ROOT SYSTEM ARCHITECTURE OF MERLOT VARIETY GRAFTED ON DIFFERENT ROOTSTOCKS AND GROWN UNDER THE PEDOCLIMATIC CONDITIONS OF VALEA CALUGAREASCA VITICULTURAL CENTER

ARHITECTONICA SISTEMULUI RADICULAR LA SOIUL MERLOT ALTOIT PE DIFERIȚI PORTALTOI CULTIVAT ÎN CONDIȚIILE PEDOCLIMATICE ALE CENTRULUI VITICOL VALEA CĂLUGĂREASCĂ

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Abstract. *The influence of the scion-rootstock interaction on the root system development was emphasized by the research works carried out in Valea Călugărească viticultural center under the conditions of a reddish-brown mollic vertic soil. The biological material used was Merlot variety grafted on 11 rootstocks: 8B, 26C, 57D, 71C, 2C, 5BB, SO4-4, 125AA, 41B, 140Ru and 93RG. When analysing the development of the rootstock root system in its depth (100 cm), it was noticed a differentiated distribution of the roots, even if for the greatest part of the rootstocks, the large mass of the roots is located inside a depth of 0-60 cm.*

The rootstocks having explored the soil profile the most efficiently, showing deeper and more uniform distributions of the root system were 140 Ru an.d SO 4-4. A weaker development of the root system in the depth of the soil profile showed the rootstocks 57D and 2 C, the other rootstock holding an intermediary position.

Such a differentiated development of the root system needing to explore a larger or smaller volume of soil would certainly determine differentiations concerning the mineral nutrition of vinifera varieties grafted on those rootstocks and implicitly on the qualitative and quantitative production of grapes.

Rezumat. *Influența interacțiunii altoi-portaltoi asupra dezvoltării sistemului radicular a fost pusă în evidență prin cercetările efectuate în centrul viticol Valea Călugărească, în condițiile unui sol brun roșcat molic vertic utilizând ca material biologic soiul Merlot altoit pe 11 portaltoi (8B, 26C, 57D, 71C, 2C, 5BB, SO4-4, 125AA, 41B, 140Ru, 93RG). Analizând dezvoltarea pe adâncime (100 cm) a sistemului radicular al portaltoilor luați în studiu s-a constatat o distribuție diferențiată a acestuia chiar dacă majoritatea portaltoilor marea masă a rădăcinilor se află cantonată pe adâncimea 0-60 cm*

Portaltoii care au explorat cel mai eficient profilul de sol, prezentând o distribuție mai uniformă și mai în adâncime a sistemului radicular au fost: 140 Ru și SO 4-4. O dezvoltare mai slabă a sistemului radicular pe adâncimea profilului de sol au prezentat-o portaltoii: 57D și 2 C, ceilalți portaltoi ocupând o poziție intermediară.

Această dezvoltare diferențiată a sistemului radicular, care conduce la explorarea unui volum mai mare sau mai redus de sol va determina în mod cert diferențieri în privința nutriției minerale a soiurilor vinifera altoite pe acești portaltoi și implicit a producției cantitative și calitative de struguri.

A better knowledge of the root system architecture and of the modifying factors represents an important necessity for elaborating adequate agro-technical measures so as to obtain constantly great productions of good quality grapes. In this respect it is worth mentioning the research works carried out by Oşlobeanu (1966), Popa (1974), Southey and Archer (1988), their research works emphasizing on the influence of the scion on the root system development and architecture in case of different vinifera/rootstock combinations.

MATERIAL AND METHOD

The research works carried out in 2003 in a checking plot where Merlot variety was grafted on a large range of rootstocks having different genetic origins. There were used rootstocks belonging to Vitis riparia (R G clone 93), as well as the hybrids Berlandieri x Riparia (8B, 5BB, 2C, SO4-4, 125 AA, 57D, 26C, 71C), Berlandieri x Rupestis (140 Ru) and Vinifera x Berlandieri (41 B).

The grapevines were planted at a distance of 2 x 1 m (5000 vines/ha). As a training form it was used the bilateral spurred cordon on half stem (h=60 cm).

The soil is a reddish-brown mollic vertic soil, such a soil being a rather limiting one for growing grapevine. It generally presents a loamy texture up to loamy-clayey, the content in loam on the soil profile being of almost 46.8%.

The content in carbonates (IPC=1.21) is low and therefore soil reaction is only a little acid, the pH being of 6.4, such a value being favourable for the grapevine.

The development of the root system distribution by the soil profile in case of the combinations vinifera variety/rootstock partner was determined by using the metric framework method.

