

Effect of Planting Date on Starch Accumulation of Whole Crop Barley

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Two varieties of whole-plant barley (AC Lacombe and Vivar), planted on either May 5, 2005 (**BM**) or June 7, 2005 (**BJ**), were examined for their rate of starch accumulation and free sugar concentration from heading to harvest. Samples of whole plants (n= 6) were collected twice weekly after the plant reached the heading stage, until the harvest at late dough stage. Samples were collected on July 5, 8, 12, 15, 19, and 22 for BM and July 26, 29, August 2, 5, 9, 12, 16, 19, and 23 for BJ. The BM took 62 days to reach the heading stage, which was longer than BJ that only took 50 days. However, the period from heading to harvest was shorter for BM (18 d) compared to BJ (29 d). For both BM and BJ, starch concentration increased over time and sugar concentration decreased over time. The final starch concentration of BM at late dough stage was 29.5 and 27.9% for AC Lacombe and Vivar, respectively, and that of BJ was 25.4 and 22.9% for AC Lacombe and Vivar, respectively. Free glucose concentration for BM and BJ were 1.3 and 1.6%, respectively for AC Lacombe, and 1.8 and 1.0% for Vivar. Greater final starch concentration for BM, when compared to BJ, might be attributed to lower average temperature throughout the growing period of BM, when compared to the relatively higher average temperature throughout the growing period of BJ. It was also noted that when the temperature deviated greatly from 15°C, either too high or too low, rate of starch accumulation of whole crop barley is decreased regardless of planting date.

Implications. Planting dates of barley can alter its growing environment, and affect rate of starch accumulation and its final concentration. The starch concentration of whole crop barley may be predicted from the ambient temperature during the growing season. Feeding whole-plant barley with greater starch concentration may decrease feed costs by decreasing the amount of grains fed in dairy diets and still maintaining similar dietary starch content.