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

2004 Results

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INTRODUCTION

Field peas are one of the fasting growing crops in North Dakota. Greater than 250,000 acres were planted in the state in 2004 vaulting North Dakota to number one in planted acreage in the United States. Field peas fit well into rotations that include small grains due to different pathogen susceptibility. Field peas are also very desirable due to the minimal need for added nitrogen fertilizer and its ability to leave a very substantial amount of nitrogen available for the following year's crop. Growers are including field peas in rotations that include other broadleaf crops susceptible to white mold (*Sclerotinia sclerotiorum*). 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

Trials were conducted at the Carrington Research Extension Center, east central North Dakota, and 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 Bayer experimental JAU 6476 (prothioconazole), Endura (boscalid), and Topsin M (thiophanate methyl) and were applied at 10, 40, 100, and 10 + 100% flowering stage 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 sclerotia were incorporated into the soil before crop emergence and ascospores applied after flower 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 ascospores. Crop production practices for field pea 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. After flowering ceased the incidence of disease was determined by visual estimation of 10 feet of row. The location of the infection was recorded when it infected the main stem. The studies were harvested with small plot type combines and processed to determine yield, test weight, and protein.

DISCUSSION

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 low. Both crops flowered nearly all 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. At Langdon cultivar differences were measure for sclerotinia incidence, yield, and test weight (Figure 3). Carrington also had test weight and protein differences 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 4). At Langdon, seed protein was reduced by JAU 6476 fungicide (Figure 5). Yield at Carrington, was significantly greater when Endura fungicide was applied at 100% bloom growth stage compared to 40% bloom stage (Figure 6). However, 10% bloom stage fungicide timings with JAU 6476 produced greatest yields.

The difference in vine length, Eclipse much longer than Integra, may have contributed to the lower disease incidence on Eclipse as the spores would have to travel upward further to infect the flowers. Contrasting results are reported between the sites. Further research is warranted to qualify these results.

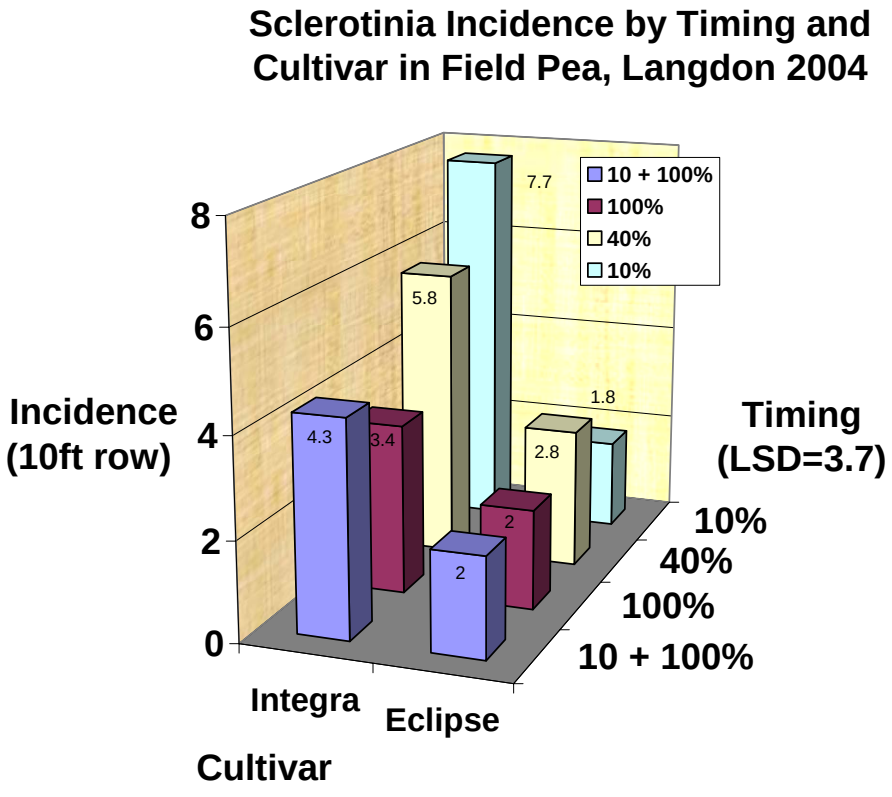

Figure 1.

