

## RESEARCH ARTICLE

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**The cultivation of hazelnuts, variety “visoka” in Fier district in Albania**NAZMI AJAZI<sup>1</sup>, VATH TABAKU<sup>2</sup>, KRISTO QENDRO<sup>3</sup>

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**Abstract**

The treatment of hazelnuts in ecosystem and their importance related to other nut trees. These trees can be grown in hard terrenes with little qualities, so this fact has made hazelnut favorable to cultivate in Mallakstra district. Botanic characteristics and the history of its development in the district. The arrival of variety “visoka” in Albania, the spread and priorities that it took, the adaption with phytoclimatic and terrene’s factors. It is treated the problem of cultivation, the schemes of planting, the recommendation from current experience and the priorities. The agro technique that is used for cultivation and all relevant services, which are connected with development of this cultivar. Priorities’ classification between planting in separated blocks and in plantation. The graphic of costs and the performance for each case. The cultivation’s way in Balkan region and the comparisons with our country. The tables that present land qualities, which are recommended according to the study about Mallakstra district. The graphic of land plots that are speeded in the area. Also the chemical analyses of earth. The techniques of saplings production and given results. Marketing condition and the production priorities of this variety.

**Key words:** treatment, cultivation, agro technique, quality, chemical, adaption, biotechnology.

**1. Introduction**

Common hazel *Corylus avellana* is a forest wood of Betulaceae family, genus Coryus, from which are known 11 kind of species out of which in Europe can be found only three [5][6]. Common hazel is typically a shrub reaching 4-5 m of altitude, deciduous, monoecism. It is cultivated all over Albanian territory. It is a hydride from maxima variety. This variety can be found as wild but also cultivated. It is founded in the river valleys, hills, in the north-south expositions in south of Albania but also in southern expositions in north of the country.

The so called Turkish Hazel *Corylus colurna* variety *Visokais* cultivated in Albania since 1926, firstly in Visoka Village of Mallakaster region from where is named Visoka. [11]. Today this variety can be founded almost everywhere, in Fieri region, Pogradec and also in the northern part of the country. The altitude of Visoka variety is 3-4 m. Very characteristic for this variety is the blooming period, i.e. in Visoka the flowers are bloom in the first 10 days of January meanwhile in Pogradec one month later. This plant that is being adapted very well in our country and the production level is very satisfactory.

The root system is very dense, it reaches in depth until 50 cm, in deep and permeable soils can reach even 3 m. This makes possible the extent of lateral roots which increase the possibility of reproduction. [5][6]

From the analysis of different studies made until now and the comparative results came out that Visoka Hazelnut needs a normal PH to give the maximal production. In some region where have been made analysis in Tirana and Fieri where the ph is 7.2 is recommended to improve the hydrolytic reaction of the soil using ammonium sulfate.

During the plantation it is recommended to use phosphoric fertilizers taking into consideration the fact that the percentage of phosphor in a normal ph soils is less than the required minimum. The process of blooming which presumes the creation of the male flower through the male flower spray appears in the middle of June, the pollen is ready for pollination in January, a few days before bloom the female flowers (protandria). The female flowers are covered with leaflets in forms of scale which bloom in the end of January beginning of February and appears the pistil in pink color. The risk of the damage for the male and female flowers exists in low temperatures under 0, -8<sup>0</sup> because the bloom occurs in January. During January starts also the pollination. The pollen tube grows,

reaches the pistil and stays there until the pollination is done. But the pollination occurs in May – June, after 4-5 months. During the period June-July-August the embryo and the germ grow. We should underline that the varieties of hazelnut need a hybridized pollination to ensure that the next process of production of fruits occurs. During this step except the main variety it is needed to be planted the pollinator which can be planted 30-50 m away from the main variety. The proportion between the pollinator and the variety it is recommended to be 1:10. Hazelnut will enter into production the second year. The production increases until the six year and around the tenth year it is stabilized. It produces until the 50 year, but if it is well administrated and regenerated it can live a century. The average production per hectare is 20-30 kv.

But in general in our country the physical qualities of the soil are suitable for the cultivation of this cultivar. The trunk of this cultivar is around 2-3-4 m high, grows in shape of bush but it does not find big use.

Wood bud provides vegetative spray, during the summer the male flowers grows and give the male floral. The mixed bud bloom in spring and form the sprays, which in May bloom forming 4-8 female flowers which are followed by the production of fruits.

## 2. Material and methods.

The most suitable condition to cultivate hazelnut according to the climate is the north geographical latitude 35-45<sup>0</sup> (Albania is in a favorable geographical position). The region with the biggest production is Turkey which is in the first place especially in the territory around the Black Sea situated in 40-41<sup>0</sup>. There hazelnut is cultivated in 750 m of altitude reaching the maximal production. These conditions are similar with the Albanian territory from north to the south of the country. In the table below are listed some of the indicators of precipitation, max, min and absolute temperature in two specific regions where the hazelnut is cultivated in our country [1].

