Development of Walnuts in Abandoned Fields

[a]Nazmi Ajazi, [b]Vath Tabaku, [c]Kristo Qendro
[a]Mcs St Teleferiku-Linze-Tirane: Work Address: Dajti Ekpres, Albania
[b]Prof. Koder-Kmez-Tirane: Work Adress: Fakulteti i Shkencave Pyjore-Tirane, Albania
[c]Prof. Rr Petro Nini Luarasi-Tirane; Work Address: Dajti Ekspres, Albania

---

Abstract

The Walnut (Juglans sp.), Arra (the name in Albanian), is a very widespread species in our country and its cultivation has a very early tradition. The surfaces occupied with this species are known with the name "arrore" in native terminology. Most widespread is in Dibra District and that of Berati, in the Valleys of Drini, Shkumbini, Devolli, Osumi that are known from ancient times for the native walnut cultivation. Because of the wide use of walnut some inhabited places are named with the name of walnut. It is known in all populations of the country and keeps the vitality of using in all the seasons of the year . It can treated easy from walnut of pocket to medicinal processing. The botanical pieces of walnut have a very large usage, beginning from the fruit, leafs, wood, roots, bark etc.
It is treated like a forest tree but it is known also in the agronomy. Walnut is a plant that , according to the analyses it can be developed on the fallow and abandoned forest lands, because of its spreading over coffee-brown soils. The results are very positive. These lands, up to the latest years are not treated as fruit-growing fund.
Walnut, being one of the high demanded fruit tree it needs to be treated according to a long-term policy in the biological aspect of the plant and, also in the biotechnological aspect of seedling production.
KEYWORDS: treatment, fruit-growing, abandoned, widespread, biology .

Walnut has a great industrial and economic importance in our country. It is called also the "Combinat tree" because of all its botanical pieces that have a large usage in industrial chemistry and particularly its fruit that is very demanded in market.
According to the bibliography searched about walnut results that it is a fruit-tree of very old times. Actually we have tens of toponyms with reference to walnut. Concretely you can find town, villages and other places with the name Walnut, par example: Arrwz in Kaçinar, Arrwz in Kukws, Arras and Arre-moll in Dibra, Fush Arrwz in Puka, Arrnjet in Zadrima, Kodwr Arrw in Malwsi tw Madhe, Arra e madhe in Shkodra, Arrishte in Semani, Guri i arrws in Tropoja, Bregu i Arrws in Fan etc.
The most remarkable places where the walnut is developed are Gryka e Valit, that ofShales, of Drini in all basin of water collecting and the largest area of Kiri, Fani ,Valbona, Matit, Shkumbinit, Devollit, Osumit, Vjosws , Malles etc.
The Walnut is widespread from the seashore up to 1300 m sea-level (Klinja). It can be found on free lands, around terraced uncultivated of the fields and meadows, etc, commonly in natural way . It can be found as a separately tree but also in forest groups as in Valley of Vali in Martanesh, Zagore village in Malwsi e madhe.
In our country the walnut is cultivated mainly for its fruit and mainly in east zone. There are no plantations with walnut .

Its planting normally is done with seedlings according the schema 8x10 m and 10x10m. Are used mostly new seedlings from seeds.
The walnut trees prefers sloping, fresh and stony soils. In all the cases to the planted trees are no any agrotechnical services like fertilization, tilling, irrigation and chemical treatment.
The soils with mechanical sub-clay, medium, alluvial and deep , clay-sandy, penetrated, drained and with ph 5-8.5 are suitable for walnut planting.
The soils reach in salty calcium are suitable because the calcium is indispensable for shell development. The soils reach in phosphorus are also suitable because the phosphorus is indispensable for kernel development. The soils that contain over 20 % active lime are not suitable because the lime causes chlorination and blocks the iron. The walnut is sensitive towards salt-soils and when reaches 1500 ppm the production goes down. It is damage also from the moist, therefore walnut needs permeated soils. It goes in west and NW direction , the freatic waters must be over 2 m. Under wise it can be damaged from the asphyxia of the roots up to be dried.

