

THE PLANT DISEASE SITUATION IN ILLINOIS DURING 1925.

L. R. TEHON, STATE NATURAL HISTORY SURVEY, URBANA.

In order to make an account available to those in this state and elsewhere who have use for it of the prevalence and destructiveness of crop diseases in Illinois, we have presented here in summary, each year since 1921, the observations of the Botanists of the Natural History Survey. This paper, the fifth we have prepared, continues the purpose.

WEATHER RELATIONS.

The excess temperature, when taken for the entire year, was not great, being but 1.1° more than normal, but it was coupled with a lack of rainfall averaging 3.59 inches less than normal and produced a year of drought unequalled since 1914. It is especially significant that both the excess temperature and the lack of rainfall prevailed generally from January through September, the period of the year during which our most important crops are produced and during which diseases exact their most destructive toll. The inhibitory effect of the combination of excess temperature, which amounted to 25.6 month-degrees, and the lack of rain, which was 4.96 inches less than the usual amount, was heightened by the conditions prevailing during May, the month when diseases are most actively developing into epidemic proportions. For May the temperature was 3.4° below normal and the rainfall 2.85 inches less than normal.

The fact that 59 per cent of the year's precipitation fell during the crop growing season, as compared with 56 per cent during the same period in 1924, would appear to favor disease development, but the smaller total amount of precipitation more than balanced this effect. Moreover, precipitation amounting to one one-hundredth of an inch fell on only 94 days during the year as compared to 112 days during 1924, and there were 165 clear days as compared with 159 the previous year.

DISEASES OF FRUITS.

Apples. In the southern and western fruit districts a Bitter Rot epidemic threatened during the last few days of July and through early August when rains provided favorable conditions for disease, but the drought of late August and early September prevented serious trouble. Black Rot was much less prevalent than usual, doing little damage to the fruit in spite of abundant worm injury. Blister Canker was prevalent as usual on the Ben Davis variety, which is the only one that suffers severely in Illinois. Blotch was of only slight importance, affecting mainly the market grade of the fruit. Brown rot was not seen in the state, and Rust did very little injury even to the leaves. Early in the season Fire Blight assumed serious proportions as a blossom-blight on Jonathan trees, causing 50 to 75 per cent loss in many orchards. Scab caused slight injury to fruit but could be found rarely on the leaves.

Pears. This crop suffered from no disease except blight, which was confined to serious injury of twigs in Marion County. Pear blossoms had practically all been killed by the extremely low temperatures of the previous December.

Peaches. Bacterial Shot Hole was of less significance than usual. It attacked mainly the Elbertas and Hales in the southern peach section of the state, doing only slight injury to the leaves and practically none to the fruit. Brown Rot was prevalent south of Carbondale, but the dry harvest weather prevented any considerable damage. Leaf Curl was found in only a few orchards and did practically no damage.

Plums. These are not known to have suffered from the Bacterial Shot Hole, but in the eastern section of the state Black Knot appeared to be slightly worse than usual. There was no instance of serious Brown Rot injury in commercial plum plantations.

Cherries suffered only from Brown Rot and Leaf Spot, but neither disease did serious damage anywhere in the state.

Grapes suffered but slightly from Black Rot, Downy Mildew, and Powdery Mildew. If Anthracnose was present, it passed unnoticed.

DISEASES OF CEREAL CROPS.

Wheat. More than 3,000 acres of wheat were examined in the state, but Anthracnose was found only twice and Black Chaff once. Stinking Smut was apparently widely distributed but present in very small amounts. Flag Smut, prevalent in the old infested district, was of only slight significance. Glume Blotch passed unnoticed. Leaf Rust was, as usual, the most prevalent disease but through the state generally it was so mild as to be of almost negligible significance. The Septoria Leaf Spot, commonly so abundant in Illinois, was practically absent from the state. Loose Smut occurred throughout the state, being very light and patchy in the southwest and northwest but general and heavier through the eastern and central parts, with a total infection amounting to about 0.5 per cent. Scab appeared very late and did but slight damage, being severe only on spring wheat in the extreme northern counties. Stem Rust was present throughout the state, being heaviest on winter wheat in the southeast and on spring wheat in the north, but the attack was the lightest we have recorded. A Physiological Stripe disease of wheat appeared in a few fields but was generally inconspicuous and not the cause of any appreciable injury.

Oats. Owing to the fact that this crop is chiefly spring-planted, the unusual weather attending its entire growing period notably reversed the conspicuousness of the diseases attacking it. Anthracnose was not found. Blast, or Sterility, was an important source of loss. Crown Rust, usually abundant and severe, appeared so late that it did no damage. Halo Blight, commonly a minor disease, somehow found an advantage in the unusual weather and became the most conspicuous of all the oat diseases. Scab was not seen. Smut was the most important disease, causing an apparent loss determined by representative counts of smutted heads in fields totaling more than 2,000 acres to be about 3.4 per

cent. Stem Rust appeared late and was of no consequence.

Barley. Covered Smut, which is always rare in Illinois, was seen only in McHenry County, but Loose Smut was prevalent throughout the state and was especially abundant and severe in the northern counties. Net Blotch was seen as a minor disease in the north. Stem Rust appeared only in the north where from one to a few rust spots could usually be found widely scattered on the barley stems. Stripe was the most important disease, being unusually abundant in the north where instances of infection as high as 12 per cent were seen, but elsewhere it was rare.

