

Forest plantation trial with 14 almond genotypes under rainfed condition at Arak area of Iran

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Abstract

Almond (*Prunus dulcis* (Mill) D. A. Webb.) is a cultivated tree, which can be used as a multipurpose tree for forest plantation on degraded lands of natural resources. In this research project, 23 genotypes of almond were collected from different sites of Arak province of Iran and sown in Arak Natural Resources Experimental Station nursery, 50 km west of Arak. After two years, the seedlings of 14 genotypes, which were selected as elite genotypes within the 23 genotypes, were planted on a virgin site at the station under rainfed condition and under the statistical design of Randomized Complete Blocks. The results showed that the genotype G₃ with average height of 116.3 cm and the genotypes G₉ and G₁₁ with average height of 59.5 and 64.3 cm, respectively obtained the tallest and the shortest height, respectively. According to diameter data analysis, the genotypes G₃ and G₁₄ with average diameter of 24.97 and 10 mm, respectively had the greatest and the lowest diameter, respectively. The diameter growth of the genotypes G₂, G₄ and G₅ was interesting. According to survival data analysis, the genotype G₁ with average survival of 79.8% and the genotypes G₇, G₁₀ and G₁₁ with average survival of 46.7%, 49% and 48.3%, respectively had the lowest and the greatest mortality, respectively. In addition, the genotypes G₈, G₄ and G₆ with average survival of 73.3, 71.8 and 70.8 percent, respectively had the lowest mortality in comparison to the other genotypes rather than the genotype G₁. The following seven genotypes are recommended for forest plantation under rainfed condition or limited irrigation at severe drought periods, on marginal lands of Markazi province of Iran where are ecologically similar to the Experimental Station of Arak (321 mm mean annual rainfall, 1800 m. above sea level altitude, 13.2 C° mean daily temperature, cold-semi arid according to the modified DeMartin Climate Classification System and deep clay sandy loam soil type):
Genotypes G₁, G₅ and G₆ with Arak seed origin
Genotypes G₂, G₃ and G₇ with Khomain seed origin
Genotype G₄ with Deligan seed origin

Keywords: Almond, forest plantation, height, diameter, survival, and mortality

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Determining the most resistant almond ecotypes and genotypes to water stress for forest plantation at rainfed conditions

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Abstract

The investigation was conducted at two trials. At the first trial, genotypes number one (G1) and two (G2) of the cultivated almond (*Prunus dulcis* var. *amara*) with seed origin from Esfahan-Najafabad and one ecotype (E1) of the natural almond (*Amygdalus scoparia*) with seed origin from Esfahan-Semirom) were tested under the Statistical Design of Split Plots, with three replicates. The main treatments were five soil water contents (7, 10, 13, 16 and 20 percent) and the second treatments were the almond ecotype and genotypes. The second trial was similar to the first one at the main treatments but different at the second treatments.

The second treatments were as follows:

- Three almond cultivated genotypes: G4, G5, and G6

- One almond native ecotype (E2) with seed origin from Kurdistan-Paveh.

The measured seedlings quantitative and physiological characteristics were as follows:

stem height (SH), stem collar diameter (SCD), leaves dry weight (LDW), stem dry weight (SDW), root dry weight (RDW), leaf thickness, leaf total number (LTN) and branch numbers (BN), leaf proline rate (LPR), and leaf stomata (LS).

The first trial showed that although there was significant difference between E1, and G1, G2, through the seedlings SH, LDW, SDW, RDW, SCD and LN characteristics, but the G1 was the most resistant Almond to water stress. The almond genotype resistance was due to its high root volume, which resulted in high shoot volume as well.

The second trial showed that there were significant difference between E2 and G4, G5, G6 through the seedlings SH, RDW and LN characteristics. G6 had the highest and E2 and G5 had the lowest root volume. Overall, there were greater differences between the Almond species and genotypes in root dry weight than in shoot dry weight. G6 and G4 were the most resistant to water stress, respectively.

Keywords: Almond, resistant, water stress, Esfahan, Kurdistan, ecotype, genotype.

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Investigation on best season and method of transplantation of *Cypressus sempervirens* var. *horizontalis* seedlings at Gorgan area

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Abstract

A trial was conducted under split plots design in 1997 to investigate the best season and method of Cypress trans plantation using 1600 seedlings. The treatments were: Two planting seasons (Autumn [december] and spring [march]) and two methods of transplantation (bare and un bare roots). Economical and growth aspects of the seedling production and transplantaion expenses, percentage of survival, height and diameter (collar) growth .

