



DIVERSITY OF MAIZE IN MONTENEGRO

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Introduction



- ❖ In Montenegro maize was brought in the middle of 16th century
- ❖ All maize types in Montenegro originate from North America, South America and Mexico and their introduction lasted until XX century
- ❖ First maize varieties in Montenegro were mostly flint corn varieties
- ❖ Maize was cultivated on all the land and positions, from the sea level, up to 1000 m of altitude, and even higher (very early maize varieties were grown at the altitude of 1300 m)

❖ Since the introduction, as result of mutations, recombination and selection many local populations were developed



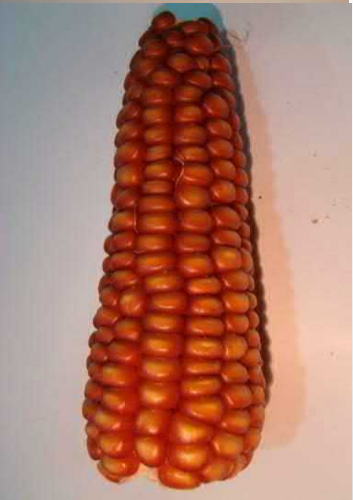
Activities concerning collection and conservation of genetic variability



- ❖ The first organized collection of local maize populations from the territory of the former Yugoslavia was done in the early 1960s by the USA Department of Agriculture

❖ All local populations from former Yugoslavian area were classified in 16 main and two derived groups:

1. **Montenegrin flint corn**
2. Bosnian dent corn
3. Kosovo early dent corn
4. Macedonian dent corn
5. Osmak North-Eastern American type
6. Transitional flint corn
7. Mediterranean flint corn
8. Small seeded flint corn
9. Eight rowed soft flint corn
10. Romanian flint corn
11. Long ear flint corn
12. White half dent corn Moravac
13. Dent corn of maize area of USA
14. Transitional dent corn
15. South dent corn
16. Serbian dent corn
17. Hard dent corn
18. Soft dent corn



- ❖ The second organized inventorization and collection of maize genetic resources was carried out between 1974 and 1981, covering all local maize populations that were grown in Montenegro at the time, including areas in the border zones of its cultivation. The result was more than 200 maize accessions collected.
- ❖ The aim of this research was to collect and conserve this valuable material before it completely disappears from the cultural flora
- ❖ Due to the lack of financial resources, human and technical capacities, but also the lack of a clear strategy for their conservation, all the collected accessions have been lost.

- ❖ Many years later, thanks to the SEEDNet project (Collection of local populations of maize and cereals (wheat, barley, rye, oats, millet and buckwheat) in South East Europe, 2009-2010), studies on maize diversity were once again continued





❖ During this period, many collection missions were performed and 159 Montenegrin villages in 20 municipalities were visited. 68 local maize populations were preserved

❖ Majority of these accessions belong to Montenegrin **flint corn types** with high genetic purity, while fewer are **dent** and **semi-dent** type, resulting from their cultivation in the vicinity of modern varieties

- ❖ Full passport data for all Montenegrin accessions were collected and transferred to the EURISCO database. Samples of seeds are stored at the Montenegrin Plant Gene Bank at -20°C





❖ The basic characteristics of Montenegrin flint corn populations are:

- ✓ early maturing,
- ✓ low and firm stem, resistant to breaking
- ✓ small or very small ear, 12-15 cm long and 3-5 cm wide
- ✓ small grain
- ✓ good adaptability to local agro-climatic conditions and day length
- ✓ high content of proteins

❖ Because of that Montenegrin flint maize have been included in breeding programs of the Maize Research Institute "Zemun Polje" long time ago

Characterization and evaluation

- ❖ Beside the accessions conserved in the Montenegrin plant gene bank the Maize Research Institute "Zemun Polje" in its gene bank owns 320 maize samples collected in Montenegro in the sixties and seventies of the last century
- ❖ All these samples are morphologically characterized by the international CIMMYT/ IBPGR maize descriptor and classified into homogeneous groups

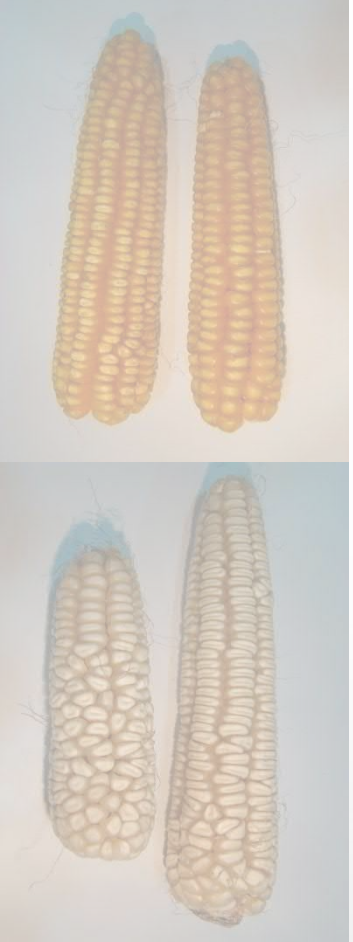




- ❖ In Maize Research Institute "Zemun Polje" characterization of Montenegrin accessions has also been completed
- ❖ Classification of Montenegrin maize populations and their comparison with Montenegrin samples stored in Maize Research Institute "Zemun Polje" is ongoing
- ❖ The next step is the DNA evaluation of the characteristic group representatives in order to determine if Montenegrin maize samples originate from populations collected in the previous period by the Maize Research Institute in Zemun

Conclusions

- ✓ No studies on morphological and molecular identification of the maize local population have been done in Montenegro until now
- ✓ The main weakness is the lack of human and technical capacity
- ✓ After completing characterization and evaluation, repatriation of missing genotypes will be done





Thank you for your attention!!!