SHOOT WATER POTENTIAL OF SAXAUL TREES (*HALOXYLON AMMODENDRON* C.A.Mey.) Bunge FROM TWO DISTINCTIVE POPULATIONS OF MONGOLIA

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INTRODUCTION

Haloxylon ammodendron (C.A.Mey) Bunge, Amaranthacaeae (Saxaul) grows in the desert and semi-desert regions of Mongolia forming "Southern Saxaul Forest". This species is of great ecological and economic importance, not only because it survives in harsh environmental conditions but also because it reduces wind erosion and sand movement (Tobe *et al.,* 2000; Sheng *et al.,* 2004). The objective of this study is investigate the water potential in Saxaul trees when they grow in natural stands.

MATERIAL AND METHODS

***Study site*:** This study was conducted with the two distinctive populations differing for their geographical location, type of vegetation and climate condition. The *Bayanzag* population (103˚42' E, 44˚05' N, 1,100 m, asl) is situated in the southern part of Mongolia, Umnugobi province. *Dulaan uul* population (44˚12' N, 110˚01' E, 700-1,000 m, asl) whereas is located in the southeastern part of Mongolia, Dornogobi province.

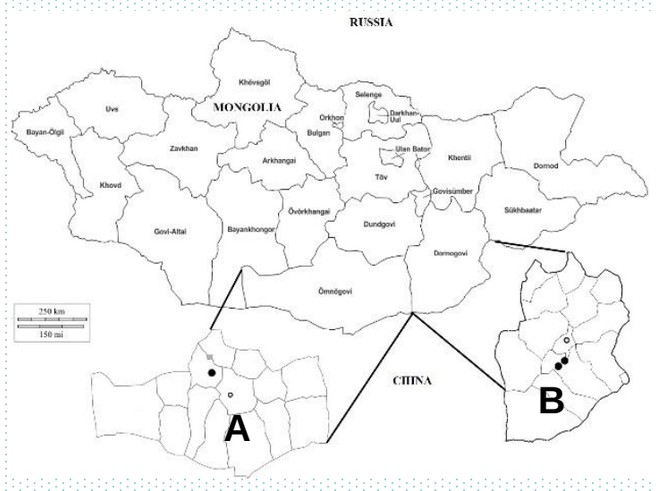

Fig 1. Location of study site: A. Bayanzag population; B. Dulaan uul population

***Measurement of shoot water potential**:* Water potential of shoots as measured in trees differing by age classes: a) mature tree (>200 cm) in height; b) young tree (80-200 cm) in height; c) juvenile (<80 cm). 10 cm long shoots from sun-exposed branches were cut every four hours and their water potential was measured immediately by using a Pressure Chamber (Model 1505D EXP Pressure Chamber U.S.A.) following Scholander protocol.

Soil moisture content: Soil moisture content was measured using a HydroSense II Soil Moisture Measurement System (Campbell Scientific Australia).

***Statistical analysis*:** Statistical analysis as done by using JMP 5.1.2 and comparative analysis as done by ANOVA (2004 SAS Institute Inc).

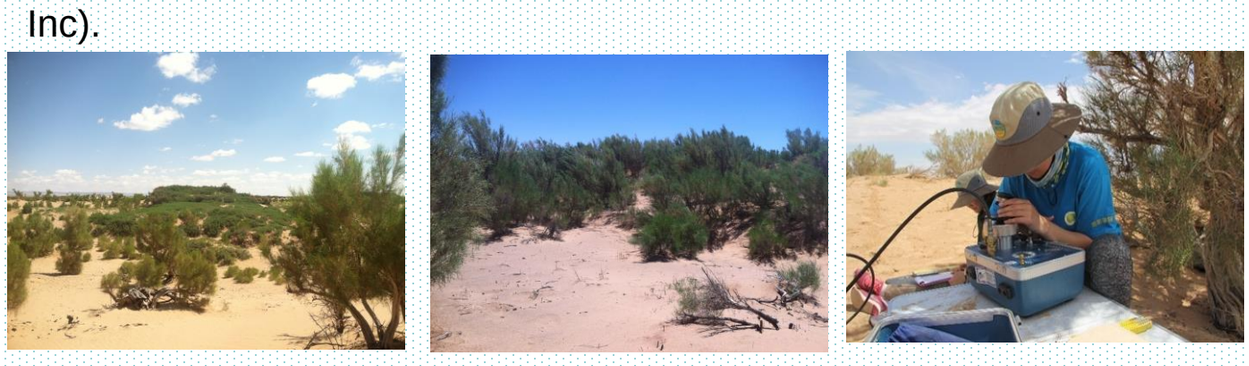

Fig 2. Saxaul population: A. Bayanzag; B. Dulaan uul

RESULT AND DISCUSSION

Measurement of shoot water potential was conducted on sunny clear days once in the beginning of July, 2017. We have found the occurrence of significant in shoot water potential at the time of measurements (*p<0.0002 and 0.0004*) between in both populations but not when age-classes were compared (*p= 0.146 and 0.982, respectively*). Our data showed that all trees are affected by water stress independently from the population, but the younger trees were more affected then older trees (Fig. 3; A and B).

