

Researches Regarding the Selection of Onion Genotypes Tolerant to Drought

Niculai POPANDRON¹⁾, Gicuta SBIRCIOG¹⁾, Mircea TUDORA²⁾, Constantin TUDORA²⁾

¹⁾Research and Development Institute for Vegetable and Flower Growing Vidra, 077185,
nicupopandron@yahoo.com.

²⁾SC Oferta Bob SRL Tartasesti, Dambovita

Abstract: The lack of water and very high temperatures influence very much the production of vegetable species, the onion being one of the most sensitive species in this respect. Identifying germoplasm sources resistant to drought or with other attributes able to determine the decreasing of water consume represents the major objective in onion amelioration in order to diminish the effects the drought produces. In order to valuate the germoplasm sources as regards their reaction to the abiotic factors (the vulnerability to the thermal and water stress), experiments have been organized as follows: culture irrigated in order to ensure the best conditions of growing and development of the plants, culture less irrigated in the critical moments and culture that is not irrigated from the establishment of the culture. 12 lines have been tested, local populations and species. . Following the experiments performed, from the 12 studied cultivars, three of them (Briliant, Haltedon and L-123/2006) behaved the best at the thermal and water stress, being recommended as valuable germoplasma sources in the future amelioration works.

Keywords: onion, cultivar, germoplasm, breeding, tolerant to drought

Introduction. The climatic changes are currently recognized as one of the most serious challenges for the entire world agriculture and especially for Europe. The lack of water and very high temperatures influence very much the production of vegetable species, the onion being one of the most sensitive species in this respect. The growing of the onions roots on the surface and the exploitation of a low surface determine the request of high humidity especially in the first vegetation period.

Aims and objectives. The first stage in obtaining and introducing in the culture cultivars resistant to drought is finding the germoplasm sources resistant to drought. Identifying germoplasm sources resistant to drought or with other attributes able to determine the decreasing of water consume represents the major objective in onion amelioration in order to diminish the effects the drought produces.

There are three areas of researches in onion ameliorating that aim the reducing of water consumption: creation of cultivars with roots well developed and with leaves covered by a thick layer of wax, obtaining of cultivars with short vegetation period (cca 90 days), creation of cultivars able to establish onion cultures in the autumn, reducing the frequency of irrigation by at least one month. This article presents the results of the first area of research.

Materials and methods. In order to valuate the germoplasm sources as regards their reaction to the abiotic factors (the vulnerability to the thermal and water stress), experiments have been organized as follows: - V1 – culture irrigated in order to ensure the best conditions of growing and development of the plants, V2 – culture less irrigated in the critical moments and V3 – culture that is not irrigated from the establishment of the culture.

12 lines have been tested, local populations and species: V1-L 123/ 2006 (ICDLF Vidra), SVGB- 16 996(Palatos-Ungaria), SVGB- 16 993(Palatos- Ungaria), SVGB- 18 649(Bautar- CS), SVGB- 15 176(Ighiu-Alba), SVGB- 16 404(Coltesti-Alba), Haltedon (Rep.

Moldova), Andrada (ICDLF Vidra), Ovation (Sakata- Japonia), Hiberna (Sakata- Japonia), Regaso (Sakata- Japonia), Brilliant (Romania). The characters that were studied in order to genetical improvement of the onion to the water stress have been: the number and size of the roots, the thickness of the wax layer on the leaves and the size of the bulb.

Results and Discussion The experiments have been performed in 2012, when there were three different periods as regards the precipitations and temperatures: the period 12.04.2012-14.05.2012 – no precipitations, temperatures of 29-30° C, the period 15.05.2012-29.05.2012 with heavy rains and temperatures of 15-20° C, the period 30.05.2012-15.07.2012 – no precipitations and high temperatures (32-38° C).

Under the precipitation conditions during April, at the version not irrigated, only the Brilliant species, Haltedon and L123/2006 sprang in a proportion of 10%. The plants developed very hardly, the formation of the bulbs being almost inexistent, the lack of water accelerated the bulbs maturation. When the moderate irrigation was applied (the irrigations alternated at 10 days), the emergence percentage was different. Therefore, the emergence was satisfactory (70%) for V2 and very good (98%) for the plants that were irrigated immediately after the seeding, and it was repeated at a 48 hours period. After the emergence, V2 was moderately irrigated (at 10 days) and V3 was irrigated at 48 hours period. After observing the three irrigation versions, the conclusion may be that the lack of the water in the soil is considered very stressful for the plants which are in the first vegetation phases (from the emergence to the forming of the third real leaf). Significant differences were registered between the three versions as regards the growing and development of the plants. As regards V1 the plants formed only 4 leaves, their peak starting to dry very early, the roots were unsatisfactorily developed. As regards V2, the plants formed 6 leaves less developed than V3, the number and size of the roots being a little bigger than V2. As regards V3 the plants formed 7 vigorous leaves, longer and thicker roots and the bulb formed in a shorter period of time. As regards the behaviour on high temperatures and on the lack of water of the 12 studied germoplasm sources during the three versions, they behaved distinctly, the species Brilliant, Haltedon and the line L123-2006 drew the attention.

Conclusion. Following the experiments performed, from the 12 studied cultivars, three of them (Briliant, Haltedon and L-123/2006) behaved the best at the thermal and water stress, being recommended as valuable germoplasma sources in the future amelioration works.

REFERENCES

1. Popandron, N.(1989), Breeding onion program, Anale I.C.L.F.Vidra, vol.X, p.153-185
2. Popandron, N.(2002), Contribution to the onion assortment diversification in Romania, Buletinul USAMV-CN, 57/2002, P.96-99.
3. Popandron, N.(2003), Technology of cultivating onion by sowing, Horticultura, No.4, 16-20