

IN SITU CHARACTERIZATION OF PLUM LANDRACES ORIGINATED FROM THE REGION OF WESTERN SERBIA

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INTRODUCTION

Plum landraces in Serbia are numerous, heterogeneous and well adapted to existing agro-ecological conditions [1]. Some plum genotypes of local importance are potential gene donors for late flowering and ripening time, resistance to drought and high temperatures [2], as well as for resistance to economically important diseases [3]. Apart from this, the fruits of local plum genotypes often show exceptional nutritional properties, especially in terms of total phenol content and antioxidant capacity, as well as in terms of mineral and pectin content [4]. The Fruit Research Institute has a long tradition of *in situ* and *ex situ* collection of plum genotypes [5; 6; 7; 4], thus ensuring the preservation of genetic basis for breeding activities and development of new selections and cultivars that can be interesting for commercial growing, as well as developing of new rootstocks for plum, peach and apricot [8]. Therefore, this work was aimed primarily to study harvest date, physical fruit traits and nutritional value, as well as field resistance to Sharka disease (*Plum pox virus*) in eleven *in situ* plum landraces grown in different regions of western Serbia.

MATERIALS AND METHODS

Eleven autochthonous plum genotypes (Table 1) of unknown origin were sampled as single trees and analyzed in orchards of growers in the region of western Serbia during 2020/21.

Table 1. Location of trees of the assessed plum landraces.

Genotype	Location		
	Latitude	Longitude	Altitude
'G-1'	43°57'439"N	20°19'285"E	358.00 m
'G-2'	43°49'425"N	20°53'538"E	509.00 m
'G-3'	43°49'423"N	20°53'544"E	507.00 m
'G-4'	43°49'436"N	20°53'521"E	512.00 m
'G-5'	43°86'149"N	20°42'354"E	207.00 m
'G-6'	43°54'595"N	19°52'210"E	539.00 m
'G-7'	43°54'675"N	19°52'297"E	555.50 m
'G-8'	44°09'304"N	20°40'967"E	443.00 m
'G-9'	44°09'090"N	20°24'009"E	642.00 m
'G-10'	44°05'015"N	20°50'667"E	405.00 m
'G-11'	43°54'738"N	19°52'306"E	539.00 m

The investigation included:

- 🌱 Harvest date
- 🌱 Fruit and stone weight
- 🌱 Fruit dimensions
- 🌱 Fruit surface area
- 🌱 Soluble solids content
- 🌱 Total acids content
- 🌱 Ratio between soluble solids and total acids
- 🌱 Total phenols
- 🌱 Total anthocyanins
- 🌱 Antioxidant activity
- 🌱 Field resistance to Sharka disease (*Plum pox virus*)

RESULTS AND DISCUSSION

Table 2. Fruit and stone weight and ripening time of the assessed plum landraces.

Genotype	Fruit weight (g)	Stone weight (g)	Ripening time (date)
'G-1'	17.24±0.78 de*	1.08±0.18 b	July 30 th
'G-2'	20.82±0.90 bc	1.11±0.18 b	July 30 th
'G-3'	37.13±1.12 a	2.39±0.41 a	July 31 st
'G-4'	11.76±0.53 g	0.57±0.07 d	August 01 st
'G-5'	13.39±1.66 fg	0.85±0.04 bcd	August 10 th
'G-6'	20.34±1.33 bc	0.82±0.16 bcd	August 11 th
'G-7'	21.43±1.28 b	0.92±0.04 bc	August 11 th
'G-8'	15.47±1.66 ef	0.66±0.03 cd	August 12 th
'G-9'	21.50±1.56 b	0.94±0.15 bc	August 12 th
'G-10'	18.58±1.15 cd	0.85±0.05 bcd	September 13 th
'G-11'	20.16±2.84 bc	0.90±0.18 bc	September 15 th



Table 3. Fruit dimensions (height, width and thickness), mean geometrical diameter of fruit and fruit surface area of the assessed plum landraces.

