



IRAQI
Academic Scientific Journals



العراقية
المجلات الأكاديمية العلمية

TJAS

Tikrit Journal for
Agricultural
Sciences

ISSN:1813-1646 (Print); 2664-0597 (Online)

Tikrit Journal for Agricultural Sciences

Journal Homepage: <http://tujas.tu.edu.iq>

E-mail: tjas@tu.edu.iq

**Hamid
Mohammed
Ibrahim ***

Forestry Dept. College
of Agriculture &
Forestry, Mosul
University, Iraq

KEY WORDS:

genus of pine,
Mediterranean, forest.

ARTICLE HISTORY:

Received: 24/04/2022

Accepted: 26/06/2022

Available online:
30/6/2022

Tikrit Journal for Agricultural Sciences (TJAS)

The Importance of The Species of Genus Pine Scattered in The Mediterranean Region

ABSTRACT

Economic and useful forest trees belong to the group of Gymnospermae. This class includes four orders. One of the largest and most important order is Coniferales, to which belong 550 species spread all over the world. This order concentrated in the northern hemisphere, especially in cold regions. It grows in poor soils and has the ability to adapt to harsh environmental conditions. It also produces good timber for various purposes. For these reasons, there was great interest to study it in natural forests. One of the largest families under this order is Pinaceae. This family includes nine genera with up to 210 species. Pinus L. is considered one of the most important and largest genus, which contains more than 90 species. Its plants are found in cold and temperate regions. However, in hot areas, it is found only on high mountains. Brutian pine spreads at different altitudes (0 - 1600 meters) above sea level. It grows naturally in Iraq including the governorates of Nineveh and Dohuk. Particularly, areas such as Zawita and Atrush are involved. Pine spreads in cold and temperate regions. In the Arab world, there are types of pine and it is found in the mountains of the Levant. It is found in the regions of Mount Lebanon Matn, Kesrouan, Chouf and Aley, in Syria in the mountains of Lattakia and Mount Aleppo, and in the Syrian forest areas, and it is found in northern and central Palestine and Jordan. In the Maghreb, it is found in the forests northwest of Tunisia, in the mountains of Algeria and the Moroccan countryside, and is found in the areas adjacent to the city of Al-Bayda.

© 2021 TJAS. College of Agriculture, Tikrit University

INTRODUCTION

Forests are among the renewable natural resources because of their direct and indirect benefits that serve humanity in economic terms. Some countries depend entirely on forests for their economy in addition to their environmental benefits such as soil maintenance, and water conservation, pollution reduction, wildlife development, air purification and mitigation, as well as their tourism benefits are also taken in account. Wood still represents one of the main sources of raw materials that humans have used from ancient times to the present (Al-Hadidi, 1999). Various types of pine trees can be found all over the world and can grow in a wide range of soil types and climates. Pine trees originated in Europe, Asia, and the Mediterranean regions and were introduced to the Americas by immigrants. Although characteristics differ from species to species, their characteristics overlap.

leaves

Instead of the broad, flat leaves of most tree species, pines have sac-shaped leaves, usually referred to as needles. The needles are usually stacked in groups of two to eight and joined to the base by a sheath. Different species will have different numbers of needles in each group. For example, white pines usually have five needles per cluster, while Ponderosa pines have only two needles. Pine trees grow new leaves in spirals around their branches. These spirals are called candles. The leaves will

* Corresponding author: E-mail: hamid-muhammad@uomosul.edu.iq

generally live for about two years, after which they turn brown and are discarded. Because the pine is evergreen, it will replace dead candles with new ones. Pine leaves are also covered in a waxy layer called the cuticle. This wax prevents water loss which is the reason for its shiny appearance.

Bark

Pine bark, too, has characteristics that distinguish it from other bark. Many pines have reddish-brown bark, as do long-leaved pines. Pine bark also appears as plates either in layers or scaly. The bark has a rough texture. Pine bark has a distinct odor, and is often described as turpentine. If you peel off a small part of the bark and smell the underside, you should get a strong odor. This is often the determining factor for determining whether it is pine bark or not.

Cones

Instead of producing fruit, pine trees produce cones. This is how pine trees reproduce. There are two types of cones, male and female, the latter being the most common shape when referring to pine cones. The male cone is usually smaller and not as dense. Its function is to fertilize the female component by releasing pollen grains. Female cones are harder and longer lasting than males. They pick up pollen and eventually drop the fertilized seeds. The female is covered in scales. At the bottom of each scale the seeds are produced and released when the cone is opened.

