

A Compilation of Plant Diseases and Disorders in Indiana—1983

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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. The clinic provides a free service for interested persons through the county extension system, for accurate identification of weeds, plant diseases, and plant disorders. This paper is a compilation of plant diseases and disorders which were diagnosed in the clinic from January 1 through Nov. 18, 1983. Such a compilation is an invaluable tool in determining the problem areas in which extension personnel need to concentrate. Ultimately, comparisons of yearly disease/disorder compilations could provide additional insight for epidemiological studies in Indiana.

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 are diagnosed by the ELISA technique or by the leaf dip 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 December 1, 1983 is given in Table 1.

Results

The incidence and severity of infectious diseases were greatly influenced by extremes in environmental conditions in 1983. Excessive rainfall in early spring resulted in an outbreak of a number of foliar infecting diseases on both ornamental and fruit crops. However, reduced rainfall throughout the growing season resulted in an overall decrease in infectious foliar diseases in 1983. Weather and site related problems were common place in Indiana during the 1983 growing season. Tables 2-8 show the host plant, the disease or disorder diagnosed, the pathogen or cause of disorder, and the number of samples received.

Shade and Ornamental Trees

Disease: Excessive rainfall in early spring resulted in the outbreak of a number of foliar infecting diseases. Apple scab was extremely severe (Table 2). By late May susceptible crabapples were showing extensive leaf yellowing and drop. Anthracnose on sycamore, white oak and ash was prevalent in all areas of the state. Diplodia tip blight continued to be the major cause of pine death, and few new reports of pine wood nematode, first reported in 1980 (1), were recorded. Slime flux on oak, elm, maple, and other hardwood trees was very pronounced during July and August. Two cases of bleeding necrosis on sweetgum caused by *Botryosphaeria dothidea* were reported in Tippecanoe County.

Disorders: The combination of drought conditions and extreme heat during July and August resulted in leaf scorch and tree decline being the most commonly recorded disorders (Table 2). Newly planted trees and shrubs were especially hard hit. Soil-line

TABLE 1. *Plant Samples received in the Purdue Plant Diagnostic Clinic Jan 1 through Dec. 1, 1983.*

Plant Specimen	Number of Samples	Disease	Disorder	Chemical	Nutritional
AGRONOMIC					
Corn	80	32	28	11	6
Soybeans	82	58	7	19	4
Small Grain	168	213	23	0	7
Forage Grasses and Legumes	18	20	3	2	1
ORNAMENTAL					
Trees-Shade and Ornamental	304	102	171	17	10
Shrubs and Groundcover	95	33	48	8	5
Flowers	47	32	7	6	5
House plants	32	8	20	0	1
FRUIT					
Tree Fruit	91	38	40	3	0
Small Fruit	64	33	32	6	1
VEGETABLE	108	49	26	17	4
TURFGRASS	37	27	18	0	0
PLANT IDENTIFICATION	196	—	—	—	—
FORWARDED TO					
ENTOMOLOGY (4%)	85	—	—	—	—
TOTAL	1407	645	423	86	39

1 Problem 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.

TABLE 2. *Shade and Ornamental Trees.*

Host Plant Diseases and/or Disorders	Causal Agent	Number of Samples
<i>Abies</i> (FIR)		
Miscellaneous Disorders		
Needle Tip Burn	Stress factors	1
Needle Yellowing/Drop	Drought stress	1
<i>Acer</i> (MAPLE)		
Anthracnose	<i>Gloeosporium apocryptum</i>	5
Canker	<i>Nectria</i> sp.	1
Miscellaneous Disorders		
Scorch	Stress factor(s)	16
Decline	Stress factor(s)	16
Herbicide Injury	Spray drift	4
Dieback	Stress factor(s)	23
Bark Split	Frost injury	1
Trunk/Limb Cankers	Desiccation	1
Leaf Burn	Pesticide misuse	1
Leaf Drop	Stress	2
Tatterleaf	Freeze injury	5
<i>Betula</i> (BIRCH)		
Powdery Mildew	<i>Phyllactinia</i> sp.	1
Miscellaneous Disorders		
Scorch	Heat, wind and drought	3
Chlorosis	Nutrient imbalance	1
Decline	Stress factors	1

TABLE 2.—Continued

Host Plant Diseases and/or Disorders	Causal Agent	Number of Samples
<i>Carya</i> (HICKORY)		
Downy Spot	<i>Microstroma juglandis</i>	1
<i>Castanea</i> (CHESTNUT)		
Heart Rot	unidentified	1
Leaf Blight	unidentified	1
Miscellaneous Disorder		
Leaf Curl	Herbicide drift	1
<i>Catalpa</i> (CATALPA)		
Miscellaneous Disorder		
Leaf Scorch	<i>Stress factor(s)</i>	1
<i>Cercis</i> (RED BUD)		
Wilt	<i>Verticillium albo-atrum</i>	2
Miscellaneous Disorders		
Leaf Scorch	Heat, wind, and drought	1
Leaf Burn	Pesticide misuse	1
<i>Cornus</i> (DOGWOOD)		
Miscellaneous Disorders		
Dieback	Site stress	2
Leaf Purpling	Cold	1
Leaf Scorch	Heat, wind, drought	2
<i>Cotinus</i> (SMOKETREE)		
Anthraxnose	<i>Gloeosporium</i> sp.	1
Miscellaneous Disorder		
Curled Leaves	Herbicide misuse	1
<i>Elaeagnus</i> (RUSSIAN OLIVE)		
Miscellaneous Disorders		
Sapling Storage Molds	Poor ventilation	1
Tree Decline	Root stress	2
<i>Fagus</i> (BEECH)		
Miscellaneous Disorder		
Decline	Stress factor(s)	1
<i>Fraxinus</i> (ASH)		
Anthraxnose	<i>Gloeosporium aridum</i>	9
Miscellaneous Disorders		
Leaf Scorch	Heat, wind, and drought	2
Tatterleaf	Freeze injury	1
Leaf Drop	Stress factor(s)	1
<i>Gleditsia</i> (HONEY LOCUST)		
Miscellaneous Disorder		
Tatterleaf	Freeze injury	1
<i>Juglans</i> (WALNUT)		
Anthraxnose	<i>Gnomonia leptostyla</i>	2
<i>Juniperus virginiana</i> (RED CEDAR)		
Twig Blight	<i>Phomopsis juniperovora</i>	4
Cedar-Apple Rust	<i>Gymnosporangium juniperi-virginianae</i>	1
Miscellaneous Disorder		
Chlorosis	Stress factors	1
<i>Liquidambar</i> (SWEET GUM)		
Bleeding Necrosis	<i>Botryosphaeria dothidea</i>	2
Miscellaneous Disorder		
Decline	Stress factor(s)	1
<i>Liriodendron</i> (TULIP TREE)		
Powdery Mildew	<i>Erysiphe polygoni</i>	1

