Seeding Date and Cultivar Affects Growth and Yield of Camelina

H.Y. Sintim\textsuperscript{1}, V.D. Jeliazkov\textsuperscript{1,2}, A.K. Obour\textsuperscript{3}, A. Garcia y Garcia\textsuperscript{1,4}, T.K. Foulke\textsuperscript{5}, and J. Vardiman\textsuperscript{2}

\textsuperscript{1}Department of Plant Sciences; \textsuperscript{2}Sheridan Research and Extension Center; \textsuperscript{3}Kansas State University; \textsuperscript{4}Powell Research and Extension Center; \textsuperscript{5}Department of Agricultural and Applied Economics.

Introduction

Camelina (\textit{Camelina sativa} L.) is a low-cost feedstock with potential in Wyoming. Production costs of camelina can be low when compared to other oilseeds, thus the need to optimize its production.

Seeding date is a useful management tool that can be adopted to minimize adverse effects of moisture stress and high temperatures during critical stages of crop establishment. Early seeding allows crops to establish before most spring weeds emerge, which helps crops better compete with weeds. Low temperature in the early spring, however, can impede crop growth. Camelina is frost tolerant so it may be able to survive early spring seeding. In addition, its short growing season (85–100 days) can compensate for slight delays in seeding, and it may be able to complete its life cycle before the usual summer drought periods. Due to genetic variability, different species vary in their interactions with environmental factors and their absorption and use of moisture and nutrients; thus, production may also vary.

Objectives

The aim of this study is to evaluate the effects of using different cultivars and different spring-seeding dates on the performance of camelina.

Materials and Methods

This is an ongoing project at the Sheridan Research and Extension Center (ShREC). Three spring-seeding dates (May 2, May 9, and May 16, 2013) and five cultivars are being studied. Included are two winter varieties (‘BX WG1’ and ‘Bison’) and three spring varieties (‘Blaine Creek,’ ‘Pronghorn,’ and ‘Shoshone’). Camelina was seeded at five pounds per/acre. Data collected included number of days to flowering, flowering period, and days to maturity. We also collected initial growth data on plant emergence, plant height at maturity, and the percent of plants naturally thinned out by maturity as a result of crop competition.

To compute the crop harvest index (estimated as seed yield divided by total above-ground biomass), total above-ground biomass (whole plant) samples from each plot were harvested, weighed, and threshed to determine the seed weight. Yields from all plots were converted to 8% moisture content. Oil content and fatty acid profiles will be analyzed using the gas chromatography method.
Results and Discussion

Preliminary results showed that cultivar and the three seeding dates had no influence on the crop harvest index. Earlier seeding dates resulted in higher plant height (not shown) and yield (Figure 1). There was no effect by seeding date on plant emergence, but the cultivar affected plant emergence. Blaine Creek and Pronghorn cultivars did not differ in plant emergence, but their emergence was higher than the emergence of Shoshone. Consequently, the percent of plants thinned out at maturity was higher in Pronghorn than Shoshone (not shown). Seed yield of Blaine Creek and Pronghorn, which did not differ, were greater than the yield of Shoshone (Figure 2). Plants from the cultivars in this study had similar height. In general, days to flowering, flowering period, and days to maturity were shorter for the third seeding than the first seeding date, with the second seeding date being intermediate.

The two winter cultivars did not yield seed due to late seeding and lack of sufficient time for vernalization (acquired ability of plants to flower by exposure to prolonged cold periods). Results from similar studies that are ongoing near Hays, Kansas, showed that only the winter cultivars from the first seeding date (April 4, 2013) were able to produce seed yield. These findings suggest that different winter cultivars may require different cold periods.

Preliminary results from this study indicate that cultivar and seeding dates may have significant effect on yield and growth of camelina. The earlier the spring seeding dates (of the three dates we tested), the better the plant growth and seed yields.

Acknowledgments

We acknowledge ShREC field crews for their assistance and Charlie Rife (a private breeder) for supplying seeds. The study was supported by the U.S. Department of Agriculture’s National Institute of Food and Agriculture.

Contact Information

Henry Sintim at hsintim@uwyo.edu, or Valtcho Jeliazkov at vjeliazk@uwyo.edu or 307-737-2415.

Key words: camelina, seeding date, cultivar

PARP: I:2, XI:1