**Table 1:** The most favorable climatic conditions for the cultivation of hazelnut

Region	Geographic Latitude	Precipitation average/annual	Temp. The hottest month	Min. average 0 <sup>0</sup> C	Temp. The coldest month	Min. average 0 <sup>0</sup> C	Precipitation mm coldest month	Raining days during the harvest time	Abs.tem p. Coldest month
Mallak	40 36''	1016	29,6	17,2	11,8	3,3	137	51	-4,5
Alarup	40 54''	796	25,5	12,3	3,2	3,2	84	73	-11,7

### Requests toward the soil

The best soil for the cultivation of hazelnut is the soil with a mechanical structure SAM, deep and drainage. Refuse the heavy soils with much humidity. The soil with a ph of 5.5-7.5. To have a normal production are requested some indicators which we will list in the table no.2 for Mallakastra and Pogradec as the standard places for Albania. The results refers

**Table 2:** Soil analysis

Analysis	ph	Phosphor (mg/kg)	Nitrate/nitro (mg/kg/N)	EC ds/m	Ca	Mg	P	K	CEC	Lyme/Argil
Mallak	7,5	33,5 <sub>ppm</sub>	0,11 %	9,6	21	2,55	0,265	0,81	26,11	37,2/31
Alarup	7,5	12,67 <sub>ppm</sub>	0,09 %	16	6,5	2,46	,265	0,161	14,21	-----

*Biotechnological production of hazelnut saplings.*

To have the best expected results and to avoid the deviations in ecotype today exist in addition to classical methods and modern implementation in the process of continuation of increase hazelnuts. The basic method of producing saplings of hazelnuts is the

to the second horizon of the profile where is expanded the main part of the root system of the hazelnut. Referring to the facts and data of a study from the Ministry of Agriculture Food and Consumer Protection in 2012 are emphasized the points where to take the samples for the agro-chemical and pedagogical analysis in a national network of the soil studies.

formation of new saplings or young plant. These young plants appear in the basis of the root system which is used for fruit production[2]

This is one of the primitive methods, it is simple and it is used by human being since in the old times. We stress out that this method is widely used in Turkey, Italy etc. it is a risk for genetic and phytosanitary problems, where the saplings are

created from the adhesive germs and are inherited from the parent plant.

The young plants that come from the bottom of the root have high capacity to create new roots in the moment that are in the contact with the soil. For sure the soil must be prepared and well wet in order to create the most adaptable contact. It is recommended especially in the nurseries where the conditions are more secure because we have to deal with prepared soil with suitable structure. In this case the sapling enters into production from the second year, but it is recommended to remove the fruits in this year to inhibit the growth.

### 3. Results and discussion

Now we are discussing for a certified plantation according to precise parameters. The orchard is prepared to produce saplings that come out from the sleeping germs or the adventives germs from neck of the root. In the moment that the germ reaches 40 cm is covered with soil the first 20 cm and when the germ arrives in 70 cm, is covered with soil 30 cm. The humidity must be kept in the maximal capacity of 70 %, the irrigation is realized in form of the rain, and should not have an impact on the level of soil cover. For this reason it is recommended to be performed by spraying. When the vegetation is finished, we take out the soil and recuperate the saplings with a slip in shape of an arch being careful not to create rips or hurts. The part where the sapling is cut should be sprayed with a preparation which has a basis of copper and it is covered with a horizon of perili. One plant can give 15-20 pieces of rooted saplings. It is important that the sapling not fulfilling the requested standard to be planted in a straight line in the nursery because the next year will be treated in the same way as mentioned above. This is the way that we continue to increase the plantations in our country with different cultivars. The need is to increase and improve the technology of the cultivation of the saplings with new methods. In Italy some saplings producers prepares the soil coverage of the seedlings with an artificial substract like agripelite, perlite or

water-safe polymer (hidrorententer) methods which accelerate the process of formation of roots, spraying the basis of the seedlings before covering with IBA. Also we have the production of the saplings in dendritic form pieces which are planted directly and can be treated with IBA 1000-2000 ppm. [4]

Except the above mentioned methods it exist also the method of growth with seed. This method is used especially in case that we have only a trunk and as rootstock is used *Corylus Columna*. This consists in putting that into production but it has also high cost. In our country it not commonly used. One of the reasons is the inappropriate territory. Also it is known the method of micro-breeding in vitro, but in our country is not used [7].

Choosing the cultivars for plantation

The scope is to build a hazelnut orchard. The variety must:

- Be adapted to clime and soil factor
- To give a high productivity in quality and quantity
- To ensure the pollen, knowing that the hazelnut is infertile
- It is an advantage to be from an origin with positive qualities.