TABLE 2.—Continued

Host Plant Diseases and/or Disorders	Causal Agent	Number of Samples
Miscellaneous Disorders		
Leaf Yellowing/Spotting	Site Stress	8
Leaf Scorch	Heat, wind, drought	2
Limb Dieback	Stress factor(s)	2
<i>Magnolia</i> (MAGNOLIA)		
Miscellaneous Disorder		
Dieback	Winter Injury	1
<i>Malus</i> (CRABAPPLE)		
Scab	<i>Venturia inaequalis</i>	15
Powdery Mildew	Unidentified	1
Miscellaneous Disorders		
Leaf Scorch	Stress factor(s)	1
Leaf Curl	Herbicide drift	2
<i>Picea</i> (SPRUCE)		
Canker	<i>Cytospora kunzei</i>	2
Needlecast	<i>Rhizosphaera kalkoffii</i>	4
Miscellaneous Disorders		
Chlorosis	Poor site location	5
Needle Loss	Stress factor(s)	6
Needle Browning	Site stress	10
Leaf Mottle	Nutritional imbalance	1
Branch Dieback	Herbicide misuse	1
<i>Pinus</i> (PINE)		
Tip Blight	<i>Diplodia pinea</i>	3
Needle Blight	<i>Dothistroma pini</i>	1
Needle Cast	<i>Lophodermium pinastri</i>	4
Needle Rust	<i>Coleosporium</i> sp.	1
Western Gall Rust	<i>Endocronartium harknessii</i>	1
Sooty Mold	<i>Fumago vagans</i>	2
Miscellaneous Disorders		
Decline	Poor drainage, site-stress	16
Winter Damage	Desiccation	10
Chlorotic Needles	Site stress	6
Dieback	Transplant shock	2
Needle Tip Burn	Environmental stress	3
Chlorotic Needles	Herbicide damage	2
Needle Drop	Normal	2
Dieback	Shovel Root (Poor planting)	1
<i>Platanus</i> (SYCAMORE)		
Anthracnose	<i>Gnomonia veneta</i>	2
Miscellaneous Disorder		
Leaf Scorch	Environmental stress	1
<i>Plantanus acerifolia</i> (LONDON PLANE)		
Anthracnose	<i>Gnomonia plantani</i>	1
Twig Canker	Unidentified	1
<i>Populus</i> (POPLAR)		
Canker	<i>Cytospora</i>	2
Miscellaneous Disorders		
Dieback	Site stress	1
Dieback	Site stress/cold	1
<i>Prunus</i> (PURPLE LEAF PLUM)		
Miscellaneous Disorder		
Decline	Stress	1
<i>Prunus</i> (ORIENTAL CHERRY)		
Miscellaneous Disorder		
Decline	Root stress	1

TABLE 2.—Continued

Host Plant Diseases and/or Disorders	Causal Agent	Number of Samples
<i>Quercus</i> (OAK)		
Canker	<i>Dothiorella</i>	1
Leaf Spot	<i>Actinopelte dryina</i>	5
Anthrachnose	<i>Gnomonia quercina</i>	9
Blisterleaf	<i>Taphrina caerulescens</i>	3
Oak Wilt	<i>Chalara quercinum</i>	1
Miscellaneous Disorders		
Chlorosis	Nutritional Deficiency	7
Leaf Curl	Herbicide	1
Leaf Scorch	Environmental stress	2
Tatterleaf	Unknown	5
Decline	Site	3
<i>Salix</i> (WILLOW)		
Canker	<i>Cytospora</i> sp.	2
Miscellaneous Disorder		
Dieback	Stress	1
<i>Sorbus</i> (MOUNTAIN ASH)		
Canker	Sunscald-canker complex	1
<i>Tsuga</i> (HEMLOCK)		
Miscellaneous Disorders		
Dieback	Drought	2
Curled Leaves	Herbicide	1
<i>Ulmus</i> (ELM)		
Dutch Elm Disease	<i>Ceratocystis ulmi</i>	3
Black Leaf Spot	<i>Gnomonia ulmea</i>	2
Anthrachnose	<i>Gloeosporium inconspicuum</i>	1

heat cankers occurred in many new plantings of white pine. A previously unreported disorder occurred on many of the white oak in northern Indiana. Newly developed leaves had a 'tattered' appearance with the leaf blade missing to the main and lateral veins. The leaf malformation occurred in all size trees from seedlings to timber size trees. Late freeze injury was considered as a possible cause but did not explain the entire symptom picture. Drought related dieback of hemlock occurred in many areas of the state in late summer.

Ornamentals

Diseases: Black spot of rose, juniper tip blight, and powdery mildew of various shrubs were frequently reported during spring. Botrytis blight was common on peonies, tulips, roses, and geraniums early in the growing season, again primarily due to the wet weather conditions. Dieback of yews caused by *Phytophthora* spp. was common in a number of nurseries throughout the state (Table 3).

