Analele Universităţii din Craiova, seria Agricultură – Montanologie – Cadastru (Annals of the University of Craiova - Agriculture, Montanology, Cadastre Series)Vol. XLIV 2014

THE BIODIVERSITY STUDY OF SOME *ROSA CANINA L.* GNEOTYPES FROM OLTENIA AREA

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Keywords:morfological parameters, PrincipalComponent Analysis, rosehips, variability

ABSTRACT

In this paper there was studied the variability of some morphological characters from Rosa canina genotypes of 20 local populations from different areas from central and northern part of Oltenia, Valcea County, and also plant association where there were found those ones. The results werestatistically interpreted byanalysis of variance, PearsonCorrelationsandPCA(PrincipalComponent Analysis).

There were indentified 3 populations groups: first group with 6 genotypes with high values for both shoot length and flower diameter; second group with 9 genotypes and has low values for both shoot length and for the flower diameter (both negative components) and third group with 5 genotypes and has low values for shoot length and high values for flower diameter. The great variability indentified inside of studied populations is probably caused by the altitude and the phytosociological associations.

INTRODUCTION

Rosa canina L. (common name Wild rose, Thorn, Rosehips) is a shrub in the spontaneous flora of Romania. Taxonomic position: *Rosaceae, Rosoideae*, *Rosa* L. subgenus *Eurosa* Focke, section *Cinnamomeae* (DC.) Rehder.

Section *Caninae* is very important in the subgenus *Eurosa*, which contains all but four of the approximately 150 *Rosa* species in the world (Tutin, T.G., (eds.), 1964–1980 & 1993) (M. Niculescu, 2014).

The shrubshaveheights of2-3m, arched branches, recurved and strongthornsandsmallredbuds. Imparipenatleaves arecompoundwithseven ovate-elliptic leaflets, glabrouson both sides.The flowers arepinkish-white, terminal, solitary or grouped and fruits areellipsoidalwith numeroussmallhairyachenes. The speciepresents large variations of the climaticfactors, withreduced requirementstovegetation factors, supporting well compactsoilsand evendegraded ones(Nețoiuetal., 2008).

*RosacaninaL.*are important as rootstocks in rose breeding process(Wagner, 2002; Nețoiuetal., 2008) as ashrubinprotective ordefensivefences(Soareetal., 2009) andas an amelioratingsoilspecie(Nețoiuetal., 2008). Besides theseuses, rosehip hasimportantmedicinaland food, because it containsvitamins,especially C vitamin(Kazazetal.,2009,Mabellinietal., 2011).

Althoughin some countries, such as Bulgaria,Turkey, the Netherlands, etc., there are big *Rosa canina*crops,inRomaniathere isrecentexperimentalplantationsestablishedwithvarieties, types and formsof*Rosa canina*selectedfromInstituteforHorticultureResearch and Development,Mărăcineni,Pitești.

Rosehipsspeciebiodiversityinthe Oltenia area, Romaniahas beenless studiedso far. Recentresearch conductedinthis area, onthe technological characteristicsand biochemicalvariability, valuable genotypeswere identified(Soareet. al,2014a,b).

To promotevaluableforms forbreeding processof this specieis necessary tostudy thevariability ofvegetativeand reproductive morphologic characters. Inthis way, the purpose of this studywas to identifythe existingvariability of thelocalpopulation from Vâlcea County,Romania.

MATERIALS AND METHODS

Inthis studywere studied twenty localpopulationsfromOlteniaarea, Vâlceacounty from fivevillageswithdifferent altitudes: Balcesti(234-240 m),Tetoiu(400-410 m),Lapus(350-358 m),Horezu(470-540m) andSlatioara(540-600 m). The analyzed biotypescame fromspontaneous florainareasrichinRosehips bushes. The*Rosacanina*speciespresents55intertaxa8Varietiesand43forms. Therefore,there were analyzedthesepopulationsin phytosociologicalterms of inthis area.

Within thesepopulationsvariabilityof somemorfological parameters:length ofsprouts, flowerdiameter, medium number of inflorescences/shoots,petallength, petalwidth, leaflength and width. Determinationsandbiometricmeasurementswere madeinJune,2014.

The results werestatistically interpreted byanalysis of varianceusingMicrosoftExcelandcalculating the means,standarddeviations, variance, range, count, 95% confidencelevel. Alsowere calculatedPearsonCorrelationsandPCA(PrincipalComponent Analysis).

RESULTS AND DISCUSSIONS

The analyzed morphological characteristicsshowgreatvariabilityfrom onegenotypeto another, indicating the possibility ofselectionofnew genotypes.

