

# ANALYSIS OF MONTENEGRIN MAIZE LANDRACES GENE POOL STRUCTURE WITHIN MRIZP GENE BANK

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## INTRODUCTION

Due to the evident loss of agro-biodiversity, there is a strong determination to find apparent and efficient mechanisms for conservation and sustainable use of genetic diversity. Joint monitoring of diversity and collection's structure of the Montenegrin maize landraces conserved in the Serbian (MRIZPGB) and Montenegrin (MGB) gene banks has been conducted. The aim of the present study was to provide a clearer insight into the conserved maize gene pools in these two gene banks, in order to improve the composition of collections and to identify and eliminate possible redundancy.

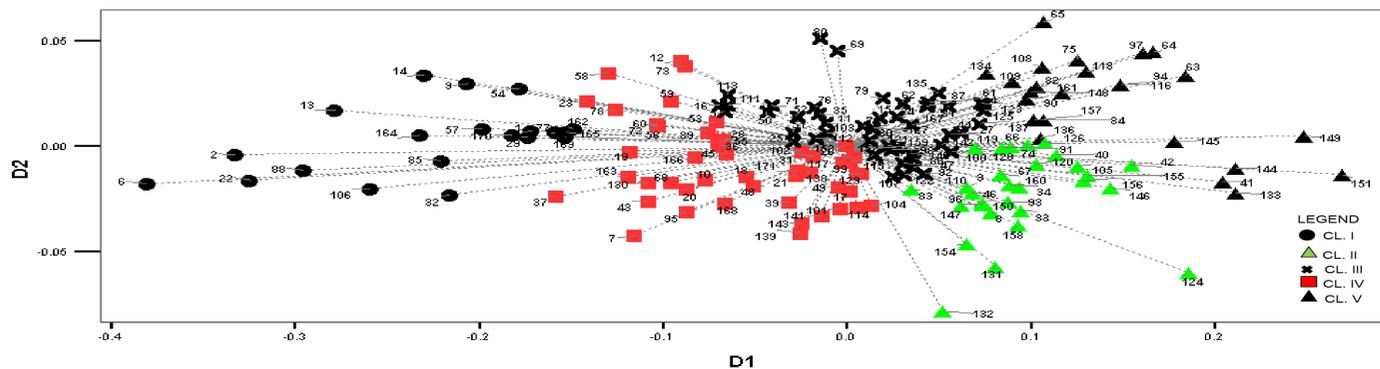


Figure 1. Distribution of white landraces according to Correspondent analysis

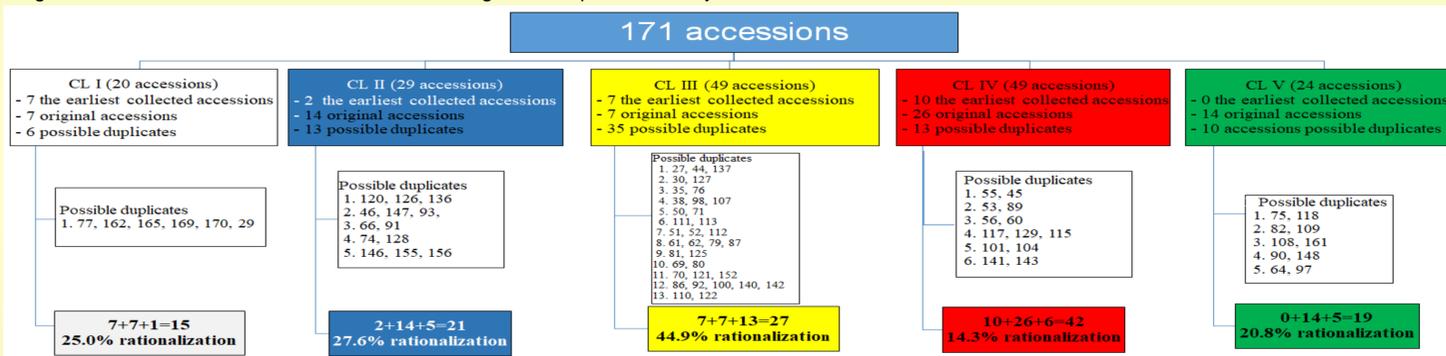


Figure 2. Possible duplicate/redundant accessions in the MRIZPGB white maize landraces collection originating from Montenegro

