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Research Article

Compatibility of CAB 6p (*In Vitro*) X *Bigarreau Burlat*, Compared to the Affinity of the Saplings *P. mahaleb* (*In Vivo*) X *Bigarreau Burlat*

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Abstract

CAB 6 P variety, selected vegetative subspecies of *P. cerasium* (clone of marasca and vigo) has spread widely recently in Albania, is derived from *In vitro* propagation, distinguishes for features that make it interesting in the conventional propagation. Some root-stocks varieties are propagated but their grafting with the country varieties are done without enough experimental data. Our study consisted in compare of seedlings CAB 6 P (*in vitro*) x *Bigarreau Burlat* with *P. mahaleb* (*in vivo*) x *Bigarreau Burlat* thus for cherry varieties, determined by our study, the best nurses; CAB 6 P *in vitro*, or with rootstock derived from the seed and *P. mahaleb* with cv *Burlat*.

Cv *Hatif Bigarreau Burlat*, the best results have given it with rootstock *in vivo P. mahaleb*, in the indicators no of roots 12. 6; versus, those *in vitro:* 5.6 of CAB 6 P.

Each sapling has had an average diameter of 22.8 mm in *P. mahaleb* and 17.8 in CAB 6P.

Though in the indicator of survival percentage No. of shoots successfully and callusing has been without variability. The seedlings weight has good quantitative and qualitative (morphological) indicators, respectively, 650 *P. mahaleb* and 750 CAB 6 P.

In indicators: percentage of catching/per plant and weight of seedlings with *P. mahaleb* like rootstock and CAB 6 P *in vitro* did not present variables. As well as from the morphological point of view, it makes us conclude that the measurements had to be done a little later, because seedlings of *Burlat* x CAB 6P *in vitro* it should have taken a little longer to mature.

Keywords: *Compatibility; Rootstock; P. mahaleb; CAB 6 P; In Vitro; In Vivo*

Introduction

Prunus is a large genus of tree plants belonging to the Prunoideae subfamily of the Rosaceae family [1]. The genus of Prunus includes more than 400 species of shrubs and flowering trees, some of which are economically important all in the world [2]., This genus is economically important and results in 46 fruit sources (e.g. apricot, cherry, nuts, almonds, peaches and plums), oil, timber and 47 ornamental plants [3]. In general, not all varieties of rootstock are suitable and have the affinity for grafting with cultivated varieties, this is due to:

- Change of their anatomical construction
- From the growing power of one or the other
- By the change of fluid movement

When not matched, these characteristics negatively affect the percentage of the rooting, the production of suitable seedilings and the provision of a normal plant growth in the definite place. Some other types of Prunus or interspecific hybrids have been used as rootstock [4].

P. cerasus* CAB 6P*: Selected by *P. cerasus* (clone, cv Marasca and Vigo). Cherry Rootstock selected by the University of Bologna. Promotes moderately high tree energy. It is suitable for medium density in fertile soil. The seeding distance can be set to 5 x 4.5m.

Propagation and rootstock

1. Cherry is propagated in two ways that are: With seed, where, after seed germination, the shoots must be grafted with parent plant material, because the seed from the seed does not transmit productions capabilities.
2. Cutting proopagations, only the addition of pieces to produce vegetable rootstocks (or *in vitro* way) is made.
3. By grafting: Grafting techniques can be extremely useful in nursery work. Grafting can significantly increase the growth and propagations speed between different tree plants. Through the use of these techniques, a local nursery for plant production can quickly grow up some seedlings for the use of conventional production [5,6].

Best cherries rootstocks includes:

a) Wild Cherry, propagated by seed. This rootstock gives big fruits and with fast ripening.

b) Mezhdrava, *P. mahaleb*, this rootstock is made only for the conditions of hilly lands, dried, rare, but also in conditions of cold and unheated soil. *Prunus mahaleb*, it is quite suitable on calcareous soils and dried. There is a high resistance to cold.

c) Plant forms for vegetative rootstocks.

Some of the selected forms for vegetative rootstocks are as follows: Cab-11; Cab-6; Colt; F-12/1; Franco; Gisela-5; GM-61/1; Hargot; Ma x Ma-14; Ma x Ma-97; etj

Most reccommended vegatative rootstocks are: CAB-6, Franco, Gisela-5, GM-61/1, Hargot, etj.

