DISCRIMINATING ABILITY OF ISSR MARKERS IN THE REVEALING OF THE GENETIC POLYMORPHISM IN TURKISH BROOMRAPE POPULATIONS

*Maria Duca 1 & Ina Bivol 2,**

1 Center of Functional Genetics Moldova State University
2 University Centre For Functional Genetics Moldova State University

bivolinga@yahoo.com

ABSTRACT

In the present study, the analysis of the informativity level and discriminatory capacity for 14 ISSR-markers to identify polymorphism of seven *Orobanche cumana* populations from different geographical regions of Turkey was performed. ISSR markers utility was assessed by calculating of different parameters such as the polymorphism information content (PIC), observed and effective number of alleles (Na and Ne), Nei's and Shannon diversity indexes (H and I), number and percentage of polymorphic loci, resolving power (Rp), Simpson's coefficient (Hj). Out of 207 amplicons generated by microsatellites primers, 195 were found polymorphic (94.29%) and 12 were monomorphic with size range from 341 to 5353 bp. The average number of amplified bands was 14.79 fragments per primer. The PIC values for 14 primers ranged from 0.18 ((GATA)4) to 0.41 ((AG)8YA) with the mean value 0.34 Eight primers ((AG)8YA, (CT)8TC, BC807, BC841, (CA)6AC, (CTC)4RC, (CAG)5, BC835) were considered the most effective. The mean I value was 0.52 and ranged from 0.32 ((GATA)4) to 0.6 ((AG)8YA). The (AG)8YA, (CT)8TC, BC807, BC841, (CTC)4RC, (CA)6AC and (CAG)5 primers had the highest I values. The Rp ranged from 5.9 for primer (CA)6RG to 22.59 for primer (AG)8YA. Nine of the ISSR primers ((AG)8YA, (CTC)4RC, BC810, BC807, BC841, BC835, (CAG)5, BC857 and (CT)8TC) possessed high Rp values (22.59, 19.12, 16.83, 16.54, 16.49, 14.59, 13.32, 12.88 and 11.37, respectively) and were able to distinguish all 41genotypes. The higher discrimination potential calculating by the Simpson's coefficient had primer BC810 (0.33) and the lower (CA)6RG (0.01), the mean value for all primers was 0.18. According to ISSR data analysis, the high proportion of the genetic variability (94.29%) was due to interpopulation variation and 45.82% of the diversity by cause of intrapopulation variations. In conclusion, in this comparative study of the discrimination capacity of 14 ISSR markers using to broomrape population genetic analysis, the tri- ((CTC)4RC, (CAG)5) and dinucleotide ((AG)8YA, BC807, BC841, (CT)8TC) primers proved more informative than tetranucleotide repeats. Moreover, these primers revealed the highest values for all analyzed polymorphism information indexes of genetic diversity (number of amplicons per primer from 15 to 28, level of polymorphism more than 88.89%, PIC≥0.36, I≥0.53, Hj≥0.11 and Rp≥11.37) for Turkish broomrape populations. The analysis of ISSR-markers showed that this type of marker is applicable for the assessment of intra- and interpopulation genetic polymorphism for species *O. cumana.*

Keywords: broomrape, population, Orobanche cumana, genetic polymorphism, ISSR markers

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