

Identification and abundance of mycorrhizal fungi symbiosis with *Juniperus excelsa*

M. Matinizadeh¹, S. Ali Ahmad Korori¹, M. Khoshnevis¹ and M. Teimouri¹

Abstract

Mycorrhiza is one of the most common symbiosis between vascular plants and microorganisms. Mycorrhizal fungi play an important role in life cycle of plants by increasing their ability to absorb water and nutrients, excreting plant hormones and protecting the host plants against pathogens. The identified mycorrhizal fungi are used to inoculate on poor soils. Eight juniper (*Juniperus excelsa* M. Beib) trees were selected at their natural habitat in Karaj valley of Iran in order to start the investigation. Root and soil were sampled from each tree for two years in two seasons (autumn and spring). After staining roots, the mycorrhizal organs such as hyphae, arbuscles and vesicles were observed. The AM fungi were identified, using Morton and Trappe keys and INVAM site information. Two genus and two species of mycorrhizal fungi were identified, including *Glomus* sp., *Glomus multicaule*, *Acaulospora* sp. and *Glomus fasciculatum*. The species *Glomus multicaule* had the greatest abundance in all of the soil samples and in both seasons.

Key words: Symbiosis, Arbuscular Mycorrhizal Fungi, *Juniperus excelsa*, *Acaulospora*, *Glomus*

1- Members of Scientific Board, Research Institute of Forests and Rangelands, P.O. Box 13185-116, Tehran, I.R.Iran. e-mail: matini@rifr-ac.ir

Diameter and volume increment of (*Fagus orientalis* Lipsky) in an intact forest of Nave-Asalem region

B. Karamdost¹ and A. Bonyad²

Abstract

Beech (*F. orientalis* Lipsky) is one of the valuable species of Caspian forests of Iran which shares about 30% of the forests growing stock. Measurement of the annual diameter and volume increment of this species is essential for accurate planning and logging. Furthermore, measuring the annual allowable cut for the forest management projects, is based on the annual volume increment. The trial was conducted in district one of Nave-Asalem forest Management Project at west forests of Guilan province. In the control compartment of this district, 30 circular plots, each 500 m², were randomly allocated. In each plot, in addition to measuring different variables, three trees were used to sample growth increment cores and calculate the annual volume increment by the Meyer method. The annual volume increment of *F. orientalis* at the studied intact stand was calculated after measuring its annual diameter increment, which was 10.284 sylve per hectare per year. For further investigation, the annual volume increment of the species was calculated at three diameter classes, including 15-45 cm (young trees), 45-75 cm (middle – aged trees) and > 75 cm (old – aged trees), which resulted in: 0.0295, 0.0512 and 0.735 sylve per hectare per year, respectively. There was significant correlation between breast height diameter (dbh), annual diameter increment and annual volume increment.

Keywords: Beech, *Fagus orientalis*, diameter increment, volume increment, Nave-Asalem, Caspian region.

¹ - Forest Senior Expert, Shafaroud Forest Joint-Stock company, Poonel, Rezvanshahr, P. O. Box: 43841-1159, Guilan, I.R. Iran.

² - Member of Scientific Board, Guilan University, Rasht, I.R. Iran

Site demands and some quantitative characteristics of Lebanon oak (*Quercus libani* Oliv.) in Kurdistan province

H. Maroofi¹, Kh. Sagheb-Talebi², M. Fattahi² and M.H. Sadri¹

Abstract

This study was carried out in cities of Baneh and Marivan in Kurdistan province where are located at west of Iran. The main aim of the study was to determine the ecological characteristics of Lebanon oak (*Quercus libani* Oliv.) which is the most important tree species of northern Zagros region in Iran.

After developing the distribution map of this species, the study area was divided into three main land forms, including valley, slope and mountain ridge. Within each land form, sample plots (1000 m²) were allocated randomly and some of the quantitative characteristics of the oak trees were studied. The statistical data of the landforms were compared using analysis of variance and t- test. The results showed that Lebanon oak is a light demanding tree species which prefers to appear in east and north-east aspects. The altitude range of Lebanon oak varied between 1400 and 2000 meters above sea level, while the optimum range might be found at 1600-1700 m.a.s.l. Soils of the studied stands were shallow with light and heavy texture at surface and deeper layer, respectively. pH varied between 6 and 7.

The greatest dimension and growth rate of Lebanon oak was observed at valley landform where the soil was humid and fertile. At best and most suitable sites pure stands were developed, but in other sites mixed stands were developed, including Gall oak (*Quercus infectoria*). The main regeneration form of the studied oak stands was coppice with standard, containing trees with forked and twisted stems.

Keywords: Iran, Kurdistan, land form, lebanon oak, site demands, soil.

¹ Member of Scientific Board and Research Senior Expert, Kurdistan Agricultural and Natural Resources Research Centre..

