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Changes of proline content in leaves of two alfalfa cultivars with different salt tolerance under salt stress

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Key word : alfalfa , growth , proline , salt stress

Introduction Salinity is the major environmental factor that limit plant growth , productivity and distribution . Proline is generally regarded as a compatible solute involved in cellular osmotic adjustments , whose accumulation increases when plants are in drought and salt stressed conditions . However , Lutts et al (1996) concluded from their studies on rice that proline accumulation contributed little in cellular osmotic adjustments , and that it may have had other functionality not yet discovered in plants .

Materials and methods Seeds of two cultivars of alfalfa (*Medicago sativa* L.) , cultivars Zhongmu No . 1 and Defor were surface sterilized with 6% sodium hypochlorite solution for 5 min . They were then germinated in humid sand medium on plate in the dark at 25/20°C of 8 h/16 h , and then four uniform seedlings per cultivar and treatment combination , as a unit , were fixed into the holes of quadrate foam and transplanted into plastic vessels . Every vessel contained 4 L of a standard nutrient solution . After 20 days , 6 plants of each cultivar at each treatment were removed and divided into roots , shoots and leaves for the growth parameter and proline content (Tigen et al . , 1973) measurements .

Results Root , shoot , and leaf growths (Figure 1) were inhibited by increased salt treatments in both cultivars , but Zhongmu No . 1 had significantly higher root , shoot and leaf dry weights per plant than Defor . NaCl treatments led to a significant increase in the leaves of proline content in both alfalfa cultivars (Figure 1) . The proline accumulation in Defor (low salt tolerance) , however , was much greater than in Zhongmu No . 1 (high salt tolerance) at 140 and 210 mM salt treatments .

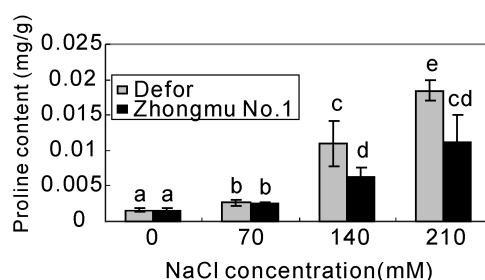


Figure 1 Effect of NaCl on Proline of leaves of Defor and Zhongmu No . 1 at 7 days after salt stress .

Table 1 Dry weight (mg / plant) of root , shoot and leaf of Zhongmu No . 1 and Defor grown in four treatments after 15 days NaCl treatments .

NaCl	Zhongmu No . 1)				Defor			
	Control	70	140	210	Control	70	140	210
Root	0 .035	0 .032	0 .028	0 .023	0 .033	0 .024	0 .019	0 .014
Shoot	0 .15	0 .09	0 .08	0 .05	0 .14	0 .06	0 .04	0 .02
Leaf	0 .13	0 .11	0 .10	0 .07	0 .12	0 .07	0 .06	0 .03

Conclusions Under high salt treatments , Zhongmu No . 1 exhibited better salt tolerance than Defor . Proline accumulation might result in higher salt tolerance instead of causing it . Also , this might indicate that proline was a contributing factor to the inhibited growth of plants under salt stress .

References

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