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DO SEED MOTHER'S SITES AFFECT THE QUALITY OF THE SEEDLINGS PRODUCED

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ABSTRACT

This experiment was conducted in (Zawita) area in Dohuk governorate / Iraq, and the morphological characteristics were studied by selecting four sites, four trees from each site, four sectors and, choosing twenty trees in each sector. Statistical analysis (RCBD) was done using the SPSS system. Through this study, it was found that Pinus brutia Ten. In Zawita, there is a clear effect on some morphological characteristics of the seedlings resulting from it. The first site was one of the best sites followed by the second site where he gave seedlings of good quality in terms of stem length with an average of 39.25 cm and the total weight of wet and dry seedlings with averages of 13.97 and 35.34 g respectively, and the third site was the lowest studied sites and gave seedlings of less quality than the rest of the sites where he scored Stem length averaged 23.06 cm while wet and dry weight was 7.68 and 22.17 g, respectively. As for the correlation between the variables, the relationship was positive and strong among all the variables except those between the length of the root and the rest of the variables except with the characteristic of the wet root weight. The highest correlation values were between total dry weight and total wet weight recording 0.960 and the lowest between the length of the root and the dry vegetative weight where the value was 0.070.

1. INTRODUCTION

The natural forests in Iraq cover an area estimated at (7110400) acres whose lands are spread in the northern and northeastern mountainous regions. The natural forests in Iraq consist of many types of forest trees, including the pine (brutia) which was planted in 1811 by Tenore[1]. The scientific name is *Pinus brutia* Ten. to the genus Pinus L., which is considered one of the largest and most important of the ten species of the Pinaceae conifer family [6], [8], [11], [14], [15], [16]. In Iraq, pines form open and degraded forests, covering an estimated area of (200) thousand dunums per person in Zawita and Atruch within the Governorate of Duhok. The Zawita region is 16 km from Dohuk Governorate and is located at an altitude of 880 m above the ground and longitude 43 ° 06 '46.203 and latitude 36 ° 55 '51.92. Within the same species, the tree growth movement varies markedly according to site conditions, which include terrain and the availability of soil nutrients [4], [11]. The availability of soil nitrogen (N) and phosphates (P) affects plant productivity and other biological processes [23]. Differences in moderate conditions, ability to compete

[1] . https://en.wikipedia.org/wiki/Michele_Tenore.

with others, and vitality due to differences in initial size can all influence an increase in Rates [7], [9]. Another factor that affects tree properties is the interference of environmental elements. Previous studies have found that asymmetric competition is a vital way to shape a tree mutation within forests [5], [13], [19]. The presence of competing for neighboring trees may reduce tree growth. This type of tree is light-loving and exposed to long periods of lighting for sun rays. One of the most important functions of the tree in these areas is to prevent erosion operations on slopes and improve soil properties as well [23]. Likewise, pine is tolerant of drought and grows in poor soils as well. It is twice the speed of its branches being broken by the accumulation of snow on it. The tree lives for periods of more than 300 years [21]. Its growth rate is average, as the annual growth rate of tree diameter ranges between (0.9-15.6 mm). [22]. The researcher [2], was interested in studying the relationship between the nature of the terrain (site variation) and the effect of that on conifers vegetation, as well as knowing the relationship of terrain to climate, as this information is important for forest departments to contribute to making important decisions, including reforestation of this species of trees in that region. [1], results showed that the sites were not equal in growth indicators This was due to many factors that affect growth, such as site characteristics and tree density. A study was conducted in three different forest sites in Syria by [3], to determine the effect of temperature, rain, and soil changes on productivity. There were significant differences between the studied characteristics. These differences were attributed to the variation in soil composition and fertility as a result of the differences in the three sites studied.

2. MATERIALS AND METHOD

As shown on the map (1), four sites were identified in the Zawita Forest in Dohuk Governorate, which contains *Pinus brutia* Ten trees known as the Pine Zawitas in August (2010). Four trees were chosen from each site with good morphological characteristics in terms of integrity and safety from plateau injuries and the majority and abundance of cones production and estimated tree length, crown width, stem diameter at chest level (DBH)[2], the thickness of the arbor, tree color, and the color of the armpit as shown in Table (1). Cones were collected from the trees selected in September (2010) each tree separately and after that, the seeds were extracted and stored in paper bags in the refrigerator. In February (2011) the seeds used in the nursery of Nineveh Forest planted each tree separately. In January 2012, the seedlings were removed in nylon bags and transferred to the forestry nursery in Al-Rachidiya. In March (2013), measurements were made on seedlings and stem length/cm, root length/cm, wet stem length/gm, wet stem weight/gm, wet root weight/gm, dry seedling weight/gm, and these measurements were performed on 20 seedlings per treatment using the global experiment with complete random design with four replications for four trees in four sites and Dunkin method was used at the probability level 0.05 to compare rates using the SPSS system (Ver. 24). Then, seedlings quality was calculated using the following formula: [10].

