عنوان مقاله:

The Physiological Response of Three Iranian Grape Cultivars to Progressive Drought Stress

محل انتشار:

مجله علوم و فناوری کشاورزی, دوره 13, شماره 4 (سال: 1390)

تعداد صفحات اصل مقاله: 10

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خلاصه مقاله:

Investigating the role of drought stress conditions on physiological characteristics of plant may provide means to understand basic drought resistance. Differences in leaf emergence rate, leaf relative water content (RWC), membrane stability index (MSI), leaf mass area (LMA), net photosynthesis (Anet), stomatal conductance (gs), transpiration rate (E), intercellular CO۲ concentration (Ci), water use efficiency (Anet/gs) and recovery of gas exchange were investigated in two-year-old grapes of three Vitis vinifera L. cultivars ("Khoshnave", "Bidane-Sefid" and "Askari"), subjected to progressive drought stress (soil water potential: -۰.۲, -۰.۶, -۱, and -۱.۵ MPa). The results showed temporary reduction in RWC, MSI, leaf emergence rate, LMA, Anet, gs and E. Ci decreased with increasing drought stress. "Khoshnave" grape showed a higher photosynthesis rate than "Bidane-Sefid" and "Askari". Higher LMA of "Khoshnave" may be attributed to the potential for carbon absorbance and higher Anet as compared to the other two cultivars. Complete recovery of Anet for all cultivars occurred one day after rewatering at -۰.۶ MPa and four days after rewatering at -۱ MPa treatments. Complete recovery of gs was not observed in either one or four days after rewatering except for "Askari". The results showed that Anet of "Khoshnave" recovered quickly as compared to those in the other two cultivars. Water use efficiency was maximum in all cultivars under -۱ MPa treatment. Similar patterns of Anet/gs were observed for the three cultivars. "Khoshnave" had higher Anet/gs as compared to "Askari" and "Bidane-Sefid" under severe drought stress conditions. "Khoshnave" cultivar, with a higher Anet, higher leaf emergence rate, higher LMA, rapid recovery of Anet, higher Anet/gs was found to be promising for cultivation in rain-fed areas across the west of Iran in comparison with the other cultivars.

کلمات کلیدی:

Drought Stress, Grapevine, Gas exchange, LMA, Water use efficiency