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Comparison on water-stress tolerance of three alfalfa varieties

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Key words : alfalfa, water stress, betain, ABA, net photosynthesis rate, stoma conductance

Introduction Alfalfa (*Medicago sativa* L.) is a legume forage with high production and excellent quality, and is cultivated in the most world. In China, alfalfa mainly is plants in the arid and semi-arid zones. So it always suffers water-stress which effected alfalfa performance. The study compared three alfalfa varieties on the change of drought physiological indexes and their drought tolerance (Xing, Rajasheka, 2001).

Materials and methods Three alfalfa varieties were planted in pots in greenhouse. Water-stress treatment was controlled by weighing pot every two days. In this experiment, there were four drought levels, including CK, LS, MS and SS. Leaf betain content, ABA content, net photosynthesis rate (NPR) and stoma conductance were measured.

Results Zhongmul and Aohan had higher betain content than Queen under water stress (Figure1). There had two change models of ABA content, double-apex model and single apex model respectively. ABA accumulation of double apex varieties was earlier than that of single apex variety. Among the alfalfa varieties, Aohan's NPR was highest under water stress. The main factor of alfalfa NPR was stoma closure in this experiment. But under SS treatment, Queen's stoma conductance significantly increased, extra-cell CO₂ concentration also increased (data not show), so the main factor of Queen's NPR was non-stoma effect (Gunasekera, Berkowits, 1992).

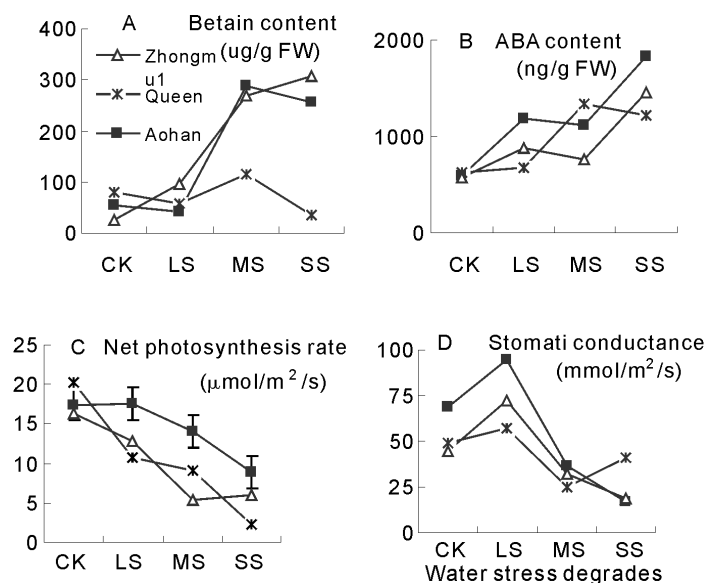


Figure 1 The change of betain content, ABA content, NPR, stoma conductance of three alfalfa varieties under different water stress degrades.

Conclusions Based on the change of three alfalfa varieties on betain content, ABA content, net photosynthesis rate and stoma conductance under water stress, betain osmoregulation and ABA stress inducement are the most important mechanism of alfalfa water-stress resistance and acclimation. Queen is less tolerance to drought than Aohan and Zhongmul, and has different water-stress tolerance formability.

References

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