The best climate for the walnut development is in geographical breadth up to 49 gr. (we are in 39gr-43gr), in zones with medium annual temperature from 8gr – 10 gr C with warm summer, with temperature to up 22gr C and mild winter – 3 gr. C but no more than -10 gr.C. The temperature has an important influence in the fruit development during all the year. Here must be stressed that the wood of walnut tree endures the cold weather up to -24gr. C without any serious damage. But the low temperatures are dangerous mainly the vegetation, particularly in Spring time. The spring temperatures of -2 gr. During the flowering destroy the female and male flowers.

Concerning the sanity of the walnut tree here must be stressed the damage from bakterioza (Xanthomonas spp) that appears during the flowering, mainly when the spring comes with high humidity . This disease is combated with spraying based on copper 4-5 kg / ha, the decay of roots (Phtophtora spp.) is stimulated from the high humidity of the soil damaging the root system. In these cases the tree must be pulled out . Atrraknoza (Gnomonia leptostyla) damages the leafs and the fruits, mainly in cold weather and humidity. This can be combated in the same way as Bakterioza. The worm of fruits (Cydonia pomonella) can damage the fruit during the midst of April in the early strains. It must be combat with Carbaryl and (Bacikkus thuringensis)

The sidling production is made with difficulties because the walnut has some specific phenols that obstruct the callus formation. In artificial condition the problem can be resolved with the warm temperature combination. With success can be resolved the patch-buddeding system that depends from the climatic conditions of the zone.
This method is widespread with success in all European countries.

An other method is the growing of seedlings 1-2 year old in greenhouse with bags which in spring are grafted and later transferred in parcels.

There is an other method through grafting known as English method (the grafting on table) in February-March using seedling one year old. This procedure is used also in grape fruits.

The material and the method

During the process of the study are taking in consideration some factors as the actual situation of walnut, the actual grown up demands of market inside and outside our country, the possibilities of its cultivation and the surfaces of our country, which in many cases are uncultivated and abandoned as the result of demographical movements of population in democratic system toward the urban zones.
The extending on the country districts, according the inventory of 2010 can be seen on the following organography in which can be understand clearly the situation where we are.
From the ecological point of view walnut participates in Jungo-Platanetum formations where the water in the roots and fresh streams.

This extending gives us the possibility to suggest other surfaces that have been abandoned, to cultivate with this species so much demanded inside and outside our country. To cultivate it mainly through new plantings for increase the capacities . Many possibilities offer also the new methods of seedling production technology and the use of under-grafting. The practices used in European countries have had positive results in this direction. During the latest years also our farmers are included in attempts to acquire the latest technologies of walnut seedling production. A great role has had also the stabilization of some nurseries in Diber, Korça and other regions where have been outstanding early tradition of this species cultivation.