Disorders: Dieback of burning bush was extensive in many locations. The cause of dieback was associated with an early spring warm up followed by freezing weather. Scorch and dieback were of frequent occurrence during the summer months, especially in new plantings (Table 3). As in previous years (1, 2, 3, 4, 5) houseplant problems were primarily related to poor cultural conditions, e.g. overwatering, salt build-up, low humidity, etc.

TABLE 3. *Ornamentals—Diseases and Disorders.*

Host Plant Diseases and/or Disorders	Causal Agent	Number of Samples
<i>Aglaonema</i> (CHINESE EVERGREEN)		
Leaf Spot	Bacterial	1
<i>Agrostemma</i> (CORNFLOWER)		
Miscellaneous Disorder		
Curled Leaves	Herbicide misuse	1
<i>Ajuga</i> (BUGLE WEED)		
Leaf Curl	Herbicide misuse	1
<i>Aloe</i> (ALOE)		
Dieback	Unidentified root rot	1
Miscellaneous Disorder		
Leaf Spot	Improper cultural care	1
<i>Althaea</i> (HOLLYHOCK)		
Rust	<i>Puccinia malvacearum</i>	1
<i>Araucaria</i> (NORFOLK ISLAND PINE)		
Miscellaneous Disorder		
Dieback	Improper cultural care	1
<i>Asarum</i> (GINGER)		
Root Rot	<i>Rhizoctonia solani</i>	1
Crown Rot	<i>Sclerotinia sclerotiorum</i>	1
<i>Aspidistra</i> (CAST IRON PLANT)		
Miscellaneous Disorder		
Scorch	Improper cultural care	1
<i>Begonia</i> (BEGONIA)		
Miscellaneous Disorder		
Leaf Scorch	Chemical misuse	1
<i>Bellis</i> (ENGLISH DAISY)		
Root Rot	<i>Rhizoctonia solani</i>	1
<i>Berberis</i> (BARBERRY)		
Root Rot	<i>Phytophthora</i> sp.	1
Miscellaneous Disorders		
Dieback	Environmental stress factor(s)	1
Leaf Curl	Herbicide misuse	1
<i>Boxus</i> (BOXWOOD)		
Miscellaneous Disorder		
Chlorosis	Nutrient imbalance	1
<i>Chrysanthemum</i> (CHRYSANTHEMUM)		
Leaf Spot	<i>Alternaria</i> sp.	1
Stem Canker	<i>Erwinia chrysanthemi</i>	1
Stem/Crown Rot	<i>Fusarium</i> sp.	2
Miscellaneous Disorder		
Chlorosis	Fertilizer burn	1
<i>Citrus</i> (ORANGE TREE)		
Miscellaneous Disorder		
Leaf Spot	Improper cultural care	1
<i>Cosmos</i> (COSMOS)		
Miscellaneous Disorder		
Leaf Spot	Environmental stress	1
<i>Cotoneaster</i> (COTONEASTER)		
Miscellaneous Disorder		
Dieback	Root decline	1
<i>Crassula</i> (JADE PLANT)		
Leaf Blight	<i>Botrytis</i> sp.	1
<i>Crateagus</i> (HAWTHORN)		
Rust	<i>Gymnosporangium clavipes</i>	4
Fireblight	<i>Erwinia amylovora</i>	1

TABLE 3.—Continued

Host Plant Diseases and/or Disorders	Causal Agent	Number of Samples
Miscellaneous Disorder		
Dieback	Environmental stress	1
<i>Dahlia</i> (DAHLIA)		
Tuber Rot	<i>Fusarium</i> sp.	1
Tuber Rot	<i>Penicillium</i> sp.	1
<i>Euonymus</i> (BURNING BUSH)		
Miscellaneous Disorders		
Leaf Scorch	Environmental stress	3
Chlorosis	Nutritional imbalance	2
Dieback	Stress factor(s)	2
<i>Euphorbia</i> (POINSETTIA)		
Root Rot	<i>Phythium</i> sp.	1
Stem Rot	<i>Fusarium</i> sp.	1
Top Rot	<i>Botrytis</i> sp.	1
<i>Fatsia</i> (CASTOR OIL PLANT)		
Miscellaneous Disorder		
Leaf Spot	Improper cultural care	1
<i>Ficus</i> (WEeping FIG)		
Miscellaneous Disorders		
Leaf Spot	Improper cultural care	1
Leaf Spot	Pesticide burn	1
<i>Ficus</i> (RUBBER PLANT)		
Anthraxnose	<i>Glomerella cingulata</i>	1
Miscellaneous Disorder		
Leaf Drop	Improper cultural care	1
<i>Forsythia</i> (FORSYTHIA)		
Miscellaneous Disorder		
Stem/Leaf Twist	Herbicide misuse	1
<i>Frangipani</i> (PLUMERIA)		
Stem Rot	<i>Fusarium</i> sp.	1
<i>Geranium</i> (GERANIUM)		
Root Rot	<i>Phytophthora</i> sp.	1
<i>Gladiolus</i> (GLADIOLUS)		
White Break Mosaic	White Break Mosaic Virus	1
<i>Hedera</i> (ENGLISH IVY)		
Anthraxnose	<i>Colletotrichum</i> sp.	2
Bacterial Leaf Spot	<i>Xanthomonas hederae</i>	2
<i>Hemerocallis</i> (DAYLILLY)		
Anthraxnose Leaf Spot	<i>Colletotrichum</i> sp.	1
<i>Hoya</i> (WAXPLANT)		
Miscellaneous Disorder		
Chlorosis	Stress	1
<i>Ilex</i> (HOLLY)		
Root Rot	<i>Phytophthora</i> sp.	1
Miscellaneous Disorders		
Leaf Scorch	Ice scald	3
Oedema	Stress	1
<i>Impatiens</i> (IMPATIENS)		
Root Rot	<i>Rhizoctonia solani</i>	1
Miscellaneous Disorder		
Leaf Spot	Environmental stress	1
<i>Iris</i> (IRIS)		
Miscellaneous Disorder		
Leaf Spot	Frost	1