Evergreen

Pine evergreen. This means that they keep their leaves all year round, and do not shed them in the fall like most other tree species. Scientists view them as evergreen due to the low-growth environments in which they grow. They remain green all year long to continue processing nutrients. There are a number of species of the genus pine spread in the Mediterranean region, and we mention them.

***Pinus brutia* Ten.**

Pinus brutia Ten. plant grow naturally in a variety of locations from sea level to 1500 m above. It thrives in a Mediterranean climate characterized by hot, dry summers, mild winters and rain, as in Turkey. This country is considered one of the richest countries in the world with this plant, covering a large area (Ozkaya, 2013) it is found in France, Britain, Holland and Belgium in the form of trees (Bernicchia et al., 2007). It is a light-requiring and fast-growing plant, which is renewed with fires in general, but it can be renewed in natural conditions without forest fires (Boydak ,2000). *Pinus brutia* Ten. A large tree of the species belonging to the coniferous family Pinaceae, generally characterized by a conical crown of dark green color, and it has a long, wedge-shaped root that spreads The *Pinus brutia* Ten spreads naturally in the eastern part of the Mediterranean, starting from Greece to Lebanon, passing through Turkey and Syria. Cyprus and Iraq (Nahal, 2003). *Pinus brutia* Ten. grows naturally in Iraq and spreads in the governorates of Nineveh and Dohuk in the regions of Zawita and Atrush and spreads at different altitudes (zero - 1600 meters) above sea level. It is found in several types of soils, except for highly saline soils. It is also considered a light-loving species and has the ability to resist relatively low and high temperatures and resists drought to some extent. Also, the *Pinus brutia* Ten has slow growth and the height of the tree reaches more than 35 meters. It has a straight stem. And with few branches, the seedlings of *Pinus brutia* Ten are widely used in afforestation operations in Iraq, whether in natural forest areas Or in areas devoid of trees, trees produce seeds after the fourth year of their life and the cones mature after two years of their formation. *Pinus brutia* Ten. reproduces by sexual only, that is, using seeds and trees carry cones annually in good quantities and their seeds can be stored for several years in cold stores, used Its wood is used in various fields, including furniture, box making, charcoal industry, and others (Abdullah, 1988). Pine is preferred over broad-leaved species for rebuilding forests, as in the cultivation of poor lands in the northern regions and many central regions (Daoud, 1979). Male (Nahal, 2002) that the types of pine spread in the Syrian flora are very few, and they are represented by only two types *Pinus brutia* and *Pinus halepensis*, while the other types are introduced. And (Ali, 1980) showed that the clay soil gave the highest increase in the linear growth and the fresh and dry weight of the seedlings of *Pinus brutia*, but it reduced the survival rate. It was also found that the medium consisting of clay soil + sedimentary soil at a ratio of (1: 1) gave a significant increase in different growth characteristics. Bain (Abdullah, 1971) that scratching with sulfuric acid H₂SO₄

concentration of 98% leads to a decrease in the thickness of the seed shells of *Pinus brutia* by (162.90) microns in the event that it is treated for (30) minutes with acid and an amount of (244,60) Micron in the case of treatment for a period of (120) minutes. The researcher (Shafiq et al, 1987) confirmed that the best medium for the growth of seedlings of *Pinus brutia* and *Casuarina equisetifolia* It is a mixture of (sedimentary soil + organic fertilizer + clay soil in a ratio of (2: 1: 1), while the best medium for the growth of *Eucalyptus camaldulensis* seedlings was the same mixture, but in a ratio of (1: 1: 1 And (Al-Kinani et al, 1981) conducted an experiment to show the effect of spraying with gibberellic acid at concentrations (zero, 50, 100 and 150 mg/L) in single *Pinus brutia* seedlings at two months old, and from the results it was shown that spraying gibberellic acid at a concentration of (50 mg/L) twice during the experiment period gave the best results regarding seedling length, linear growth, and diameter, number of leaves, number of branches, wet and dry weight for each of the stem, leaves, twigs, roots and total plant compared to the rest of the other concentrations. *Pinus brutia* Ten is represented by trees that reach a height of up to 30 m in highly fertile sites and live between 120 and 150 years (Nahal, 1982) and are characterized by rapid growth in the early stages of life and straight stems. To form overlapping branches (Abido and Qebimi, 2001). *Pinus brutia* Ten reproduces easily by seeds, and begins producing seed cones at an early age of about 6-8 years, The fruiting cones ripen in the fall of the second year, and its seeds have a high vegetative capacity of up to (70-90,)% , but they pass a three-month dormancy period before their germination (Nahal, 1982) subject to change under the influence of many factors that affect their dormancy and germination (Dirik and Tilki, 2007) and the growing seedlings need high light (Trabaud, 1995). It also found (Salhab, 2011) that years with high precipitation and moderate heat, especially in summer, help to form broad growth rings in *Pinus brutia* Ten. while adverse conditions encourage the formation of Narrow growth rings *Pinus brutia* Ten grows on different types of soils, but originally it grows on red soils arising on limestone and clay sediments (Boydak, 2004)