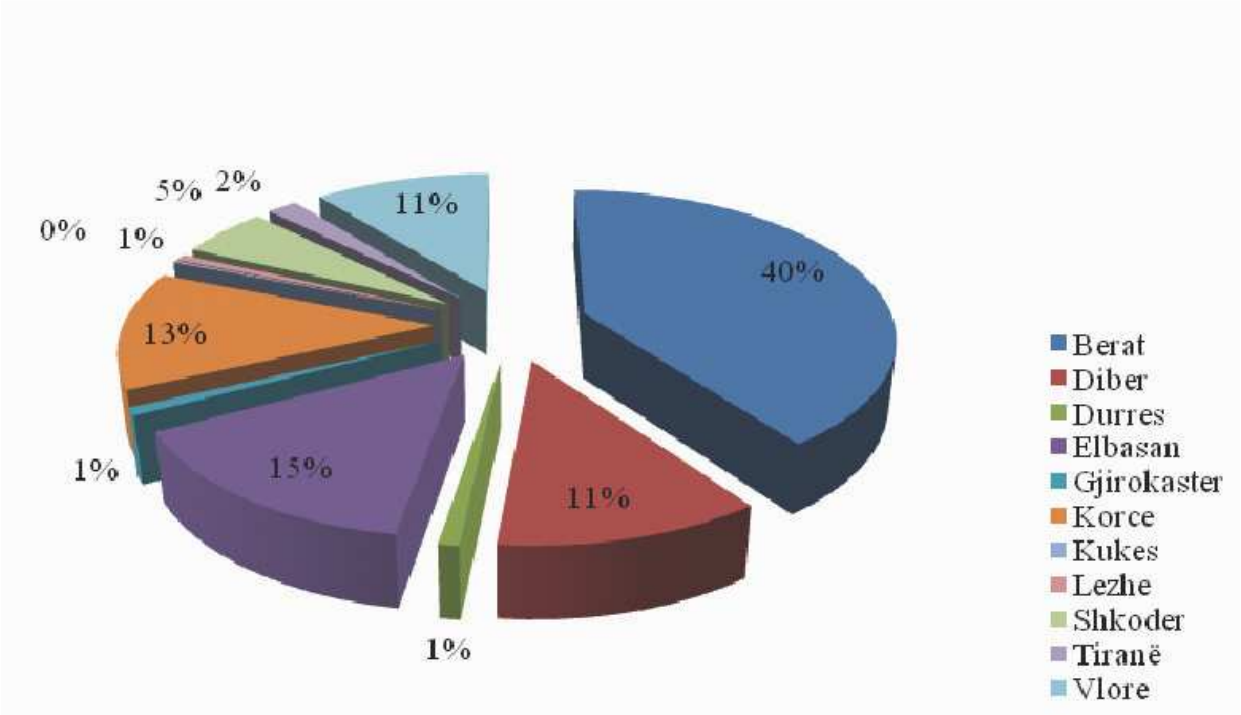
Our data have been taken not only from the opinions but also from the statistical inventory of DRB in country districts. The actual structure of the identified materials is made based in communes, districts, villages, codes, orthographical photos, forest economies and parcels. In the same time has been study about phytopathological situation of the existed plants, the fruits quality, botanical characteristics of the trees, the cultivation manner etc.

Are determinate also the nurseries stabilized up to now and the schemas of subventions used from donators during these latest years.
The study is realized for a period of 4 years in terrain and from the official statistic. Here we have the possibility to enter with the covering of the new nurseries and with the treatment of seedlings with the most advanced methods. In the same time in the study is analyzed also a piece of the soil fund of the forest fund of the abandoned that must be treated as arrore. This will contribute for the increase of the surfaces which up to now are abandoned. In the same time, with this study we recommend to the farmer to cultivate these lands that up to now are not treated as this one.

The results and the discussion
During the study made from us in four years we have extracted soma results very specific with reference to the situation of the walnut in our country, the division according districts in percentage , possibilities of its cultivation etc. The walnut
The walnut is widespread over all the territory of Diber district, Berat and Elbasan and where are the big valleys of Black Drini, Shkumbin, Osum and Devoll. In these valleys the walnut is of the high quality and quantity of native production. In Dibra we have the

development of the walnut with large grain in the Commune ofZerqan (Peladhi, Zalldardhe, Reci, the long grain walnut that can be found widespread in Zdojan (Diber), in Berat district and in that of Korca. In the same time widespread is also the walnut with the fruit in form of Vile in commune of Ostren, Librazhd in 620 m sea level etc.

The schema of widespread walnut according the Regions



But, in general in our country it is found widespread the habitually walnut (J. Regia var. Semidura). It is found in typical brown soils, with water and up to 580 m sea level, trees up to 100 years old, with height that goes up to 12 m and the diameter 60 cm, and diameter of the crown up to 14 m, with the form of dens pyramid , and with the twigs of the trunk up to 5 levels. The one year offshoots in spring are bright green and in autumn in brown color. The vegetative bud with the length of 0.8 -1cm and breadth 05 - 07cm. The side buds are under twig, small as these of the top, in round form .Under bud can be seen two buds. The female buds are in side of productive tweeds and are 1.5-1.7 cm. Their grow begins in April when develops leveret with many flowers, with a length up to 18 cm. The pollen begins to develop from the top of the tree in direction to its base in difference from the levar which goes from the side toward the top. The female buds are formed in April but 3-4 days before these of male in the end of the period end of April to 5

May. (The observation is made in region of Diber-Kastriot and the valley of Malles-Rec).

