

OBSERVATIONS ON SOME ANATOMICAL ELEMENTS OF ANNUAL BRANCHES, IN ORDER TO ESTABLISH DIFFERENCES BETWEEN SPECIES OF THE GENUS *PRUNUS*

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Abstract. Genus *Prunus* contains many species, but only a few of them have contributed at the current varieties under cropping. Observations on some anatomical elements at the annual branches of some varieties of the species *Prunus domestica*, *Prunus armeniaca* and *Prunus persica* plays an important role in understanding and using the useful results from scientific and practical point of view, in agricultural research. Usefulness of the results obtained intervenes in breeding programs in order to create new interspecific genitors with high biological value.

Keywords: species, variability, differentiation, breeding

INTRODUCTION

Bortiri et al. (2001) and Potter et al. (2007) consider that the genus *Prunus* has over 200 species, but they are not clearly identified through genetic analysis. Over the last 30 years, with few exceptions, the singular concept of “*Prunus*” was the most favored (Bortiri et al. 2001). Currently, the attention of the breeders is focused on the problem of interspecific genetic breeding (Botu, 1999), so that a proper and detailed morphological and anatomical, physiological and ecological knowledge of the species from genus *Prunus* occurs as needed. OECD (2002) estimates that less difficult seems to be the gene flow between plum-apricot-peach and almond as documents date by the list of successful interspecific crosses.

MATERIAL AND METHOD

The researches were carried out at the University of Craiova-Research and Development Station for Fruit Growing Valcea.

The biological material consisted of varieties belonging to the species *Prunus domestica* (Valcean, Andreea), *Prunus armeniaca* (Excelsior, Sulina) and *Prunus persica* (Redhaven, Romamer 2), and shows ages between 11-18.

The observations were made with the microscope Optech B4 and was used the ocular 10x and objectives 10x, 20x, 40x.

Macro photos were taken with Canon Power Shot S1 IS camera attached to the microscope.

The observations were aimed at establishing species differences through microscope measurements regarding the size of some anatomical elements like the size of wood vessels (diameter), the size of medullar rays (width) and the size of sclerenchyma fiber groups, at the level of annual branches.

From each group of varieties were analyzed and photographed two varieties for comparison.

RESULTS AND DISSCUTIONS

Analyzing the three species studied, it was observed that although are related genetically, anatomically they have specific characteristics. These features have been differentiated depending on the species and variety, in order to establish differences or similarities between them (Table 1 and Photo 1-6).

The size of wood vessels oscillates in very tight limits between varieties of the same species: 2.7% (apricot), 11.3% (plum) and 3.5% (peach). The conclusion is that wood vessels have similar size within species. Most large wood vessels were recorded at peach. If we compare wood vessels between species, we find that at apricot we have a size of 52.5% and at plum a size of only 46.4% from the size of peach.

Among the varieties of the same group, the variability of wood vessels diameter is reduced, but between species is very high. We meet the largest wood vessels at the peach, followed by the apricot and the smallest we meet at the plum.

The size of the medullary rays between varieties of the same species differs in low percentages (from 2.4 to 5.6%). The biggest differences are found among groups of varieties from different species. The largest diameters of the medullary rays meet in peach, while at the apricot are lower, of only 85.2% and at plum of 95.2% of them.

As regards the variability of sclerenchyma fiber groups size was found that in the same group, the differences between varieties are of 8.5% in apricot, 15.9% at plum and of 10.9% at peach. Reporting sclerenchyma fiber groups size between groups of varieties, it results that the biggest are meet at the peach, while at the plum they are 56.1% and at the apricot are of 84.3%, much smaller in size.

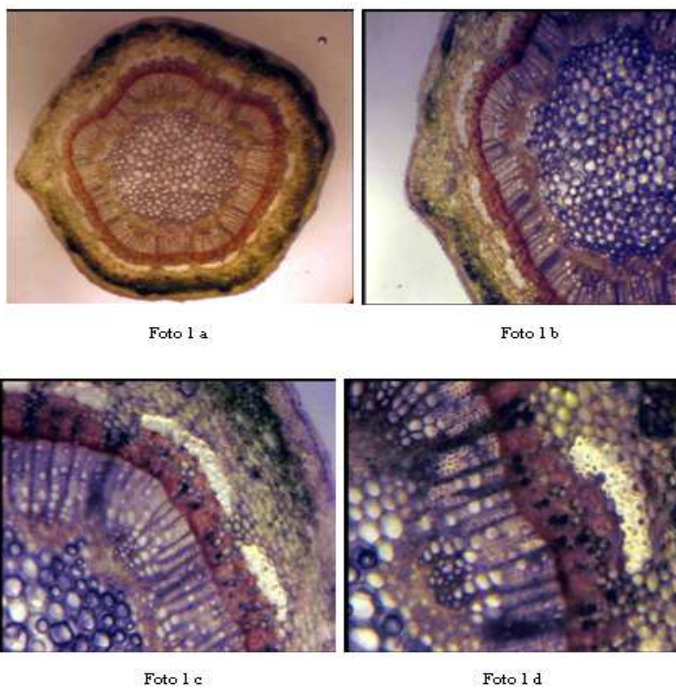


Fig. 1. Transversely cut through annual branch of *Prunus domestica* L. (Andreea variety)
 - Original photo –
 a- full section (objective 4x10x4), b- section fragment (objective 10x4x6,4), c,d- section detail
 (objective 10x10x6,4)