***Pinus halepensis* Mill.**

The height of the *Pinus halepensis* Mill. tree reaches 20-25 m, and it can withstand high temperatures that exceeds 40 °C in the area of its natural spread. It also tolerates low temperatures that may reach - 10 °. The tree resists calcareous and poor soils, and fears heavy soils with weak permeability and saline, and it grows in areas with a quantity of drops between 300-1000 mm annually. *Pinus halepensis* Mill. has economic importance and prominent position in influencing the national income of some rich countries. Its economic importance is limited to many areas as it is used in rebuilding forests, and due to its resistance to drought, cold and poor soils. It is used in afforestation of barren areas and in reducing sand movement. In the areas of sand dunes, windbreaks and afforestation of roadsides. Its wood is used for many uses in telephone and electricity poles, in carpentry and in the manufacture of paper pulp. This type is also used in Turkey and Greece for the production of resin (glue). It is widely used in industry, as one tree gives the equivalent of 2-3.5 kg of resin (Nahal et al., 1996). As a result of the rapid cultural and industrial development, the increase in the world's population and the loss of forest areas annually, the need for various raw materials, including wood, has been increased, considering that natural forests have become unqualified to cover the steady increase in demand. The slow-growing in a short period of time and with a developed root and vegetative complex, and using it in the establishment of fertile and irrigated trees in order to shorten the cutting cycle on the one hand and increase production on the other hand. One of the most important species of forest trees is Aleppo pine *Pinus halepensis* Mill. (Abdullah, 2004). This species was first classified by Duhamel in 1755 AD under the name *Pinus hierosolimitana*, In 1768 AD Miller described it under the name *Pinus halepensis*. However, the accepted scientific name for this species is the one given by Miller, which is *Pinus halepensis*, Its English name is Aleppo pine (Nahal, 1982). In a study conducted by (Qassem, 2009) by spraying *Pinus halepensis* Mill seedlings with different concentrations of gibberellic acid (zero, 20, 40, 60 mg It was found that the concentration (60 mg/L) led to a significant increase in the rates of most of the studied traits except for the survival rate and chlorophyll content of leaves .This plant is found naturally in the Mediterranean region, Spain, France, and Italy. It also exists in Yugoslavia,

Greece and North Africa, especially in Algeria and Tunisia. In the Middle East, it is found in Palestine, Lebanon, Syria and Jordan.). As mentioned, (Vila et al., 2007) in a study of the effect of nitrogen fertilization on the growth of five species of conifers, *Pinus halepensis* Mill. and *P. pinaster* L., *pinia* P, *P. nigra* L. and *P. sylvestris* L., where the results showed significant differences between pine species and there was a significant increase in root diameter of *pinus pinia*, *P. pinaster* L. and *Pinus halepensis* Mill compared with pine species other pines, and there was also a significant increase in root thickness of fruiting pine compared with other species. Between (Abdullah et al., 1978) in a study of them on the effect of light ratios (25, 50, 75, 100%) on the growth of Seedlings of *Pinus halepensis* Mill, thuja seedlings, *Thuja occidentalis*, and cypress seedlings *Cupressus spp.* The country growth of seedlings mentioned above at light ratio (25%) of natural light recorded the highest values compared to other light ratios used in the study. For the manufacture of wood panels and the furniture industry, as well as in the manufacture of cellulosic paste and paper (Abdullah, 1986). In another study conducted by (Abdullah et al., 1978) on seedlings of *Pinus halepensis*, *Thuja occidentalis* and Cypress *Cupressus spp.* seedlings to see the effect of light ratios (25, 50, 75, 100%) from natural light on their growth, we find that they recorded the highest values For the country growth of seedlings of *Pinus halepensis* and thuja at the proportion of light (25%).