This explains that the variety of common walnut is dominant in comparison with the other varieties of walnut of the country.

During the study we have had reference to the technology of new plantings and services made in nursery and on the field . There is a limited number of nurseries in some districts. Therefore is needed to increase this number, because the import of seedlings has not the needed stability and resistance. For this, in the inventory made from us is emphases the increase of the number of the persons that are involved in the treatment and the development of seedlings up to twice of the actual number. In addition the grafting methods are very effective and the under and over-grafting needs to be done with care. There are four methods to prepare the callus.

The under-grafting *Juglans hindisi*- the plants grafted over this species are resulted with a strong grow and with a developed root system, resistant towards the deceases but are sensible towards phitoftores and black-line that is a physiological anomaly that can be seen in grafting point. This, after destructs the cambium cells results in yellow and drying of the plant.

*Juglans regia x Juglans hindi (*Paradox*)*

Weight Trocken	N Nitrog.	P Phosp.	K Potas.	Ca Calc.	Mn Magn.	B Bor.	Cu Coop.	Mg Mag.
%	2-3	0.1-03	>1.2	>1.0	>200 ppm	>36 ppm	>4 ppm	>0.3

This consists in early introduction of the plant in production process and are resistant toward nematodes (Pratilenchus). It endures the calcium and the moist. But can be invaded from Armillaria melleas. It permits replanting over the same place.

Juglans nigra (arra e zezë). The plant can be entering early in production process but with limited development. Ti prefers deep and reaches soils, but can not be adapt on calcified soils. It do not permit replanting.

Juglans regia these plants that are drafted over juglans regia do not permit planting over the same place because not endure toxic pollution and are sensible towards armillaria mellea and salt soils.

The service Technology

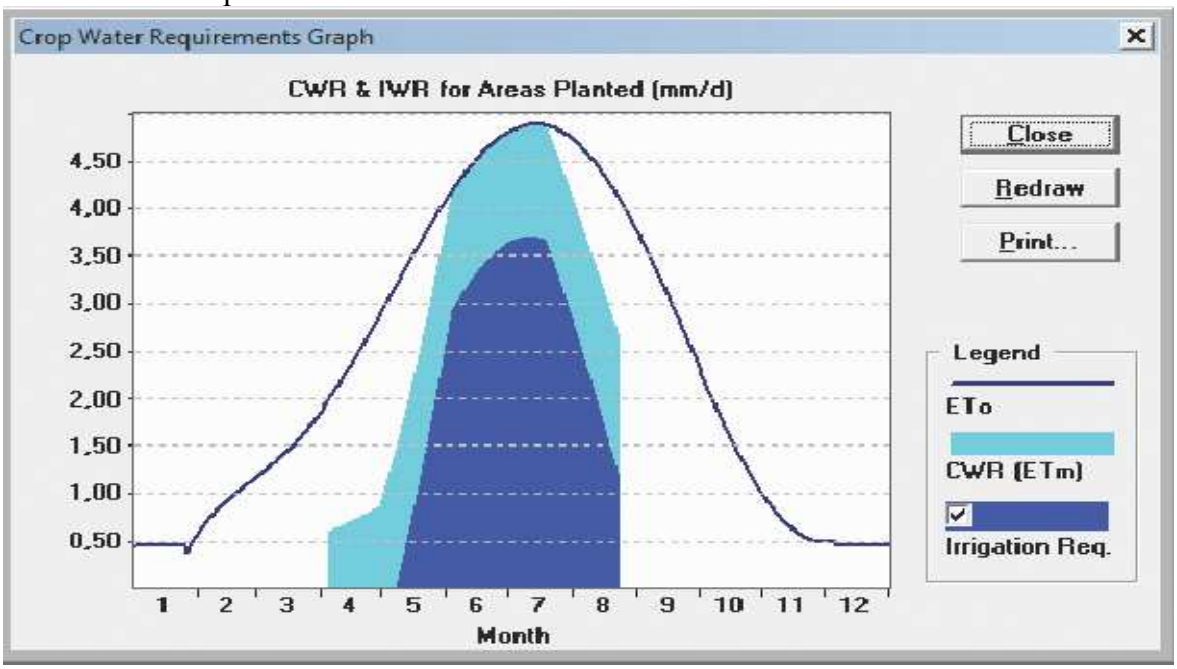
During our four years study in terrain we have observed that fertilization of the walnut in our country isn't applicable and the analyses demonstrate the falling of soil fertility from the lack of fertilization. Is lacking also the organic fertility that is the base of improvement and enrichment of the soil. This process increases the soil texture and is accepted in a dose of 400 kv/ha. It improves the structure and increases the solubility of the chemical elements and makes easier the assimilation of root system.

