

A STRATEGY FOR THE IDENTIFICATION AND ISOLATION OF GENETIC VARIATION WITHIN LANDRACE POPULATIONS

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In a series of visits to the gardens of some farmers in the municipalities of Capracotta, Conca Casale and Castelverrino, small villages in the province of Isernia in Molise, Italy, we located landraces of lentil (*Lens culinaris* Medik.). From interviews with local farmers, each one regarded their lentils as being the best. The most highly regarded were small seeded which were considered as being of better quality. Their management and assessments are based on the whole populations. To date there has been no objective strategy for dissecting the heterogeneity of these landrace populations into component subpopulations to address questions relating to quantifying the genetic variation represented within them. The landraces collected in Molise have been characterized within a collaboration between the John Innes Centre in Norwich (UK), and Banca del Germoplasma del Molise. Using the three lentil landrace populations of Molise as an exemplar, we have developed a methodology for the selection and characterization of the different subpopulations that make up the landraces themselves and have begun the process of more detailed description and characterization of their component variation based on the known literature and observations of the material grown under standard glasshouse conditions (free of pests and diseases) and clarify aspects of agronomical difference among and between the subpopulations. The methodological approach is essentially based on observations starting with variation in seeds characters known to be of high heritability before sowing, sowing in a controlled environment, observation and selection of single plants in a controlled environment, harvesting of the seed of the first generation and comparison to the characteristics of that class. Further subpopulations may be identified based on plants and growth characteristics eg. growth habit, flowering time and flower color and shape. Growth was broken down into component traits and descriptor stated developed. From initial results there were clear differences between the three populations examined lentils.

For example, flowering, maturing of the pods and seeds was earlier in the subpopulations of landrace from Capracotta, followed by those of Conca Casale and finally those from Castelverrino. The average size of the population is preserved for generations and is quite distinct among the three landraces. It appears that the lentil Castelverrino is larger than that of Capracotta and Conca Casale. The latter turns out to be the smallest in size and weight and the average delay in flowering. Other information relating to other important traits are still under analysis. Significant variation was also recorded between subpopulations within the three landrace populations. The development of single plant selections from these subpopulations allows for more detailed genetic studies into some of this underlying variation which might allow further studies as to how the underlying heterogeneity/heterozygosity possibly helps to buffer the crop at a population level as well as revealing possible selection for extreme phenotypic variation and adaptation to particular area where the landraces are maintained.

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