***Pinus pinia* L.**

The fruit pine *Pinus pinia* L. is a natural Mediterranean species in southern Europe and occupies an area of 650 thousand hectares in the Mediterranean basin (Quezel and Medial, 2003). The forest bed, namely the needle leaves of the fruiting pine, has a relatively high oxidative capacity (Alfredsson et al, 1998). Therefore, it is worth noting the necessity of planting fruit pine in somewhat acidic soils (6- 5.5 = pH) and not acidic because the communities of fruit pine in turn work to raise the acidity of the soil growing in them, and the high acidity makes the chances of absorption of major and minor minerals by the plant very limited (Haddad, 2004). As for the *Pinus pinia* L it spreads in most of the areas surrounding the Mediterranean, and its original natural habitat is not yet known, as humans introduced it to these areas to use its seeds for food a very long time ago (Nahal, 2003). This type was introduced into Iraq and spreads in artificial trees in the governorates of Nineveh and Erbil, but it spreads naturally in the areas overlooking the Mediterranean Sea. The fruit pine is considered one of the types that are resistant to coastal winds and has little tolerance for freezing. The height of the tree reaches 25 meters. Its growth is dense and flat in the form of an umbrella with branches growing upwards. Its seedlings are used in afforestation of the coastal sand interior areas and for decoration in gardens and parks. Trees are also planted with the aim of obtaining seeds, which are used as food. Trees bear seeds after about fifteen years (Abdullah, 1988). Salvador et al., (2005) mentioned in a study on six types of forest trees, three of which are oak trees are *Quersus suber* L., *Q. ilex* L. and *Q. coccifera* L. and three species of conifers *Pinus pinia* L. and *P. halepensis* Mill. and *Juniperus thurifera* L. The results showed significant differences between species, as it recorded a significant increase in nitrogen concentration in leaves and stems of *P. halepensis* Mill pine seedlings. and *Juniperus thurifera* L. compared to other species. (Al-Khafaf et al, 1998) indicated that the effect of scratching by sandpaper and the duration of immersion with gibberellic acid on seed germination and growth of seedlings of fruiting pine *Pinus pinia* L. led to the superiority of scratched seeds in all studied traits (stem length and dry weight of stem, leaves and roots) in seedlings produced by Submerge the seeds for (3) hours in gibberellic acid of a concentration (150) ppm. The results of (Shaheen, 2017) showed that the low productivity of the fruiting cones of the *Pinus pinia* L in the Dahr Al-Khuraybat site in Gileh was one of the determining factors for natural regeneration, and the study (Zeina, 2015) indicated the success of afforestation of the Dahr Al-Khuraybat site in Jableh with the *Pinus pinia* L, through a study Some indicators of growth and productivity, despite the emergence of many hypotheses to justify this problem.). In a study conducted by (Al-Ashho, 2004) The results of cooling the seeds of *Pinus pinia* under a temperature of (-4) - (-6) C and for periods (0, 2, 4, 6, 8) days before planting, as the seeds cooled for a period of four days gave the best results for the percentage of germination and stem length And the dry weight of the stem and leaves.

