

THE BEHAVIOR OF SOME SOUR CHERRY VARIETIES IN THE SOUTHERN PART OF THE COUNTRY

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Abstract

The sour cherry species is of great economic importance due to the quality of the fruits together with the agrobiological particularities of the trees to capitalize on a great diversity of pedoclimatic conditions from the plains to the hills. A major contribution is made by the adaptability of varieties to specific growing conditions. The varieties Vrâncean and Crișana 2 showed very well developed roots at a depth of 40 cm, the roots absorbing soil fertilizers better, an aspect that helps the growth and development of the trees. We found a higher percentage of roots in Mocănești varieties 16 - 24.8%, Schattenmorelle - 22.5% and Vrâncean - 21.8%.

The Rival variety stands out with a slightly shallower root system, however, the rooting depth as well as the way of branching is a genetic characteristic. The study of the root system of trees brings great support in solving some theoretical and practical problems.

Key words: pear, nectarine, radicular system, variety

INTRODUCTION

The nutritive, complex properties of the fruit lead the sour cherry species to a special importance for the consumer in general, also the specific characteristics of sour cherry trees to capitalize on the climate of various regions of the country, raise this species to a very high level. The sour cherry species is a species with relative productions, these being due to some aspects such as the non-fruiting of the sour cherry, a phenomenon that is determined by a complex of factors to which a significant contribution is presented by the variety's adaptability in specific culture conditions. In order to elucidate many aspects of the life of each species, research must be done, works that highlight the negative aspects and measures to eliminate them, to retain consistently productive varieties in the assortment. The book *Varieties of trees, fruit bushes and strawberries created in Romania*, presents the cherry varieties created in the Pitesti Mărăcineni region, varieties with their biological and technological peculiarities, valuable

varieties for expansion and experimentation, (Braniste N., 2007). In the north-eastern region of Hungary, with the aim of discovering self-fertility sour cherry clones with high productivity and quality fruit, the authors of the experiments concretized two new sour cherry varieties that were recommended, namely Debreceni Botermo and Furtos Ujfehertoi, (Szabo T., 1996). The rootstock has an important role in the vigor of the trees, precocity, in the way the crown is formed, everything must be compensated with the variety/rootstock combination, (Hrotko K., 2008). The way in which the climatic conditions influence the blooming of the cherry tree is very important, (Lakatos L. et al., 2014). In the case of open pollination the percentage of fruits can be higher than in the case of artificial pollination, the variety Botermo Debreceni was considered the best pollen donor, (Davarynejad G.H. et al., 2014). The type of fruit evaluation is embodied by fruit size, productivity, fruit quality, resistance to diseases and pests, (Papstein F. et al., 2017). Hybrid XII/57 is less sensitive to some diseases such as

red spot, thus the hybrid has a tree with great vigor, the fruits are large, 6.5 g, (Nikolic M. et al., 1998). The complete identification of the genetic resources needed in the production activity, of the most valuable parents, requires a complex study of the characteristics of the variety and the correct evaluation of all genotypes, (Budan S., 1996). In general, the rootstock can have a special role in the growth of branches, the emergence of inflorescences, (Cichi M. et al., 2020). Due to the favorable conditions, the roots of some rootstocks can explore the soil up to depths of 80 cm, (Cichi M. et al., 2016). Also, an important role is played by the agrotechnics applied to the soil, on the trees in the plantation in accordance with the agrobiological particularities of the varieties.

MATERIALS AND METHODS

The research was carried out in the period 2020-2021 in a plantation established in 2012 in the Breasta area, Dolj county (Oltenia), comprising five sour cherry varieties in two repetitions with five trees in the repetition, a total of 10 trees for each variety, respectively variant. The varieties from this experience are: Schattenmorelle, Rival, Mocănești 16, Vrâncean and Crișana 2. The cultivation system is intensive with a planting distance of 4 m between rows and 4 m per row, respectively 625 trees per hectare. The crown shape practiced is vessel. The cultivars were grafted on mahaleb (Turkish sour cherry) rootstock. Within the plantation, the land was prepared in August, by plowing at 60 cm, the trees were planted in the fall. When the plantation was established, a quantity of 15 tons of manure per hectare was administered, then 200 kg of superphosphate, 150 kg of potassium salt per hectare. The soil was kept black field both on the row of trees and between the rows. Within the studied varieties, depending on the existing environmental

conditions and to achieve the proposed objectives, the following observations and determinations were made: the passage of the main phenophases of vegetation; the amount of vegetative growth; the height of the tree; crown diameter; cross-sectional area of the trunk (SST); the main fruiting phenophases; resistance to the main diseases and pests; fruit production; the main physical and chemical properties of fruits; visualization of the root system in the horizontal direction by the profile method.