TABLE 3.—Continued

Host Plant Diseases and/or Disorders	Causal Agent	Number of Samples
<i>Juniperus</i> (JUNIPER)		
Twig Blight	<i>Phomopsis juniperovora</i>	3
Miscellaneous Disorders		
Dieback	Environmental/site stress	4
Chlorosis	Stress factor(s)	1
Needle Burn	Oil damage	1
<i>Lonicera</i> (HONEYSUCKLE)		
Leaf Blight	<i>Herpobasidium deformans</i>	2
Anthracnose	<i>Colletotrichum</i> sp.	1
Miscellaneous Disorder		
Scorch	Stress factor(s)	1
<i>Maranta</i> (PRAYER PLANT)		
Miscellaneous Disorder		
Leaf Spot	Improper cultural care	1
<i>Monstera</i> (SWISS CHEESE PLANT)		
Anthracnose	<i>Colletotrichum</i> sp.	1
Miscellaneous Disorder		
Leaf Scorch	Improper cultural care	1
<i>Opuntia</i> (CACTUS)		
Soft Rot	Bacterial	1
Leaf Spot	<i>Phyllosticta concava</i>	1
<i>Orchid</i> (ORCHID)		
Leaf Spot	Cymbidium virus	2
<i>Pachysandra</i> (JAPANESE SPURGE)		
Leaf/Stem Blight	<i>Volutella pachysandrae</i>	5
<i>Paeonia</i> (PEONY)		
Leaf Spot	<i>Cladosporium paeoniae</i>	1
<i>Pandanus</i> (SCREW PINE)		
Miscellaneous Disorder		
Trunk Damage	Physical damage	1
<i>Parthenocissus</i> (BOSTON IVY)		
Black Rot	<i>Guignardia bidwelli</i>	2
<i>Pelargonium</i> (GERANIUM)		
Blackleg	<i>Pythium</i> sp.	3
Stem Rot	<i>Xanthomonas pelargonii</i>	1
Miscellaneous Disorder		
Chlorosis	Improper cultural care	2
Oedema	Over watering/shade	2
<i>Pteridium</i> (FERN)		
Miscellaneous Disorder		
Brown Leaf Spots	Natural spores	1
<i>Pyracantha</i> (FIRETHORN)		
Scab	<i>Fusicladium pyracanthae</i>	1
Miscellaneous Disorder		
Dieback	Winter injury	1
<i>Rhododendron</i> (AZALEA)		
Leaf Gall	<i>Exobasidium vaccinii</i>	1
Miscellaneous Disorder		
Chlorosis	Nutrient imbalance	1
Dieback	Environmental/site stress	3
<i>Rosa</i> (ROSE)		
Black Spot	<i>Diplocarpon rosae</i>	2
Petal Blight	<i>Botrytis</i> sp.	1
Canker	<i>Coniothyrium wernsdorffiae</i>	1

TABLE 3.—Continued

Host Plant Diseases and/or Disorders	Causal Agent	Number of Samples
Miscellaneous Disorder		
Leaf Curl	Herbicide misuse	1
<i>Saintpaulia</i> (AFRICAN VIOLET)		
Miscellaneous Disorders		
Root Rot	Hi soil nitrate	1
Leaf Rot	Rim rot	1
<i>Sansevieria</i> (SNAKE PLANT)		
Miscellaneous Disorder		
Leaf Spot	Improper cultural care	1
<i>Schefflera</i> (UMBRELLA TREE)		
Miscellaneous Disorder		
Leaf Spot	Improper cultural care	1
<i>Scindapsus</i> (POTHOS)		
Miscellaneous Disorder		
Leaf Spot	Sunburn	1
<i>Spathiphyllum</i> (PEACE LILLY)		
Miscellaneous Disorder		
Leaf Scorch	Environmental stress	1
<i>Streptocarpus</i> (CAPE PRIMROSE)		
Miscellaneous Disorder		
Leaf Spot	Improper cultural care	1
<i>Syringa</i> (LILAC)		
Powdery Mildew	<i>Microsphaera alni</i>	1
Miscellaneous Disorder		
Leaf Scorch	Site stress	1
<i>Tagetes</i> (MARIGOLD)		
Miscellaneous Disorder		
Leaf Curl	Herbicide drift	1
<i>Tanacetum</i> (TANSY)		
Root Rot	<i>Phytophthora</i> sp.	1
<i>Taxus</i> (YEW)		
Yew Dieback	Poor site location/root rot complex	6
Miscellaneous Disorders		
Needle Browning	Winter Desiccation	4
Tip Dieback	Freeze injury	2
Needle Curl	Herbicide drift	4
Chlorosis	Site stress	3
Needle burn	Sun scorch	1
<i>Thuja</i> (ARBORVITAE)		
Tip Dieback	<i>Pestalotia funerea</i>	2
Miscellaneous Disorders		
Needle Bronzing	Environmental stress	6
Tip Dieback	Poor root establishment	3
Dieback	Winter desiccation	3
<i>Tulipa</i> (TULIP)		
Flower Blight	<i>Botrytis</i> sp.	1
<i>Viburnum</i> (VIBURNUM)		
Powdery Mildew	<i>Microsphaera alni</i>	1
<i>Vinca</i> (PERIWINKLE)		
Stem Blight	<i>Phoma exigua</i>	3
Miscellaneous Disorders		
Dieback	Cold injury	1
Dodder	<i>Cuscuta indecora</i>	1
<i>Viola</i> (PANSY)		
Leaf Blight	<i>Botrytis</i> sp.	1

TABLE 3.—Continued

Host Plant Diseases and/or Disorders	Causal Agent	Number of Samples
<i>Wistaria</i> (WISTERIA)		
Miscellaneous Disorder		
Leaf Scorch	Stress	1
<i>Zinnia</i> (ZINNIA)		
Miscellaneous Disorder		
Leaf Curl	Herbicide drift	1
<i>Zygocactus</i> (CHRISTMAS CACTUS)		
Stunt Nematode	<i>Tylenchorhynchus</i> sp.	1

Tree Fruits

Diseases: Apple scab was epidemic in various orchards in the state due to the extreme wet spring. Peach leaf curl was prevalent early in the year due to the delayed wet spring conditions (Table 4). Bacterial spot of peach, nectarine and plum was widespread throughout the state. Powdery mildew was observed more frequently than in previous years. The increase in powdery mildew was attributed to the extreme mild winter. Fireblight, for a change, was not of widespread occurrence.

