Etiology of Alfalfa Blossom Blight Caused by Sclerotinia sclerotiorum and Botrytis cinerea

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ABSTRACT


Blossom blight caused by Sclerotinia sclerotiorum and Botrytis cinerea is an important disease of alfalfa in the forage seed production areas of western Canada. A greenhouse study was conducted to determine the relative importance of these two pathogens in causing blossom blight of alfalfa, and the roles of humidity and floral parts in development of this disease. Tripping alfalfa florets with spores of S. sclerotiorum or B. cinerea not only caused infection of styles, but also reduced pod formation and seed production. Under humid conditions, the pathogens grew from infected styles, spread rapidly onto pods, and infected seeds. The frequency of infected seeds was higher when humidity was applied at the mature pod stage than when applied at the young pod stage. The rate of seed infection was reduced in the absence of flower petals, suggesting that senescent petals play an important role in movement of the pathogens from infected styles to seeds. Losses in pod formation, seed yield and seed quality were more severe for S. sclerotiorum than for B. cinerea. Humidity, the presence of senescent petals, and the age of pods all affect the development of alfalfa blossom blight caused by S. sclerotiorum and B. cinerea.

Key words: Blossom blight, Sclerotinia sclerotiorum, white mold, Botrytis cinerea, gray mold, Medicago sativa, alfalfa, lucerne, etiology

INTRODUCTION

Alfalfa (Medicago sativa L.) is the most important leguminous forage crop in Canada. In 1996, the area for alfalfa tame hay production in Canada was 3.6 million ha (1). Approximately 4,200 ha of seed alfalfa was grown in Alberta in 1996, resulting in a total seed yield of nearly 3000 t (2). This represents more than 50 percent of Canadian alfalfa seed production (Harold Moore, personal communication). The pollinating insect, alfalfa leafcutter bee (Megachile rotundata (Fabricius)), is used exclusively in commercial production of alfalfa seed in Canada (5).

Blossom blight, caused by Sclerotinia sclerotiorum (Lib.) de Bary and Botrytis cinerea Pers.:Fr., has become an important disease of alfalfa in the forage seed production areas in western Canada (6, 7, 8, 9). Both pathogens have been found throughout the Canadian prairies, and their occurrence varies with year and region. The fungicide, benomyl, has recently been registered for control of S. sclerotiorum and B. cinerea on alfalfa in Canada (3).

Understanding the cause and development of blossom blight of alfalfa is crucial in developing effective control measures for the disease. The objectives of this study were to determine the importance of S. sclerotiorum and B. cinerea in causing blossom blight of alfalfa and to determine major factors affecting the development of this disease.

MATERIALS AND METHODS

Seeds of alfalfa, cultivar Barrier, were planted in Cornell Peat-Lite Mix™ (4) in Root- trainer books™ (Spencer-Lemaire Industries Ltd., Edmonton, Alberta, Canada) and grown in a greenhouse at 20 ± 5 °C. After 10 weeks, plants were transplanted into Cornell Peat-Lite Mix™ in plastic pots (16 cm in diam.), watered daily, and used for the experiments during the blossom period.

Effect of pathogens on alfalfa pods, styles and seeds.

Sclerotinia sclerotiorum, isolate LRC 2148, and Botrytis cinerea, isolate LRC 2421, were used to study the effects of these pathogens on alfalfa styles, pods and seeds. For S.