Factors, which affects the compatibility of grafting

About the coexistence of the rootstock with the graft affect a complex of factors that can be grouped:

1. Anatomy - physiologic factors
2. Technical Factors
3. Ecological factors

Anatomy - physiologic factors

A set of biological factors, summarizes a series of relationships among which the most important are Cherry varieties.

In the world there are about 1500 - 2000 cultivars/varieties.

Cherry Classification is made for:

1. Based on the consistenc of the pulb,
2. Ripening Time,
3. For the color of the fruit, etc.

By the consistenc of the fruit, cherries are divided into 3 groups (in Albania):

i) Soft Pulp varieties, in this group make the cultivars of the country like *Beliza e Zeze*, *Belica e Kuqe, Dolmasi*, and by foreigners is the market's first.

ii) Strong pulp varieties, in this group take part the cultivars of country like *Cualle e Zeze*, *Cualle e Kuqe*, *Krapje e zeze*, etc. and from foreigners is Napoleon.

iii) Varieties of liquid pulp, etc.

Classification by time of maturing, cherries are divided into 3 groups:

i) Early ripening varieties, fruit ripening takes place in the second half of May and include: The forefront of the market, *E hershmja e Tregut*, *Lionit*, *bigaro*, *Moro*, etc.

ii) Medium ripening varieties, fruit ripening takes place in the first half of June and this group includes: *Dureno nero, Vignjolo*, etc.

iii) Late ripening varieties, fruit ripening takes place in the second half of June and include: *E bukura e Pistonjes*, *Turka*, *Bigareu, Napoleon*, etc.

Material and Methods

The study of the compatibility of two rootsctock; *in vivo* of *P. mahaleb* and CAB 6 P *in vitro* will be evaluated in the grafts carried out with the cultivar Bigarraeu Burlat.

The base rootstock that will be applied in the experiment are: CAB 6 P (*in vitro*) and *P. mahaleb* (*in vivo*).

The experiment was concucted at the "Rabeta" nursery in Peze, Tirana. The grafting was done in the September month (2017) and the observations in spring 2018. The experiment treats 10 plants per variant, according to the following scheme:

1. *P. mahaleb* (*in vivo*) in *Bigerraeu Burlat* (5 repetition x 5 pices)
2. CAB 6 P (*in vivo*) in *Bigerraeu Burlat* (5 repetition x 5 pieces)

Rootstocks are cut in the undamaged buds released from the treated material in controlled greenhouse regimens for a period of 1 year (*in vivo* of *P. mahaleb* and *in vitro* CAB 6 P). The grafting is carried out with bud (grafting in a protected environment) is made the tying with plastifilm, disinfected, according to the classical bud grafting procedure. They are housed in a greenhouse with temperature regimes, the first week 28 - 32°C and the other 2 weeks 24 - 25°C. The fourth week is applied aclimatizated.

The grafts after the callus process are planted in the field, the soil is well prepared, on a 35 - 40 cm bed soil, immediately treated for phytopathogens with cuprum preparations and systematic irrigation. At the end of the vegetation, at the time of defogliations of the shoots, the seedlings are going to be observed. For our study are choosed with random way, carefully pulled down. After carefully pulling the seedlings, evaluation of the experimental indicators, evaluation, processing and drafting of the final report are made.

Research indicators

1. The percentage of the grafts callus, estimated the grafting rate callus in 10 grafts of each variant and expressed in percentage.
2. The production coefficient expressed in (%) calculated by the difference in the quantity of seedlings produced on them grafted.
3. Quality of the seedlings, estimated by:
   i) The weight of the seedlings spread to grams, by weighing the shoots.
   ii) The seedlings diameter 4 - 5 cm at the graft point, expressed in mm.
   iii) The number of rootstocks, differentiated in the rootstock body. measured in 10 seedlings.
   iv) PC Value Informatics and variance analysis with start graphix.

Figure 1: *Burlat Grafts in CAB 6P in vivo of P. Mahaleb and in vitro.*

Results and Discussion

Percentage of callusing

After grafting, the first observed indicator was the callus for the first year. From these data it turns out that the *Bigarraeu Burlat* variety has made good callus. An effective result was found in *in vivo* rootstock of *P. mahaleb* and CAB 6 P *in vitro* with 100%. We can say that these rootstock that have been proven in the *Bigerrau Burlat* variety have made good callus, but it is the change of their anatomical construction that can adversely affect production.