Disorders: Late freezes caused extensive losses to both the peach crop and certain apple varieties. Many apple cultivars showed extensive tattering of primary leaves due to the late spring freezes which occurred. A number of cases of individual tree death were related to a combination of a weakened tree and drought conditions.

Small Fruits

Diseases: The predominant diseases on small fruits were black rot of grape, which was epidemic on non-sprayed vineyards in southern Indiana, and strawberry leaf and stem diseases, in particular, strawberry leaf scorch (Table 5).

Disorders: Drought related problems occurred on a number of small fruits, especially brambles, late in the year. Poor fruit formation and/or malformed fruit were the major complaints.

Turfgrass

Diseases: As in previous years (1,2,3,4) the extended wet weather during the spring was conducive to considerable *Helminthosporium* leaf spot and melting out (Table 6). This disease complex was an additional stress on grass plants during the hot, dry summer which resulted in many turf areas being completely killed. Cool weather brown patch caused by *Rhizoctonia solani* was observed in many turf areas in spring. For the first time in several years, *Fusarium* blight was not a major turf problem. It is felt that the hot, dry weather rapidly killed plants and probably precluded the diagnosis of *Fusarium* blight where it was present. *Pythium* blight and *Rhizoctonia* brown patch on bentgrass were troublesome during the summer, while dollar spot was relatively light. *Ophiobolus* patch was suspected on annual bluegrass. Severe nematode problems were identified in the bentgrass greens of a central Indiana golf course.

Disorders: Improper cultural care, involving thatch build-up and environmental stress were common noninfectious problems.

TABLE 4. *Fruit Trees—Diseases and Disorders.*

Host Plant Diseases and/or Disorders	Causal Agent	Number of Samples
<i>Malus sylvestris</i> (APPLE)		
Scab	<i>Venturia inaequalis</i>	9
Cedar-Apple Rust	<i>Gymnosporangium juniperi-virginianae</i>	3
Fireblight	<i>Erwinia amylovora</i>	3
Apple Blotch	<i>Phyllosticta</i> sp.	1
Stem Canker	unidentified	1
Frog-Eye Leaf Spot	<i>Phyllosticta</i> sp.	1
Bacterial Spot	<i>Pseudomonas syringae</i>	1
Miscellaneous Disorders		
Bud Death	Cold injury	1
Chemical Injury	Improper use	2
Leaf Scorch	Heat, wind and drought	4
Trunk Canker	Incompatible Root Stock	1
Leaf Spot/Curl	Frost damage	3
Ripped Lower Leaf Epidermis	Cold	1
Twig Cankers	Freeze injury	1
Stunted Fruit	Tree decline	1
Leaf Curl	Desiccation	1
Leaf Drop	Stress	1
Rotted Fruit	Heat scald	1
Water Core	Heat	1
<i>Prunus americana</i> (PLUM)		
Black Knot	<i>Dibotryon morbosum</i>	1
Plum Pockets	<i>Taphrina deformans</i>	1
<i>Prunus avium</i> (CHERRY)		
Miscellaneous Disorders		
Root Rot	Wet site location	5
Dieback	Stress factor(s)	3
Leaf Scorch	Stress	2
Leaf Drop	Heat, wind, and drought	2
<i>Prunus persica</i> (PEACH)		
Peach Leaf Curl	<i>Taphrina deformans</i>	5
Bacterial Spot	<i>Xanthomonas pruni</i>	5
Scab	<i>Cladosporium carpophilum</i>	3
Miscellaneous Disorders		
Herbicide damage	Spray drift	1
Chlorotic Leaves	Stress	1
Leaf Scorch	Frost	1
<i>Prunus persica</i> var. <i>nectarina</i> (NECTARINE)		
Leaf Curl	<i>Taphrina deformans</i>	1
<i>Pyrus communis</i> (PEAR)		
Scab	<i>Venturia pyrina</i>	1
Miscellaneous Disorders		
Leaf Scorch	Heat, wind, and drought	10
Leaf spot	Stress	1

Vegetables

Diseases: Cool, wet weather in the early part of the growing season favored root diseases such as Rhizoctonia root rot of beans, black leg of crucifers and Sclerotinia stem rot of fresh market tomatoes. These diseases were present to some extent in most fields. However, fields severely affected by these root diseases were not common.