In thestudied populations, length ofsproutshas recordedan average of12.70cmand a variation amplitude from6.88 to 21.85cm, the difference being 3.1 timeshigher thanina genotypeto another.Forflower diameterwas recordedan average of4.58cmandan amplitude ofvariationfrom2.85 to 5.71cm, the difference being 2times higher.

Number ofinflorescences/shootrecordedan average of2.95anda variation amplitude offrom2.1 to 4.5 difference being2.1 timeshigher.Regarding thelength of thepetals, itwas recordedan average of2.11cmandan amplitude ofvariationfrom1.57 to 2.59cm, the difference being 1.6 timeshigher.Onaverage, petalwidthwas2.22cm, the amplitude of variationfrom1.53cmto2.65cm, and the difference was 1.7times higher.

The leaf length recorded an average of 7.87 cm, an amplitude of variation from 5.67 to 11.07 cm, the difference being 1.9 times higher and for leaf width, the average was 5.52 cm, the amplitude of variation from 4.41 cm to 7.73 cm and 1.7fold difference from one to another genotype (Table 1).

Table 1

Descriptive statistics for *Rosa canina* populations.

Specification	Shoot lenght (cm)	Flower diameter (cm)	No. inflorescence/ shoot	Petal lenght (cm)	Petal width (cm)	Leaf lenght (cm)	Leaf width (cm)
Media	12.70	4.58	2.95	2.11	2.22	7.87	5.52
Standard Error	4.82	1.14	0.72	0.44	0.41	1.79	1.11
Standard Deviation	3.42	0.68	0.59	0.25	0.27	1.29	0.84
Sample Variance	11.74	0.47	0.35	0.06	0.07	1.68	0.71
Range	14.97	2.86	2.4	1.02	1.12	5.4	3.32
Minimum	6.88	2.85	2.1	1.57	1.53	5.67	4.41
Maximum	21.85	5.71	4.5	2.59	2.65	11.07	7.73
Count	20	20	20	20	20	20	20
Confidence Level 95 %	10.51	2.50	1.57	0.96	0.89	3.90	2.43

Regarding the correlations betweencharacters, the highest correlationswere recordedbetween: widthanddiameter offlowerpetals(r=0.760); leafwidthand length(r=0.673) andlengthand width oftheirpetals(r=0.663). Otherpositive correlationswere recordedbetweenthe length ofthe flowerpetalsanddiameter(r=0.555) andbetweenshoot lengthandleaflength(r=0.470) (table 2).

Table 2

Correlations between studied morphologic characters

Character	Shoot lenght	Flower diameter	No. of inflorescence	Petal lenght	Petal width	Leaf lenght
Flower diameter	0.317	-	-	-	-	-
No. of inflorescence	0.279	-0.198	-	-	-	-
Petal lenght	0.318	0.555**	-0.218	-	-	-
Petal width	0.194	0.760***	-0.098	0.663***	-	-
Leaf lenght	0.470*	0.275	-0.122	0.300	0.358	-
Leaf width	0.343	0.275	0.004	0.361	0.397	0.673***

P 5%=0.42; P 1%=0.53%; P 0.1%=0.65

FromTable 3it can be seenthatonlythreeof the sevenanalyzedfactorsinfluenced in percentage of93.289 the total variance, which isthe length ofsprouts(60.466%), flowerdiameter(20.921%) and number offlowers(11.901%).

Table 3

Eigenvalues and component score coefficients

Component	Initial Eigenvalues			Component Score Coefficient Matrix	
	Total	% of Variance	Cumulative %	1	2
Shoot lenght (cm)	4.233	60.466	60.466	-0.174	-0.121
Flower diameter (cm)	1.465	20.921	81.387	0.462	-0.074
No.inflorescence/shoot	0.833	11.901	93.289	0.023	-0.157
Petal lenght (cm)	0.271	3.874	97.163	0.418	-0.075
Petal width (cm)	0.112	1.599	98.762	0.291	-0.131
Leaf lenght (cm)	0.055	0.783	99.546	-0.083	0.542
Leaf width (cm)	0.032	0.454	100.000	-0.077	0.722

The analysis of principal component wasappliedto highlightothermorphological characters, such as various species oftrees (Sofletea etal., 2011) and productivity, as inpaprikapepper, bell pepper(Ciulca et al., 2010, Madoșa et al., 2010).

In this study, the plot was donefor the first twocomponents, namelythe length ofsprouts(PCA 1)and diameterof flowers (PCA 2).Thus, wehave identifiedthreegroupswith the following characteristics:

- Group I has 6 genotypes with high values for both shoot length and flower diameter (both positive components);
- Grup II has 9 genotypes and has low values for both shoot length and for the flower diameter (both negative components);
- Grup III with 5 genotypes and has low values for shoot length and high values for flower diameter.