² Member of Scientific Board, Research Institute of Forests & Rangelands, e-mail: saghebalebi@rifr-ac.ir

Relationship between regeneration of oriental beech (*Fagus orientalis* Lipsky) and land form

S. Mortezapour¹, M.R. Marvie-Mohadjer², Kh. Sagheb-Talebi³
and Gh. Zahedi Amiri²

Abstract

This paper investigates the relationship between land form and location and natural regeneration of beech species. For this purpose, the beech communities over 100 m. above sea level at Namkhaneh district of Educational and Experimental Forest of Tehran University in Caspian region were selected. Based on regeneration condition and distribution at different land forms, data sampling was performed at four different land forms, including slope, valley, ridge and doulin, using 15 sampling strips with equal widths (2m), but different lengths, depends on different environmental circumstances. The strips were selected at 150 m. intervals. Where the longest and the shortest ones were 517 and 40 m., respectively. The doulin land form was selected where the regeneration cover was more than 30%. The doulin forms were divided into four aspects, including north, east, south and west faced directions for precise study of regeneration. Quantitative and qualitative characteristics of natural regeneration of beech (*Fagus orientalis* Lipsky) were recorded and canopy cover of the beech old-growth stands was estimated. The results showed that there were significant differences between the four landforms in respect to regeneration cover of beech species, where the ridges had the greatest values. The greatest frequency of beech seedlings on ridge and valley and as well as slope and doulin land forms were found at <30 and 30-130 cm height classes, respectively. There was not significant correlation between beech regeneration frequency and different aspects within the doulin land form. Therefore, the average density of the seedlings per m² was 0.8 (equal to 8000/ha). 70% of the seedlings were healthy and the rest were not sound.

Keywords: beech regeneration, landform, Aspect, Caspian forests.

¹ - Forest Senior Expert M.Sc., e-mail: s_mortezapour@yahoo.com

² - Member of Scientific board, University of Tehran, e-mail: mohadjer@nrf.ut.ac.ir

³ - Member of Scientific board, Research Institute of Forests and Rangelands,
e-mail: saghebtalebi@rifr-ac.ir

Eucalyptus species trial on sandy dunes of Khuzestan province (Iran)

M.H. Saleheh Shoostari¹ and H. Rouhipour²

Abstract

There are about 350,000 hectares of sandy dunes and sandy lands in Khuzestan. During the past 40 years, different Physical, chemical and biological operations were applied to stabilize these lands and the results were all satisfied. The aim of the study was to determine the most tolerant species of *Eucalyptus* to drought and heat for biological fixation of sand dunes. Three species and one provenance of *Eucalyptus*, including *E. camaldulensis* 9616, *E. camaldulensis*, *E. microtheca* and *E. sargentii* were planted in 1992 under rainfed condition and statistical design of randomized complete blocks, with three replicates at 3*3meter spacing and against dominant wind direction. In this study, a mulch cover was applied to stabilize the sandy dunes against wind erosion. The measured *Eucalyptus* characteristics were: survival, height and diameter. After seven years, the data were analyzed, using ANOVA and Duncan tests. The results showed that *E. camaldulensis* 9616 was the most promising species due to its highest value of survival (73%), mean height (9.66m) and mean diameter at breast height (10 cm).

Key words: Sandy dune stabilization, height, diameter, afforestation, *Eucalyptus*, Survival.

¹- Forest Research Expert, Khuzestan Agricultural and Natural Resources Research, Center, P.O.Box 61335-3341, Ahwaz, I.R.Iran, e-mail: mh_saleheh@yahoo.co.uk

²- Member of Scientific Board, Research Institute of Forest and Rangelands, P. O. Box: 13185-116. Tehran, I.R. Iran.

Phenological characteristics of different *Poplar* species at Yassoj Experimental Station

M. Yosefi¹, A. Shahrivar¹, A. R. Modirrahmati², R. A. Ghasemy²
and A. Hemmati²

Abstract

In order to collect and study the morphological- phenological characteristics and ecological requirements of different poplars, 40 most successful clones were selected from Selection Nursery and transferred into Mother Individual collection by 5*5 and 4*4 m intervals for open and closed crown species, respectively, using five seedlings for each planting line. The collection is located in western Iran, near Yasooj in Kohgiluyeh and Buyerahmad province.

The studied growth characteristics contained of diameter and height which recorded at the end of growth period. The phenological phenomena consisted of were flower, leaf, seed development and leaf fall. Furthermore, daily maximum and minimum temperature data was recorded all over the growth period.

The results showed that the poplar biotic activity usually starts at March and ends at November. The phenological phenomena at different poplar species and clones started in different dates due to variation in species and clones genetic characteristics and climate condition which varied from few days to few weeks. Beginning of phenological phenomena of a species is usually correlated to air temperature (maximum, minimum and average) at beginning of growth period, whereas its end is often correlated to photoperiodism and minimum air temperature. Leaf discolor and fall date at different poplar species varied from 6th September to 6th November due to shorter day time and cooler air temperature. The species *P. alba* and *P. euramericana* started their phenological activities earlier than the other species and the clones of *P. alba* and *P. deltoides* had longest biotic activities. The clones of *P. alba* were more sensitive to forest, whereas the clones of *P. euramericana* and *P. deltoides* were very sensitive to pests, particularly to beetle xylophagus (*Melanophila* sp.). About 70% of *P. euramericana* clones were complete died due to damage caused by this pest.

Keywords: Clone, collection, selection. Poplar, photoperiodism, temperature

¹ - Member of Scientific Board, Kohgiluyeh and Buyerahmad-Ahmad, Agricultural and Natural Resources Research Centre, Yassoj, I. R. Iran.

² - Member of Scientific Board, Research Institute of Forests and Rangelands, P.O. Box 13185-116, Tehran, I. R. Iran. e-mail: modirrahmati@rifr-ac.ir