For the germination dynamics the grain size is obtained, to the extent that the blossom leaf is well distinguished. This is done every 10 days and is presented in table 1, like average.

Indicator	B/ *in vivo* te *P. mahaleb*	B/ CAB 6P *in vitro*
No. of producted seedlings	25	25
No of uncallusing grafts	-	-

Table 1: *Seedlings obtained from cv Bigerrau Burlat in 2 in vivo rootstocks of P. mahaleb and CAB 6 P in vitro.*

As seen from the table 2, as the greatest energy we have in the rootstock *P. mahaleb* with cv = 8.4 and CAB 6 P *in vitro* cv = 8.1. So as seen from the descriptive analysis, the averages, the max value, the minimum values are in the highest values with the *in vivo* rootstock of *P. mahaleb*, in this research indicator. So the energy of germinating of the graft has depended on the affinity in the appearance and thickness of the seedlings.

Mean	**22.8**	**17.88**
Std	2.692582	2.185559
CV	8.467707	8.180975

Table 2: *Rootstock diameter in mm for in vivo P. mahaleb and for in vitro CAB 6 P.*

Rate of mature of cutting

The color of the peel uniform, clearer and darker waist in the nodules in the two grafts with Burlat with the rootstock; *in vivo* of *P. mahaleb* and CAB 6 P *in vitro*, as well as in other morphological indications: It does not smash even with strong touch. The diaphragm is presented as the full color of the same color as the wood.

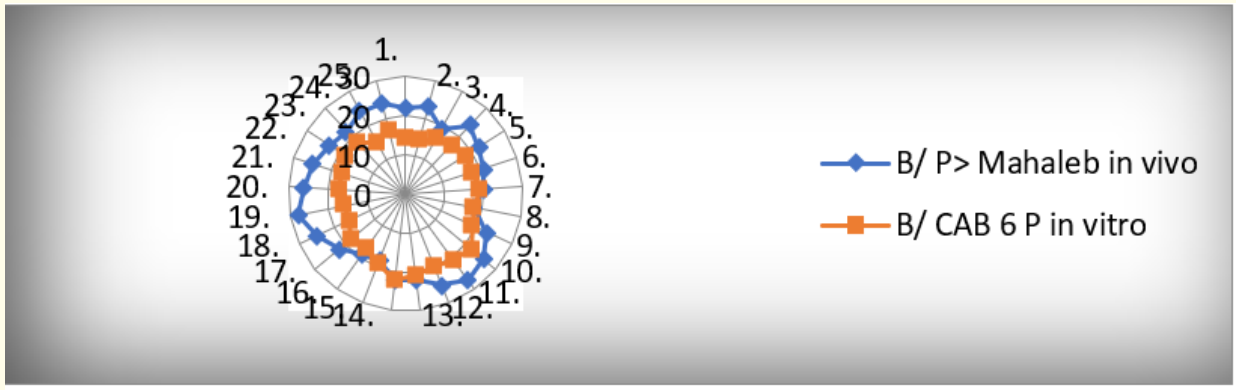

Figure 2: *Diagram of diameter of grafts Burlat x P. mahaleb and Burlat x CAB 6P (in vitro).*

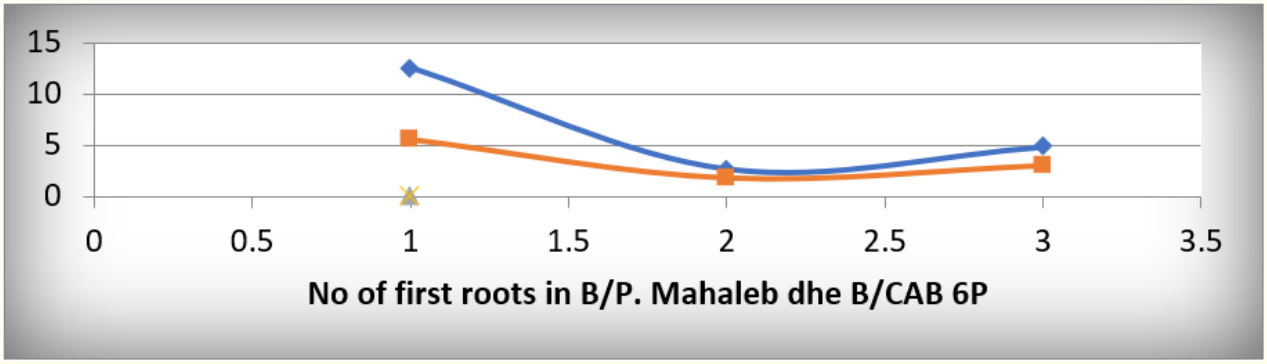

Figure 3: *No of first root in CAB 6P dhe P. Mahaleb.*

Rootstock No.	B/ P. Mahaleb *in vivo*	B/CAB 6 P *in vitro*
1	19	3
2	12	4
3	11	4
4	12	7
5	10	7
6	11	8
7	15	5
8	12	4
9	13	6
10	11	8