Rye. Leaf Rust was the most prevalent and important disease but did very little damage. Stem Smut occurred in widely isolated spots in western and northern parts of the state, causing very little injury but appearing to occur more widely and generally farther north than a year ago.

Corn. Bacterial Wilt was very rare in field corn, producing only light infections which resulted chiefly in mild leaf injury. Brown Spot occurred throughout the southern half of the state, doing very little damage. Rust occurred throughout the state in unusual amounts, being especially abundant in the west and north, but it did no appreciable injury to the plants it attacked. Smut appeared in practically all the fields of the state, being more abundant in the southwest than elsewhere but doing relatively little damage. Ear Rot was much less abundant than a year ago, the apparent damage record in most of our field examinations running less than 0.5 per cent. The Root- and Stalk-rot reports, though of necessity quite incomplete, indicate an infection of from 14 to 18 per cent of the plants and a crop loss of from 5 to 6 per cent.

MISCELLANEOUS CROPS.

Alfalfa. Anthracnose was rare. Leaf spots, however, were abundant, those caused by *Cercospora*, *Pleosphaerulina*, and *Pseudopeziza* being the ones especially noticed. There was a single instance of damage by the *Rhizoctonia* Root Rot. The Alfalfa Stem Nematode,

Tylenchus dipsaci, was found in two recently sown fields in Brown county. A new bacterial disease, caused by *Aplanobacter insidiosum*, appears to be prevalent throughout the state, oftentimes in rather serious amounts.

Beans. The only disease of any consequence was the Bacterial Leaf Spot, which appeared early in June and continued to be mildly prevalent until harvest.

Blackberries. The Eldorado and Early Harvest varieties suffered severely from Orange Rust in some southern districts. Other diseases were so mild as to pass almost unnoticed.

Cabbage. Black Rot and Yellows were prevalent in serious amounts, but the infection was generally much lighter than in an average year.

Clover. Powdery Mildew was prevalent throughout the state but was less intense than in any season since its appearance in Illinois. The Bacterial Leaf Spot caused by *Pseudomonas trifoliorum* was prevalent in very unusual abundance throughout the northern half of the state, the severity of its attack adding materially to the damage done by the clover bud weevil whose injuries to the plants appeared to afford good opportunity for bacterial infection. A round Leaf Spot, due to *Thyrospora sarcinaeforme*, was prevalent but not serious. The Leaf Spot caused by *Cercospora zebrina*, which has been so prevalent in Illinois during past seasons, was very rare. Mosaic, not hitherto much seen, was found in all parts of the state in slight amounts. White and Alsike clovers were attacked generally by Rust, but Red Clover was seen with it only twice.

Cotton. The Bacterial Spot of cotton was prevalent chiefly on the bolls, seldom showing on the leaves, but was too light to do any serious damage to the crop.

Cow Pea. Bacterial Spot of the leaf and pod was prevalent but not often serious. A Wilt, the cause of which we do not know, was common in southern counties, killing from 2 to 10 per cent of the plants in diseased fields.

Pop Corn. In DeKalb and LaSalle Counties this crop was subject to a heavy but not damaging attack of Rust. Smut infection was confined almost entirely to the tassels.

Potatoes. Early Blight, Tip Burn, Scab, and Mosaic attacked this crop, none, however, being serious except Mosaic.

Raspberries. Mosaic and Bramble Streak were prevalent, the former being more widely distributed and more severe. Anthracnose injury was remarkably light in comparison with the usual season.

Soy Bean. The Bacterial Leaf Spot was very prevalent, though only mildly injurious. Two other Leaf Spots, one caused by *Phyllosticta phaseolina* and one associated with an *Alternaria*, were occasionally encountered. In a few places a Root Rot was seen, the infected fields having from a few up to 10 per cent of the plants killed.

Sweet Clover. The *Cercospora* Leaf Spot caused considerable defoliation after the middle of June, reducing the forage value of the crop.

Timothy. The Leaf Blight caused by *Scolecotrichum graminis* was prevalent, its injuries detracting materially from the food value of the hay. Stem Rust was prevalent only in the extreme north, though seen elsewhere, and Smut was found but twice during the season.

Watermelon. Wilt was prevalent in most districts, being enormously destructive unless the precaution to use new ground had been taken. Anthracnose was of little importance.

SUMMARY.

The prevalence of crop diseases in 1925 presents a striking contrast to that of the other years of our record. In the past we have called attention to their severity and to the great damage to crops resulting from their attack but this season we have had to speak of their mildness, rarely mentioning any considerable damage. Leaf rust of wheat, the most destructive disease of that crop, furnishes an illustration of the contrast, which may be made more concrete than the remarks we have made above. During the three previous seasons this disease

occurred on an average of 83.4 per cent of the wheat stalks in the state, occupying an average of 33.5 per cent of the total wheat leaf area in the state; but in 1925 only 63.5 per cent of the stalks carried the disease, and it occupied only 6.5 per cent of the leaf area. Comparisons could be made of many other diseases with similar results. The very warm dry weather of the growing season appears to have been the chief reason for the difference. Even under such unfavorable conditions, however, most diseases were able to establish themselves well enough to insure an abundance of infective material for a new season.