The results showed that:

1-There were significant effects of the treatments and their interactions on the measured growth parameters and survival.

2-The greatest records of survival (87.36%) height and diameter were at spring and unbare root transplanting method.

3-Although expenses of seedling production with bare root was less than the unbare root method but because of its low survival and its extra expenses for seedling season with unbare root system was the most economical method for Gorgan area .

Key words: *Cupressus sempervirens* var. *horizontalis*, forest plantation planting season , seedling transplantation method.

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Callus induction and plant regeneration of *Juniperus excelsa* using *in vitro* technique

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Abstract

Low germination and non-viability of embryos are the main hindrances for forestation of *Juniperus excelsa*. Conventional methods of asexual plant propagation of this species have not been successful so far.

In order to *in vitro* propagation, small pieces of stem of 8-10 years old trees (10-15 mm long) containing shoot tips with needles fascicles were used as explants. Those were excised from the plants and after surface sterilization. Samples were cultured on a Murashige & Skoog (MS) medium and six revised MS medium supplemented with different concentrations of BAP, Kin, IBA, NAA and 2,4-D.

Then the cultures were incubated in a climate chamber at temperatures of 25°C (for day) and 15°C (for night) and 12 hours light at 2000-2500 Lux with 75% humidity.

Results indicated that callus formation and callus growth restricted by both type and nitrate and hormonal source.

The best simulation of callus growth occurred on cultures of without KNO₃, with glutamine (100 mg/l) and amount of 2,4-D/BAP at more than 1 ratio. Although adventitious buds were formed on juvenile stages of parent plants, but root induction did not occur.

In addition, the season of sampling can also restrict the callus formation. Such, callus formation of collected plants in autumn was more than in spring.

We could not find any shoot proliferation on medium MS, however by elimination of ammonium nitrate from medium MS bud appeared from callus as well as leaf blade.

Key words: *Juniperus excelsa*, Tissue culture, hormonal treatment, Nitrate Treatment.

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Utilization of poplar biomass as a source of fodder

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Abstract

Trees and shrubs can supplement the quantity and quality of pastures for grazing livestock. Also they are an effective insurance against seasonal feed shortages or the risk of drought. In this research seven poplar clones with high productivity and high survival percentage were selected for experiment. The purpose of this study was to provide feed resources for animals. In this experiment productivity of poplar clones at three times removal intervals were evaluated for one-year-old plants. Estimation of biomass yield (leaf and edible branch) showed that the most amount of biomass production was belong to *P. e. 561/41*, *P. e. triplo* and *P.d. missoriensis* clones with 18.02, 17.65 and 16.64 t.ha⁻¹ respectively and it was significantly different at 1% level of probability.

Also some growth parameters such as leaf number, leaf weight, stem weight, stem number and stump sprout percentage measured during two years. The results indicated that leaf number, leaf weight, stem weight per stand for *P. e. 561/41* clone were 401, 293 gr. and 180.7 gr. respectively, so that it was the best clones than others clones. With the view of stump sprout percentage *P. nigra 42/78* and *P. e. 561/41* clones had higher stump sprout percent during six removal time than other clones with 88% and 85% respectively.

Key words: poplar clones, biomass production, growth parameters

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Preliminary results of elimination trial with need - leaved species in Mazandaran forests (Vanamak)

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Abstract

This Paper presents the results of an elimination trial in the form of randomized completely blocks design within 3 replications and 13 treatments (species and provenances of needleleaves) within ten years after establishment in Vanamak forest of Neka region in Mazandaran province (North of Iran).

The altitude of area is 757 meters above sea level and has a humid climate with less than one month dry period. Results obtained as the followings:

Differences between the average of residual saplings, the average of height, the average of collar diameter, the average of diameter at breast height and the average of quality of saplings in relationship with treatments were significant). (P=0.04)

The results of 10 years (1992-2001) studies showed that *Pinus sylvestris* (origin Yugoslavia) was the most promising species and *Pinus sylvestris* (origin Armenia), *Pinus Ponderosa* (origin U.S.A) and *Pinus nigra var. austriaca* (origin Austria) were promising species respectively.

Key words: Elimination, Needleleaved, Mazandran forests, Height, Diameter

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