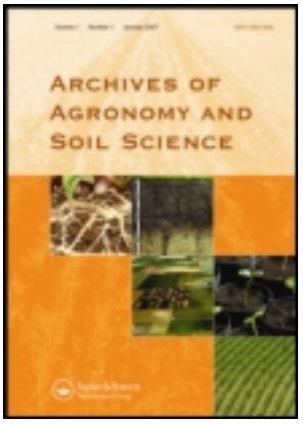

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Evaluation of assimilate remobilization and yield of wheat cultivars under different irrigation regimes in an arid climate

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Evaluation of assimilate remobilization and yield of wheat cultivars under different irrigation regimes in an arid climate

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To investigate the effects of irrigation regimes on assimilate remobilization, water use efficiency (WUE), relative water content (RWC), photosynthesis and yield of five wheat cultivars, a field experiment was conducted at Shiraz University during the 2008 and 2009 growing seasons. The experimental design was a randomized complete block and treatments were arranged as split-plot in three replicates. There were four levels of water regime including well-watered [irrigation based on 100% field capacity (FC)], excess watered (125% FC), mild drought (75% FC) and severe drought (50% FC) stress, and four bread wheat cultivars (Shiraz, Bahar, Pishtaz and Sistan) and a durum wheat (Yavaros). In all cultivars, progressed leaf senescence at 30 days after anthesis (DAA), was associated with a reduction in chlorophyll content. The reduction was more pronounced in Shiraz and Yavaros than Pishtaz and Sistan. With increasing temperature and remobilization of assimilate to grain, net photosynthesis and stomatal conductance were decreased significantly at 18 DAA compared with 8 DAA. Sistan and Pishtaz cultivars maintained higher RWC than sensitive cultivars of Shiraz and Yavaros under drought stress. The higher WUE in Pishtaz and Sistan was attributed to the effectiveness of a small amount of water in alleviating severe stress during the sensitive stages of growth. Under mild drought stress, controlled soil drying could enhance remobilization efficiency of assimilates in Pishtaz and Sistan and under severe drought, these cultivars had the highest grain yield compared with the other cultivars. Reduction of assimilates remobilization to the grain and 1000-grain weight, caused lower grain yield in Shiraz under severe drought. Overall, controlled soil drying in Sistan and Pishtaz might result in better mobilization of pre-stored assimilates to the grain in arid areas, where a rapid depletion of water resources is threatening crop production.

Keywords: wheat cultivars; drought; remobilization; chlorophyll content; RWC

Introduction

Wheat (*Triticum aeastivum* L.) is the most essential food crop in Iran and many other countries (Emam 2007). Approximately 32% of wheat-growing areas in developing countries experience some types of drought stress during the growing season (FAO 2009). In southern areas of Iran such as Fars Province with an arid climate, wheat is typically planted in late autumn and harvested in early summer. Rainfall decreases

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