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Effect of Minerals and Biofertilization on Growth of Acacia saligna Seedlings

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ABSTRACT
The present study was conducted to figure out the effect of some fertilizers on the growth parameters of Acacia saligna seedlings. This study was carried for 14 months at the nursery of Forestry and Wood Technology Department, Faculty of Agriculture, University of Alexandria-Egypt. In this study, six levels of mineral fertilization treatments were used [F0-F5]. The results of this study showed that Acacia saligna seedlings treated with F2 & F3 fertilizers recorded the highest shoot height, whereas, treatment with F1 fertilizer displayed the highest leaf dry weight [9.729 g.], such treatment has no significant differences of that treated with F0 [control]. Moreover, treatment by F1 fertilizer showed the highest value of shoot / root ratio [4.793]. Whereas, treatment with F1 & F2 fertilizers showed the highest leaf number / plant. Seedlings fertilized with F1 & F2 displayed the highest total dry weight [26.067 & 25.630 g.] respectively. In addition to that, seedlings of Acacia saligna treated with halex biofertilizer showed no significant effect on the growth parameter, but its affect can be observed when mixed with mineral fertilizer as in treatment F4.

Keyword: *Minerals, Fertilizers, Acacia saligna, Treatment.,*

INTRODUCTION
The study, concerns with the effect of mineral and biofertilizers on the growth of Acacia saligna seedlings. Such species is well adapted to barren slopes, derelict land, and arid conditions. Acacia saligna is used for stabilizing drift sands and wood production, whereas, its leaves and pods are used as supplementary feed for sheep and goats [14]. Mineral fertilizers had increased the absorption of nutrition by roots, which in turn led to increase the growth of the species under investigation. In addition to that, fertilization of Acacia saligna seedlings represents a useful tool for increasing wood production. Application of Biofertilizers showed an increase in Nitrogen content in the plant organs. Several authors have published many publications on the effect of fertilizers on the growth of different plant species [1-13 & 15].

MATERIALS AND METHODS
This study lasted 14 months [1.3.2013-1.5.2014] and was carried out at the nursery of Forestry & Wood Technology Department, Faculty of Agriculture, Alexandria University. Seeds of Acacia saligna were collected from healthy trees at the nursery. The soil used in this study was obtained from Department nursery in Abies region, Alexandria, and it was a mixture of clay and sand [1:2, V: V]. Three commercial mineral fertilizers were used: Urea [46% N], Calcium superphosphate [15% P2O5], and Potassium sulphate [48% K2O] as a source of nitrogen, phosphorus, and potassium respectively. In addition to that, halex was used as a biofertilizer.

The collected seeds were soaked in boiled water and left to cool one overnight to break the pericarp dormancy. The seeds were then sown in the soil mixture at 1.3.2013, and after 45 days seedlings were transplanted in polyethylene bags [33cm x 15cm]. Each bag was filled with 4Kg of soil, and seedlings were watered with tap water. Seedlings were fertilized with the 1st dose after 4 months [1st of July 2013], and the 2nd dose after two months later [1st of September 2013] [1:2, V: V] when seedlings aged 6 months. Six levels of fertilizers were used in this study: F0 [control]. F1 [1g N, o.5 P2O5, and 0.5g K2O/Kg soil]. F2 [0.5g N, 0.25g P2O5, and 0.25g K2O/Kg soil]. F3 [1g N, 0.5g P2O5, 0.5g K2O, and 0.5g halex/Kg soil]. F4 [0.5g N, 0.25g P2O5, 0.25g K2O, and 0.25 halex/Kg soil], and F5 [1g halex/Kg soil]. The growth parameters investigated in this study are shooth height, stem dimeter, leaf number, leaf dry weight, total dry weight, and shoot/root ratio. The obtained data of such parameters was statistically analyzed by ANOVA, F. test, and L.S.D procedure.

RESULTS
The effect of mineral and biofertilizers on the growth parameters of Acacia saligna seedlings was studied and the results had shown the followings [Table 1]. Seedlings treated with F2 & F3 fertilizers displayed the highest shoot height 119.1 & 121.3 cm respectively, such results had no significant differences with seedlings treated with F1 & F4. Seedlings treated with F1 & F2 fertilizers induced the highest leaf number/plant 63.868 & 64.400, and no significant differences between them and those fertilized with F3 & F4. Moreover, seedlings treated with F1 fertilizer gave rise the highest value of leaf dry weight [9.726g], and no significant difference with those treated with F0 [Control] & F2. In addition to that, seedlings treated with F1 & F2 fertilizers had brought the highest total dry weight 26.067g & 25.630g respectively. Whereas, there was no significant differences in total dry weight among seedlings treated with F1 & F2 and those treated with F0 & F3-F5. As for shoot/root ratio, the results showed that seedlings treated with F1 fertilizers gave rise to the highest s/r ratio [4.7936].

Table 1: Means of growth parameters of *Acacia saligna* seedlings after 14 months treatments with F0-F5 fertilizers.

Treatments	Mean				
	Shoot height cm	Leaf No./plant	Leaf dry weight g	Total dry weight g	Shoot/Root ratio
F_0 [control]	93.713^{B}	50.908^{BC}	8.1280^{AB}	22.058^{AB}	3.3828^{BC}
F_1	110.604^{AB}	63.868^{A}	9.7268^{A}	26.067^{A}	4.7936^{A}
F_2	119.108^{A}	64.400^{A}	8.9896^{AB}	25.630^{A}	3.5916^{BC}
F_3	121.296^{A}	57.000^{AB}	7.7504^{BC}	24.495^{AB}	3.9468^{AB}
F_4	106.537^{AB}	55.148^{AB}	7.3632^{BC}	23.049^{AB}	3.3496^{BC}
F_5	92.949^{B}	40.948^{c}	5.9624^{C}	20.058^{B}	2.6992^{C}

Within each column, Values with the same superscript are not significant at 0.05, 0.01 level probability.

DISCUSSION

Statistical analysis of data pertaining the effect of mineral and biofertilizer on the growth parameters of Acacia saligna seedlings showed that fertilizers had a significant effect on all growth parameters. In general, treatment with F1 fertilizer gave rise to the best results on leaf dry weight, total dry weight, and shoot/root ratio followed by F2 & F3 fertilizers. Treatment with F2 produced the best result on leaf number/plant followed by F1 & F3; however, F0 & F4 treatments showed no significant differences. Treatment with F3 gave the highest result of shoot height followed by F2, whereas, F1 & F4 treatments showed no significant differences. The effect of Halex biofertilizer [F5] showed slight effect of growth parameters; however, its effect can be enhanced when added to mineral fertilizer as in treatment of F4.

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