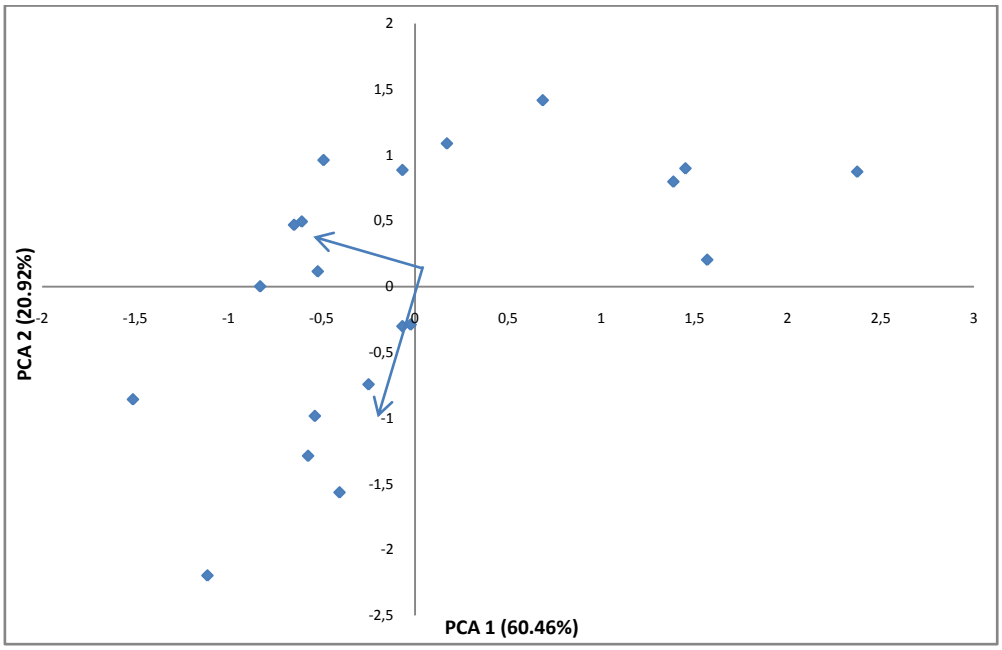

Fig.1. Plot of the first two principal components (PCA1 and PCA2). Eigenvalues for each two principal component are listed in parentheses.

The analyzed rosehipspopulations are fromdifferentphytocenosis. Thus,the investigationsinVâlcea County, there was a great phytocoenotic variabilityof the specieand of the infrataxons of this one. In this area, *Rosa canina* and its inter-taxa is found in natural communities (Rodwell, et al., 2000): in the pure beech forests - *Symphyto cordati-Fagetum* Vida (1959) 1963); in the mixed forests of beech and fir tree - *Pulmonario rubrae-Fagetum* (Soó 1964) Täuber 1987; in the alder tree groves - *Stellario nemori-Alnetum glutinosae* (Kärstner 1938) Lohm. 1957 and *Telekio speciosae-Alnetum incanae* Coldea (1986) 1990; in the underwoods edified by *Prunus spinosa* and *Crataegus monogynya* (Niculescu, M., 2009), in the *Coryletum avellanae* Soó 1927, *Pruno spinosae-Ligustretum vulgarae* Tx. 1952, *Salicetum albae*Issler 1924 (Sanda et al, 1997); in the meadows of *Festuca pratensis (fig. 1)*, *F. valesiaca*, *F. rubra,Poa pratensis*, *Anthoxanum odoratum*; in the ruderal vegetation of *Agropyron repens*, *Cicuta virosa, Sambucus ebulus*. Also *Rosa canina* characterize alliances BerberidionBr.-Bl. 1950(Prunion spinosaeSoó (1930) n.n 1940).

Fig. 1 Rosa canina in the FestucetumpratensisSoó (1938) 1955, 1969 plant community

CONCLUSIONS

The variation of the studied charactersmay be due toseveralfactors, including thealtitude andplant communitiesthat are foundinpopulationsof*Rosacanina*. The plant communities examined with *Rosa canina* are divided into the following groups: forestry, shrublands, grasslands and ruderal .

The high variabilityobserved inthis areaindicates the possibility of selection ofnewgenotypesto beusedin specie breeding process.

Acknowledgment. This work was partially supported by the grant number 13C/27.01/2014 awarded in the internal grant competition of the University of Craiova".

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