applications suffered serious losses. More than 90% of the melon fields in southwest Indiana were infected with gummy stem blight. Work is underway to determine the origin of the gummy stem blight epidemics in 1985.

The gummy stem blight pathogen (*Didymella bryoniae*) overwinters on infested crop residue in the soil. Regardless of the source of initial inoculum for the 1985

epidemics, sufficient amounts of primary inoculum will be availabe locally to incite future epidemics. In order to decrease the amount of effective initial inoculum, longer rotations (more than 3 years out of cucurbits) and fall plowing (moldboard) must be practiced. Periodic application of fungicides including Benomyl will become standard. Although genetic resistance to gummy stem blight currently is not well defined, incorporation of inherant capacities to reduce disease increase should be part of a long term disease management strategy.

Bacterial Canker of Tomatoes

Although significant amounts of bacterial canker occurred within the processing tomato crop in 1985, the disease was diagnosed in more than 95% of the fresh market tomato fields. Reports of severe bacterial canker epidemics were received from Michigan, Ohio, Illinois and Iowa. Infected plants yield less, drop their fruit prematurely, and produce fruit with unappealing raised white blisters. A combination of three factors make bacterial canker a particularly troublesome disease for the future: 1) The disease is systemic, 2) the pathogen (*Corynebacterium michiganense*) enters the plant through wounds or natural openings which makes rapid spread possible and, 3) the bacteria can survive nothern winters on crop debris. Canker control is further confounded by the fact that the pathogen can be transmitted on or in tomato seed and, bactericide applications (such as copper) are not effective in stopping disease increase.

Midwestern farms are being urged to take a very conservative approach towards management of bacterial canker. Longer rotations, fall plowing and greenhouse sanitation must be implemented while techniques are being sought to detect the presence of the pathogen in seed.

Agrinomic Crops

Diseases-Wheat: Several wheat diseases were prevalent in Indiana during 1985, however, yield losses were variable depending on amount of spring rainfall. Both disease incidence and disease severity were more severe in the southern half of the state, and especially in the southwest portion where spring rainfall was excessive. Powdery mildew, leaf rust and glume blotch (*Septoria nodorum*) were the most significant fungus diseases. Leaf blotch (*Septoria tritici*) was also prevalent but did not develop to severe proportions. Tan spot was observed more frequently during 1985 than during any previous growing season. Trace amounts of stripe rust occurred in the central portion of the state. Loose smut was observed in trace amounts in several fields, and bunt occurred in scattered fields where untreated, home-grown seed was used. Take-all was severe in southern Indiana and moderately severe in northern Indiana in fields where wheat followed wheat and nitrogen stress occurred. The Barley Yellow Dwarf Virus was widespread throughout the state on both wheat and oats. The disease was especially severe in oats.

Diseases-Soybean: Rhizoctonia root rot was observed throughout the state. The dry weather in the northern half of the state held Phytophthora root rot to relatively low levels. The soybean cyst nematode was recorded for the first time in Marshall county and continued to be identified in additional fields in northwestern Indiana. This has become the most serious pest problem in that area of the state. Brown stem rot occurred in the north while charcoal root rot occurred in the south. Sclerotinia stem rot was found in central Indiana in a few fields, and stem canker was observed in minor amounts. Foliar diseases such as brown spot, bacterial blight and downy mildew were prevalent in most areas, however, these diseases caused insignificant yield losses.

Diseases-Corn: Common and southern rust of corn occurred in many areas in July. These diseases developed to damaging proportions in unsprayed seed production fields

planted with susceptible inbreds. Northern corn leaf blight, southern corn leaf blight and anthracnose leaf blight appeared relatively late in the season (mid-August) and after rainfall increased.

Literature Cited

1. Evans, G.E., D.H. Scott and P.C. Pecknold. 1980. A Compilation of Plant Diseases and Disorders in Indiana—1980. Proc. Indiana Acad. Sci. 90:91-104.
2. Evans-Ruhl, G.E., R.X. Latin, P.C. Pecknold, and D.H. Scott. 1981. A Compilation of Plant Diseases and Disorders in Indiana—1981. Proc. Indiana Acad. Sci. 91:20-139.
3. Pecknold, P.C., W.R. Stevenson, and D.H. Scott. 1974. A Compilation of Plant Diseases and Disorders in Indiana—1974. Proc. Indiana Acad. Sci. 84:71-84.
4. Ruhl, G.E., R.X. Latin, P.C. Pecknold, and D.H. Scott. 1982. A Compilation of Plant Diseases and Disorders in Indiana—1982. Proc. Indiana Acad. Sci. 92:97-177.
5. Ruhl, G.E., R.X. Latin, P.C. Pecknold, and D.H. Scott, 1983. A Compilation of Plant Diseases and Disorders in Indiana—1983. Proc. Indiana Acad. Sci. 92:103-120.