

PARASITIC PLANT DISEASES REPORTED FOR INDIANA.

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The following summary of plant diseases in Indiana has been made up from information which has been accumulating during the past few years at the Botanical Laboratory of the Indiana Experiment Station.

In this list only the more important diseases have been considered from the standpoint of the cultivator. The information at hand is far from complete, since the diseases are invariably reported by common names, and as it is impossible to investigate or verify each case there is a probability that disturbances in growth and health do not always have the proper causes assigned. An effort has been made to classify the diseases according to their pathological effects, fifty-six in all being discussed. Such a grouping is difficult, owing to the lack of knowledge concerning the exact manner in which many of the parasites act.

Before taking up the detailed account it will be of interest from the point of view of the mycologist to consider the parasites which are held responsible for the various diseased conditions of root, stem, leaf and fruit. Out of fifty species under discussion forty-five are *fungi*, five *bacteria*, and one a *slime-mould*. Three species are causes for two separate diseases each, while three have no cause assigned, thus bringing the total up to fifty-six, the number selected for consideration by this paper. The fungus parasites are divided among thirty-two genera belonging to classes as follows: *Ascomycetes*, nine; *Basidiomycetes*, nine; *Phycomycetes*, one; *Fungi Imperfecti*, thirteen. Under the general term of *Fungi Imperfecti* are included a miscellaneous lot of forms whose life histories are imperfectly understood; some may have no other stages, while others may have connections not yet discovered. Comparatively recently three which were formerly classed here have had their perfect stages identified and have been transferred to the class *Ascomycetes*. These are the Bitter-rot fungus of the apple, the Scab-fungus of the apple and pear and the Brown-rot fungus of the peach and plum. The bacterial parasites are divided among two genera, both belonging to the same family, *Bacteriaceae*.

The enumeration of specific diseases is as follows:

I. Root diseases, affecting absorption of food materials—

Crown gall (cause uncertain). On fruit trees, small fruits, known to occur; extent of injury not reported.

Root-rot (Fungi not identified). On fruit trees; troublesome in orchards, principally in southern part.

Club-root (*Myxomycetes*, *Plasmodiophora Crassicae*). On cabbages and other cruciferae. Distribution not known. Reported from market gardening regions about larger cities.

II. Stem diseases, affecting ascent of sap and transpiration—

Fire-blight (*Bacillus amylovorus*). On apples, pears and quinces in all parts of the State. Very destructive and difficult to control.

Black-knot (*Plowrightia morbosa*). On plums and cherries. Common all over State on plum trees. Cherries less injured by it.

Black-rust (*Puccinia graminis*). On wheat, chiefly, but attacking also other grains and grasses. Occurs everywhere. Extent of injury in any particular season usually dependent upon weather.

Black-rot (*Pseudomonas compestris*). On cabbage, cauliflower and related plants. Affects leaves also, and finally entire head. Very destructive in some localities.

III. Wood diseases, affecting absorption and transfer of water—

Wilt (*Bacillus tracheiphilus*). On melons and cucumbers. A common and injurious trouble affecting melons, especially in southern countries. Few reports concerning cucumbers; this crop of much less importance.

Elight (*Bacillus salanacearum*). On tomatoes. Few local reports of this. May be due to other causes than bacteria.

IV. Bark diseases, affecting transpiration chiefly—

Canker (*Spaeropsis nialorum*, *Bacillus amylovorus*, *Glomerella rufo-maculans*). On apple trees. Cankers may be due to the parasites mentioned or others. Occurrence of any except the first mentioned has not been verified.

Asparagus rust (*Puccinia asparagi*). On asparagus. Bad locally in northwestern portion of State.

Anthracoose (*Gleosporium venetum*). On blackberries and raspberries. Often very destructive.

V. Leaf diseases, affecting assimilation and transpiration—

Rusts, caused by *uredineae* (*Gymnosporangium* sup.). On apple, pear, quince and red cedar. Not reported as very destructive on cultivated apples; common on wild crabs or thorns.

(*Puccinia rubigo-vera*.) On wheat. This is the leaf rust and is usually common, but not especially injurious.

