# OBSERVATIONS ON THE DISEASES OF FORAGE CROPS IN PRINCE EDWARD ISLAND[1/]

C. B. Willis[2/]

## Abstract

A 3-year survey of diseases occurring on forage legumes and grasses in Prince Edward Island indicated that several diseases were widespread and destructive. Common leaf spot (Pseudopeziza trifolii (Biv.-Bern. ex Fr.) Fckl. f. sp. trifolii-pratensis Schlepp) was the most destructive leaf spot disease on red clover. Sooty blotch (Cymadothea trifolii (Pers. ex Fr.) Wolf) was very destructive-on alsike clover. Common leaf spot (Pseudopeziza trifolii f. sp. medicaginis-sativae Schlepp) was the most destructive leaf spot on alfalfa. Crown rot (Sclerotinia trifoliorum Erikss.) caused more than a 10 per cent loss in clover stands in 1964. The root rot complex in forage legumes was considered to be the most important deterrent to forage production. None of the diseases observed on forage grasses were considered to be of economic importance.

## Introduction

Hay, forage crops, and improved pastures account for 60 percent of the improved land, or one-third of the total land area, of Prince Edward Island. Of the legumes and grasses utilized for livestock consumption, red clover is the most widely grown legume and timothy the most widely grown of the grasses. No survey of forage crop diseases had been conducted and, therefore, records were undoubtedly incomplete. It seemed advisable, therefore, to conduct such a survey in order to provide a basis for future research.

In 1962 a 3-year survey was initiated to determine the occurrence of specific diseases of the predominant legumes and grasses grown for forage in Prince Edward Island. Some evaluation of economic significance of the specific diseases was also an objective. The results of the survey are presented in this paper.

## Materials and Methods

Forage production is distributed throughout all three counties of Prince Edward Island. Surveys were carried out so as to include visits to each of the counties prior to the first cutting of hay in early July and again later in the season. Fields for inspection were selected at random and approximately the same number were selected in each of the counties. Fields in varying years of production were selected for inspection. Plants of each species growing in the fields were examined carefully at a predetermined number of stops in a walk through representative areas of the fields. A number of fields were inspected in early spring to determine the extent of crown rot and winter injury damage.

## Results and Discussion

The role played by diseases in losses of forage stands or in forage production and quality is difficult to determine. The occurrence of each disease on the plant species observed is listed in Table 1. From the information obtained, it was not possible to make an accurate appraisal of losses caused by all of the diseases observed. Some indication of the losses caused by the more commonly observed 'diseases follows.

1/ Contribution No. 142 from the Experimental Farm, Canada Department of Agriculture, Charlottetown, P.E.I.

2/ Plant Pathologist.

Table 1. Diseases of forage crops in Prince Edward Island.

