Fungicides Applied at Four Application Timings to Two Field Pea Cultivars with Differing Flower Durations for White Mold Disease Control

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INTRODUCTION

Field peas are one of the fastest growing crops in North Dakota. Greater than 200,000 acres were planted in the state in 2004, making it a major crop. However, field peas are also very desirable due to the nitrogen fixation capabilities of the legume. Greater than 250,000 acres were planted in North Dakota. Research studies conducted in 2003 indicated that some fungicides and timings may provide some control of the disease. The studies initiated in 2004 will qualify some of the 2003 findings and determine differences in susceptibility between two cultivars with determinate and indeterminate type of flowering.

MATERIALS AND METHODS

Yields were conducted at the Carrington Research Extension Center, near central North Dakota, and the Langdon Research Extension Center, northeast North Dakota, in 2004 to evaluate fungicides, application timings, and field pea cultivars. The studies were designed as a randomized complete block arranged as a 3 x 4 x 2 factorial with four replicates. The fungicides were tested at experimental rates as follows: Topsin M, 1 lb/acre; JAU 6476, 1 lb/acre; and Endura, 1 lb/acre. The flowering stages of growth to an indeterminate ‘Eclipse’ and a determinate ‘Integra’ flowering type cultivars. Sites with a history of white mold disease were selected. In addition, inoculation was introduced into the soil before crops emergence and inoculum applied after flowering initiation to improve chance of disease infection. Supplemental water was applied by overhead sprinkler to improve chance of sclerotia germination and subsequent disease infection by the inoculum. Crop production practices for field peas for the respective regions of the state as recommended by the North Dakota State University Extension Service were followed. The cultivars were planted with disk drills, 6-inch row spacing. Disease and yield data were collected approximately 10 to 14 days following application. The region experienced one of the coldest summers on record. The Langdon average temperature from May through August was 1.5 degrees less than the previous year. Both crops received nearly all of the summer with flowers still evident on Eclipse at the end of the growing season. A frost on August 20 at Langdon, also a new record, damaged many susceptible crops in the region. The field peas were not visibly damaged but may have been affected. Significant differences in sclerotinia incidence were measured between cultivars and timings at Langdon and Carrington (Figure 1 and 2). No differences were measured with Eclipse cultivar regardless of timing at Langdon. However, late fungicide timing was more effective at Carrington on Eclipse compared to Integra. In addition, significant differences were observed between Eclipse and Integra cultivars (62.6 and 63.8 lb/bu and 20.4 and 19.3 %, respectively). Hundred seed weight was affected differently by timings and fungicides (Figure 3). At Langdon, seed protein was reduced by JAU 6476 fungicide (Figure 4). Yield at Carrington, was significantly greater when Endura fungicide was applied at 100% bloom growth stage compared to 45% bloom stage (Figure 5). However, 10% bloom stage fungicide timings with JAU 6476 produced greatest yields.

DISCUSSION

The Langdon average temperature from May through August was 1.5 degrees less than the previous year. Both crops received nearly all of the summer with flowers still evident on Eclipse at the end of the growing season. A frost on August 20 at Langdon, also a new record, damaged many susceptible crops in the region. The field peas were not visibly damaged but may have been affected. Significant differences in sclerotinia incidence were measured between cultivars and timings at Langdon and Carrington (Figure 1 and 2). No differences were measured with Eclipse cultivar regardless of timing at Langdon. However, late fungicide timing was more effective at Carrington on Eclipse compared to Integra. In addition, significant differences were observed between Eclipse and Integra cultivars (62.6 and 63.8 lb/bu and 20.4 and 19.3 %, respectively). Hundred seed weight was affected differently by timings and fungicides (Figure 3). At Langdon, seed protein was reduced by JAU 6476 fungicide (Figure 4). Yield at Carrington, was significantly greater when Endura fungicide was applied at 100% bloom growth stage compared to 45% bloom stage (Figure 5). However, 10% bloom stage fungicide timings with JAU 6476 produced greatest yields.