***Pinus sylvestris* L.**

Little (and Macdonald, 2003) mentioned in an experiment they conducted on seedlings of *Pinus sylvestris* L and *Picea gluca* at one year old and treated with six types of gibberellins GA20, GA9, GA6, GA4 and GA3 GA1 and two types of auxins (IAA and NAA), by Soaking the head of the seedling or injecting the stem or spraying on the vegetative group, that the three methods led to an increase in the longitudinal growth of both plants with GA1), GA3 and (GA4 and the increase in the length of the bud with the type *Picea gluca* and the width of the bud with *Pinus sylvestris*, the auxins inhibited the longitudinal growth of the two types and with The three methods of addition, The researchers also concluded that gibberellins can work to increase the activity of the apical and subapical meristems in the coniferous family. (Kraus and Johansen, 1960) found that treatment of *Pinus sylvestris* seedlings with gibberellic acid at a concentration of (200 ppm) by complete soaking of the seedling, soaking the root group or soaking the vegetative group to the stem-root contact area, all treatments gave negative results in the percentage of survival compared to non-seedling seedlings. (Katherine et al, 1994) studied the effect of light, nitrogen and phosphorous on the growth of the red pine phase *Pinus vesinosa* and its nutrient content under different levels of illumination, nitrogen, and phosphorous. Tables of answers in the search process in Tables (4-5). Effect of light, water and nitrogen on photosynthesis and growth of long-leaved pine seedlings, *Pinus palustris* Mill. The length of the seedlings and the diameter of the main root were significantly affected by nitrogen and water and the interaction between them and without the presence of the effect of light, and the effect of light, water and nitrogen was clear and had an important role in the growth of living mass, especially in an abundance of water. The plant types used in afforestation projects vary greatly, and conifers are among the most important trees in these projects, as their importance lies in preserving the soil, preventing erosion and resisting desertification, in addition to the importance and types of plant material worthy of attention, and this is what made pines important in the field of afforestation (Vallet , 2009).

***Pinus radiate* D.**

The vegetative nature of conifers and slow-growing species (Al-Ashwa et al., 2000 It was mentioned (Nyakuengama et al., 2003) in a study of the effect of fertilizing with N, P and NP on *Pinus radiate* D. trees of seven years of age on average stalk diameter and wall thickness in three locations, and the results showed There was a significant increase in the diameter of the stalk as a result of the treatment with P and NP compared to the comparison treatment. And (Duranti, 1972) explained that the growth of pine seedlings of the type *Pinus radiate* in clay soil was better than seedlings planted in sandy soil and that As a result of cultivating this species using eight mixtures of clay and sandy soils, the percentage of clay in them ranged from 12-100%. Phipps (1974) stated that red pine seedlings growing in media containing peat moss had greater vegetative and root growth than seedlings growing in media without peatmoss.

***Pinus caribaea* V.**

Researchers (Bhatanger and Talwar, 1978) found that spraying the seedlings of *Pinus carbaea* with (100 mg/L) of gibberellic acid led to an increase in the length, diameter and number of seedlings produced. In a study by Jessica et al, (2004) on the effect of light, temperature and long night on the growth and carbon positions of seedlings of two pine species *Pinus banksiana* and *Pinus rigida*, they showed an effect of light on the early growth success of 1-year-old seedlings of the two species, and *Pinus banksiana* seedlings showed a live mass The second type, *Pinus rigida*, showed a higher biomass relative to the leaves. . (Cowan, 1975) that the use of pine and cypress sawdust with peat moss and sand in a ratio of (3: 2: 1), respectively, was an appropriate medium for the cultivation of eucalyptus seedlings and the development of the root group. The researchers (Awan and Betancourt, 1975) found that the longitudinal growth of pine seedlings, *Pinus caribaea*, was better when using a mixture consisting of 90% mixed soil. Mild + 10% hydrolyzed sugar cane juice residues. Awan (and Betancourt, 1975) showed that the linear growth of *Pinus caribaea* seedlings was better when using a mixture of 90% light soil mixture + 10% decomposed sugarcane juice. (Nicky's Nursery ,2004) report on the typesetting of seeds under nursery conditions in the UK to break the dormancy phase confirmed that the seeds need cold stacking for a period of (2-32) weeks

depending on the species and variety. (Al-Hadidi, 2005) indicated that soaking the seeds of Canary pine *Pinus canariensis* in gibberellic acid in concentrations (zero, 200 and 300) parts per million and for periods (0, 10, 15 and 20) minutes exceeded the concentration (300) parts per gallon of the acid in its effect on All the studied traits (germination percentage, survival rate, length of seedlings, and dry weight of stems, leaves and roots), and that the duration of soaking with acid (20) minutes showed a significant superiority in their effect on the length of the seedling and the dry weight of the stem and roots.

The researcher (Pasquini et al., 2008) in the Pataconia region of Argentina showed in his study of the seeds of *Pinus ponderosa* Dogl for the purpose of increasing their germination to determine the optimum initial cooling period for them, so he experimented with cooling these seeds for periods (0, 10, 20, 30). 40, 60 days) The results showed that after 40 days of the initial cooling period, the speed of seed germination reached 62% and the yield rate reached 70%, and both values were higher than the values obtained under normal conditions, which means the success of increasing the viability of germination of Pandanus pine seeds.