Genotype	Fruit height (mm)	Fruit width (mm)	Fruit thickness (mm)	Mean geometrical diameter (mm)	Fruit surface area (mm ²)
'G-1'	34.75±1.23 c*	27.29±0.82 c	29.02±0.17 b	30.19±0.44 d	2863.76±83.65 c
'G-2'	38.83±1.89 b	28.47±0.86 b	30.46±0.52 b	32.35±0.84 bc	3289.9±171.21 b
'G-3'	40.94±0.32 a	36.39±0.49 a	38.86±0.56 a	38.68±0.25 a	4702.02±61.78 a
'G-4'	32.55±0.97 d	24.42±0.55 f	24.72±1.25 bc	26.98±0.88 f	3211.26±76.16 b
'G-5'	29.16±0.87 e	25.18±0.68 ef	25.76±0.70 bc	26.68±0.71 f	2237.32±118.65 e
'G-6'	32.08±0.52 d	25.56±0.96 e	26.01±1.02 bc	27.47±0.77 f	2673.05±483.05 cd
'G-7'	30.45±0.53 e	26.09±1.05 d	26.12±0.72 b	27.70±0.71 ef	2411.58±125.5 de
'G-8'	32.74±1.66 c	26.42±0.38 d	19.18±0.69 c	28.76±0.53 e	2599.15±94.95 cd
'G-9'	39.93±0.87 ab	28.94±0.69 b	31.97±0.70 ab	33.31±0.63 b	3485.91±132.95 b
'G-10'	38.92±0.15 b	28.98±0.82 ab	28.08±0.38 b	31.63±0.39 c	3211.26±76.16 b
'G-11'	39.98±1.07 ab	29.02±1.73 ab	29.06±1.45 b	32.30±1.40 c	3282.41±1.73 b

*The different lower-case letters within columns indicates significant differences for $P \leq 0.05$ (LSD test).

Table 4. Fruit chemical composition of the assessed plum landraces.

Genotype	Soluble solids content (%)	Total acids content (%)	Soluble solids/Total acids
'G-1'	19.50	1.11	17.58
'G-2'	16.60	1.35	12.29
'G-3'	16.55	1.94	8.53
'G-4'	20.05	2.09	9.59
'G-5'	24.55	1.13	21.73
'G-6'	20.45	1.29	15.85
'G-7'	18.25	1.12	16.29
'G-8'	15.65	1.17	13.89
'G-9'	14.25	1.13	12.61
'G-10'	16.10	0.70	23.00
'G-11'	21.10	0.70	30.14