Q= [Seedling dry weight(gm)]/[[(Height(cm)/Diameter(mm)] +[Total weight(gm)/Root weight(gm)]]

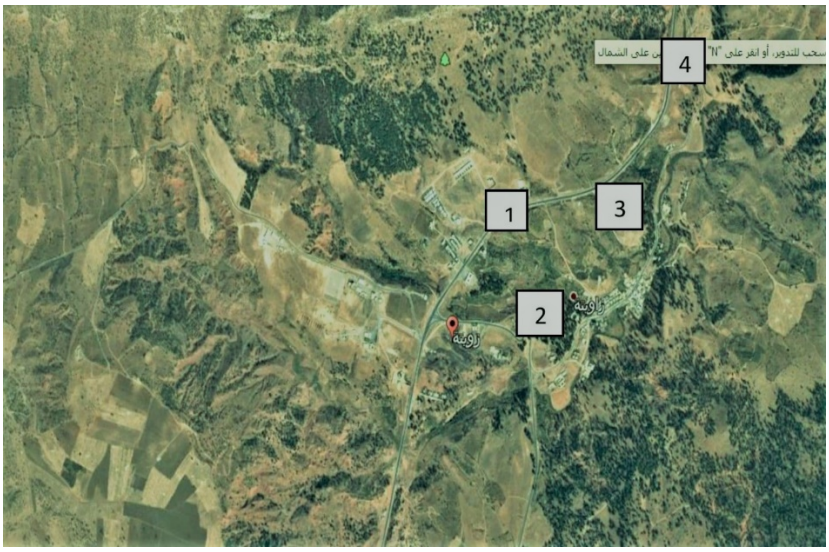

Figure 1: Sites of this study in Zawita region (Duhok, IRAQ).

[2] . (DBH): Diameter at Breast height.

3. RESULTS AND DISCUSSION

It is clear from Table (2) that there are highly significant differences for the sites on all growth characteristics studied on pine seedlings, except for the wet root weight characteristic, as no significant differences appeared as follows.

3.1. STEM LENGTH

When comparing the rates in the Dunkin method at the probability level (0.05) Table (2), the first and second sites showed significant differences from the rest of the sites, as the third site differed from the fourth site and averages 30.62, 23.06, 37.37, 39.25 respectively, and it is noted that the stem length in the seedlings of the site The first is almost double that of the fourth site. This property had a highly significant correlation with all other properties under the study, except with root length. Table (4).

3.2. ROOT LENGTH

When comparing the rates, the third site showed significant differences from the rest of the sites and showed a clear difference with an average of 65.75 cm in which the rest of the sites were equal among them. Table (3). This may belong to the build-up of a continuous pore system in the soil which differs by sites. [14]. A significant correlation was with the total wet weight of the root only, recording 0. 470.Table (4).

3.3. LENGTH OF SEEDLINGS

The third site showed no significant difference from the first site giving 88.81 and 84.37 with mean averages, but they differed significantly from the second and fourth sites which recorded averages of 75.62 and 80.0 cm respectively. Table (3).

3.4. STEM DIAMETER

The first site had a clear and distinctive effect, as it outperformed the rest of the tested sites with an average of 6.06 cm in which the second and fourth sites were equal. No significant differences appeared, and the third site was the least influential site on the stem diameter.

3.5. THE WET WEIGHT OF SEEDLINGS

From table (3), the first and second sites were equal in terms of the effect on the wet weight characteristic of the seedlings, and their means were 36.89, 34.34 g. No significant differences emerged between them, and they differed significantly with the third and fourth sites, with averages of 26.9 and 22.17 g.

3.6. STEM WET WEIGHT

The first and second sites also equaled the effect of the wet weight of the stem with averages of 25.02 and 26.08 g, and they significantly outperform the third and fourth sites. The averages in favor of the fourth site were with an average of 19.42 g, while in the third site it was an average of 13.02 g. Here, we find that the wet weight of the stem at the first site is 100% higher than it is on the third site.

3.7. THE WET WEIGHT OF THE ROOT

No significant differences emerged between the sites tested on this trait, as they were equal in effect, averaging 7.56, 8.25, 8.96, and 9.15 for the third, second, and first and fourth sites respectively. We conclude from these values

that there was no correlation between the wet weight of the stem compared to the wet weight of the root at the level of this study.