Table 3: *Number of the first grafts root.*

Mean	12.6	5.6
Std	2.633122	1.837873
CV	4.785194	3.047

Table 4

The first roots number, has resulted in the highest maximum in the grafts B/CAB 6 P *in vivo*. This shows the Burlat, has a tremendous increase when it is used for rootstock that CAB 6 P *in vivo*, respectively 11 to 8.

No. Batches	B/ P. mahaleb	B/CAB 6 P *in vitro*
1	640	600
2	645	897
3	660	800
4	650	605
5	695	702

Table 5: *Weight of batches of grafts Burlat x P. mahaleb the Burlatx CAB 6P.*

Mean	658	720.8
Std	21.96588	128.1355

Table 6

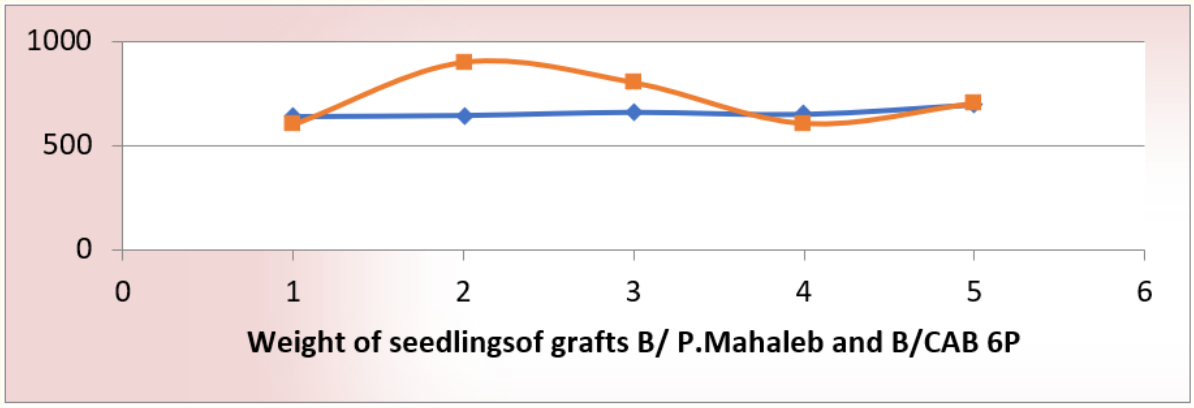

Figure 4: *Weight of the seedling with rootstock: P. mahaleb dhe CAB 6 P.*

From this study and from production data to determine the best rootstock for the production of cherry seedling, with rootstock conveyed by *P. mahaleb* or CAB 6 P from *in vitro*, grafted and rooting for variety *Bigarraeu Burlat*.

Conclusions

1. Hatif Bugerrau Burlat, the best results has achieved with the rootstock *in vivo P. mahaleb*, with the following indicators.
   a. Roots No. 12. 6 *P. mahaleb* against *in vitro* CAB 6 P, 5.6.
   b. Each seedling has been on average of diameter: 22.8 mm and 17.8 in *P. mahaleb* and CAB 6P *in vitro*.

2. Percentage of surviva; The number of catching seedlings and the callusing has been in without variability. Which makes us think that the search indicators were taken a little later in CAB 6 P *in vitro*.
3. The seedlings weight has good quantitative and qualitative (morphological) indicators, respectively: 650 of *P. mahaleb* and 750 of CAB 6 P.
4. In the indicators: percentage of catching per plant and weight of seedlings of *P. mahaleb* as rootstock *in vivo* and CAB 6 P rootstock *in vitro*, did not show variables. As well as from the morphological point of view, it makes us conclude that the measurements should be performed a little later, as the *in vitro Burlat* x CAB 6P shoots, should have taken a little longer to mature.

Note: In practice, the CAB 6 P has more developed roots and more than that of other cherry tree branches.

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