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Possibilities of Selecting Vegetative Rootstocks for Plum on the Basis of Autochthonous Genetic Material *P. Domestica* L. and *P. cerasifera* Ehrh.

P. Lucic
Faculty of Agronomy, Cacak, Yugoslavia

Gordana Djuric
Agricultural Faculty, Banja Luka, Serbian Republic of

Gorica Paunovic
Faculty of Agronomy, Cacak, Yugoslavia

Abstract: One of the basic pre-requisites for intensification of plum production in the world is considered to be selection of the vegetative rootstocks of differing vigour. Unless this is done, no significant progress towards increase in orchard density or growing habits to meet requirements of intensive production as well as higher fruit and yield quality per unit area, are expected.

With the aim of obtaining appropriate rootstocks for plum with a wider spectrum of vigour, the initially used orchard stock was: 11 autochthonous plum cultivars *P. domestica* L. and *P. institia* L. and 5 genotypes of *P.cerasifera* Ehrh. Of this material, 2.970 individuals tested on rooting, were produced. It was obvious that this material had a differing affinity to regenerating root on the above - ground parts, widely ranging from the genotypes without any response to the test on rooting (0) up to those with a high capability of rooting (5).

The paper presents regenerative abilities of the material surveyed as well as some basic characters of 5 cloned selections on the basis of *P.domestica* L. and *P. cerasifera* Ehrh. (6/209; 5/7; 2/53; 4/2; 3/3). The obtained selections have a substantial level of root regeneration, high zone of rooting and a satisfactory index of rooting (R/I). By their vigorousness, the obtained rootstocks belong to medium and low vigorous.

Key words: rootstock for plum, rooting, autchthonous plums, *Prunus domestica* L., *Prunus cerasifera* Ehrh., rooting ability index (RAI)

Introduction

One of the major pre-requisites, which leads to increase in plum production is an adequate selection of vegetative rootstocks of differing vigour, primarily those of moderate and low vigour. Unless an appropriate selection is obtained, neither progress in achieving higher orchard density per unit area nor better growing habits to meet the requirements of intensive production will be accomplished.

Investigations, carried out by Kapetanovic et al., 1976, Lucic et al., 1992 and 1993, show that some autochthonous plum cultivars are genetically prone to root regeneration on the above-ground parts. Thus, these cultivars may serve as a good initial material for further selection of the vegetative rootstocks.

The aim of the present study was to select vegetative rootstocks for plum of differing vigour from the autochthonous plum genotypes (*P. domestica* L.) and populations of numerous myrobalan genotypes (*P. cerasifera* Ehrh.).

Materials and Methods

The seedlings out of 11 autochthonous plum genotypes and 4 myrobalan genotypes were initially used for selection of the vegetative plum rootstocks.

The following procedure was used:

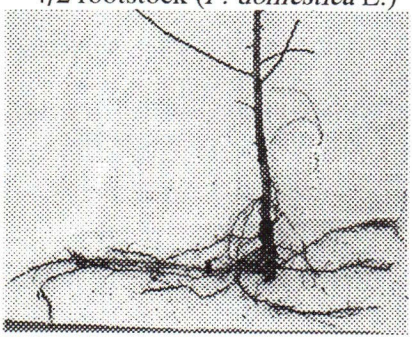
- seedling production in seedbed;
- development of mother plantation and selection;
- seedling screening of rooting with the application of stooling;
- propagation and development of mother plantation of II selection;
- selection according to the degree of rooting, the number of shoots, vigour and proportion of the total length of primary roots with that of shoots (rooting abiltiy index R/TS);
- propagation with the application of *in vitro* culture;
- grafting of the selected vegetative rootstocks on the cultivar Cacanska rodna and, evaluations of the fruit bearing, cropping material, fruit quality, vigour and compatibility between rootstock and scion.