RESULTS AND DISCUSSIONS

When analysing the development of the root system belonging to the grafting combinations of Merlot variety into soil depth (100 cm), the maximum development of the root system was registered into the depth of 0-60 cm in case of the greatest part of the rootstocks (fig. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11).

The density of the roots expressed as a total number of roots for the different grafting combinations of Merlot variety was significantly variable, the rootstock 71C proliferating the greatest number of roots and the rootstock 57D the smallest one. The rootstocks that explored the soil profile the most efficiently, presenting a deeper and more uniform distribution of the root system were 140 Ru and SO 4-4.

A poorer development of the root system into the depth of the soil profile had the rootstocks 57D and 2 C, the other rootstocks (8B, 26C, 71C, 5BB, 125AA, 41B, 93RG) holding an intermediary position.

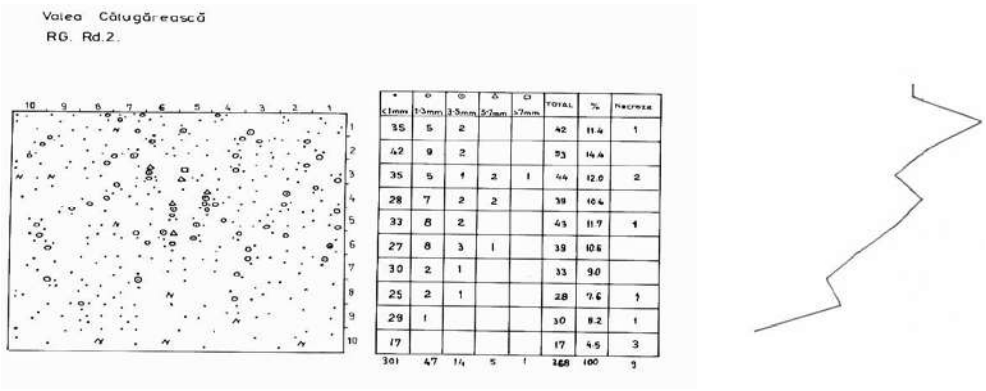