Table 1

The variability of some anatomical elements at annual branches of plum, apricot and peach varieties

Species	Variety	The size of wood vessels			The size of medullar rays			The size of sclerenchyma fiber groups		
		% amongst varieties	% compared to average	% compared to the peach	% amongst varieties	% compared to average	% compared to the peach	% amongst varieties	% compared to average	% compared to the peach
<i>Prunus armeniaca</i>	Excelsior	100,0	98,6	-	100,0	98,4	-	100,0	104,5	-
	Sulina	102,7	101,4	-	103,2	101,6	-	91,5	95,6	-
	<i>Average</i>	-	100,0	52,5	-	100,0	83,2	-	100,0	84,3
<i>Prunus domestica</i>	Andreea	100,0	94,6	-	100,0	99,4	-	100,0	108,6	-
	Vâlcean	111,3	105,3	-	102,4	101,2	-	84,1	91,4	-
	<i>Average</i>	-	100,0	46,4	-	100,0	95,2	-	100,0	56,1
<i>Prunus persica</i>	Redhaven	100,0	101,8	-	100,0	97,3	-	100,0	94,8	-
	Romamer 2	96,5	98,2	-	105,6	102,7	-	110,9	105,2	-
	<i>Average</i>	-	100,0	100,0	-	100,0	100	-	100,0	100,0

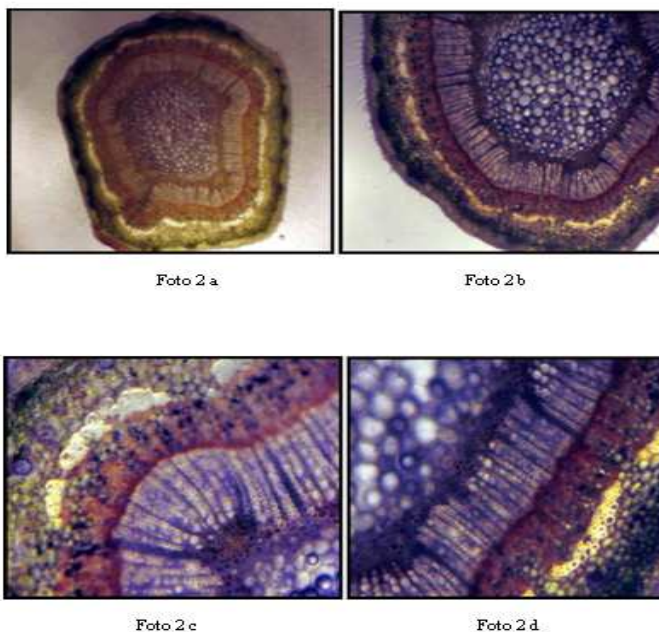


Fig. 2. Transversely cut through annual branch of *Prunus domestica* L. (Valcean variety) - Original photo -
 a- full section (objective 4x10x4), b- section fragment (objective 10x4x6,4), c,d- section detail (objective 10x10x6,4)

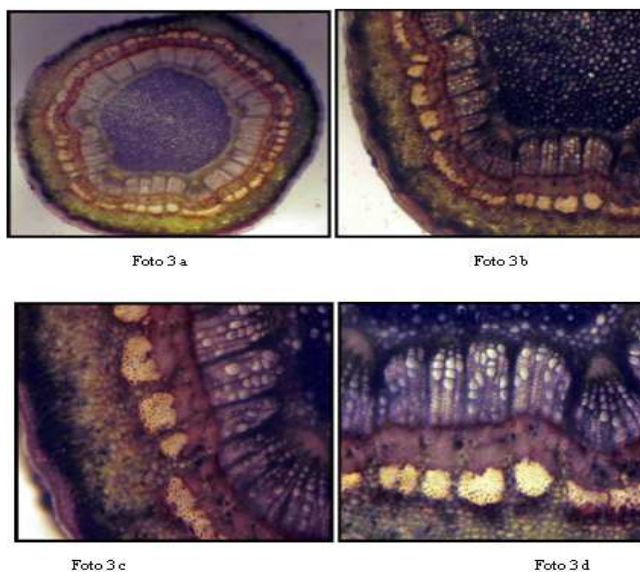


Fig. 3. Transversely cut through annual branch of *Prunus persica* L. Batsch. (Redhaven variety) - Original photo -
 a- full section (objectiv 4x10x4), b- section fragment (objectiv 10x4x6,4), c,d- section detail (objectiv 10x10x6,4)