3.8. THE DRY WEIGHT OF SEEDLINGS

The first and second sites had a pronounced effect on the dry weight of the seedlings and were equally affected by the averages of 13.97 and 13.80 g. They differed significantly from the fourth and third sites with averages of 7.68 and 10.88 g.

3.9. STEM DRY WEIGHT

The third site differed significantly from the rest of the sites tested on the dry weight of the stem and was the least influential site on this trait with an average of 5.05 g in which the rest of the sites were equal and no significant differences between them occurred and with conflicting averages recorded 8.31, 10.35, 10.45 g for the first, second and fourth sites respectively. This means that the average of this attribute in the third location represents approximately 50% of the mean values of the other three sites.

3.10. ROOT DRY WEIGHT

There were slight differences between the sites in terms of the dry weight of the root, as no significant differences emerged between the first, second, and fourth sites to record averages 3.06 and 3.51 g and differed significantly from the third site which recorded the lowest mean 2.57.

Table 1: Properties of trees measured under the study.

Site	Tree	Height m	DBH cm	Crown m	Bark thickness mm	Conifers yield	Branch thickness	Branch length
1st	1	12	38	5	25	Copious	Medium	Medium
	2	13	45	5	30	Copious	Copious	Copious
	3	14	48	6	20	Medium	Medium	Long
	4	20	43	6	30	Few	Thick	Long
2nd	5	14	58	6	40	Medium	Thick	Long
	6	16	65	6	25	Medium	Medium	Long
	7	13	61	8	40	Medium	Thick	Long
	8	15	51	7	25	Medium	Medium	Long
3rd	9	15	39	5	30	Medium	Thick	Medium
	10	17	56	8	30	Medium	Thick	Long
	11	18	44	5	40	Medium	Medium	Medium
	12	11	46	7	30	Medium	Medium	Long
4th	13	15	64	6	20	Copious	Medium	Long
	14	17	58	6	30	Medium	Medium	Long
	15	11	46	6	35	Medium	Thick	Long
	16	19	51	6	40	Medium	Thin	Long

Table 2: Source of variance and square means for some properties of Pine growth.

Source of Variance	Df	Stem Length cm	Root Length cm	Seedling Length Cm	Stem Diameter mm	Seedling dry weight gm	Stem Wet weight gm	Root wet weight gm	Seedling Dry weight Gm	Stem Dry weight gm	Root Dry weight gm
Sites	3	863.391**	1860.89**	514.8**	7.363**	662.03**	576.16**	8.385 n.s	140.42**	101.99**	2.616**

Experimental error	48	32.98	65.59	81.81	0.738	78.68	45.27	4.542	12.958	10.142	0.795

Table 3: Comparison of growth properties means in *Pinus brutia* by Duncan method at 0.05.

Site	Stem Length cm	Root Length cm	Seedling Length Cm	Stem Diameter mm	Seedling dry weight gm	Stem Wet weight gm	Root wet weight gm	Seedling Dry weight gm	Stem Dry weight gm	Root Dry weight gm
First	39.23a	45.12b	84.37ab	6.06a	34.3a	25.08a	8.2a	13.8a	10.49a	3.30a
Second	37.37a	42.75b	80.00bc	5.35b	35.8a	25.02a	8.9a	13.9a	10.39a	3.50a
Third	23.06c	66.75a	88.80a	4.40c	22.1b	13.02c	9.1a	7.00c	5.090b	2.57b
Fourth	30.62b	45.00b	75.62c	5.28b	26.1b	19.42b	7.5a	10.8b	8.300a	3.06ab

Table 4: Correlation coefficient between variables understudy

Property	Stem length cm	Root length cm	Stem diam. mm	Tot. wet weight gm	Wet Veg. Weight gm	Wet root weight gm	Tot. dry weight gm	Dry veg. Weight gm	Dry root weight gm	Seedling quality
Stem length	1	.136	.692**	.748**	.787**	.241	.799**	.765**	.564**	.425**
Root length		1	.131	.236	.148	.470**	.157	.070	.149	.209
Stem diam.			1	.691**	.728**	.364**	.739**	.726**	.599**	.649**
Tot. wet weight				1	.923**	.644**	.960**	.890**	.808**	.802**
Veg. weight					1	.411**	.914**	.884**	.691**	.677**
Wet root weight						1	.525**	.403**	.658**	.669**
Tot. dry weight							1	.958**	.833**	.827**
Dry veg. weight								1	.713**	.779**
Dry root weight									1	.805**
Seedling quality										1

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CONFLICT OF INTEREST

The author have declared that no competing interests exist.

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