Results and Discussion

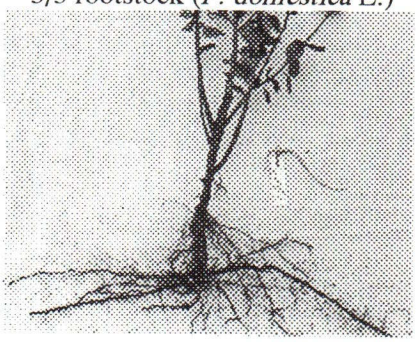
The potential of developing new vegetative rootstocks on the basis of domestic plums is differing in individual cultivars, being almost none in *P. cerasifera* Ehrh, somewhat present in *P. insititia* L., and relatively good in *P. domestica* L. Even considerable differences exist between single cultivars. Some domestic cultivars are not able to regenerate root on the seedlings at all, whereas the others show a wider spectrum of root regeneration abilities, from very slight to relatively high. If a number of individuals positively responding to the rooting test accounts for 10-15%, then this result may be assumed to be a good one. Higher degree of rooting is a rare case. Rooting degree is considered to be a decisive index for selection, but not the only one. Emission of scions and vigour

are indices, which must not to be ignored. Mother plants with a sparse emission of scions are to be excluded from further work as well as those, whose number of rooted scions per mother plant is below 60%. In these individuals, before elimination from further work, it is desirable to make sure whether other techniques of vegetative rooting, such as, cuttings and permanently embedded seedlings, may prove more efficient. It is beyond doubt that other techniques will also contribute to a more efficient vegetative propagation.

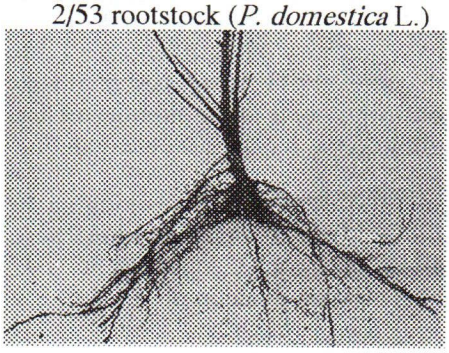
4/2 rootstock (*P. domestica* L.)



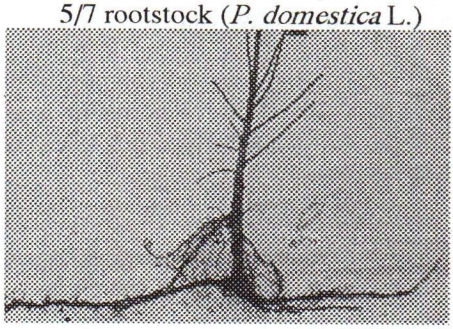
3/3 rootstock (*P. domestica* L.)



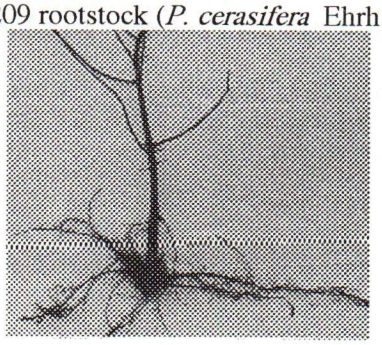
2/53 rootstock (*P. domestica* L.)



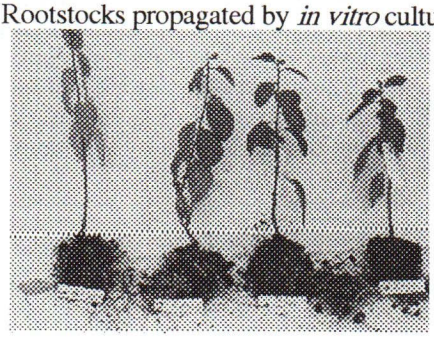
5/7 rootstock (*P. domestica* L.)



6/209 rootstock (*P. cerasifera* Ehrh.)



Rootstocks propagated by *in vitro* culture



Based upon the evaluation of the autochthonous plum genotypes *P. domestica* L. and myrobalan genotypes *P. cerasifera* Ehrh., 5 vegetative rootstocks were singled out. 6/209 selection belongs to *P. cerasifera* Ehrh., whereas the other 4 selections (5/7, 2/53, 4/2, 3/3) belong to *P.domestica* L.