Taking into consideration these specifics “Visoka” variety fulfills the criteria of being adapted in the best way with the soil not only in Fier, but in 70 % of the territory of our country. The current data indicate a high productivity in the market and good quality; it is a licensed and certified variety. We underline that in every place especially in the big regions are specified the most adapted varieties, for Fier and Pogradec is “Visoka” which is spreading in the other part of the territory, especially during the last years with the support of Albanian Government (ARDA) the cultivated area in south to north with this variety are increased sensitively [9].

Visoka is a variety mainly for table. In the strategy of the nuts cultivation this cultivar is calculated to cover 50% of the territory. To introduce new cultivars we need also the time as a factor.

**Table. 3:** Cultivars

	<i>Region</i>	<i>Cultivar</i>	<i>Pollinator</i>
Albania	Mallakastër	Visoka	TondaRomana
	Pogradec	Visoka	TondaRomana

*The used techniques during the plantation.*

In the planting process is used the scheme 4x4m or 5x5m. Importance should be given to the scheme of

pollinator, usually is used the normal scheme in a distance of around 10 m. So every plant of the third

row must have the pollinator as in the scheme in the table no.4.

**Table 4:** The scheme of the pollinator (p-pollinator, k- cultivar).

K	k	k	k	k	k	k	K
K	K	k	K	k	K	k	K
P	P	P	P	P	P	P	P
K	K	K	K	K	K	K	K
P	K	K	K	K	K	K	K
P	P	P	P	P	P	P	P
K	K	K	K	K	K	K	k
K	k	K	K	K	k	K	k

The planting period is the last week of November until the beginning of March. The soil must be worked in 70 m deep. Before the plantation it is needed to put organic fertilizer 200-300 kv/ha, in the mean time phosphoric fertilizer 6-8 kv/ha and dig up 30 cm in deep are mixed. The second case is to throw them in holes in cases where the plantation is done in holes in proportion with the quantity mentioned above. The holes are 60x60x60 cm when the preparation of the soil is made in 100x100x100 cm when plantation is made directly with holes. The 25 cm of the hole must be prepared with the fusion of organic + phosphoric fertilizer. The sapling before the plantation should be refreshed with water and to cut the roots next to the

neck of the sapling. The space between the rows of the plantations must be slightly worked in order to take out weeds but it can be used also herbicides. There are other methods like harvesting with motorized means until 2-4 inch over the soil area.

This area between the rows also can be used in plantation with leguminous plants or clover, this for the reason to protect the soil from erosion and its maximal exploitation. Fertilization is indispensable, but depends on the soil analysis in any case. We should take into consideration the normal quantities of the alimentary components and ph. For the needs for phosphoric and phosphate fertilizers we can refer to the table below.

**Table 5:** Demand for phosphoric fertilizer

<i>Phosphoric concentration in soil ppm</i>	<i>Phosphoric concentration in soil kg/ha P<sub>2</sub>O<sub>5</sub></i>
0-7	40-50
7-14	30-40
>14	0

**Table 6:** Demand for Potassium

<i>concentration in soil ppm</i>	<i>Potassium concentration in soil kg/haK<sub>2</sub>O</i>
0-100	150-200
100-200	100-200
>200	0

To respect strictly the agro-technical requests in the first five years each root should filled with 40 g Nitrogen (for every seedling of the hazelnut) in order to ensure the same development. To follow the continuity of the fertilization and spraying which are planed with a seasonal graphic, the farmer should be consulted with the respective specialist.

An important problem of the treatment and the service is the irrigation which depends on the atmospheric precipitation. If we see the continuation of the irrigation we have major changes between the same variety VisokainMallakastro and Has. But is very sensible to water stress, because the deficit of humidity reduces the growing plant. Hazelnut creates short slips and does not create fruit germs, influence in failure of the fruits and normally has an influence in decreasing the production. This is the reason we recommend that during the period June-September to

use the artificial irrigation of hazelnut with the new methods or simple ones.

In agriculture support schemes of the Albanian Government (AZHBR) since in 2010 and on it is included the drip irrigation of the hazelnut plantations.[10]. In cases we have to deal with plantation more than 100 ha we need to make studies and calculations regarding the requests of the hazelnut for water taking into consideration some elements like climatic data (maximal and minimal temperature, humidity, speed of the wind, hours with sun and sun emission) from which it is calculated the evapotranspiration. This parameter will be interpreted following the equation of Penman-Monteth.

Relying on the data that exist until now and the situation on the spot we think that the variety Visoka comparing to the other cultivars has priorities in many directions that will be expanded in all the territory

because it justifies the service and improve the Albanian market. Another characteristic that is interesting is the evaluation of the abandoned soils in slopes of forest fund which can be used to be planted with hazelnuts[8].

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