

IDIAM –PROJECT: IDENTIFICATION OF GENETIC VARIABILITY AND GENES FOR SELECTION OF GENOTYPES TOLERANT TO ROOTWORM DAMAGE IN MAIZE

LANZANOVA C., BERARDO N., VALOTI P., HARTINGS H., TORRI A., MOTTO M., BALCONI C.

CRA - MAC Maize Research Unit, Via Stezzano 24, 24126 Bergamo (Italy)

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Recently, *Diabrotica virgifera virgifera*, commonly referred to as the Western corn rootworm (WCR), spread in the Italian areas devoted to corn cultivation. The major damage to maize plants is caused by larval feeding on the roots, which disrupts water and nutrient uptake. In addition, the adult stage can cause silk clipping causing low fertility of the ear with a consequent reduced production.

One of the most promising strategies to deal with infestations of pests is given by the cultivation of resistant varieties. The establishment of plants that can produce their own insecticide is proposed as an effective strategy, safe from an ecological point of view to control the spread of insects. Plants resistant to insects lead to a reduction in production losses, a decrease of the costs of insecticide treatments and improved food safety for animal feed and human.

The most important methods to control this pest are crop rotation, insecticide application, use of resistant maize varieties developed by classical plant breeding methods, or use of transgenic approaches. In particular maize expressing *Bacillus thuringiensis* (bt) toxins or the *caryophyllene synthase* gene which is responsible for (E)- β -Caryophyllene production in maize, have been used as protection from the pests. Recently the use of RNAi might be exploited to control insect pests via *in planta* expression of a dsRNA.

Studies have also revealed a wide range of varieties and genetic variability in inbred lines showing a complex quantitative genetic basis, making difficult and expensive the selection of tolerant genotypes. It is therefore clear that the identification of genes and molecules underlying the defensive response of the plant against the corn rootworm products are of primary importance for the establishment of plants tolerant to the damage caused by rootworm larvae.

Our research in the IDIAM project is focused on the identification of genetic variability and genes for the selection of genotypes tolerant to rootworm damage in maize. The main topics involve: i) analysis of genetic variability and identification of hybrids with low-radical damage; ii) identification of genes underlying the plant response to damage inflicted by corn rootworm larvae; iii) validation of candidate genes and polymorphisms mapping.

In our laboratory are in progress experiments to set up an artificial *Diabrotica virgifera virgifera* eggs inoculation method on B73x MO17 genotype, in order to obtain root samples for differential gene expression analysis in comparison with control samples.

In addition, the artificial inoculation method could be useful for a preliminary analysis of genetic variability for rootworm damage tolerance in maize.

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