RESULTS AND DISCUSSIONS

By studying both the root system and the aerial part, it is possible to establish the relationship between the root system, the trunk and the crown. The high-vigor varieties Vrâncean and Crișana 2 had a distribution of horizontal roots up to a depth of 80 cm, and the other less vigorous varieties Rival, Schattenmorelle and Mocănești 16 had horizontal roots up to a depth of 60 cm. The Vrâncean and Crișana 2 varieties showed very well developed roots at a depth of 40 cm, the roots absorbing soil fertilizers better, an aspect that helps the growth and development of the trees. The Rival variety stands out with a slightly shallower root system, however, the rooting depth as well as the way of branching is a genetic characteristic. A higher percentage of roots was found in Mocănești varieties 16 - 24.8%, Schattenmorelle - 22.5% and Vrâncean - 21.8%, (figure 1).

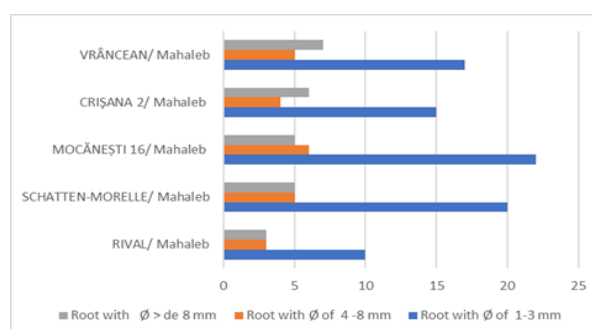


Fig. 1. Distribution of the root system in the sour cherry varieties studied

After studying the root system of cherry varieties grafted on the Mahaleb rootstock, we found that the Mocănești 16 (33) and Schattenmorelle (30), Vrâncean (29) varieties have a greater number of horizontal roots. A small number of roots was recorded in the Rival and Crișana 2 varieties (16 - 25), (figure 2).

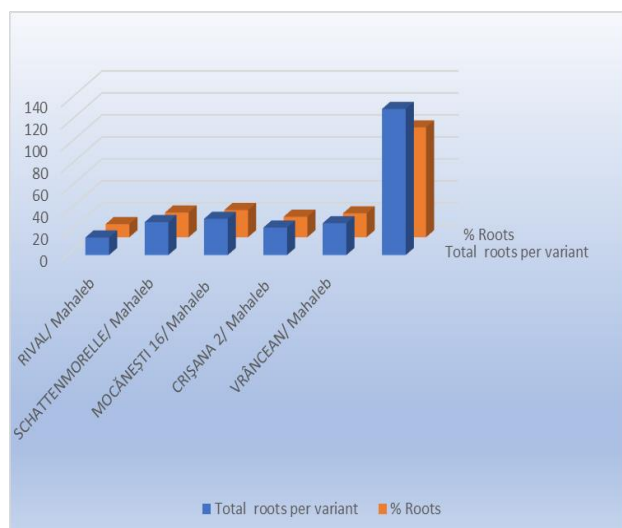


Fig. 2. Total number of roots on the depth of 0-100 cm

The varieties Vrâncean - (7 roots), Crișana 2 - (6 roots), Schattenmorelle and Mocănești 16 have roots thicker than 8 mm each, 5 roots each, they strengthen the soil tree much better, being much more deeply anchored. Varieties with longer roots ensure a solid anchorage, but the transport of fertilizers is also more difficult at great depths, they are more prone to drought and irrigation is sometimes necessary.

Analyzing the amount of vegetative growth achieved by the sour cherry varieties in the respective area, we find that they achieve an average of 28.4 m / tree. Above-average vegetative growth is achieved by the Crișana 2 variety (34.0 m/tree) and the Vrâncean variety (34.5 m/tree), whose values are significantly positive compared to the average.

The Schattenmorelle variety (21.5 m/tree) and the Mocănești 16 variety (22.0 m/tree) achieve small or significantly negative

increases, expressing the low vigor of the variety (figure 3).