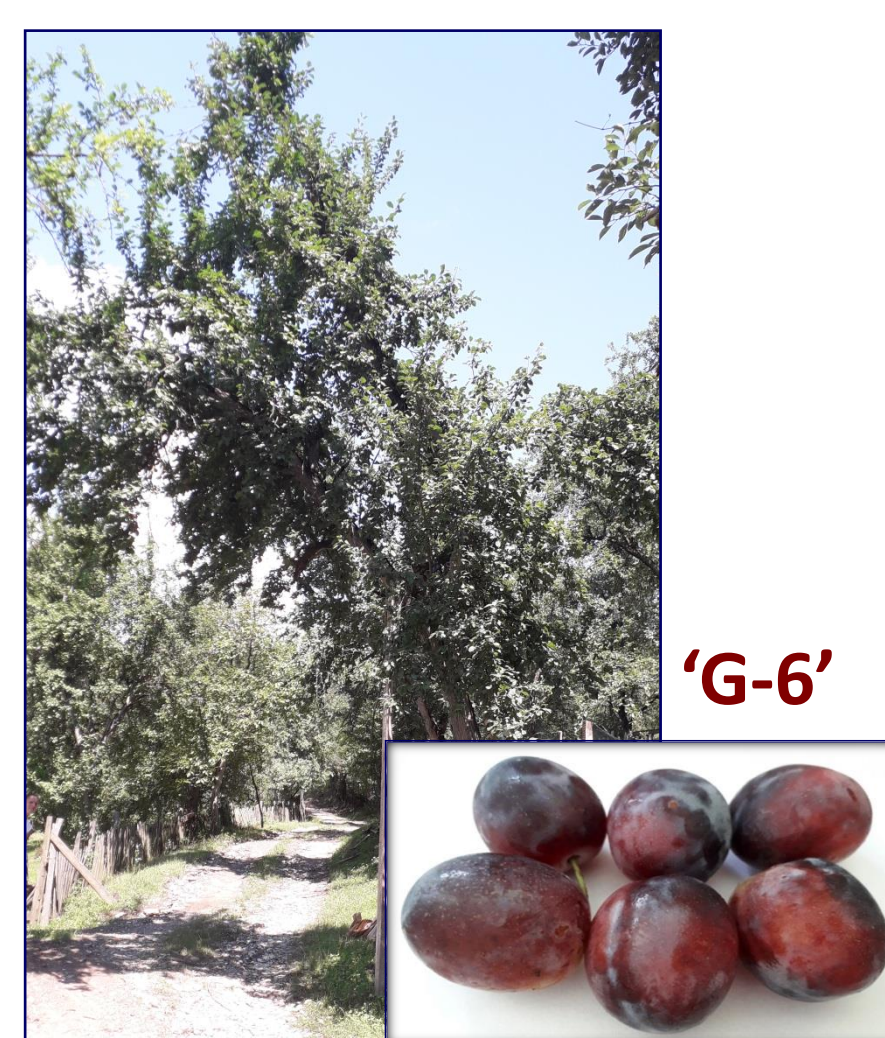
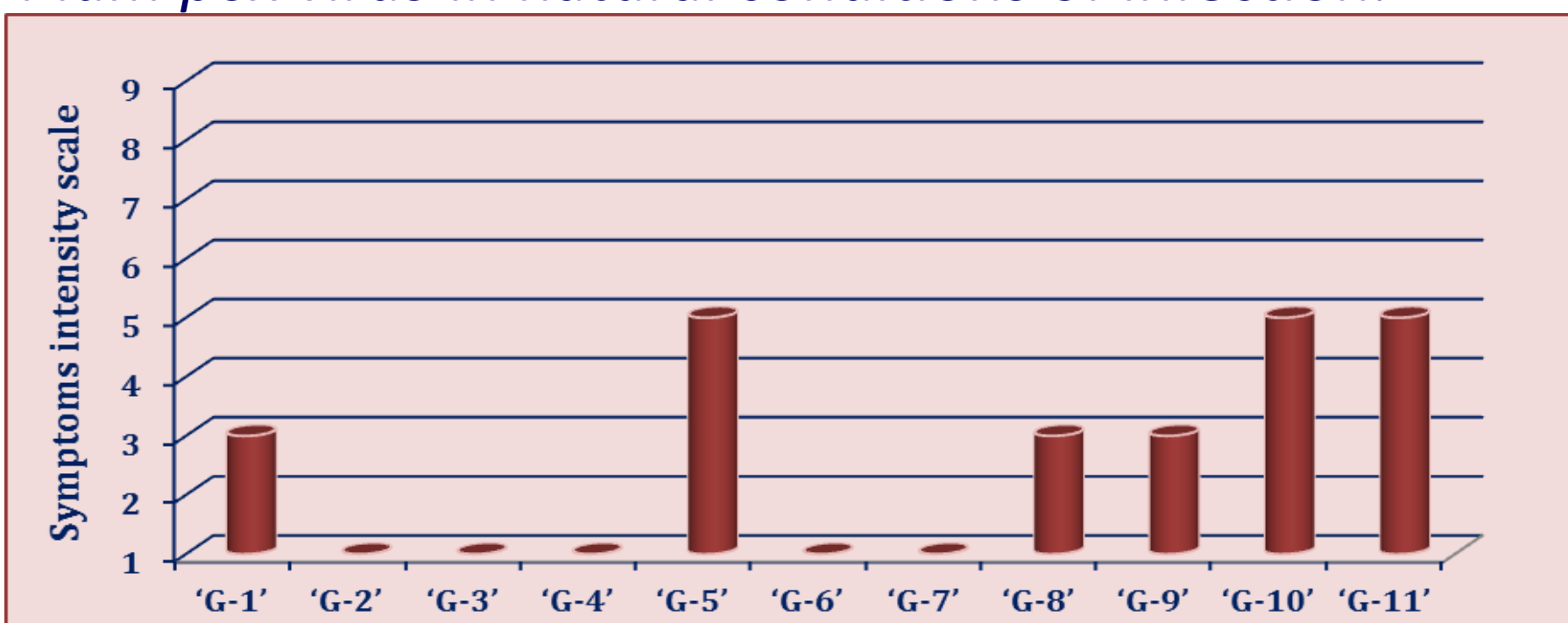


Table 5. Content of bioactive compounds in the fruit of the assessed plum landraces.