REFERENCES

- Abdullah, Ahmed Saeed (1986). Comparison of some qualitative characteristics of the trunks of four types of pine for use in the manufacture of pulp. Master's thesis submitted to the College of Agriculture and Forestry, University of Mosul.
- Abdullah, Muzaffar Omar (2004). Mineral fertilization of *Pinus brutia* Ten. The Boy in Nineveh Forest, PhD thesis, College of Agriculture and Forestry, University of Mosul.
- Abdullah, Yavuz Shafik (1988). Foundations of forest development. University of Mosul, Ministry of Higher Education and Scientific Research, Republic of Iraq. 295 - 297.
- Abdullah, Yavuz Shafiq (1971). Effect of sulfuric acid H_2SO_4 on shell thickness and seed germination of *Pinus brutia* pine; Mesopotamia Agriculture Journal, Volume 5 and 6.
- Abdullah, Yavuz Shafiq (1988). Foundations of Forest Development, Ministry of Higher Education and Scientific Research, University of Mosul, Directorate of Dar al-Kutub for Printing and Publishing.
- Abdullah, Yavuz Shafiq, Abu al-Dhahab Muhammad, and Ali Ihsan al-Naqib (1978). The effect of misinformation on the growth of seedlings of Aleppo pine, *Pinus halepensis*, *Cupressus* spp, and *Thuja occidentalis*, Mesopotamian Journal of Agriculture, Volume 13, Issue 1.
- Abido, Muhammad Smeiman; Qubaimi, Imad (2001). Study of growth and productivity of *Pinus nigra* and *Pinus brutia* on the vertical Mediterranean floor of the coastal mountain range. Basil Al-Assad Journal of Engineering Sciences, Issue 14: 183-195.
- Al-Acho, Jayad Abdel Mahmoud and Riyadh Saleh Al-Khaffaf (2000) The effect of seed weight and gibberellic acid on the germination and growth of fruiting pine seedlings. Ziraat al-Rafidain Journal 23 (1): 61-65.
- Al-Ashho, Jiyad Abd (2004) The effect of seed weights and cooling periods on the germination and growth of seedlings of fruit pine *Pinus pinea*, Iraqi Journal of Agricultural Sciences, Volume (5), Issue (2), 2004
- Alfredsson, H., L. M. Condron, M. Clarholm, M. R. Davis. 1998. Change in soil acidity and organic matter following the establishment of conifers on former grassland in New Zealand, Forest Ecology and Management, Elsevier, 112:245-252 .
- Al-Hadidi, Samoud Hussain Ali (1999). A study of some factors affecting the production of vegetative Western maple seedlings. Master Thesis, College of Agriculture and Forestry, University of Mosul.
- Al-Hadidi, Samoud Hussain Ali (2005). Effect of concentrations and periods of immersion with gibberellic acid on seed germination and growth of canary pine seedlings. Al-Rafidain Agriculture Journal, 33.(4)
- Ali, Hashem Younes (1980). Effect of some soil media and nitrogen fertilization levels on the growth of protea pine seedlings in Nineveh nursery. Master's thesis, College of Agriculture and Forestry, University of Mosul. Iraq.