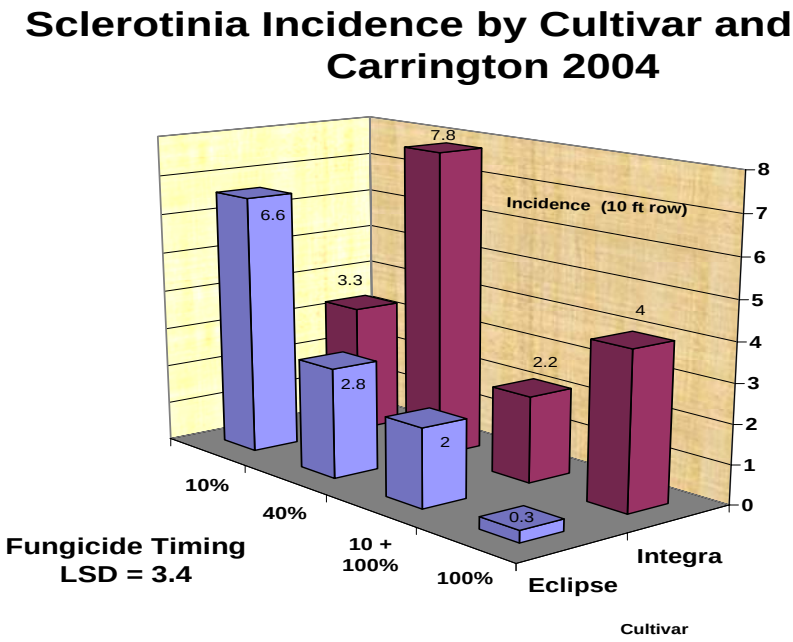

Figure 2.

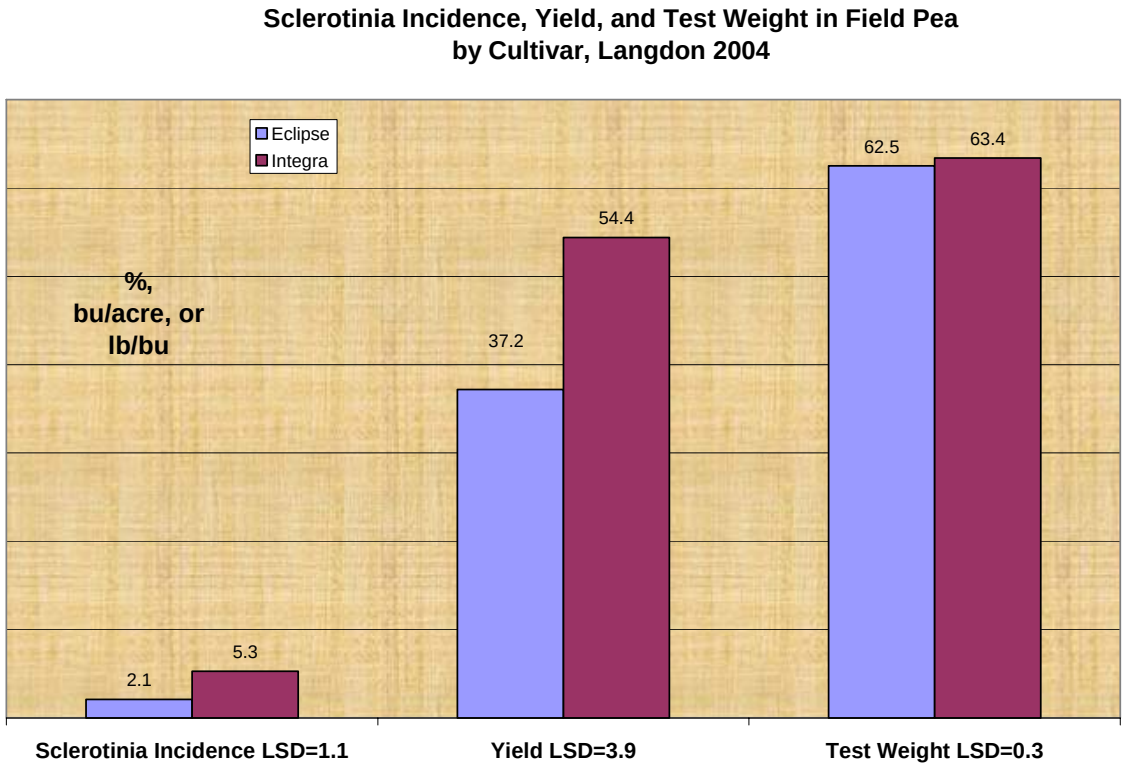

Figure 3.