(*Puccinia graminis*.) On wheat and other cereals. This is the stem rust and only rarely occurs to any extent on the leaves.

(*Puccinia caronata*.) On oats. Occurs very commonly on leaves, but is not accountable for losses of any extent.

(*Uromyces trifolii*.) On clover. Not known to be of much economic importance, though quite common.

(*Puccinia poarum*.) On blue-grass, often in lawns.

(*Puccinia sarghi*.) On corn. Very widespread and common, but not especially injurious.

(*Gymnoconia interstitialis*.) On blackberry and raspberry, called the orange leaf rust. Has a perennial mycelium, but manifests itself only in the leaves. Common and destructive.

(*Kuehneola albida*.) On blackberry and raspberry. First noticed this season. Not of importance.

(*Uromyces appendiculatus*.) On beans. Extent and damage unknown.

(*Uromyces caryophyllacearum*.) On carnations in greenhouses.

(*Puccinia chrysanthemi*.) On chrysanthemums in greenhouses.

Spots and Blights--

(*Phylosticta* spp.) On apple, often causing premature defoliation.

(*Cylindrosporium padi*.) On cherry and plum. Not uncommon.

(*Septoria ribes*.) On gooseberry and currant. Extent unknown; crop of minor importance.

(*Septoria lycopersici*.) On tomato. Very injurious in some localities.

(*Cercospora beticola*.) On beets. Two reports have been received.

(*Atteruariæ brassicæ nigrescens*.) On muskmellons. This is known as the leaf blight and is very injurious in some localities.

(*Calleto buchum Lagenarium*.) On melons. Known as anthraenace, and while affecting leaves, usually attacks stems and catyledons of young plants. Reported by several horticulturists.

Powdery mildew (*Spaerothaera moro-uvae*). On gooseberry. Extent of damage unknown.

Powdery mildew (*Podosphaera oxyacanthae*). On cherry. Extent of damage unknown.

Leaf curl (*Exoascus defarmanus*). On peach. Usually quite prevalent.

Early blight (*Alternaria solani*). On potato. Usually prevalent, doing considerable damage.

Late blight (*Phytophthora infestans*). On potato. Present to some extent; usually very destructive.

Black-rot (*Pseudomonas compestrio*). On cabbage and closely related crops.

VI. Fruit, Seed and Tuber diseases, affecting crop's economic value, directly—

Apple rots, ripe or bitter (*Glomerella rufomaculans*); Apple rots, black (*Sphaeropsis malorum*). Usually common and causes of considerable losses.

Brown rot (*Sclerotinia fructigena*). On peaches and plums chiefly, often causing a loss of half the crops.

Scab (*Venturia inaequalis*). On apple; very common and injurious. (*Venturia pyrina*). On pear; prevalent, but not especially prevalent. (*Cladosporium carphyllum*). On peach; bad on some varieties.

Black rot (*Gnignardia bidwelli*). On grape. Widespread and injurious.

Fruit rot (cause uncertain). On tomato. Very injurious in some localities.

Flyspeck and sooty blotch (*Leptothyrium* and *Phyllachara* spp.). On apple, often affecting a considerable per cent. of the crop.

Smuts (*Ustilago leae*). On corn; widespread, sometimes causing bad losses. (*Ustilago avenae*.) On oats; usually bad; losses underestimated. (*Ustilago tritici*.) On wheat; so-called loose smut; usually prevalent. (*Tilletia foetans*.) On wheat; so-called stinking smut; usually prevalent.

Wheat scab (*Fusarium culmorum*). On wheat; usually more or less abundant; sometimes accountable for heavy losses.

White mold of corn (*Fusarium* sp.). Very abundant in some localities during present and past seasons.

Potato scab (*Oospora scabies*). Occurs quite generally over the State.

Brown rot of potato (*Bacillus solanacearum*). Often the cause of considerable losses in all parts of State.

Black rot of sweet potato (*Ceratocyctis fimbriata*). Distribution and extent of injury unreported.



Selevotinia fructigena (ascus stage) showing apothecia about mummied peach.