

Influence of cutting management on photosynthetic parameters, heat use efficiency and productivity of barley (*Hordium vulgare* L.) under variable sowing dates

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ABSTRACT

Field experiments were conducted during 2015–16 and 2016–17 at Punjab Agricultural University, Ludhiana, to study the effect of staggered sowing on photosynthetic parameters, heat use efficiency and the productivity of barley (*Hordium vulgare* L.) in relation to different cutting management. The experiment was laid out in split plot design with three sowing dates (October 15, October 30 and November 15) in main plots and five cutting management [un-cut (control), cut at 50 days after sowing (DAS), cut at 60 DAS, cut at 50 DAS + additional 15 kg N ha⁻¹ after cut (N₁₅) and cut at 60 DAS + additional 15 kg N ha⁻¹ after cut (N₁₅)] in sub plots, replicated four times. The results indicated that photosynthetic parameters (PAR interception, chlorophyll index and normalized difference vegetation index) decreased significantly and progressively with each delay in sowing. Heat use efficiency and helio thermal use efficiency of October 15 and October 30 sown crops were statistically similar. Delay in sowing caused significant reduction in fodder, grain and biological yield of barley probably due to significant reduction in photosynthetic parameters. Nitrogen application after fodder cut improved the chlorophyll index, whereas, cutting did not influence the normalized difference vegetative index (NDVI). Un-cut crop recorded higher PAR interception. Significantly higher heat use efficiency and helio thermal use efficiency were recorded in un-cut crop. Un-cut and fodder cut at 50 DAS produced similar grain and biological yield and significantly higher than other cutting treatments. Cut at 60 DAS gave higher fodder yield but at the cost of 9.43-18.3 per cent reduction in grain yield than cut at 50 DAS. Correlation studies indicated significant positive correlation of grain yield with photosynthetic parameters, emphasizing the importance of higher growth and photosynthetic rate during reproductive period for best yield accrual from barley.

Keywords : Barley, chlorophyll, cutting management, grain yield and heat use efficiency