The major characteristics of the selections under survey are, as follows:

- as regards growing intensity, 6/209 selection is a moderately vigorous rootstock. It has a good ability of rooting. It forms a great number of the primarily skeletal roots (10). The average root length is 19.46 cm. Rooting index (R/TS) amounts to 4.30. Root zone is large.

- 2/53 selection is considerably less vigorous than the other selections are. thus, it is determined as a low vigorous rootstock, forming numerous skeletal roots and rootlets (15), 25.20 cm averagely long.

- 4/2 selection is moderately vigorous, forming numerous rootlets (12), 21.87 cm averagely long. Rooting index (R/TS) is 5.76. Rooting zone is large.

Conclusion

In view of studying the regenerative abilities of domestic plums aiming at their good selection, we came to the following conclusions:

- abilities of domestic plum to develop the new vegetative rootstocks vary depending on the variety. Thus, *Prunus cerasifera* Ehrh. has rather low, *Prunus institia* L. low and *Prunus domestica* L. relatively high ability to do so;

- none of the domestic cultivars, belonging to *Prunus domestica* L. is able to regenerate root on the stooled growth parts. Of 11 genotypes involved, only 4 had this ability. The result is assumed to be good if the number of the cultivars within a genotype positively responding to the rooting test accounts for 10-15%;

- of the autochthonous genotypes surveyed, 4 selections, belonging to *Prunus domestica* L. and 1 selection, belonging to *Prunus cerasifera* Ehrh. were singled out; The selections, belonging to *Prunus domestica* L., namely 5/7, 3/3 and 4/2 are moderate and 2/53 low in vigour. All the selections are forming numerous roots, 10 cm averagely long. Rooting zone is large and rooting index ranges from 4.19 to 10.29.

- 6/209 selection was obtained from *Prunus cerasifera* Ehrh. It is moderately vigorous. It forms numerous roots (11) 18.45 cm averagely long. Rooting index is 4.64 and rooting zone large.

- The selections singled out have been successfully propagated with the application in vitro culture. Rooting parameters have been found to be the best in 6/209 selection, succeeded by 2/53 and 5/7, respectively.

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MOGUĆNOSTI STVARANJA VEGETATIVNIH PODLOGA ZA ŠLJIVU NA BAZI AUTOHTONOG GENETSKOG MATERIJALA *P. domestica* L. i *P. cerasifera* Ehrh.

- originalni naučni rad -

P. Lučić
Agronomski fakultet, Čačak

Gordana Đurić
Poljoprivredni fakultet, Banja Luka, Republika Srpska

Gorica Paunović
Agronomski fakultet, Čačak

Rezime

U cilju stvaranja odgovarajućih vegetativnih podloga za šljivu, po mogućnosti šireg spektra bujnosti, kao polazna osnova korišćen je semenski materijal autohtonih sorti šljiva *P. domestica* L. i *P. institia* L. i 5 genotipova *P. cerasifera* Ehrh. Od ovog materijala, proizvedeno je 2.970 jedinki koje su testirane na okorenjavanje. Ispitivanja su pokazala da su predispozicije ovog materijala za regeneraciju korena na delovima nadzemnog sistema veoma različite i kreću se u širokom rasponu, od genotipova bez reakcije na test okorenjavanja (0) do genotipova sa visokom sposobnošću okorenjavanja (5).

Rad takođe prezentuje regenerativne sposobnosti ispitivanog materijala, kao iosnovne karakteristike 5 kloniranih selekcija na bazi *P. domestica* i *P. cerasifera* (6/209; 5/7; 2/53; 4/2 i 3/3). Dobijene selekcije se odlikuju dobrim stepenom regeneracije korena, visokom zonom okorenjavanja i dobrim indeksom okorenjavanja (R/TS). Po vegetativnoj snazi rasta, ove selekcije se mogu svrstati u srednje bujne i slabo bujne podloge.