The chemical fertilization have also an importance in schemas where the plantings are made with holes. The quantity in these cases must be 300 gr/root, and the nitrogen fertility goes up to 250 gr. Sulfate Ammonium which stimulates the plant growing.

For the services after plantings we suggest the analysis of some specific essential elements. This analysis must be done in the tweeds of the plant. The normal level of the walnut needed nutritive elements results as in the following table:

It is known that the plants in horticulture big users and with big doses of potassium. Therefore, the doses used per ha are as follows:
Ammonium Nitrate 4 kv/ha
Superphosphate 2kv/ha
Potassium sulphate 2kv/ha
Phosphorus and Potassium normally are distributed in late autumn or in winter. In some cases for movement fertilizers in form of nitrates that are moved from waters must be used fertilizers with azot base as Ammonium nitrate or urea that brakes the process. These can be thrown in the beginning of the spring. In this period the ph of the soil contributes in absorbing of the mineral fertilizers. In the cases when ph is under the value of 5.5, it has to do with the absence of Ca, Mg, P, Mo, when the ph is high it has to do with the absence ofMn, Zn, fe, and Cu.
The irrigation: The walnut is a tree that needs water because the terrain where it is developed and needs loosen soils and sloping of rivers, soils with moist. During our observing results that that in an optimal period it needs 700-900 mm annual rainfalls .

The needs of the plant for water



The rainfalls we have them considered as effective and normal to make the preparation of the graphic . The observance is made for northeast zones where the extending of the walnut is more evident in report with all the surface .
Observing the following graphic of the rainfalls we can see that the most dry period is in July-August, that is to say that here we have a marked deficit . From this fact derives our duty to compens the need of plant through irrigation.
In new schemas that continue to be used in our country for the "arrores", in every project is introduced the component of irrigation in form of drops, in frames of national subventions for the walnut beginning from 2008 . These supported schemas are administered through AZHBR and is extended in all district of the country.

The main criterion to understand the need of the plant for water is when RAM (the available water) reduces. The water is needed only when SDM (the water in soil) is in deficit. According to the study the irrigation in
the beginning must be done in small dose, than more and more according to the temperature increase up to the end of vegetative season .

The needs of the plant for water

Observing the period of the extreme drought when dominate the irrigation with round 10 hours/day, we can calculate the climax of the bringing in a month as follows:

Qpik = q x surface x hours of the irrigation (in liters/sec). In our case the calculations are made in one ha: the result : in a month 1500 l / s.
The pruning is indispensable during the growth, specially the cutting of the lateral twigs with which can be stimulated the growth in height. This contributes to the early production (3-5 years oldness). Under observation must be also the splits of the twigs during fruition. Care is given to the treatment of the walnut crown too . Except the normal crown it is important the treatment of the crown in relation to sunning that has an influence mainly in the process of photosynthesis that is developed between 15-30 gr. C. But the light must be penetrate also in the inner part of the crown, therefore is under observance . For example the plants in pyramidal form and with the main leader twig have productivity, development and quality of fruits higher in comparison with other forms of the crown. The plants that have many central twigs create more shading and the fruits have no equal development. But , not in every case the pyramidal form have positive result because, some time can causes the burning of the fruit in high temperatures and the plant needs high interference causing, in such a way, wounds.
This recommendations are given to farmers as a results of practices of latest years in our country.
The positive sides of this form are : the maximal production, the production extended in many years and the influence in mechanical picking. The process of picking consists in some mode as mechanical picking through shaking , mechanical gathers , selection, taking off the shell, washing, ,drying, selection according the quality and quantity, the packing and depositing and protecting.
Conclusion:

According to evaluation made for the soils we have reached to the conclusion that:

The walnut is developed in typical brown soils with a mechanical content of medium sub – clay, alluvial and deep sandy-clay, penetrated from water with the ph 5-8.5. Very positive are also the abandoned and deforested of oaks forests of before 1990. Priority have the creek-basins and the river mouths, the alluvial soils. It can developed also in the fresh soils with deep structure.
The farmers can cultivate also on the abandoned forest lands making the compare analyses with the terrains in vicinity.

The new applications gives positive results, maintain some agrotechnical parameters of the rainfalls and the new methods of irrigation with drops. This is successful in some districts, based in schemas of subventions given from donators to the different farmers.

The walnut production is of the great social interest, because is very demanded in the market during all the year-long and conserves the quality of the fruit in very modest conditions. Its uses are overall and of some planes. Its tree protect the soil from the erosion and except the fruit it has valuated pieces as leaves, the trunk, the shell e tc.

The walnut is used in all shapes without a strict schemas of planting, and with a light devotion gives positive results. It is guaranteed in native market and in export. It is part of the fruits group with high quality and is treated wide in all classes of the population.

The production of walnut's wood is one of the most higher in planet. From one ha of planted seedlings of this species can be attained 45-65 kv non peeled fruits that could be seeking in market with a price from 300-500 leks/kg, and from the peeled fruits that goes up to1200-1700 lek /kg. SO, in one ha planted with walnut tree we could be obtained up to 1200000 leks.

The introduction of the new grafting methods in our study is important. Through a simple questioner we can see the increasing interest of farmers for development of this species.

References:

1. De Candolle A :Monographiae Phanergamarum.V.1864,Parise 171

2. De Candolle A:Systematics Padromus Natyralis regni vegetabilis.1864.

3. IMitrushi I.Druret dhe shkurrete Shqiperise.Tirane 1955

4. Mitrushi.Topuzi I.Disa konsiderata biokimike e biometrike lidhur me format dhe kultivarte e mundshem ne vendin tone U Tiranes,seria Shkencat e Natyres nr.2.1966.

5. Isufi E.Prodhimi bio ne arra ,lajthi,bajame e geshtenje.Konference Kombetare mbi arroret 2011

6. Rama P Situata e arroreve ne Shqiperi dhe opinione nga redaktoret.konferenca Kombetare MI .Tirane 2011.

7. Aleta N.,Ninot A 1993 Exploration and evalution of Spanish native walnut population fromn Catalonia and Galicia.Acta Hort (ISHS) 311,17-23.

8. Andrew F.Smith A.1972 Historical Virtues of the Walnut.

9. Anonymous,1972 Climate of Albania .Albania Academy of Science (in Albania).

10. Epple,C 2001 A vegetation study in the walnut and fruit-tree forest of outhern Kyrgyzstan.

11. Phytocoenologia.31(4):571-604

12. Flor EUROPIANA Juglans regia

13. Frutos Toma's D 1990.Selection of Spanish Walnuts .Acat Hors.(ISHS) 284,111-124.

14. Kola H,2011Classification of Dibra 's walnuts.Bull Agric ,Sci-2

15. Shcepotjev F.L,Orehopllodonje lesnije kulturi.Moskva .Lesnaja promishljenost 1978.

16. Lushaj.B Tabaku V Acat horticultura nr.2 .2009

17. Llubani F Demtuesit dhe semundjet kryewsore te pyjeve ShPB Tirane 1989.

18. Xhuveli L.Bimet dhe shqipetaret .2012,113-115,288.