| Crop and Disease | Disease Class [1] | Distribution [2] |
|---|---|---|
| RED CLOVER (Trifolium pratense L.) | | |
| Common leaf spot (Pseudopeziza trifolii (Biv.-Bern. ex Fr.) f. sp. trifolii-pratensis Schlepp) | 1 | 1 |
| Target spot (Stemphylium sacrinaeforme (Cav.) Wilts.) | 2 | 1 |
| Black stem (Phoma trifolii E.M. Johnson & Valleau) | 2 | 2 |
| Rust (Uromyces trifolii (Hedw. f.) Ldv.) | 2 | 1 |
| Northern anthracnose (Kabatiella caulivora (Kirchn.) Karak) | 2 | 2 |
| Southern anthracnose (Colletotrichum trifolii Bain & Essary) | 3 | 3 |
| Black patch (unidentified sp.) | 1 | 1 |
| Head blight (Botrytis cinerea Pers.) | 2 | 2 |
| Powdery mildew (Erysiphe polygoni DC. ex Mérat) | 2 | 2 |
| Sooty blotch (Cymadothea trifolii (Pers. ex Fr.) Wolf) | 2 | 2 |
| Pepper spot (Leptosphaerulina trifolii (Rostr.) Petrak) | 3 | 3 |
| Crown rot (Sclerotinia trifoliorum Erikss.) | 1 | 1 |
| Root rots (various fungi) | 1 | 1 |
| Phyllody (clover phyllody virus) | 2 | 1 |
| Viruses (unidentified) | 2 | 2 |
| ALSIKE CLOVER (Trifolium hybridum L.) | | |
| common leaf spot (Pseudopeziza trifolii f. sp. trifolii-pratensis) | 2 | 2 |
| Sooty blotch (Cymadothea trifolii) | 1 | 1 |
| Black stem (Phoma trifolii) | 2 | 3 |
| Rust (Uromyces trifolii) | 2 | 1 |
| Pepper spot (Leptosphaerulina trifolii) | | |
| Powdery mildew (Erysiphe polygoni) | | |
| Crown rot (Sclerotinia trifoliorum) | 1 | 1 |
| Root rots (various fungi) | 1 | 1 |
| Phyllody (clover phyllody virus) | 2 | 1 |
| Viruses (unidentified) | 2 | 3 |
| WHITE CLOVERS (Trifolium repens L.) | | |
| Common leaf spot (Pseudopeziza trifolii f. sp. trifolii-pratensis) | 2 | 3 |
| Sooty blotch (Cymadothea trifolii) | 2 | 1 |
| Pepper spot (Leptosphaerulina trifolii) | 2 | 2 |
| Rust Uromyces trifolii) | 2 | 2 |
| [Uromyces nerviphilus (Grognot) Hotson) | 3 | 3 |
| Root and stolon rots (various fungi) | 1 | 1 |
| Phyllody (clover phyllody virus) | 2 | 1 |
| ALFALFA (Medicago sativa L.) | | |
| common leaf spot (Pseudopeziza trifolii f. sp. medicaginis-sativae Schlepp) | 1 | 1 |
| Spring black stem (Phoma sp.) | 2 | 1 |
| Summer black stem (Cercospora zebrina Pass.) | | |
| Yellow leaf blotch (Leptotrochila medicaginis (Fckl.) Schlepp | | |
| Root and crown rots (various fungi) | 1 | 1 |

Table 1. (continued)

| Crop and Disease | Disease Class[1] | Distribution[2] |
|---|---|---|
| TIMOTHY (Phleum pratense L.) | | |
| Eyespot (Heterosporium phlei Gregory) | 2 | 2 |
| Brown stripe (Passalora graminis (Fckl.) Höhn.) | 2 | 2 |
| Powdery mildew (Erysiphe araminis DC.) | 2 | 3 |
| QUACK GRASS (Agropyron repens (L.) Beauv.) | | |
| Speckled leaf blotch (Septoria elymi Ell. & Ev.) | 2 | 1 |
| Powdery mildew (Erysiphe graminis) | 2 | 2 |
| ORCHARD GRASS (Dactylis glomerata L.) | | |
| Leaf spot (Mastigosporium rubricosum (Dearn. & Barth.) Sprague) | 3 | 3 |
| BLUEGRASSES (Poa spp.) | | |
| Powdery mildew (Erysiphe graminis) | 2 | 2 |
| Melting-out (Bipolaris sorokiniana (Sacc. in Sorok.) Shoem.) | 2 | 2 |

1/ 1 = major importance; 2 = minor importance; and 3 = rare importance.

2/ 1 = observed in a majority of fields; 2 = observed in less than half of fields; and 3 = observed 1 or 2 times.

## Diseases of Clovers

Common leaf spot (Pseudopeziza trifolii (Biv.-Bern. ex Fr.) Fckl. f. sp. trifolii-pratensis Schlepp) was one of the most common leaf spots of red clover in Prince Edward Island. It was present in a majority of the fields each year. It was most prevalent and severe during the latter part of the summer and fall. Infections on alsike and white clovers were of minor importance.

Target spot (Stemphylium sarcinaeforme (Cav.) Wilts.) was observed on red clover only. In 1962, the severity was moderate to severe in fields where cutting was delayed. In 1963 and 1964, the severity ranged from slight to moderate.

