

INFLUENCE OF ROOTSTOCK ON THE GROWTH AND FRUCTIFICATION OF PEAR VARIETIES IN OLTENIA

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ABSTRACT

Pear extension is a necessity for our country. There are many areas favourable for the pear species in the country, and the Oltenia area has proved to be an area with particularly favourable climatic conditions for varieties and rootstocks.

Depth of rooting, as well as branching, is a genetic feature of the variety and species. Within the experience, there are varieties with a highly developed radicular system (absorbent roots helping to absorb the fertilizer better) and such varieties with roots that reach 80 cm are Untoasă Giffard, Untoasă Hardy, Abatele Fetel and Cure.

The period of growth of pear varieties ranged from 56 to 67 days. The varieties showed a good affinity of the two partners, namely a growing behaviour and very good development of the partners.

Physical and chemical properties help us to orient the respective varieties for fresh direct consumption as well as for industrial processing in different forms.

From the researched type there can be kept in the culture for the southern area of Oltenia the varieties: Untoasă Hardy, Passe Crassane, Olivier de Serres and Cure.

INTRODUCTION

Several researchers, scientists who have highlighted the importance of the variety in fruit growing, have taken care of the assortment establishment. Thus, some authors (Bassi D. et al., 1994) observed the behaviour of *Pyrus Communis* rootstock selections, respectively 16 selections that showed low and medium force but also tolerance to chlorosis. Raese J.T. (1994), studied the behaviour of the Anjou pear variety on eight rootstocks, analyzing the fruit, the potassium concentration was high in the fruit of the P. *Betulaefolia* and small on the Old Home rootstock.

In Italy, research has shown that a pear clone called Fox 9 has a higher force than BA 29 quince, a greater adaptability to environmental factors, and better compatibility with varieties tested (Quartieri M. et al., 2011).

Also, the way of pear breeding is influenced by some technological aspects, namely the planting distance, both in row and between rows, (Rosca C. et al., 1993). Intensive research has shown that with the growth of roots there is also the growth of branches in the tree crown, with a close correlation, (Qu Zezhou HanQiqian, 1983).

Deckers T. et al., (2005) presented aspects of the pear varieties production in Europe, and certain diseases (bacterial burn) affected production mainly in France and Greece, and red-skinned varieties were unsuccessful.

Grauslund et al., (1996) observed that following the treatments applied for the eradication of scab, some of the varieties researched continued to have scab.

Numerous results have been discovered by Braniște N. et al, (2008), which highlighted the positive characters of some pear varieties such as Napoca, Virgiliu. Some researchers have found that the resistance genes for some diseases and certain pests are derived from Japanese pear (*Pyrus serotina*), (Andrieș N., 1993).

Ciobanu A. (2015) studies the quality of plum fruit several varieties depending on the system scion/rootstock.

Stanley and Tuleu gras varieties are suitable for industrialization, based on the dry substance and sugar content.

Ciobanu A. (2016) argues that Elberta peach variety presents on franc rootstock, a good development roots in the soil and vigor of the trees in the south of the country.

MATERIAL AND METHODS

The experience was located in Oltenia, comprising several varieties with the shape of a crown practiced in trees – free palmette, and as rootstock was used the quince with Cure intermediate. The planting distance between the rows was 4.0 m and among the trees in a row of 3.5 m. Maintenance work was carried out, namely the weeding on the row, the specific treatments (10-12), cuts applied to the trees during the period of rest.

The experience was placed according to the block method and consisted of seven varieties with 5 trees per variation. Numerous observations have been made, namely:

- Visualization of the horizontal roots through the profile method.
- The height of trees for each variety.
- Expansion diameter of the analyzed tree crown.
- Sum of all vegetative growths.
- Fructification specificity and proportion of different formations.
- Observations on the affinity of the variety with the rootstock.
- Production and quality of the fruit obtained.

The statistical program used was Anova Manova.

RESULTS AND DISCUSSIONS

There are varieties with a highly developed radicular system, and such varieties with roots from 0-40 cm and reaching 80 cm deep we have at: Untoasă Giffard, Untoasă Hardy, Abatele Fetel and Cure varieties.

With an elevated radicular system, developed only up to 60 cm, the Bella di Giugno, Olivier de Serres and Passe Crassane varieties were noticed, so it has a more superficial root system.

Figure 1 shows the total number of roots observed in varieties researched in the southern area of the country.