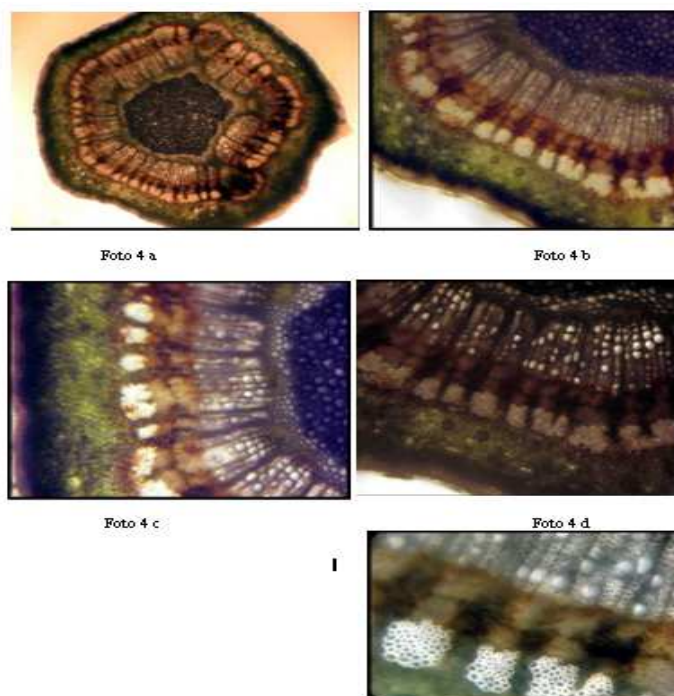


Fig. 4. Transversely cut through annual branch of *Prunus persica* L. Batsch. (Romamer 2 variety) -Original photo -
 a- full section (objectiv 4x10x4), b- section fragment (objectiv 10x4x6,4), c,d,e,- section detail (objectiv 10x10x6,4)

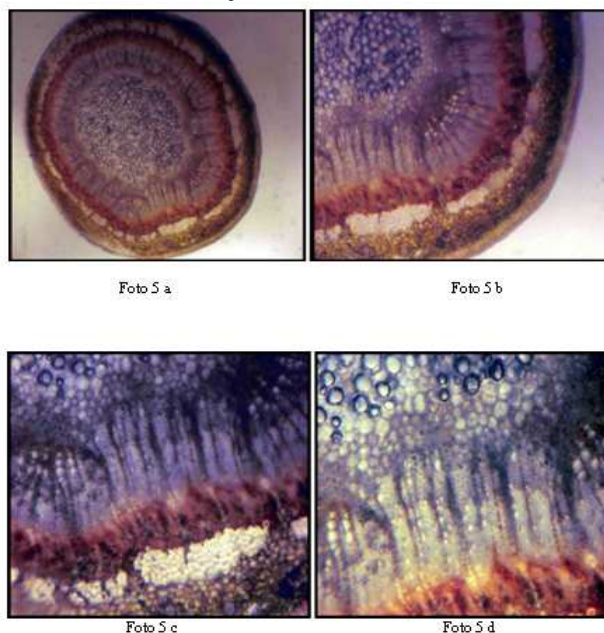


Fig. 5. Transversely cut through annual branch of *Prunus armeniaca* L. (Excelsior variety) - Original photo -
 a- full section (objectiv 4x10x4), b- section fragment (objectiv 10x4x6,4), c,d - section detail (objectiv 10x10x6,4)

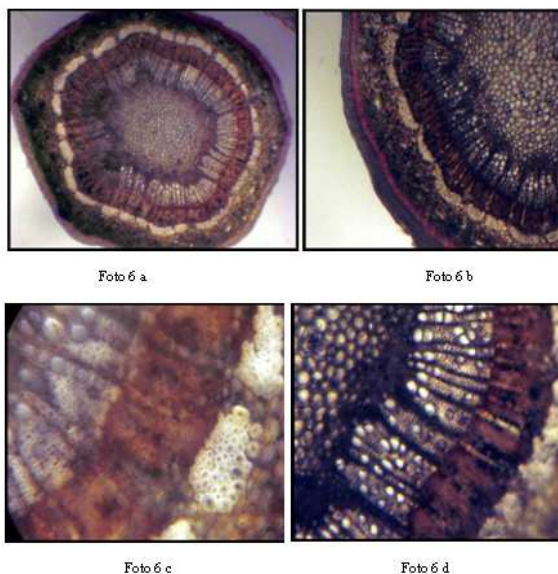


Fig. 6. Transversely cut through annual branch of *Prunus armeniaca* L. (Sulina variety)
 - Original photo -
 a- full section (objectiv 4x10x4), b- section fragment (objectiv 10x4x6,4), c,d - section detail
 (objectiv 10x10x6,4)

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CONCLUSIONS

The general conclusion that resulted from observations of anatomical elements at species of the genus *Prunus* is that the anatomical elements are important and presents variability within varieties of a species, especially among groups of varieties from different species. Variability has genetic nature (genetic determinism).

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