In recent years, dry bean production has rapidly expanded to more than 200,000 acres in Manitoba. However, this increase in acreage has been threatened by an outbreak of bean anthracnose. Anthracnose, caused by the fungus *Colletotrichum lindemuthianum*, can severely reduce seed yield, quality and marketability in all the major bean classes. Disease surveys have determined that anthracnose was present in a high percentage of dry bean fields throughout southern Manitoba.

The anthracnose fungus causes dark brown lesions to form on all the aboveground parts of the plant. On the leaves, lesions typically occur along the veins and are most obvious from the underside of the leaf. Heavy infection of the leaves often results in early defoliation. Anthracnose also causes the formation of sunken lesions on the stems and pods. Within these lesions a pinkish exudate is present that consists of spores embedded in a mucilaginous substrate. Pod infection ultimately results in the formation of dark brown lesions on the seed.

The pathogen is primarily spread by infected seed and can survive on infected crop stubble. Infected seed also can introduce new races of the pathogen into different geographic regions. Anthracnose can move into new fields with infected seed, which give rise to diseased seedlings that act as a source of inoculum of the anthracnose fungus that is spread to adjacent plants by splashing rain. Sowing infected seed also results in poorer emergence and reduced seedling vigor. Seed producers need to maintain very high standards of disease control in order to maximize yield and provide bean producers with high quality, disease-free seed. Growers should have seed samples tested to ensure they are not infected. The use of disease-free seed is a critical component of any strategy to prevent losses caused by this disease.

Frequent rainfalls favor sporulation and infection of beans by *C. lindemuthianum*. Once lesions begin to form on the seedlings, the spores of the fungus can be spread by splashing rain from infected plants to healthy plants. Splashing rain also moves the disease further up the plant and onto the pods. Temperatures above 28°C will inhibit infection and interfere with the growth of the anthracnose fungus. However in Manitoba, high temperatures are not a major factor in reducing disease buildup, since high daytime temperatures are offset by low nighttime temperatures that are conducive for the spread of anthracnose.

Seed-treatment fungicides are available that reduce transmission of anthracnose to the seedlings. However, seed treatment will not eliminate the disease from heavily infected seed. A seed treatment study in 2001 demonstrated that DCT (diazinon, captan and thiophanate-methyl) was more effective in reducing seed-borne transmission of anthracnose than other seed-treatments registered for disease control in beans.

Several foliar fungicides also will decrease the spread of the disease. A study at field sites in Morden and Winkler demonstrated that application of the foliar fungicide Headline could reduce losses in seed yield and quality from this disease. The timing of application was a critical factor in determining the effectiveness of the spray application in reducing disease severity and seed infection. Applications of Headline prior to flowering reduced yield losses if there was an early disease buildup, but did not prevent late infection of the pods and seed. Spray applications at the early or late bloom stage minimized yield losses and reduced seed infection. Application of Headline at ten days after the end of flowering did not
always prevent yield losses or high incidences of seed infection. Headline application during flowering reduced yield losses by 33% if severe infection occurred early in the growing season and by 11% where the buildup of anthracnose occurred late in the season.

The anthracnose fungus has a limited host range that includes faba beans, mung beans and scarlet runner beans, so dry beans are the most important crop on the prairies that is affected by this pathogen. This provides the growers with many options for selecting alternate crops for inclusion in long term rotations. Field studies have shown that the anthracnose fungus can survive on infected crop debris for up to two years. Bean anthracnose can be controlled by crop rotation for 2-3 years with nonhost crops and by planting disease-free seed. Anthracnose has been reported to be most severe in fields where beans have been grown for more than one year on the same field.

Worldwide, a large number of races of the anthracnose fungus have been identified. To date, researchers have detected six or seven races of *C. lindemuthianum* in Ontario. However, the identity of the prevalent races in Manitoba has not been determined. Research has recently been initiated to identify the prevalent anthracnose races in Manitoba.

Resistance to many of the common races of the anthracnose fungus has been identified in cultivars developed in Ontario. However, anthracnose is a new problem in western Canada, so cultivars specifically developed for this region have not been selected for resistance to anthracnose. For that reason, many of the bean cultivars grown in the prairie provinces are highly susceptible to the common races of anthracnose. A joint research project is underway, involving researchers from the Morden Research Station, Lethbridge Research Centre, the Greenhouse and Processing Crops Research Centre in Harrow, Ontario and the Crop Development Centre at the University of Saskatchewan, that is focusing on the development of resistant bean cultivars for the Canadian prairies. In this study, advanced breeding lines and registered cultivars are being evaluated for their reaction to the Alpha, Alpha Brazil and Delta races of the anthracnose fungus.

Information from ongoing studies on race identification, resistance and fungicidal control will form the basis of an integrated management system that should eliminate bean anthracnose as a major concern in dry bean production on the prairies.