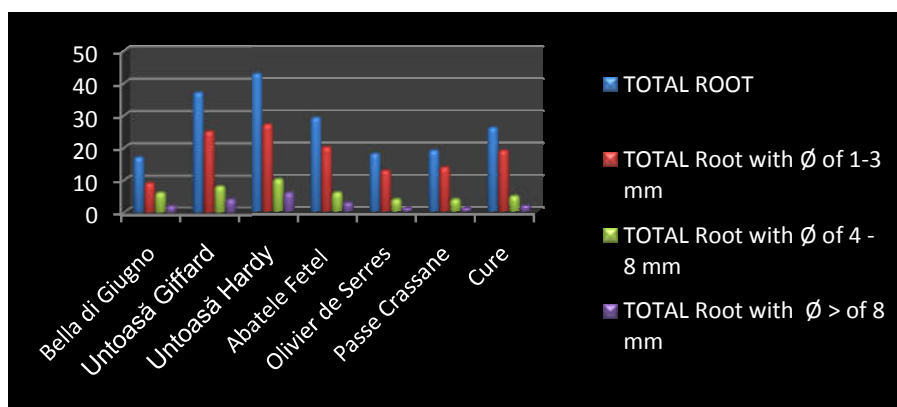


Fig. 1 – Number roots by diameter

The vegetation period depends on climatic conditions reaching 190-195 days, for relatively shorter periods than the other species. Important elements help determine the vigour of trees, namely: biometric measurements of annual increases, height, crown diameter, trunk dimensions. Analyzing the growth rate of the sprouts, we can specify that

the period of growth of the pear varieties ranged from 56 to 67 days, and the growth of the sprouts every day was 0.50 - 0.60 cm. Within the analyzed varieties, we have varieties with a higher growth of sprouts, namely Bella di Giugno, Untoasă Giffard, and varieties such as Olivier de Serres, Passe Crassane, Abatele Fetel have smaller daily increases ranging from 0.50 to 0.53 cm .

More tight crowns are Olivier de Serres - 2,2 m/tree, Passe Crassane - 1,9 m/tree and Abatele Fetel varieties with 2,1 m/tree, the values being significant, distinct and very significant negative to the average \bar{X} , (figure 2). When the tree crowns are smaller, then we can implement on establishment smaller distances between rows and on the row of trees.

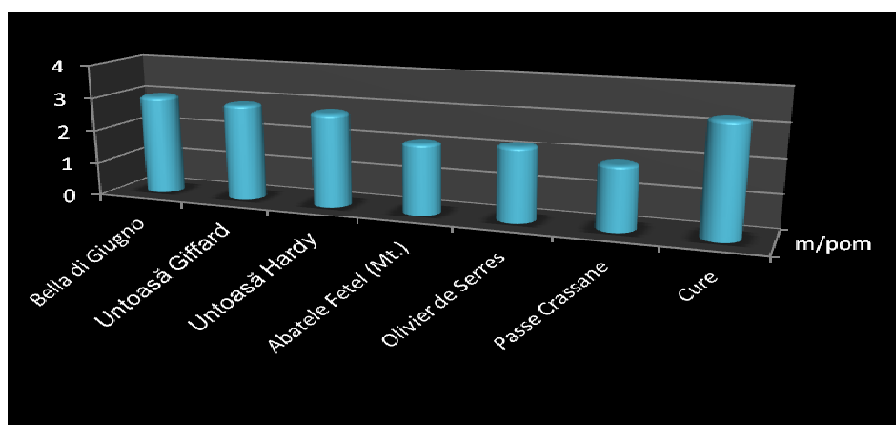


Fig. 2 - The diameter of the pear tree crown

Early vegetation begins with Bella di Giugno, Olivier de Serres and Passe Crassane (4-13 III, 5-15 III). Bu blossom phenophase is triggered later in Untoasă Hardy and Cure. The end of the bloom takes place within a range of 10-11 days detached within the varieties, which requires the placing in the plot of two or three varieties with the same period of flowering or close period.

The maturation of pear varieties is different differs from variety to variety, depends on climatic conditions and is a characteristic of variety. Fruit ripening begins in the second decade of June, then in July, September and ends in the second decade of October.

The first variety to be ripen is Bella di Giugno (15-22 VI), followed by the Untoasă Giffard variety (4th-10th VIII) summer varieties. In September, the Untoasă Hardy and Abatele Fetel varieties (14 - 18.25 IX) are grown, autumn varieties. In the first decade of October, the winter varieties Passe Crassane and Olivier de Serres (2-4 X) and the Cure variety (10-15 X).

The studied varieties fructify on all types of pair-like formations, but in fact this study highlights the following:

- the varieties that fructify more on the short formations are suitable for a reduction of the distance between the crown of the tree, but also between the branches of order II and the semi-skeleton branches;
- varieties that mainly fructify on long formations, are suitable for increasing the distance between floors, substrates and semi-skeleton.

The results of the affinity between graft and rootstocks in the studied varieties indicate that the varieties showed a close proximity of the two partners of the value of 1.0, value that highlights the very good coexistence of the partners.

In 2014, there was an average of 0.99 of the two partners, and by 2015 an average of 1.00, ie perfect compatible partners, a normal cohabitation.

Of the varieties analyzed with the quince rootstock and Cure intermediate, we notice a slight difference between the two partners, the value being of 0.98 for the Bella di Giugno, Untoasă Giffard and Untoasă Hardy varieties.

The Olivier de Serres variety has a value of 1.0 and a very good affinity between the partners, and varieties with a very small difference of 0.01 are Abatele Fetel, Passe Crassane and Cure (Figure 3).