Fig.1- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/93RG

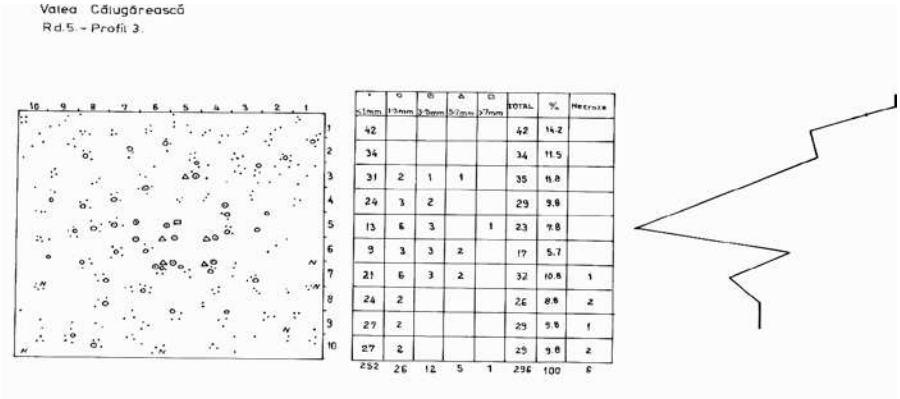

Fig.2- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/140 Ru

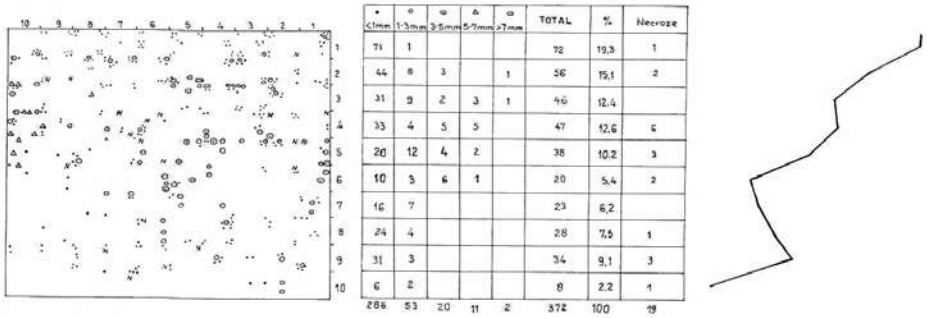

Fig.3- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/41 B

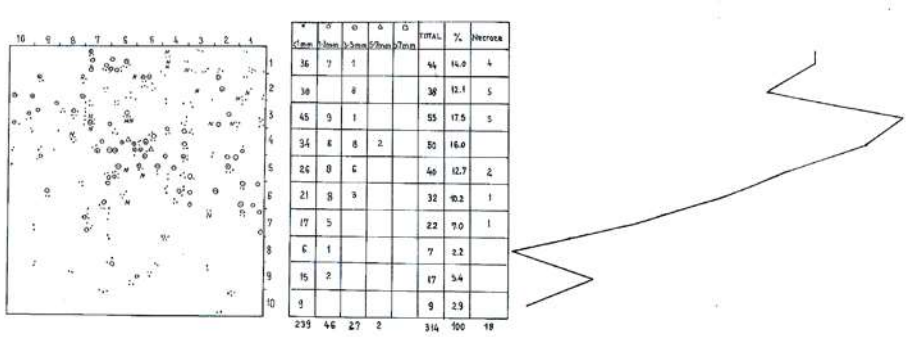

Fig.4- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/5BB

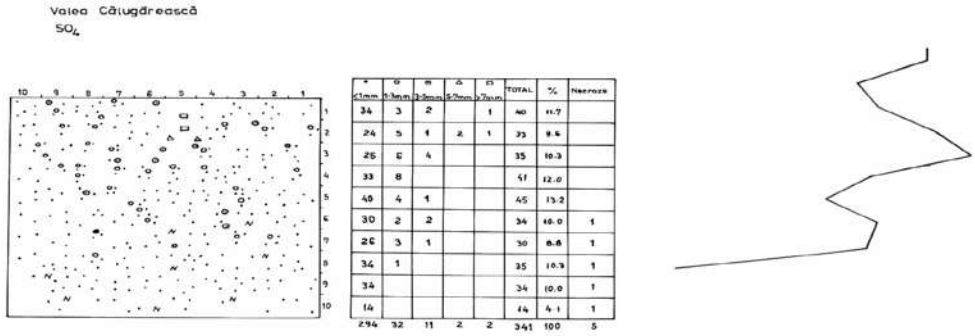

Fig.5- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/ SO 4-4

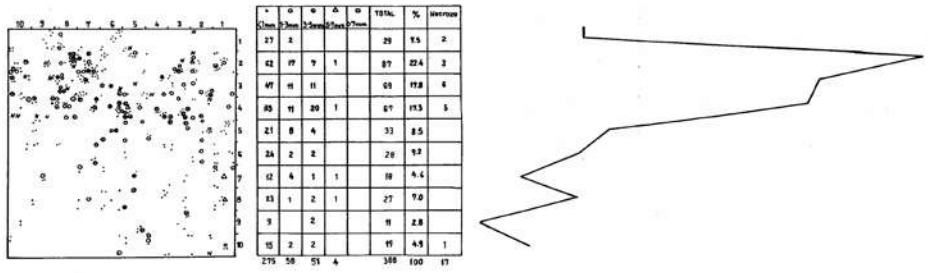

Fig.6- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/ 71 C

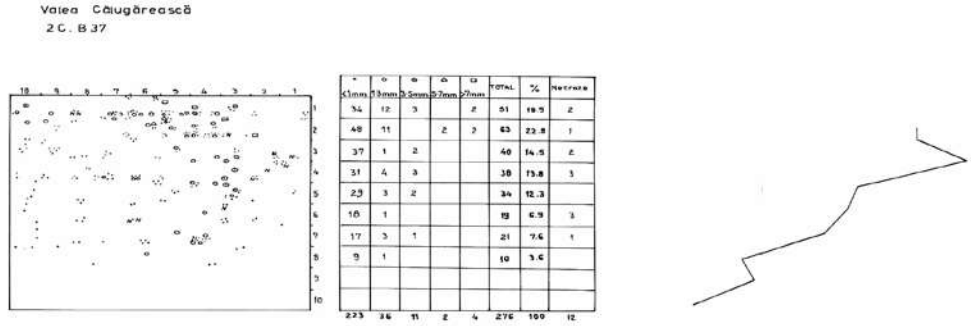

Fig.7- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/ 2 C

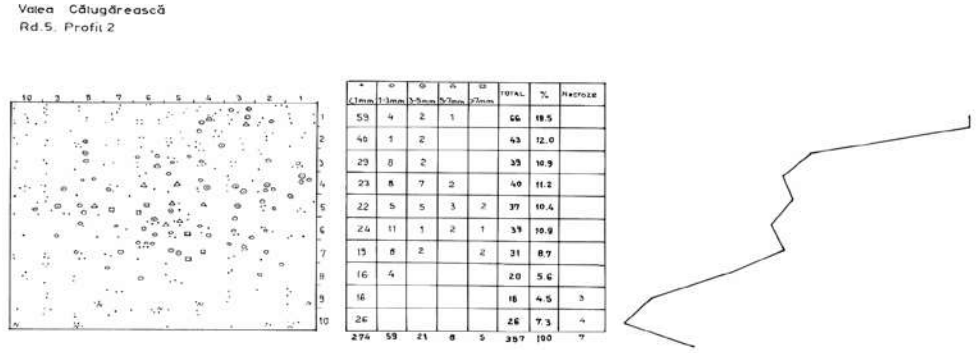

Fig.8- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/ 26 C

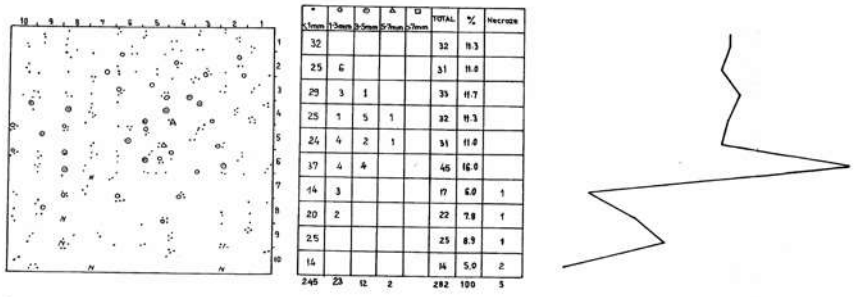

Fig.9- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/ 8B

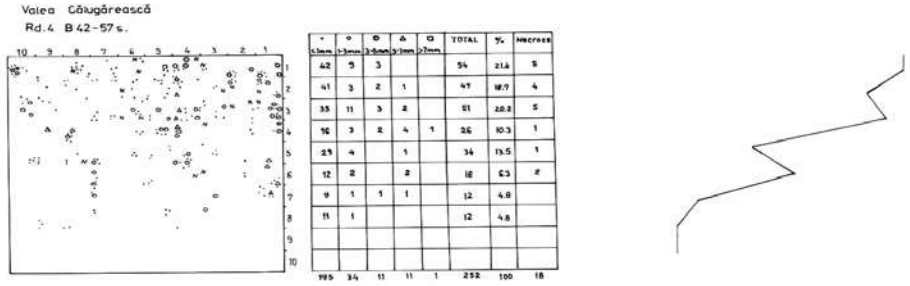

Fig.10- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/ 57 D