TABLE 5. *Small Fruits—Diseases and Disorders.*

Host Plant Diseases and/or Disorders	Causal Agent	Number of Samples
<i>Fragaria grandiflora</i> (STRAWBERRY)		
Black Root Rot	Fungal complex	8
Leaf Spot	<i>Mycosphaerella fragariae</i>	1
Leaf Scorch	<i>Diplicarpon earliana</i>	1
Leaf Blight	<i>Dendrophoma obscurans</i>	1
Gray Mold Rot	<i>Botrytis cinerea</i>	1
Root Knot Nematode	<i>Meloidogyne hapla</i>	1
Miscellaneous Disorders		
Root Rot	Cold injury/poor site	13
Herbicide Injury	Drift	2
Dieback	Poor root establishment	2
Leaf/Fruit Deformed	Chemical misuse	1
<i>Ribes</i> (GOOSEBERRY)		
Miscellaneous Disorder		
Leaf Scorch	Stress	1
<i>Rubus</i> (RASPBERRY)		
Anthracnose	<i>Elsinoe veneta</i>	3
Spur Blight	<i>Didymella applanata</i>	
Cane Gall	<i>Agrobacterium rubi</i>	1
Fruit Rot	<i>Botrytis cinerea</i>	1
Miscellaneous Disorders		
Dieback	Cold injury	7
Leaf Scorch	Heat, wind, and drought	4
<i>Vaccinium</i> (BLUEBERRY)		
Miscellaneous Disorders		
Dieback	Transplant shock	1
Leaf spot	Desiccation	1
<i>Vitis</i> (GRAPE)		
Crown Gall	<i>Agrobacterium tumefaciens</i>	1
Stem Canker	Unidentified fungus	3
Black Rot	<i>Guignardia bidwelli</i>	5
Miscellaneous Disorders		
Herbicide Injury	Spray drift	3
Leaf Spot	Environmental stress	1
Small Fruit	Heat/drought stress	1
Uneven Fruit Ripening	Heat/drought stress	1

Damping-off was not widespread on melon seedlings, presumably because of improved cold frame management practice by melon growers. A *Rhizoctonia*-induced damping-off was a significant problem for many fresh market pepper producers in northwest Indiana (Table 7). Pepper growers were also plagued by *Phytophthora* blight, especially where rotations out of Solanaceous crops were short and where disease was a problem in the past.

Hydroponic tomato growers suffered losses due to infection by *Colletotrichum coccodes*, a root rotting fungus. Management practices which tend to injure tomato stems slightly above the level of the nutrient solution were found to predispose plants to infection. The fungus gained entrance via the wounds and slowly colonized plants resulting in wilting and death of infected plants.

The foliar pathogens which often cause serious damage to maturing vegetable

TABLE 6. *Turf—Diseases and Disorders.*

Host Plant Diseases and/or Disorders	Causal Agent	Number of Samples
<i>Poa pratensis</i> (BLUEGRASS)		
Leaf Spot	<i>Helminthosporium</i> sp.	10
Fusarium Blight	<i>Fusarium roseum</i> complex	5
Red Thread	<i>Corticium fuciforme</i>	2
Brown Patch	<i>Rhizoctonia solani</i>	2
Slime Mold	<i>Physarum cinereum</i>	1
Miscellaneous Disorders		
Dieback	Drought stress	4
Excessive Thatch	Improper cultural care	12
<i>Agrostis</i> sp. (BENTGRASS)		
Stunt Nematode	<i>Tylenchorhynchus</i> sp.	2
C-15 Decline	Unknown	1
Brown Patch	<i>Rhizoctonia solani</i>	1

TABLE 7. *Vegetables—Diseases and Disorders.*

Host Plant Diseases and/or Disorders	Causal Agent	Number of Samples
<i>Allium cepa</i> (ONION)		
Leaf Rust	<i>Puccinia asparagi</i>	1
<i>Brassica oleracea</i> var. <i>capitata</i> (CABBAGE)		
Black Rot	<i>Xanthomonas campestris</i>	2
Wirestem	<i>Rhizoctonia solani</i>	2
Miscellaneous Disorder		
Chlorotic	Nutrient imbalance	1
<i>Brassica rapa</i> (TURNIP)		
Storage Rot	Unidentified bacteria	1
<i>Brasica ruvo</i> (BROCCOLI)		
Wirestem	<i>Rhizoctonia solani</i>	1
<i>Capsicum frutescens</i> (PEPPER)		
Stem Canker	<i>Rhizoctonia solani</i>	3
Miscellaneous Disorder		
Sunscald	Poor leaf coverage	1
<i>Citrullus vulgaris</i> (WATERMELON)		
Miscellaneous Disorder		
Leaf Spot	Air pollution	4
<i>Cucumis melo</i> (CANTALOPE)		
Bacterial Wilt	<i>Erwinia tracheiphila</i>	3
Fusarium Wilt	<i>Fusarium oxysporum</i>	1
Leaf Spot	<i>Alternaria cucumerina</i>	3
Miscellaneous Disorders		
Leaf Spot	Air pollution	3
Leaf Scorch	Desiccation	1
<i>Cucumis sativus</i> (CUCUMBER)		
Baterial Wilt	<i>Erwinia tracheiphila</i>	7
Miscellaneous Disorder		
Leaf Spot	Paraquat drift	1
<i>Cucurbita moschata</i> (PUMPKIN)		
Miscellaneous Disorder		
Swollen Stem	Unknown cause	1
<i>Cucurbita pepo</i> (ZUCCHINI)		
Miscellaneous Disorders		
Leaf Scorch	Heat, wind	1
Leaf Spot	Paraquat drift	1

