Assessment of population diversity in wild *Rubus idaeus* populations from Serbia

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Introduction

Genus *Rubus* L. (Rosaceae), with more than 700 species, is one of the largest genera in plant kingdom. Raspberry (*Rubus idaeus* L.) is diploid and belongs to subgenus *Idaeobatus*. Raspberry leaves are used in traditional medicine for treatment of various disorders most commonly related to menstruation, parturition, and ailments of the gastrointestinal tract and other purposes, while fruit is used as food. In this work we used AFLP markers to analyse intrapopulation diversity and interpopulation relationships of seven wild growing populations of *R. idaeus* from Serbia, that can be grouped into three spatial groups as well as into two altitude groups.

Material and methods

Plant material of was collected during field research in the period June - August 2016. The material was collected in the mountainous region of Serbia from seven different sites (Table 1) and determined and classified taxonomically according to Bulatović (1972). Four primer combinations were used (VIC-EcoRI-ACG+Tru1I-CGA; NED-EcoRI-AGA+Tru1I-CAC; FAM-EcoRI-ACA+Tru1I-CAC; PET-EcoRI-ACC+Tru1I-CGA). The genetic diversity within populations and among populations was determined using standard statistic parameters. A further population mixture analysis was conducted using BAPS.

Pop	Locality	Coordinates	Altitude (m a.s.l.)	n	%P	Npr	I	HE	DW
P1	Goč	N43,57 E20.73	675	22	0,664	0	0,375	0,159	57,62
P2	Studena planina	N43,53 E20,64	983	19	0,680	3	0,390	0,162	60,75
P3	Željin	N43,47 E20,83	1357	15	0,563	5	0,365	0,161	37,06
P4	Ozren	N43,37 E21,53	931	19	0,648	9	0,400	0,171	119,10
P5	Stara planina	N43,36 E22,58	1710	19	0,672	1	0,394	0,161	59,74
P6	Golija	N43,19 E20,25	1432	19	0,583	1	0,356	0,152	46,59
P7	Kopaonik	N43,18 E20,50	1985	20	0,615	0	0,360	0,152	45,52

Table 1. *R. idaeus* population included in study; n – number of samples; %P – proportion of polymorphiv bands; Npr - number of private bands; I - Shannon's information index; HE - gene diversity of a population assuming Hardy-Weinberg equilibrium; DW - frequency down-weighted marker values

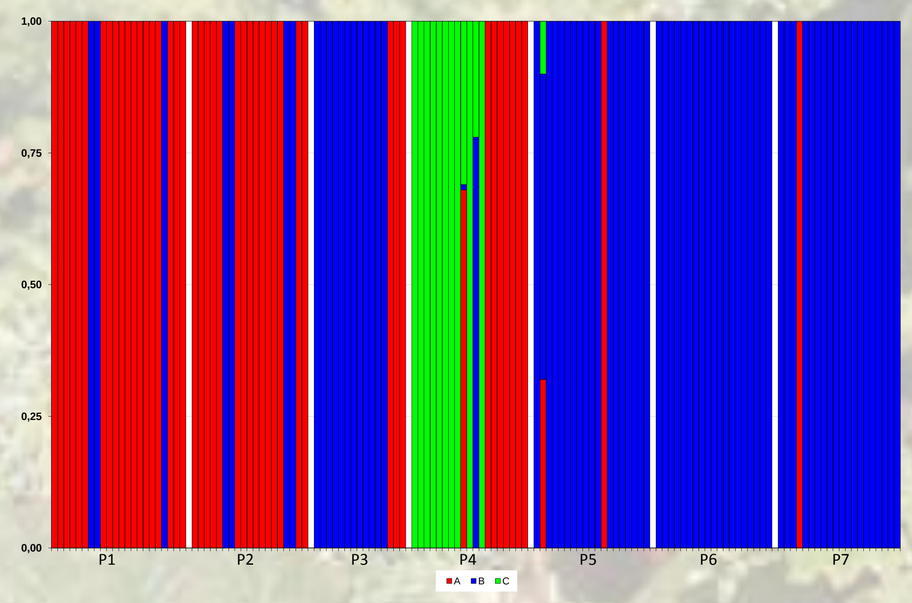

Figure 1. Genetic clustering of individuals based of Bayesian analysis without spatial coordinatesin BAPS.

Results

Four AFLP combinations yield a total of 247 polymorphic bands in 133 *R. idaeus* specimens. Data analysis revealed similar levels of diversity across populations. Population from Mt. Ozren had both the highest diversity and the highest frequency down-weighted marker values. AMOVA analyses further showed high intrapopulation diversity, while population differentiation was low. The partition among spatial groups was not significant while the partition between altitude groups was highly significant. BAPS grouped the samples into three clusters of which to cluster C belong exclusively individuals originating from population Ozren. Clusters were almost identical with or without spatial coordinates.

Conclusion

In analysed populations altitude had a stronger influence on differentiation than horizontal distance and that can be attributed to different phenology at different altitudes. Our results indicate that AFLP markers are reliable technique for assessing genetic diversity and relations between *R. idaeus* populations.

References

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