



Effects of Planting Date and Early Termination of Irrigation on Yield and Yield Quality of Confection Sunflower

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INTRODUCTION

- Confection Sunflower is relatively a new crop to Wyoming farmers. Due to good market and well adaptability in Wyoming's semi-arid climate, its importance is increasing.
- Researches done in 2010 and 2011 at the University of Wyoming Research and Extension Center located in Powell, WY (PREC) showed that little to no irrigation reduces sunflower yield by as much as 60 percent. Therefore for profitable sunflower production, irrigation management is important.
- Early termination of irrigation is one of the practices to manage agricultural water use, which may allow decreasing the production costs while increasing irrigation water use efficiency.
- Among others, planting date is an important factor in determining crop growth, yield, yield quality and crop water use.

OBJECTIVES

- To determine the best planting dates and the best combination of planting date and early termination of irrigation that will result in higher grain yield and better quality of confectionary sunflower

MATERIALS AND METHODS

- Location: University of Wyoming Research and Extension Center, Powell, Wyoming
- Year: 2012 and 2013 growing seasons (May to October)
- Genotype: Dahlgren D-9579 (confection sunflower hybrid)
- Irrigation method: Furrow
- Experimental design: Randomized complete block design set in a split plot arrangement with planting date as the main treatment and irrigation (IR) as the sub-treatment.
- Replications: 3
- Planting dates:
 - 2012: May 1, May 10, May 20, May 30, June 10, June 20 and June 29
 - 2013: May 3, May 9, May 23, June 4, and June 10
- Irrigation treatment for both years:
 - Irrigation until R5.5 stage (50% flowering, IR1), R6 stage (complete flowering, IR2), and R7 stage (color change on the back of head, IR3) (Fig. 1, 2 and 3)
- Data analysis: PROC GLM and PROC REG of SAS 9.3, differences in means were assessed using LSD at $P \leq 0.05$



Fig. 1: R 5.5 stage

Fig. 2: R 6 stage

Fig. 3: R 7 stage

RESULTS AND DISCUSSIONS

- Early termination of irrigation:** Results from 2012 showed significant ($p \leq 0.05$) effect of irrigation on total yield whereas no effect on 7.94 mm sieve yield (seeds left after screening on 7.94 mm sieve). In 2013, however, the effect of irrigation was found to be non-significant in both total yield and 20/64 yield. In both years, yield components including 1000 seeds weight and seed count/head were not affected by irrigation treatments.