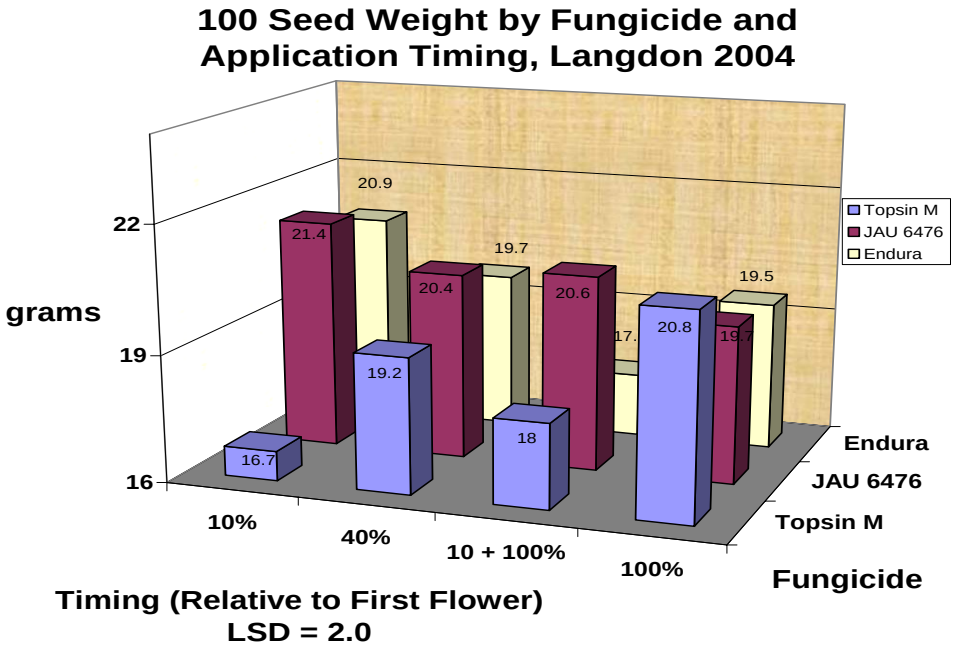

Figure 4.