- Al-Khafaf, Riyadh Saleh, Jiyad Abdel-Asho and Samoud Hussein Ali (1998). Effect of scratching and gibberellic acid on the germination and growth of fruiting pine seedlings. *Al-Rafidain Agriculture Journal*, 3.(1)
- Al-Kinani, Adel Ibrahim, Yavuz Shafeeq Abdullah and Muzaffar Omar Abdullah (1981). Effects of growth regulators (GA3) on the growth of *Pinus brutia* Ten seedlings. and CCC on the growth of *Eucalyptus camadolensis* seedlings Dehn, *Mesopotamian Journal of Agriculture*, 16 (1) 75-79.
- Awan, A. B. & O. Betan Court (1975). Effect of different mixture of material on the growth of seedling of *Pinus caribaea*. *Forestry. Abs. Vol. 34. No. 2.1975*.
- Bernicchia, A.; E. Savio; and S.P. Gorjon (2007). Aphyllloporaceous wood inhabiting fungi on *Pinus* spp. In Italy. 101: 5-8.
- Bhatanger, H. P. ; K.K . Talwar (1978) . Study on the effect of growth regulators on growth and trachied characters of *Pinus carbea* seedling . Ind . For. (Abstract) 144 (5) : 333 – 353.
- Boydak, M. (2000). Plant diversity, *Phoenix theophrasti* and *Pinus brutia* in Turkey. Biodiversity and Natural Heritage in the Aegean Proceedings of the Conference Theophrastus (2000) (A. J. Karamanos and C. A. Thanos, Eds.) (July 6-8, 2000, Eressos, Sigri, Lesbos-Greece), p. 251- 259, Athens (call paper).
- Boydak, M. 2004. Silvicultural characteristics and natural regeneration of *Pinus brutia* Ten. A review. *Plant Ecol*, 171:153-163.
- Cowan, J. M. (1975). Peat/ sawdust mixture as a propagation medium. *Forestry. Abs. Vol. 36. No. (8).1975*.
- Daoudi, Daoud Mahmoud (1979). Classification of Forest Trees, Ministry of Higher Education and Scientific Research, University of Mosul, Dar Al-Kutub for Printing and Publishing.
- Duranti, G. (1972). Preliminary research on the effect of clay content in the soil on the growth of *Pinus radiata*. *Forestry Abs. Vol.34.No.(3) .*
- Haddad, Sohail. (2004). Lectures in Plant Physiology, Damascus University Publications.
- Jessica, W.H; M.S. A.S & J.C (2004). Influence of seedbed , light environment, and elevated night temperature on growth and carbon allocation in *Pinus rigida* and *Pinus banksiana* seedlings. Department of Forest Ecosystem Science ., University of Maine . Orono. USA . (Abstract) .
- Katherine . J. Elliott Alan S . White (1994). Effects of light Nitrogen , and Phosphorus on Red pine seedling Growth and Nutrient Use Efficiency . *Forest Science* , Vol. 40 , No. 1.
- Kraus, J.F. & R. W.Johansen. (1960).A test of gibberellic acid on long leaf pine J. forestry .56:194(abstract).
- Little , C. H. A. and J . E. Macdonald (2003) . Effect of exogenous gibberellic and auxin on shoot elongation and vegetative and development in seedling of *Pinus sylvestris* and *Picea glauca* . *Tree physiology* . 23 (2) : 73- 83.
- Nahal, Ibrahim (1982). pine Brutian and its forests in Syria and the eastern Mediterranean countries, Aleppo Publications, Faculty of Agriculture, Aleppo University, Directorate of Books and University Publications.
- Nahal, Ibrahim (2003). Dendrology, Faculty of Agriculture, Aleppo University, Syria.
- Nahal, Ibrahim, Adeeb Rahma and Muhammad Nabil Shalaby (1996). Forestry and Forestry Problems, Aleppo University Publications, Faculty of Agriculture.
- Nicky's ,Nursery (2004) . Stratified tree seeds . untied kingdom gardeners and grower report . p. 1-2 .
- Nyakuengama, J. G. ; G. M. Downes and J. Ng (2003) . Changes caused by mid-rotation fertilizer application to the fiber anatomy of *Pinus radiata* , *IAWA Journal* , Vol. 24(4): 397 – 409.