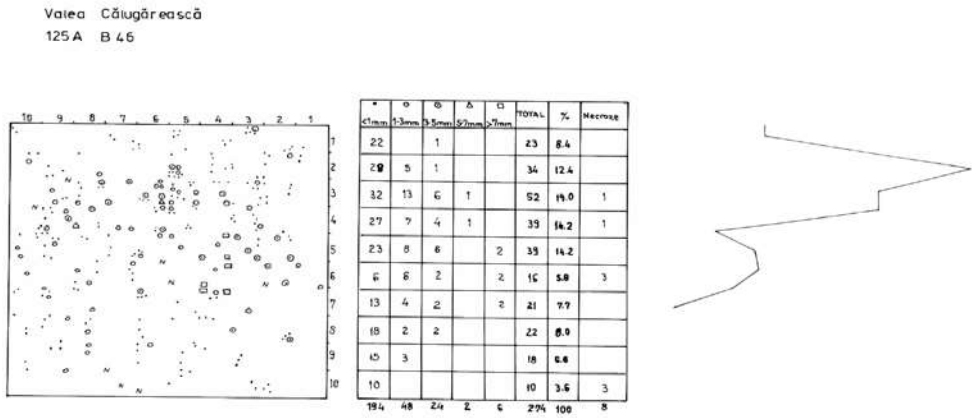

Fig.11- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/ 125 AA

The rootstocks SO4-4 and 140Ru having a deeper root system showed the smallest number of roots attacked by necrosis, which suggests the idea that they had a better resistance to drought under the climatic conditions of the years 2000-2002. A small number of roots attacked by necrosis were registered also in case of the rootstocks 8B, 26C and 125AA.

CONCLUSIONS

- The root system of the grafting combinations with Merlot variety presented a differentiated distribution according to the rootstock used in the grafting combination. The rootstocks 140 Ru and SO 4-4 presented a deeper and more uniform distribution of the root system, as well as the smallest number of roots attacked by necrosis, this suggesting that under the eco-climatic conditions of the years 2000-2002, those rootstocks had a better resistance to drought.

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