Proceedings of the Joint Congress SIBV-SIGA
Pisa, Italy – 19/22 September, 2017
ISBN **978-88-904570-7-4**

Poster Communication Abstract – 6.40

SHORT-TERM LOCAL ADAPTATION OF A BARLEY POPULATION EVOLVED UNDER DIFFERENT ENVIRONMENTAL CONDITIONS

RAGGI L.*, CECCARELLI S.**, NEGRI V.*

*) Dipartimento di Scienze Agrarie Alimentari e Ambientali, Università degli Studi di Perugia, Borgo XX Giugno 74, 06121 Perugia (Italy)
**) Rete Semi Rurali, Via di Casignano 25, 50018 Scandicci (Italy)

Hordeum vulgare L., genetic diversity evolution, multiparental populations, single nucleotide polymorphism markers

Cultivation of populations, which can adapt to the conditions under which they are grown, can represent an inexpensive way to adapt crops to climate change and to attain specific adaptation. Next Generation Genotyping will help in understanding the effects of selection and adaptation on populations' diversity.

Effects of three years of evolution under five different environmental conditions on the diversity of a barley population (namely *mix48*), selected through Evolutionary Breeding (EB), were tested using seven morpho-phenological traits and 426 SNP markers in a 'common-garden' experiment. The contribution of the different Parental Populations (PPs) that were intercrossed to generate the *mix48*, to populations' genetic diversity was also assessed.

Differences among the *mix48* populations, the original and those obtained in the different locations, were detected for all the considered traits. According to our results days to heading played a key role in conferring adaptation ability to the population. The genomic analysis (about 250K data points) also showed strong differences in the genetic constitution of the populations and that the PPs differently contribute to their genetic constitution. A rapid response of the populations to climatic constrains and, in particular, to extreme temperatures and water availability was observed.

Obtained results suggest heterogeneous populations can hold sufficient genetic variability to adapt to different climatic conditions. Thus, EB appears extremely relevant for selecting varieties for sustainable agriculture where farming conditions can be highly heterogeneous, and able to adapt to climate change. We also shed some new light on the benefits that could be obtained by the application of genomic analysis to materials developed through EB.

This study was supported by the project: *Caratterizzazione di linee di orzo adatte all'agricoltura biologica e a bassi input per la Regione Umbria*. Fondazione Cassa di Risparmio di Perugia, Codice Progetto: 2016.0146.021 RICERCA SCIENTIFICA E TECNOLOGICA