



Effective Planting of Native Shrubs for Sustainable Revegetation in Kuwait

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Abstract

Planting technique plays a significant role in revegetation program in Kuwait with respect to plant survival and growth. Direct seeding and transplanting are few of the planting techniques generally used in mass plantations and it is important to identify the effectiveness of these for establishing native plants over large areas. In this study planting techniques of *Acacia pachyceras* and *Farsetia aegyptia* were standardized for their effective utilization in mass propagation programs in Kuwait. For direct seeding seeds were primed by hydrating them in water (*Acacia pachyceras* - 12 h, *Farsetia aegyptia* - 6h) followed by surface drying prior to sowing. Non-primed seeds were also sown at the same time. Three months old seedlings which were raised in growth chamber condition at 25°C and 60% humidity were transplanted in the field. Each species had three treatments with three replication planted in randomized complete block design. Results indicated that transplanted seedlings exhibited better establishment over direct seeded plants. Hydro-priming had a positive impact on survival of *Acacia pachyceras* while it affected *Farsetia aegyptia* negatively.

Introduction

Natural recruitment of native plants into the ecosystem is slow and might take decades to be noticeable in degraded environment of Kuwait (Moberly et al., 2004). In arid countries, highly eroded soil which is poor in organic matter and nutrients, irregular and low precipitation and anthropological disturbances are few factors that slow down the natural recruitment process of native plants. In order to save the declining native plant population, immediate intervention in the form of revegetation are needed which signifies the importance of appropriate knowledge on propagation methods, planting techniques and cultural practices. Desert Agriculture and Ecosystems Program initiated evaluation and standardization of planting techniques of selected native plants at Agricultural Research Station, Kabd in 2016.

Objective

The main objective of this study was to standardize planting technique of *Acacia pachyceras*, and *Farsetia aegyptia* for use in mass plantations.

Methods

- Establishment (germination and survival) of primed and non-primed seeds were compared with transplanted seedlings of the same species
- In each species, there were three treatments with three replications planted in randomized complete block design. The plants were drip irrigated.
- In the direct seeded trials, the primed or non-primed seeds of selected plants were sown manually in the prepared site at a depth of 5-10 cm, at the pre-located seed spots.
- Seeds were hydro-primed for 24 h and six h for *Acacia pachyceras* and *Farsetia aegyptia* respectively followed by surface drying prior to sowing. Control seeds were directly sown in the field as mentioned above without priming.
- Three months old seedlings which were raised in growth chamber condition at 25°C and 60% humidity were transplanted in the field.
- For primed and non primed treatments, in each planting hole, 0.05g of *Farsetia aegyptia*, (approximately 20 seeds) and two seeds of *Acacia pachyceras* were sown in the first week of March, 2016
- Plant spacing in *Acacia pachyceras* was 3 m x 3 m and *Farsetia aegyptia* was planted at 0.5 m x 0.5 m spacing.
- Recording of Observations. The survival rate was recorded every month and compared.

Results

- Minimal mortality was noticed in seedlings germinated from primed and non-primed seeds and transplanted seedlings of *Acacia pachyceras* even after the harsh summer period.
- Establishment percentage of primed seeds was slightly higher than the non-primed *Acacia pachyceras* seeds. However, the increase was not significant.
- Transplanted seedlings exhibited better establishment and hydro priming reduced the germination percentage of *Farsetia aegyptia*.

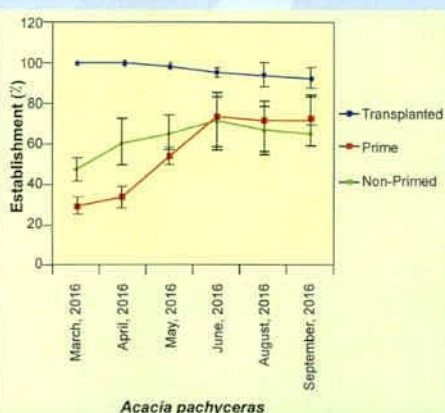


Figure 1. Survival establishment of *Acacia pachyceras* under various planting techniques.

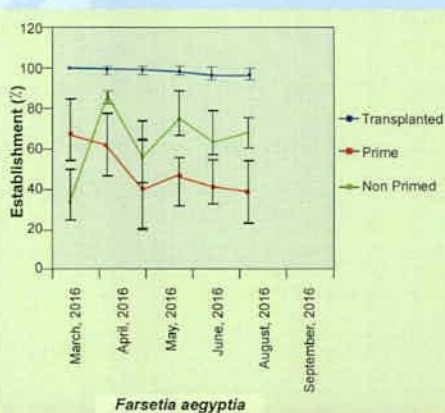


Figure 2. Survival establishment of *Farsetia aegyptia* under various planting techniques.

Conclusion

- Transplanted seedlings of *Acacia pachyceras* and *Farsetia aegyptia* had better survival and establishment during the initial six months of their life period.
- Though hydro priming demonstrated slight improvement in the establishment percentage of *Acacia pachyceras* it had a negative impact on *Farsetia aegyptia*.

References

- Moberly, C., C. Coldren, R. Mata-Gonzalez, P. Hubbard, D. Martin. 2004. Evaluation of revegetation strategies in arid environments using EDYS model. In: SER International Conference on Ecological Restoration, 24-28 August 2004 in Victoria, British Columbia, Canada.



Figure 3. Transplanted seedlings in September 2016.



Figure 4. Germination of primed *Acacia pachyceras* seeds.



Figure 5. Germination of non-primed *Farsetia aegyptia* seeds.

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