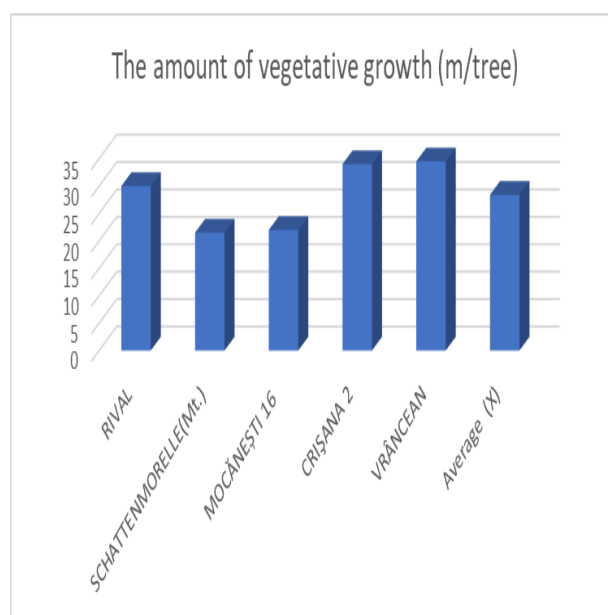


Fig. 3. The amount of annual vegetative growth in the studied sour cherry varieties

The height character always foreshadows the vigor of the trees, of the plant in general, so this is an important character for the works during the vegetation period or during the rest period. The height of the trees from the sour cherry varieties reported an average of 2.99 m/tree in the seventh year after planting. According to the recorded data, we have varieties with a slightly higher vigor such as the Crișana 2 variety - 3.30 m/tree, Vrâncean - 3.25 m/tree, both with significant statistical values compared to the X average. The Rival variety (3.10 m/tree) also shows a slightly above average height, but does not show statistical values. The varieties Schattenmorelle and Mocănești 16 with heights of 2.60 – 2.70 m/tree are below the obtained average, so they have less vigor. The varieties Crișana 2 and Vrâncean are distinguished by significantly positive values compared to our control variety Schattenmorelle. And the Rival and Mocănești 16 varieties have higher heights than the control. The diameter of the crown is the basic criterion for establishing the planting distances both per row and between rows, so in our

case of the studied sour cherry varieties we have an average of 3.55 m / tree. A slightly larger crown was observed in the Rival varieties - 3.70 m/tree, then the Crișana 2 variety - 3.85 m/tree and the Vrâncean variety - 3.90 m/tree. Crișana 2, Vrâncean and Rival varieties showed significantly positive values compared to the control. The rest of the varieties recorded values lower than the average, thus Mocănești 16 had a diameter of 3.20 m/tree and Schattenmorelle 3.10 m/tree. In the situation when the diameter of the crown does not achieve dimensions of 4.0 m, corresponding to the distance of planting in a row, in some varieties Schattenmorelle and Mocănești 16, we consider that it is possible to use smaller distances favoring the intensification of the culture and obtaining higher yields. The surface of the trunk section is of particular importance when specifying the habitus of the tree, so from the data recorded regarding this character, we find that in the seventh year after planting, an average of 100.4 cm² / tree is obtained. Small dimensions of the surface of the trunk sections and respectively distinctly significantly negative and very significantly negative values, compared to the average it is observed that the variety Mocănești 16 achieves - 85.0 cm² / tree and the variety Schattenmorelle with 88.0 cm² / tree, confirming the lower vigor of of these varieties, (figure 4).

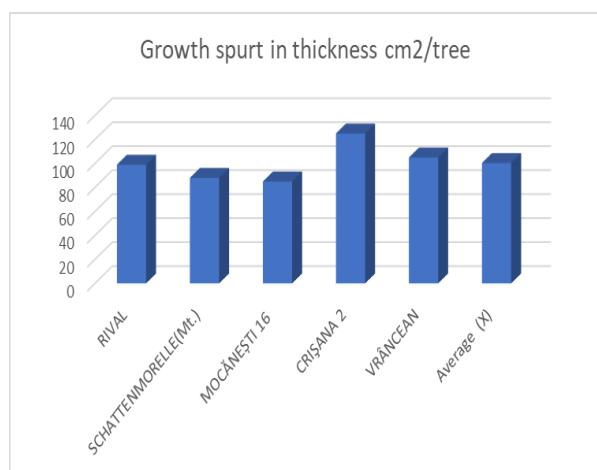


Fig. 4. The surface of the trunk section in several varieties of sour cherry

After the formation of the fruit buds, their phenophases are triggered, an important period for production, an aspect that depends on the food from the soil, the applied works. The first phenophase, the beginning of bud swelling, starts in the first - second decade of March (March 8 - 12) or in the third decade of the same month (March 20 - 25). The Rival variety was the first trigger of this phenophase starting on March 8 and is followed two to three days later by the Schattenmorelle and Mocănești 16 varieties (March 11 - 22 - 23). The flowering of the trees is marked starting from April 12 - 17 or April 24 - 30, the Rival variety being the first - April 12 - 24 and ending with the Vrâncean and Crișana varieties April 2 - 17 - 29, which showed a later flowering. Varieties ripen staggered and thus in my experience I had varieties with ripening:

- early - the Rival variety (June 10 - 20).
- medium – Schattenmorelle variety (June 25 – July 10).
- late - the Mocănești 16 variety (July 1 - 20), the Crișana 2 variety (June 30 - July 15) and the Vrâncean variety with the latest ripening (July 20 - 28). Ensuring a plantation with several varieties of different maturing, gives the consumer a staggered consumption over a longer period of the year, adding to this a safer and more complete pollination. Large fruits of more than 5.0 g / fruit are obtained under the conditions in the south of the country with the varieties Mocănești 16 and Crișana 2 (5.0 - 6.0 g / fruit), (figure 5).

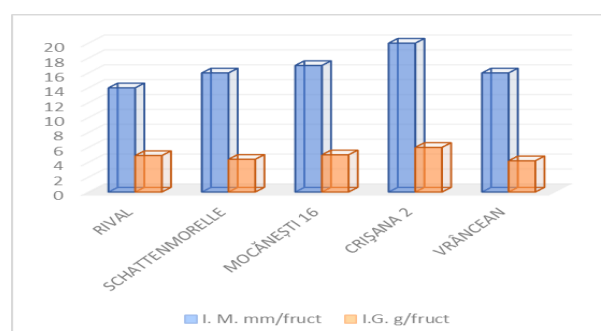


Fig. 5. The main physical characteristics of some sour cherry varieties

The content in soluble dry matter (s.u.s.) reflects differences between the varieties, being between 15.0 - 16.0%. Higher yield in the case of industrialization, is obtained with the varieties Schattenmorelle, Vrâncean and Crișana 2 (15.3 – 15.0 %). As for the acidity expressed in malic acid, it is between 0.77 - 2.09 g per 100 g s.p., (figure 6).

An acidic taste respectively with a content of more than 1.5 g per 100 g s.p. malic acid, produces the varieties: Schattenmorelle and Mocănești 16, the respective varieties being suitable mainly for industrialization.

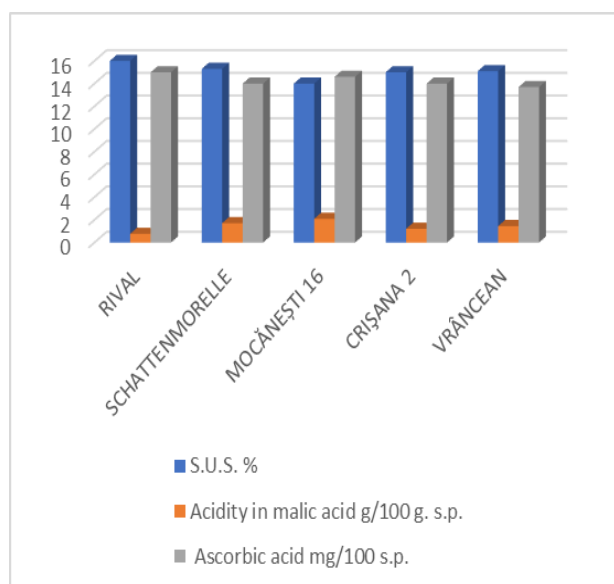


Fig. 6. The main physical and chemical characteristics of some sour cherry varieties

CONCLUSIONS

The pedoclimatic conditions specific to the central area of Oltenia are favorable for cherry cultivation. Sour cherry varieties Schattenmorelle and Mocănești 16 by the sum of vegetative growth, tree height, crown diameter, trunk cross-sectional area indicate a low vigor. The Rival variety has medium vigor and the Crișana 2 and Vrâncean varieties have high vigor. The flowering of the sour cherry species in the central area of Oltenia under the influence of climatic conditions can begin in the

second decade of April (14 – 18) or in the third decade of the same month (27 – 31). Very good productions can be obtained constantly by the varieties, Crișana 2, Vrâncean and the Rival variety. Large fruits of over 5 g/fruit are obtained in the conditions of the south of the country with the varieties Crișana 2 and Mocănești 16.

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