Genotype	Total phenol content (mg GAE 100 g ⁻¹ fruit weight)	Antioxidant activity (%)	Total anthocyanin content (mg C3G 100 g ⁻¹ fruit weight)
'G-1'	104.50±7.50 e	35.81±4.97 c	9.18±1.26 b
'G-2'	197.50±9.50 a	63.26±3.17 a	7.51±0.41 bcd
'G-3'	71.33±6.51 ef	29.54±0.58 c	0.00±0.00 f
'G-4'	85.00±4.00 ef	30.76±1.65 c	5.42±0.42 bcd
'G-5'	184.50±12.50 ab	57.78±0.29 ab	17.32±0.20 a
'G-6'	94.08±2.00 ef	31.56±1.15 c	7.51±0.56 bcd
'G-7'	166±30.00 b	36.31±3.32 c	3.13±0.63 ef
'G-8'	181.50±12.50 ab	60.30±4.39 a	18.93±6.01 a
'G-9'	108.00±3.00 de	36.09±4.25 c	8.35±4.59 bc
'G-10'	129.00±27.00 cd	49.85±15.27 bc	4.18±0.84 de
'G-11'	136.5±0.50 c	60.73±5.83 a	4.80±1.04 cd

*The different lower-case letters within columns indicates significant differences for $P \leq 0.05$ (LSD test).

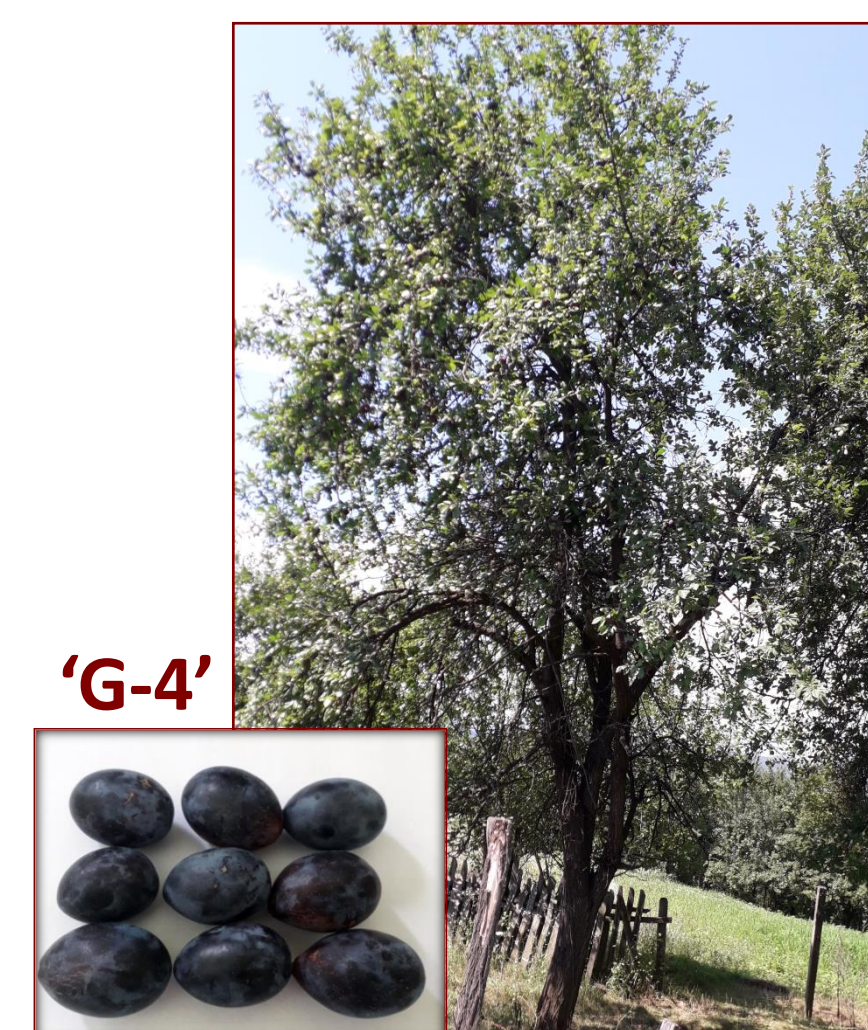
Figure 1. Reaction of the assessed plum landraces on *Plum pox virus* in natural conditions of infection.



Symptom intensity scale (1–9): 1 – no symptoms, 3 – minor symptoms, 5 – moderate symptoms, 7 – strong symptoms, 9 – very strong symptoms.

CONCLUSION

The results of this study indicate a great variability of the tested properties among the studied Serbian plum landraces, which represent an outstanding genetic basis and the source of germplasm for further research and breeding work. Future investigations of the collected accessions in field and laboratory conditions in the coming years should be extended to a larger number of significant traits and provide answers about the possibilities of their usage for the development of new cultivars and rootstocks or introduction into commercial plum production intended for fresh consumption, drying and processing into spirits or other products.



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