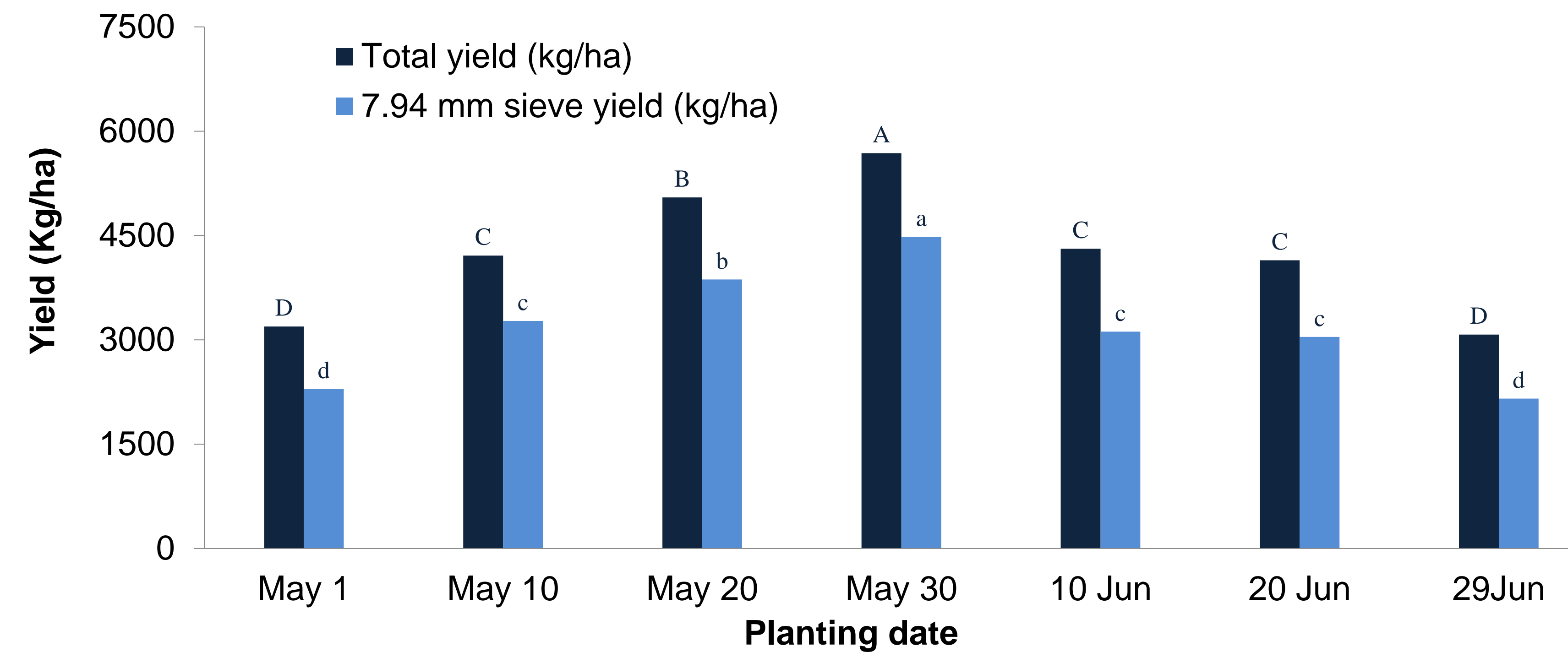


Fig 4: Yield of confection sunflower at different planting dates (2012). Average total yield with same upper case letter and average 7.94 mm sieve yield with same lower case letter are not significantly different ($P < 0.05$).

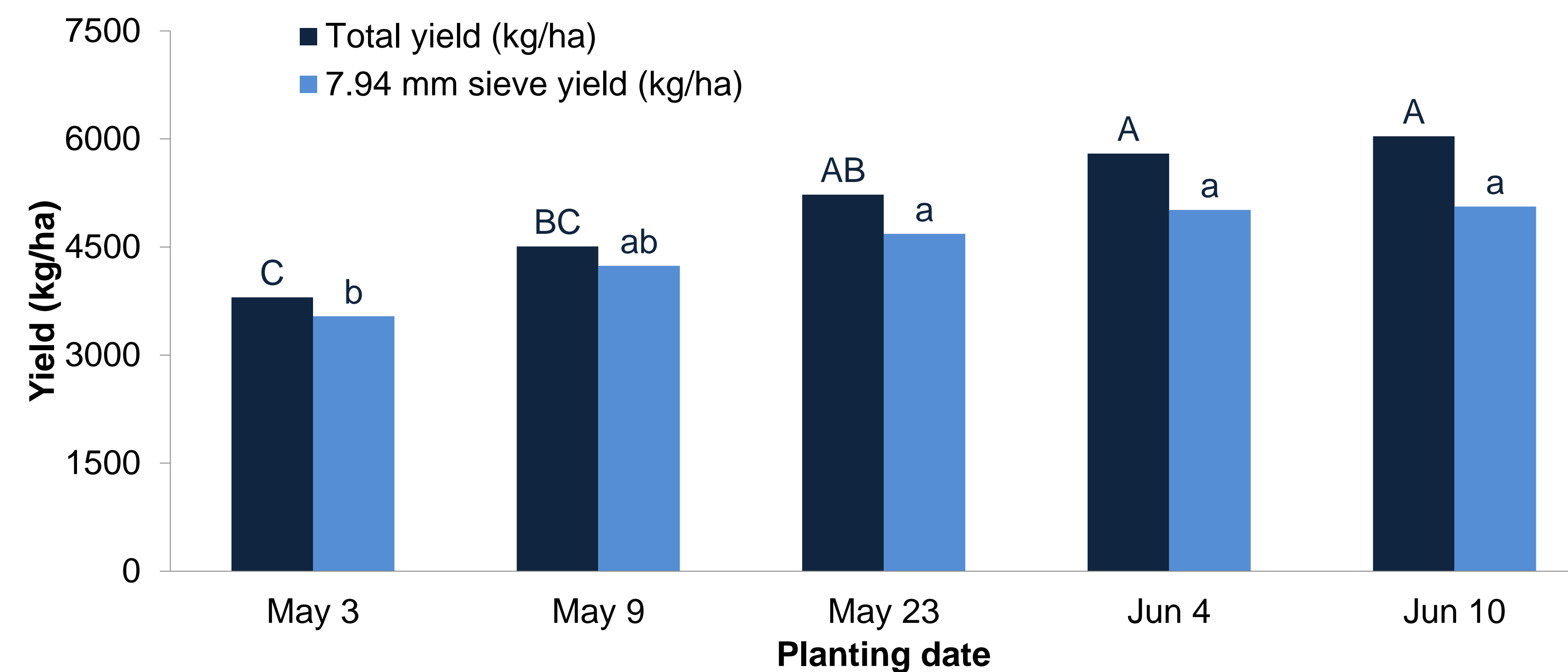


Fig 5: Yield of confection sunflower at different planting dates (2013). Average total yield with same upper case letter and average 7.94 mm sieve yield with same lower case letter are not significantly different ($P < 0.05$).