TABLE 7.—Continued

Host Plant Diseases and/or Disorders	Causal Agent	Number of Samples
<i>Ipomoea batatas</i> (SWEET POTATO)		
Storage Rot	<i>Botrytis</i> sp.	1
<i>Lactuca sativa</i> var. <i>crispa</i> (LEAF LETTUCE)		
Miscellaneous Disorders		
Root Burn (Hydroponics)	Nutrien imbalance	2
Tip Dieback (Greenhouse)	Cultural stress	1
<i>Lycopersicon esculentum</i> (TOMATO)		
Septoria Leaf Spot	<i>Septoria lycopersici</i>	2
Early Blight	<i>Alternaria solani</i>	1
Black Dot Root Rot (Hydroponics)	<i>Colletotrichum coccodes</i>	2
Pythium Root Rot (Hydroponics)	<i>Pythium</i> spp.	2
Pythium Damping Off	<i>Pythium</i> spp.	1
Southern Wilt	<i>Sclerotium rolfsii</i>	1
Bacterial Spot	<i>Xanthomonas vesicatoria</i>	1
Bacterial Canker	<i>Corynebacterium michiganensis</i>	2
Fusarium Canker (Hydroponics)	<i>Fusarium</i> spp.	2
Fusarium Canker (Greenhouse)	<i>Fusarium</i> spp.	1
Root Knot Nematode	<i>Meloidogyne hapla</i>	1
Miscellaneous Disorders		
Blotchy Ripening	Environmental stress	4
Leaf Chlorosis	Environmental stress	1
Walnut Wilt	Juglone toxin	2
Dieback	Environmental stress	1
Stem Canker (Hydroponics)	Improper placement in tube	3
Leaf Spot	Wind, heat	3
Leaf Curl	Herbicide drift	2
Leaf Burn	Improper pesticide use	2
Catface	Environmental stress	3
Blossom End Rot	Environmental stress	2
<i>Phaseolus vulgaris</i> (SNAP BEAN)		
Root Rot	<i>Rhizoctonia solani</i>	2
Root Rot	<i>Fusarium</i> sp.	1
Stem Rot	<i>Sclerotinia sclerotiorum</i>	1
Mosaic	Mosaic virus	2
Miscellaneous Disorders		
Leaf Spot	Paraquat drift	1
Leaf Curl	Growth regulator injury	1
Leaf Burn	Heat, wind, drought	7
<i>Rheum</i> spp. (RHUBARB)		
Leaf Spot	<i>Aschochyta</i> spp.	1
Miscellaneous Disorder		
Crown Rot	Poor site location	1
<i>Solanum tuberosum</i> (POTATO)		
Tuber Rot	<i>Fusarium</i> sp.	3
Common Scab	<i>Streptomyces scabies</i>	1
Soft Rot	<i>Erwinia</i> spp.	2
Late Blight (Tuber)	<i>Phytophthora infestans</i>	1
Miscellaneous Disorders		
Leaf Curl	Herbicide drift	1
Tuber Spot	Improper storage	1
<i>Zea Mays</i> var. <i>saccharata</i> (SWEET CORN)		
Miscellaneous Disorders		
Leaf Scorch	Environmental stress	1
Leaf Spot	Paraquat drift	1
Leaf Flecking	Genetic	1

crops failed to present problems. The hot, dry weather which prevailed throughout the summer prevented serious epidemics from occurring.

Disorders: Non-infectious diseases caused significant problems among crucifers and cucurbits. A bacterial soft rot of broccoli heads developed where crops were side-dressed with excess nitrogen fertilizer. Two side-dress applications of 25 lbs N after broadcast application of 100 lbs N resulted in less head rot than side-dress applications of 50 lbs N.

Molybdenum deficiency, characterized by marginal chlorosis and necrosis occurred among muskmelon crops planted in acid (pH 4.4-5.2) soils. Remarkable recovery was achieved in several days after vines were treated with 2 oz of sodium molybdate in 100 gal water per acre. Muskmelons in sandy, acid (pH 4.5-5.5) soils suffered from magnesium deficiency where pH was not corrected by application of dolomitic lime.

The most significant revelation of 1983 was that ambient air pollution (ozone and sulfur dioxide) caused serious damage to watermelons and muskmelons (Table 7). Symptoms of air pollution damage are not unlike those produced by downy mildew infection in its early stages. It is believed that air pollution had been adversely affecting the melon crops in southwest Indiana for at least several years.

Agronomic Crops

Diseases-Wheat: A mild fall and winter followed by a cool wet spring lead to development of several wheat diseases. However, the dry weather that started in June, except in southern Indiana checked disease development. Yield losses in the northern two-thirds of the state were estimated to be approximately 7 bu/A. In the southern third of Indiana, where rainfall continued until the end of June, yield losses were estimated to be approximately 30 bu/A. The barley yellow dwarf virus was found throughout the state (Table 8). This was the most severe outbreak of barley yellow dwarf in several years. Fall infection by the virus was most prevalent in the southern half of the state. The aphid vectors of the virus were suspected of overwintering in some fields in the far southern part of the state. Wheat spindle streak was observed in the majority of fields throughout the state (Table 8). However, yield losses due to this virus disease are estimated to be approximately 3 bu/A in most fields. Septoria leaf blotch, Septoria glume blotch, powdery mildew and head scab were commonly found diseases throughout the state, but, of course were more severe in the southern third. Strip rust caused by *Puccinia striiformis* was found in trace amounts in several fields in the southeast, central and northwestern parts of the state.

Diseases-Corn: Leaf blights were at their lowest levels in many years due to the hot, dry summer. Common smut was prevalent throughout the state, and the most severe in several years. Yield losses from this disease were estimated to be approximately 1 to 2 bu/A. Due to severe temperature and moisture stress, stalk rots and ear rots were prevalent throughout the state and most severe in the more severely drought stressed areas. Fusarium ear rot was the most commonly encountered ear rot. Based on an ear rot survey *Aspergillus flavus* invasion of ears was found in approximately 12% of fields scattered throughout the state (Table 8). The most prevalent invasion occurred in the most severely drought stressed areas, and primarily the western half of the state. Aflatoxin analysis of 502 fields randomly selected from 66 counties scattered over the state revealed that approximately 7% of the field samples contained this mycotoxin. Concentrations of aflatoxin ranged from 5 ppb (parts per billion) to 500 ppb with an average concentration of approximately 85 pp. This was the most severe record of aflatoxin in Indiana.

