ENVIRONMENTAL STRESSES MITIGATION ON SEEDLINGS OF SOME PASTURE SHRUBS

By

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B. Sc. Agric. Eng. (Ecology& Forests), Aleppo University, Syria, 1998
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ABSTRACT

Goson Abd El-Hameed Al-Rajab Aga: Environmental Stresses Mitigation on Seedlings of some Pasture Shrubs. Unpublished Ph.D. Dissertation, Department of Agronomy, Faculty of Agriculture, Ain Shams University, 2010.

Several sets of experiments were carried out at the Faculty of Agriculture, Ain Shams University at Shoubra El-Kheima, Kalubia Governorate to study the effect of chemical and physical scarification on breaking seeds dormancy, investigating salt tolerance and testing some different stresses mitigation treatments to improve the germination percentage, growth and yield of some pasture shrubs. The investigated pasture shrubs were *Leucaena leucocephala* and three Acacia species i.e. *Acacia farnesiana, Acacia saligna* and *Acacia victoria.* The main results could be summarized as follow:

Results showed that the best cheeps and savest method for breaking the seed dormancy of the investigated pasture shrubs was that of treating the seeds by soaking in boiling water for 20 minutes. This physical method of breaking seed dormancy has improved the germination percentage up to 92.0 % with *A. saligna,* to 100 % with *A. farnesiana*. Meanwhile, similar findings were nearly obtained by H_2SO_4 as a chemical scarification method. Treating the seeds of the investigated pasture shrubs by soaking in pure H_2SO_4 for 30 minutes was the best in breaking dormancy of the investigated seeds and improved the germination % up to 92 to 98 % according to the pasture species.

Data also indicated that treatment T_1 (Soaking of seeds in tap water for 12 hours then drying and planting) was recorded the highest values in seedling fresh weight of *A. farnesiana,* germination % of *A. saligna* and germination %, plumule length and seedling fresh weight of *A.victoria* and gave the lowest values in germination % of *L.leucocephala,* plumule length of *A. farnesiana* and radicle length of *A. saligna.* While, treatment T_2 (Soaking in seawater 5 % for 12 hours then drying and planting) gave

the highest values in radicle length of *A. victoria* and seedling fresh weight of *A. saligna.* Whereas, treatment T_4 (Soaking of seeds in seawater 5% for 6 hours followed by soaking in seawater 10 % for 6 hours then drying and planting) recorded the highest values in germination % , plumule & radicle lengths and seedling fresh weight of *L.leucocephala,* plumule & radicle lengths of *A. farnesiana* and radicle length of *A. saligna.* Germination % of *A. farnesiana* was not significant affected by mitigation stress treatments.

In respect to the effect of PEG concentration on all studied traits of the investigated pasture shrubs revealed that the -16 bar of PEG concentration recorded the highest values in fresh weights of leaves, stems, plants and leaves / stems ratio of *L.leucocephala,* stems fresh weight of *A. farnesiana* at the first stage of growth, while, the -8 of PEG concentration gave the highest values in plant height of *L.leucocephala,* dry weights of leaves, stems and the whole plant (seedling) of *L.leucocephala* and *A. farnesiana,* whilst, the -4 bar of PEG concentration recorded the highest values in plant height and leaves fresh weight of *A. farnesiana,* plant , leaves and stems fresh and dry weights of *A.saligna* at the two stages of growth.

Results showed that increasing seawater concentrations from tap water up to 25 % caused significant depression in all studied traits of investigated pasture shrubs irrigated by seawater after one and two months from planting without and with application of humic acid with some exceptions. Plant height of *L.leucocephala* with application of humic acid and plant height of *A. farnesiana* without and with application of humic acid either irrigated with seawater after one or two months of planting was not significantly affected by seawater concentrations. Generally, results indicated that the application of humic acid improved all studied traits to different extents under the seawater concentrations after one or two months of planting.

Key words : *Leucaena leucocephala, Acacia farnesiana, A. saligna, A. victoria,* Seeds dormancy, Chemical and mechanical scarification , Seawater concentrations , Mitigation treatments , Salinity, PEG, Humic acid, Total carbohydrate Crude protein , Crude fiber, ash contents.

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