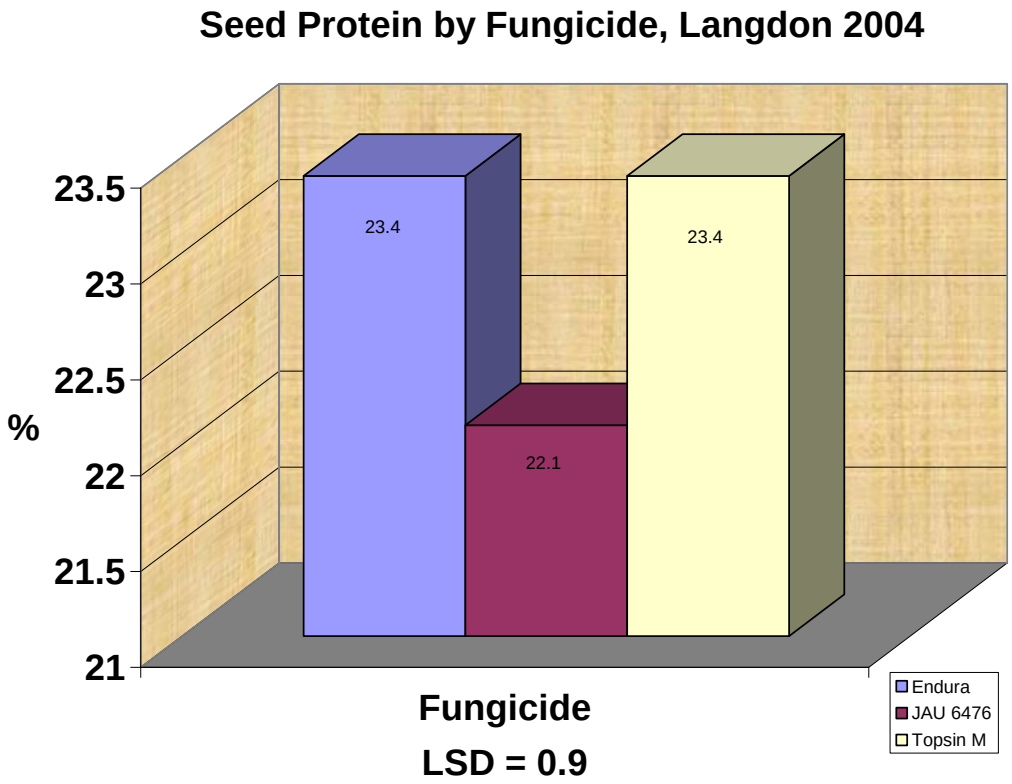

Figure 5

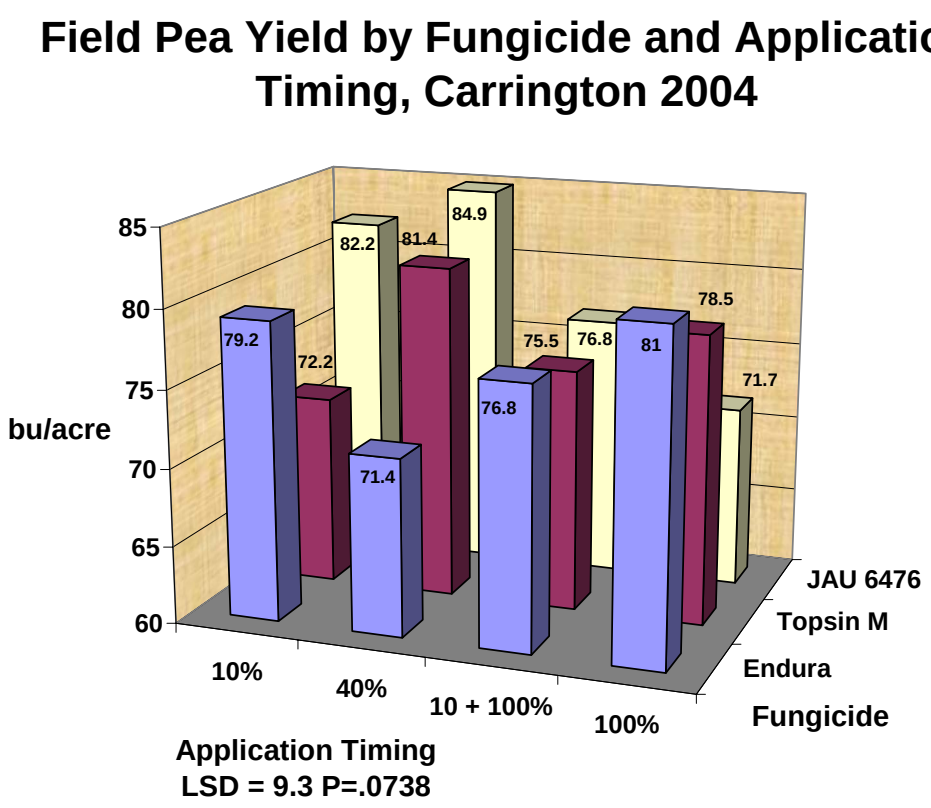
Field Pea Yield by Fungicide and Application Timing, Carrington 2004
bu/acre
85
80
75
70
65
60
79.2
72.2
71.4
82.2
81.4
84.9
75.5
76.8
76.8
81
78.5
71.7
10%
40%
10 + 100%
100%
Application Timing
LSD = 9.3 P=.0738
JAU 6476
Topsin M
Endura
Fungicide

Figure 6.