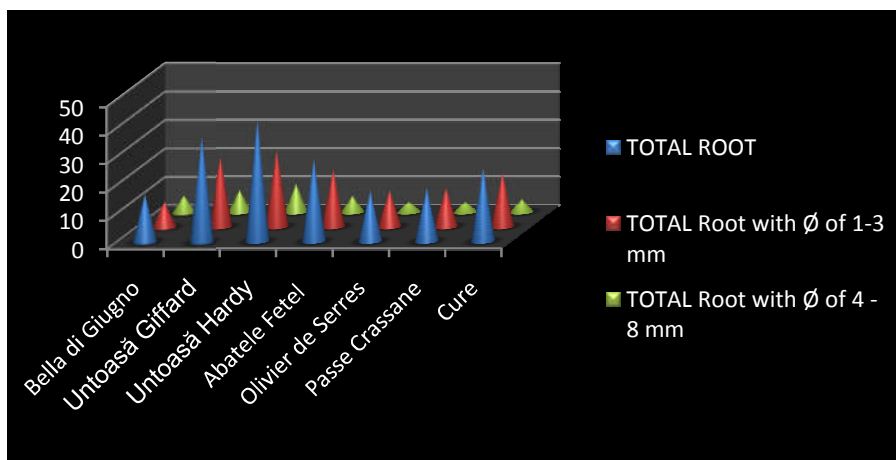


Fig. 3 - Compatibility between the scion and rootstock varieties of pear

In the years of study we obtained an average of 32.1 kg/tree for the analyzed and weighed varieties, thus productive varieties above the average were: Untoasă Hardy - 39.0 kg/tree, Cure - 37.0 kg/tree. Regarding the main physical attributes, we find that large fruits whose dimensions exceed 80.0 mm/fruit as a size index are in Abatele Fetel varieties (87.0 mm/fruit), Cure (81.8 mm/fruit). In terms of weight index, fruits are produced in excess of 150.0 g for the Abatele Fetel varieties - 169.1 g/fruit, Olivier de Serres - 186.4 g/fruit, Passe Crassane - 174.0 g/fruit, Cure - 196.1 g/fruit, (figure 4).

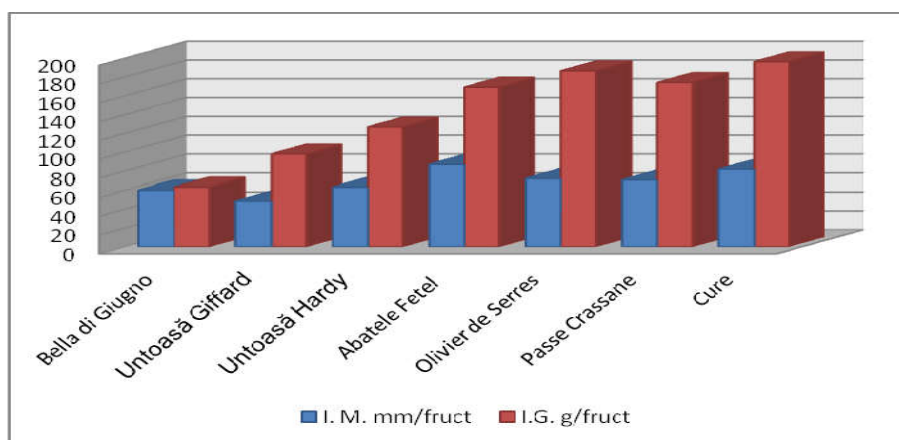


Fig. 4 – Fruit quality by physical properties

Significant sugar content can be found in Untoasă Hardy varieties - 9.30 g sugar per 100 g s.p., Passe Crassane - 9.45 g per 100 g.s.p. Also the varieties Abatele Fetel and Olivier de Serres show significant amounts of sugar - 8.74 - 8.87 g per 100 g.s.p.

Cure has a reduced sugar content of 6.75 g per 100 g.s.p. and a low acid content of 0.06 g per 100 g.s.p. Less ascorbic acid we noticed on the fruits of the Bella di Giugno varieties - 6.45 mg / 100 g s.p. and to Untoasă Giffard -10.18 mg/100 g s.p.

CONCLUSIONS

The climatic and pedological conditions in the Oltenia area fully satisfy the biological requirements of the studied pear varieties. Starting in vegetation noted by the blossom of

vegetative buds took place in the first - third decade of March. Under conditions in the southern area, an early start in vegetation is the Bella di Giugno variety, and a later startup was Untoasă Giffard variety, Abatele Fetel, and Untoasă Hardy.

Resistance to diseases and pests presented most of the varieties analyzed, but with slight sensitivity to scab are Untoasă Giffard varieties and Passe Crassane.

In order to ensure a continuous conveyor of fresh fruits from the researched range can be retained in culture for the Oltenia area the varieties: Untoasă Hardy, Passe Crassane, Olivier de Serres and Cure.

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