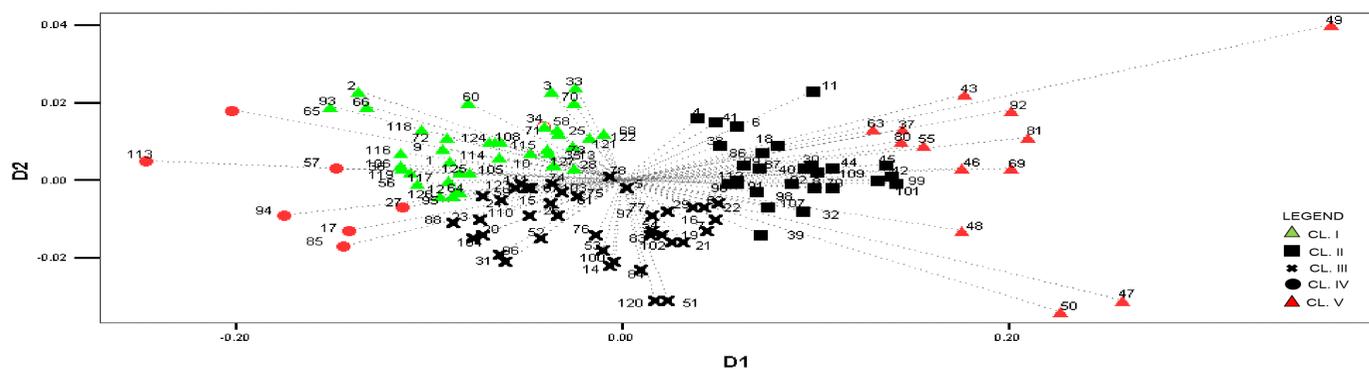


Figure 3. Distribution of yellow-orange landraces according to Correspondent analysis

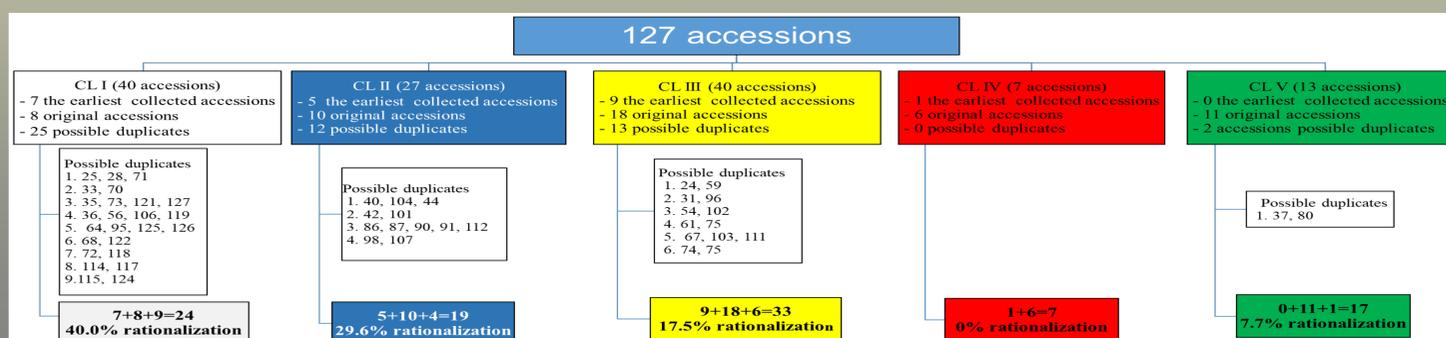


Figure 4. Possible duplicate/redundant accessions in the MRIZPGB collection of yellow-orange maize landraces originating from Montenegro

## MATERIAL AND METHODS

Out of 320 samples collected in Montenegro, morphological characterisation according to CIMMYT/IBPGR descriptors for maize was successfully performed for 298 samples. Thirty two phenotypic traits were evaluated.

The cluster analysis was performed based on 26 phenotypic traits. The squared Euclidean distance was used as a measure of the distance, while the complete linkage was used as a method of clustering. The correspondence analysis was done based on the distance matrix. Statistical analyses were performed using programme the SPSS Windows Evaluation Version 15.0

## RESULTS AND DISCUSSION

The analysis of white (171) and coloured (127) Montenegrin landraces was performed separately. Collection of MRIZPGB white maize as well as yellow-orange maize landraces was classified into five clusters (CLs I – V) (Figure 1 and 3).

Hilly-mountainous regions of Montenegro, where agricultural production is performed on small and isolated fields, is favourable for great diversity of maize populations. Insight into the passport data of the MRIZPGB accessions shows that the organised collecting missions began at the right time, but also that the large number of accessions were collected in a relatively small area, which could generate the existence of numerous redundant accessions. A large number of similar accessions within the MRIZPGB white maize collection were found in CLs III, IV and II (Figure 2.). Significant number of morphologically similar yellow-orange landraces (25.7%), and thus, potential duplicate accessions was also found (Figure 4).

The authenticity and variability of MRIZPGB Montenegrin maize landraces gene pool have largely been preserved due to collecting activities initiated prior to the introduction of hybrid varieties into commercial production. However, significant amount of redundant accessions within the MRIZPGB collection could be a consequence of insufficient coordination among institutions involved in collecting activities.

## CONCLUSION

Although it has been determined that authenticity and variability of Montenegrin maize landraces gene pool have largely been preserved in MRIZPGB collection, a significant amount of redundancy was observed. The diversity and evolution of distinct maize landraces grown in Montenegro have been simultaneously shaped by both environmental and social driven factors. The obtained results would lead to costs-efficient conservation of the maize gene pool in Montenegrin and Serbian gene banks. On the other hand, well preserved original variability of MRIZPGB Montenegrin accessions represents a valuable source for prebreeding activities on bordering white and flint commercial maize breeding programmes under temperate condition

## ACKNOWLEDGEMENTS

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