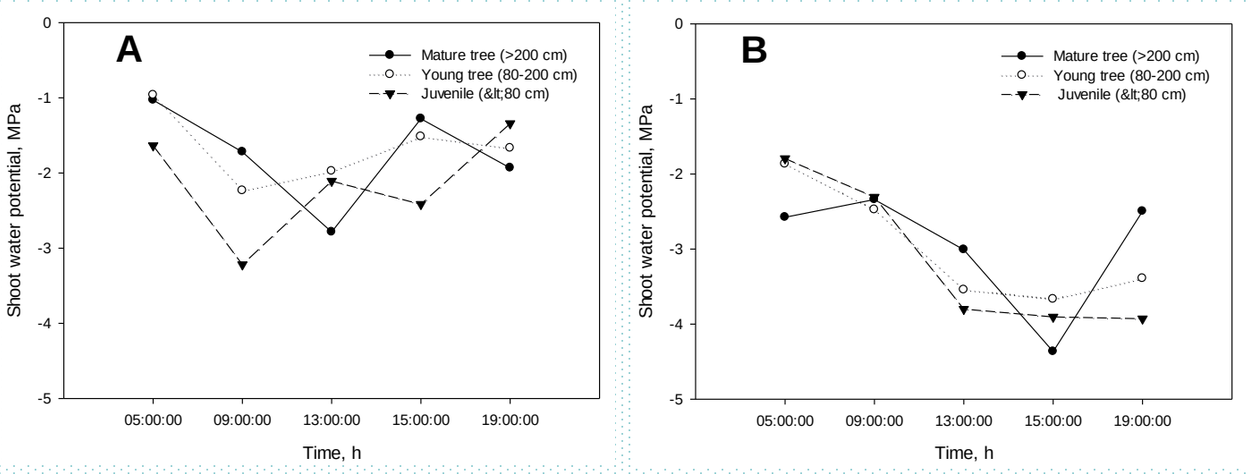

Fig 3. Shoot water potential in Bayanzag (A) and Dulaan Uul (B) populations

Mean shoot water potential and soil moisture measured respectively were -1.21±0.18 MPa and 0.53±0.05% at predawn (5:00); -2.29±0.36 MPa and 1.10±0.09% at midday (13:00); at evening (19:00) -1.65±0.69 MPa and 1.00±0.16% in Bayanzag population. In Dulaan uul population value were -2.07±0.38 MPa and 2.16±0.03% at more predawn (5:00); -3.45±0.28 MPa and 0.71±0.08% at midday (13:00); at evening (19:00) -3.27±0.36 MPa and 0.26±0.12%, respectively. These results show clearly that in Dulaan uul population water stress is higher than in Bayanzag population (between population *p<0.019*; between measurement *p<0.006*) (Fig. 4-5).

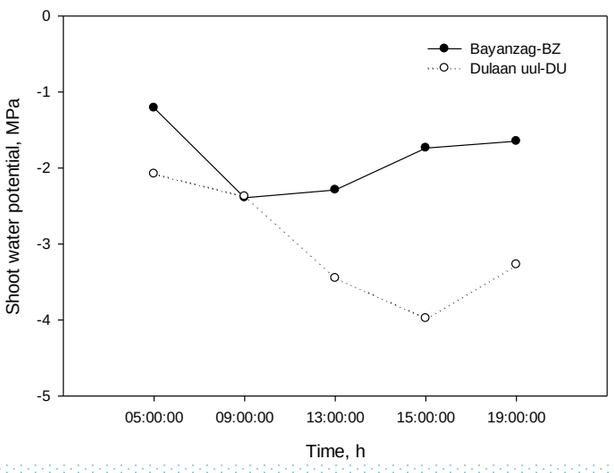

Fig 4. Shoot water potential in Bayanzag and Dulaan uul populations.

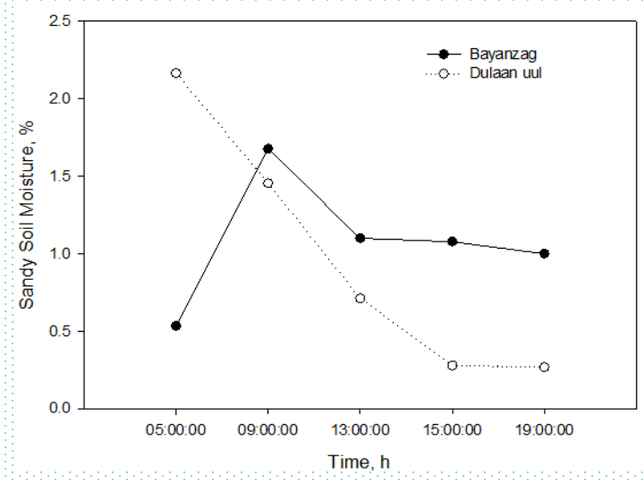

Fig 5. Soil moisture in Bayanzag and Dulaan uul populations.

Our data confirm that shoot water potential decreases as the soil moisture decreases as suggested by Yang et al. (2014) and Xu et al. (2011). These authors suggest that when soil moisture content decreases by a value of 1.0% or less, then the osmotic potential decreases to -3.41 MPa or more. In this condition the turgor cannot be recovered and this condition affect probably more young trees more than adult trees. Generally, trees belonging to Bayanzag population show highest water potential at predawn, while Dulaan uul population show highest at midday. The fact that mature trees, suffer less suggest that this tree species is characterited by a good their adaptation performance to drought conditions.

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