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Poster Abstract – E.10

ENVIRONMENTAL SUSTAINABILITY OF TRANSGENIC CROP: THE CASE OF DROUGHT STRESS IN MAIZE

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The environmental sustainability of the main cultures, together with their economic evaluation, is becoming an issue in modern agriculture competitiveness. The extreme exploitation of natural resources, the use of water being a typical example, includes the programmatic decisions for the economic development of a country. Water saving will be necessary in agriculture to face with a greater use for human consumption and for industry.

Crops like maize, which gives high yield and medium profit, is strategic because it impacts both human-animal nutrition, and industry (starch, oil). For this very reason maize is referred to as a commodity for FFP (Food, Feed and Processing).

However maize growth cycle, restricted to the soring and summer periods, is characterised by an high water demand, even if the genetic improvement has allowed to obtain a better environmental adaptability, and there are examples of maize cropped with Deficit Irrigation (DI), or even in dry condition.

The introduction of transgenic maize was finalised to achieve a better environmental adaptability (insect resistance, herbicide resistance). However there is not enough knowledges about drought stress resistance of transgenic plants and about their capacity to adapt to a water limiting condition. At this regard the data available within the notification provided by the seed companies and from other sources, are insufficient.

Furthermore there are not enough information regarding the expression of the transgene in drought stress conditions.

This research adds a useful evaluation criteria for the rational use of genetic resources in a agronomic system in which environmental sustainability is the driving force.

The transgenic maize variety MON 810, is used and compared to non transgenic hybrids Tietar and Famoso. In all varieties the following are analysed:

- functionality of photosynthesis and respiration in normal and drought stress conditions;
-protein synthesis, enzymatic activity, osmotic metabolites;
-expression analysis of candidate genes;
-physiological and yield parameters in greenhouse and in confined conditions.

Since transgenic plants are compared with hybrids characterised by different stress tolerance, it will be possible, for each transgene, to quantify the adaptive response on a reference scale given

by the non transgenic plants; therefore the fitness of each transgene is evaluated in normal and stressing conditions. Each transgene will be appointed of a ranking for its drought tolerance through a comparative evaluation against normal crops, both for the general plant behaviour and for the behaviour of the specific transgene. These informations will constitute a further and rational contribute to the use of biotechnological crop in modern Italian and European agriculture.