- Ozkaya, K. (2013). Determination of some physical and mechanical properties of Calabrian pine (*Pinus brutia* Ten.) trees grown in the Denizli area of Turkey. *International Journal of Physical Sciences*. 8(16): 2063- 2068.
- Pasquini , N. M., G. E. Defosse , O. D. Longo (2008) . New Features 16 : 93-102 .
- Phipps, H. M. (1974). Growing media effect size of container grown Red pin. North central forest Experiment station, forest service.U. S. Development of Agriculture:1-4.
- Qassem, Haitham Abdul-Jabbar (2009). Effect of light percentage, concentrations of gibberellic acid and timing of spraying on the growth of Aleppo pine seedlings, Master's thesis, College of Agriculture and Forestry, University of Mosul.
- Quezel, P. and F. Médail. (2003). *Ecologie et biogeography des forets du bassin mediterraneen*. Paris, Elsevier .
- Salhab, Hebaba (2011). Study of the effect of rainfall on the width of growth rings in Siristan Forest - Tartous Governorate. Master's thesis, Damascus University, 98 pages.
- Shafiq, Y.; A. M. Abo- Dahab & J. A. Al-Ashoo (1987). Effects of different transplanting media on growth of *Eucalyptus comaldulensis* Dehn., *Pinus brutia* & *Casuarina equisetifolia* forst transplants. *Mesip. J. Agri*. 13 (2): 167-178.
- Shaheen, Ammar (2017). A study of some factors affecting the regeneration of fruit pines in Dahr al-Khuraybat - *Pinus Jableh* - Lattakia Governorate, Master's thesis, Tishreen University, Faculty of Agricultural Engineering.
- Shibu Jose , S, C . R (2002) . Growth , nutrition , photosynthesis and transpiration responses of long leaf pine seedling to Light , water and nitrogen . School of Forest Resources and Conservation , University of Florida , 5988 Hwy 90 , Building 4900 , Milton , FL 32583 , USA.
- Tilki, F ., Dirik, H., 2007. Seed germination of three provenances of *Pinus brutia* Ten. as influenced by stratification , temperature and water stress. *Environmental Biology*, 28(1): 133-136.
- Trabaud, L.,1995. Modalites de germination des Cistes et de pins mediterraneen et colonization des sites perturbés. *Revue Ecologic (la terre et la vie)* 50:3-14.
- Vila, P. ; J. D. Heras and M. Honrubia (2007) . Effects of exponential and conventional fertilization on growth nutrient uptake by five Mediterranean pines in greenhouse, *Mycetus Biotchnology S. L. Polygono campollano* 199 – 205.
- VILLAR-SALVADOR, P., PUERTOLS, J. and PENUELAS, L.J(2008). Assessing Morphological and Physiological Plant Quality for Mediterranean Woodland Restoration Projects. *CAP* 7-1:18.
- Zeina, Rabia (2015). A study of the growth and productivity of fruit pine in afforestation site - Dahr al-Khreibat - *Pinus Jableh* - Lattakia Governorate, Master's thesis, Tishreen University, Faculty of Agricultural Engineering.

اهمية انواع جنس الصنوبر المنتشرة في منطقة البحر المتوسط

حامد محمد ابراهيم حسين

جامعة الموصل - كلية الزراعة والغابات - قسم الغابات - العراق

الخلاصة

أشجار الغابات المهمة والمفيدة من الناحية الاقتصادية تعود الى صف عاريات البذور *Gymnospermae* والتي تضم أربع رتب ، ومن أهمها وأكبرها رتبة المخروطيات *Coniferales* التي ينتمي اليها 550 نوعاً منتشراً في جميع انحاء العالم، يتركز وجودها في النصف الشمالي للكرة الارضية ولاسيما في المناطق الباردة. تمتاز هذه الرتبة بأهمية كبيرة في العالم من الناحية الاقتصادية فهي تنمو في الترب الفقيرة ولها القابلية على التكيف مع الظروف الطبيعية القاسية وتنتج اخشاباً جيدة لمختلف الاغراض ، ولهذه الاسباب نجد الاهتمام البالغ بها في الغابات الطبيعية ، ومن أكبر عوائلها عائلة الصنوبريات *Pinaceae* التي تضم تسعة اجناس تشمل بحدود 210 أنواع ويتركز وجودها في المناطق الباردة في النصف الشمالي للكرة الارضية ، ومن أهم اجناسها وأكبرها جنس الصنوبر *Pinus L.* الذي يحتوي على أكثر من 90 نوعاً والذي يوجد في المناطق الباردة والمعتدلة ، اما في المناطق الحارة ، فإنه لا يوجد الا في اعالي الجبال ينتشر الصنوبر في المناطق الباردة والمعتدلة. في الوطن العربي توجد أنواع من الصنوبر وهو موجود في جبال بلاد الشام، فهو يتواجد في مناطق جبل لبنان (المتن وكسروان والشوف وعاليه) وفي سوريا في جبال اللاذقية وجبل حلب وفي مناطق الغابات السورية ويوجد في شمال ووسط فلسطين والأردن. وفي المغرب العربي يتواجد في الغابات شمال غرب تونس وفي جبال الجزائر والريف المغربي، ويوجد في المناطق المجاورة لمدينة البيضاء.

الكلمات المفتاحية:

جنس الصنوبر، البحر المتوسط، منطقة