Black patch (cause undetermined) was present on red clover in moderate to abundant amounts, particularly in 1963 and 1964. Considerable defoliation and loss in quality resulted where stands were dense and cutting was delayed.

Sooty blotch (Cymadothea trifolii (Pers. ex Fr.) Wolf) was of minor importance on red and white clovers. It was the most prevalent and destructive of the foliage diseases observed on alsike clover. It occurred every year, causing some losses in foliage, but was responsible for extensive losses in the quality of forage harvested.

Root and crown rots (Sclerotinia trifoliorum Erikss. and several other fungi) constituted the most important group of diseases during the period of this survey. Crown rot was observed in 1964 but not in 1963; no observations in 1962; while root rots were present in moderate to severe amounts every year.

The winters of 1961-62 and 1962-63 were severe, resulting in reductions in stand ranging up to 75 percent. The surviving plants were mostly injured, weak, and ready prey for root rots which further reduced stands. Second-year stands were generally

poor. Conditions for survival during the winter of 1963-64 were quite favorable and there was a continuous snow cover. Losses in stands, however, ranged from 4 to 34 percent. Crown rot was responsible for most of this loss. Losses in stand from crown rot alone were as high as 25 percent.

Damage to roots by root feeding insects (Sitona spp.) was considered extensive in two areas of the province in 1964. Roots of damaged plants were rotting at an accelerated rate.

Virus diseases (clover phyllody and other unidentified viruses) were prevalent every year. Red, alsike and white clovers displaying phyllody symptoms were observed wherever the clovers were found growing. Infections appeared to be more abundant on alsike clover than on red or white clovers. In older stands, up to 20 percent of the plants were showing symptoms. Other virus diseases, the causes of which were not identified, were observed in trace amounts in older stands.

## Diseases of Alfalfa

Common leaf spot (Pseudopeziza trifolii f. sp. medicaginis-sativae Schüepp) was the most prevalent and widely distributed leaf spot on alfalfa. It occurred every year and caused some loss in foliage prior to harvest. Defoliation was very heavy by late fall.

Spring black stem (Phoma sp.) was generally prevalent in all three years. Infections were moderate to severe in dense, pure stands but only slight to moderate in mixed stands.

Root and crown rots (various fungi), as with the clovers, comprised one of the most important groups of diseases. Injury to old stands was very severe in 1963. The effects of root rots were usually confounded with the effects of other injurious factors and, therefore, damage caused exclusively by the rots was difficult to determine. In general., the damage was not as extensive as in the clovers.

## Diseases of Grasses

Relatively few diseases were observed on the grasses utilized for forage in Prince Edward Island. Of those observed, speckled leaf blotch (Septoria elymi Ell. & Ev.) on quackgrass was the most generally prevalent. Infections, however, varied from a trace to slight and were not considered to be responsible for appreciable loss of forage.

# LOSSES OF COLD-STORED STRAWBERRY PLANTS DUE TO MOLD, AND FACTORS AFFECTING THE SURVIVAL OF NEW PLANTINGS IN THE FIELD - 1964

C. L. Lockhart[1]/

A survey of 4 commercial strawberry plant cold storage units in Nova Scotia revealed varying degrees of losses of stored plants as shown in Table 1. Loss of plants in lot D was apparently due to a delay in getting the plants cooled in storage resulting in storage temperatures which favored mold development. The losses in lot A were not associated with improper storage temperature but could have been due to the low oxygen and high carbon dioxide levels recorded in the poly-lined storage crates of this lot in which the polyliners were wrapped tighter than recommended.

Fusarium spp., Cylindocarpon sp., Rhizoctonia sp. and bacteria were the most commonly found organisms growing over the surface of the root; or associated with cortical root rots of stored plants. Isolations from cortical root rot lesions, however, yielded the following in descending order of prevalence: bacteria, Rhizopus sp., Fusarium spp., Penicillium sp., Actinomucor sp., Gliocladium sp., Trichoderma sp., Harknesia sp., Alternaria sp., Botrytis cinerea and Gloeosporium sp.

1/ Plant Pathologist, Canada Agriculture Research Station, Kentville, Nova Scotia.