Diseases-Soybean: *Phytophthora* root rot of soybeans was more severe and widespread than usual due to heavy rainfall in May (Table 8). *Rhizoctonia* root rot was also com-

monly found throughout the state. Brown spot and downy mildew were commonly found foliar disease of soybeans, but yield losses from these foliar diseases were in-

TABLE 8. *Agronomic Crops—Diseases and Disorders.*

Host Plant Diseases and/or Disorders	Causal Agent	Number of Samples
<i>Triticum</i> (WHEAT)		
Wheat Spindle Streak	Wheat Spindle Streak Virus	97
Barley Yellow Dwarf	Barley Yellow Dwarf Virus	43
Septoria Leaf Blotch	<i>Septoria tritici</i>	54
Powdery Mildew	<i>Erysiphe graminis</i>	6
Head Mold	<i>Cladosporium</i> sp.	4
Tan Spot	<i>Helminthosporium sativum</i>	2
Stripe Rust	<i>Puccinia striiformis</i>	1
Fusarium Root Rot	<i>Fusarium</i> sp.	1
Miscellaneous Disorders		
Inhibited Growth	Soybean residue	1
Chlorosis	Nutrient imbalance	1
Stunted Growth	Heaved out of ground	6
Leaf Mottling	Environmental stress	8
Leaf Purpling	Environmental stress	11
Root Burn	Improper fertilizer application	1
<i>Avena</i> (OAT)		
Barley Yellow Dwarf	Barley Yellow Dwarf Virus	2
<i>Hordeum</i> (BARLEY)		
Barley Yellow Dwarf	Barley Yellow Dwarf Virus	2
Leaf Scald	<i>Rhynchosporium secalis</i>	1
<i>Zea</i> (DENT CORN)		
Pythium Seedling Blight	<i>Pythium aphanidermatum</i>	6
Stewart's Blight	<i>Erwinia stewartii</i>	4
Lesion Nematode	<i>Pratylenchus penetrans</i>	4
Lance Nematode	<i>Hoplolaimus galeatus</i>	1
Ear Rots (See Below)		
Fusarium Kernel Rot	<i>Gibberella zeae</i>	2
Fusarium Kernel Rot	<i>Fusarium moniliforme</i>	2
Kernel Rot	<i>Diplodia maydis</i>	1
Kernel Rot	<i>Penicillium</i> spp.	1
Kernel Rot	<i>Helminthosporium carbonum</i>	1
Kernel Rot	<i>Aspergillus flavus</i>	30
Stalk Rot (See Below)		
Fusarium Stalk Rot	<i>Fusarium moniliforme</i>	1
Anthraxose Stalk Rot	<i>Colletotrichum graminicola</i>	1
Miscellaneous Disorders		
Curled Brace Roots	Heat stress	3
Curled Brace Roots	Herbicide damage	1
Tall Corn/Short Corn	Environmental factors	4
Purple Leaves	Environmental stress	1
Storage Rot	Poor ventilation	1
Leaf Curl	Herbicide injury	1
Seed Rot	Improper fertilizer application	1
Root Burn	Improper fertilizer application	1
Brown Leaf Streaks	Sand blasting	3
Leaf Scorch	Heat, drought	10
White Leaves	Boron toxicity	1
Stubby Roots	Herbicide carryover	8
Poor Root Growth	Compaction	6
Leaf Spot	Genetic	2
Leaf Mottle	Nutrient imbalance	1
Dead Plants	Lightning damage	1

TABLE 8.—Continued

Host Plant Diseases and/or Disorders	Causal Agent	Number of Samples
<i>Glycine</i> (SOYBEAN)		
Fusarium Root Rot	<i>Fusarium</i> sp.	1
Rhizoctonia Root Rot	<i>Rhizoctonia solani</i>	16
Phytophthora Root Rot	<i>Phytophthora megasperma</i> var. <i>sojae</i>	20
Pythium Seed Rot	<i>Pythium</i> sp.	1
Pod and Stem Blight	<i>Diaporthe phaseolorum</i> var. <i>sojae</i>	1
Stem Canker	<i>Diaporthe phaseolorum</i> var. <i>caulivora</i>	8
Brown Stem Rot	<i>Cephalosporim gregatum</i>	1
Charcoal Rot	<i>Macrophomina phaseolina</i>	8
Downy Mildew	<i>Peronospora manshurica</i>	2
Lesion Nematode	<i>Pratylenchus penetrans</i>	1
Lance Nematode	<i>Hoplolaimus galeatus</i>	1
Soybean Cyst Nematode	<i>Heterodera glycines</i>	5
Miscellaneous Disorders		
Stem Damage	Herbicide injury	3
Swollen Roots	Improper fertilizer application	1
Leaf Scorch	Herbicide splash	4
Leaf Curl	Herbicide drift	6
Leaf Chlorosis	Herbicide carryover	4
Leaf Spot	Manganese deficiency	3
Leaf Scorch	Environmental stress	3
Plants Dying	Lightning damage	1
<i>Trifolium</i> (CLOVER)		
Alfalfa Mosaic	Alfalfa Mosaic Virus	1
<i>Medicago sativa</i> (ALFALFA)		
Crown/Root Rot Complex	Various fungi and poor cultural conditions	1
Sclerotinia Crown & Stem Rot	<i>Sclerotinia trifoliorum</i>	2
Spring Blackstem	<i>Phoma medicaginis</i>	1
Root Rot	<i>Phytophthora megasperma</i>	5
Leaf Spot	<i>Leptosphaerulina briosiana</i>	4
Leaf Spot	<i>Pseudopeziza medicaginis</i>	5
Miscellaneous Disorder		
White Leaves	Herbicide carryover	1
<i>Festuca</i> (FESCUE)		
Barley Yellow Dwarf	Barley Yellow Dwarf Virus	1
<i>Hedysarum</i> (HAIRY VETCH)		
Miscellaneous Disorder		
Stunted Growth	Nutrient deficiency	1
<i>Nicotiana</i> (TOBACCO)		
Miscellaneous Disorder		
Leaf Scorch	Environmental stress	1

significant. Stem canker of soybeans was more prevalent than in previous years (1,2,3,4). The soybean cyst nematode was confirmed in five additional counties: Laporte, Starke, Jasper, Warren and Tippecanoe.

Diseases-Alfalfa: Common leaf spot, *Leptosphaerulina* leaf spot and spring blackstem were severe on alfalfa until the dry June weather occurred. *Phytophthora* root rot and crown rot complex of alfalfa were also observed early in the growing season.

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