- Interaction planting date and irrigation:** Except in total yield and 7.94 mm sieve yield of 2012, no significant interaction effects were observed.

- Planting date:** Both total yield and 7.94 mm sieve yield were significantly ($p \leq 0.05$) affected by planting date in 2012 and 2013 growing seasons. The highest yield as well as 7.94 mm sieve yield in 2012 and 2013 were obtained from planting on May 30 and June 10 respectively. (Fig 4 and 5). In both years, seed moisture at harvest was higher in late planting (Fig 5 and 6). In 2012, planting date influenced seed count per head significantly whereas no such effect was seen in 2013. In both years, planting date caused significant effect on 1000 seeds weight (Tables 1 and 2).

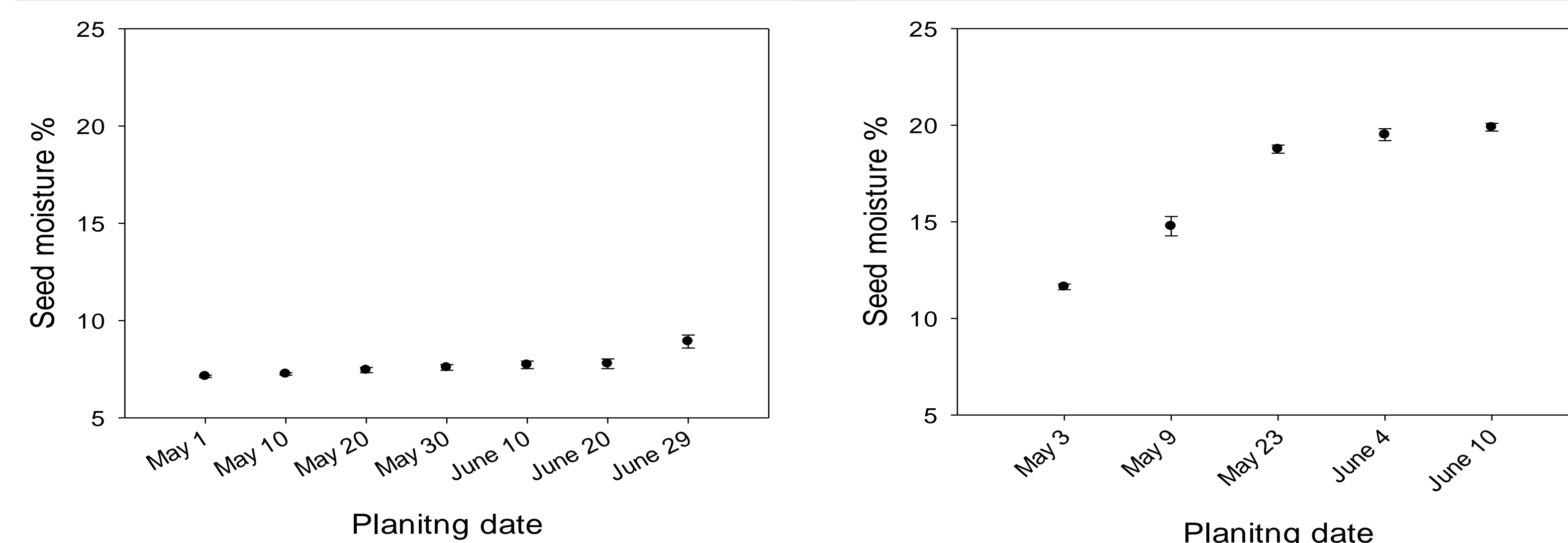


Fig 6: Seed moisture percentage at harvest at different planting dates in 2012 and 2013 growing season

Table 1: 1000 seeds weight of confection sunflower at different planting date (2012)

Planting date	1000 seeds weight (g)
10-May	156 ± 7 a
01-May	152 ± 7 ab
20-May	151 ± 5 ab
30-May	146 ± 6 ab
10-Jun	138 ± 3 abc
20-Jun	134 ± 3 bc
29-Jun	117 ± 3 c

Table 2: 1000 seeds weight of confection sunflower at different planting dates (2013)

Planting date	1000 seeds weight (g)
04-Jun	152 ± 4 a
10-Jun	151 ± 5 a
03-May	141 ± 4 ab
23-May	139 ± 6 ab
09-May	129 ± 8 b

Results from 2012 and 2013 show planting date as an important factor in determining yield and yield components of confection sunflower. Planting date has vital role in influencing kernel weight.

Planting date from the last week of may to the first week of June and irrigation till R 5.5 growth stage are promising management practices for optimum sunflower production in Wyoming.

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