mejor respuesta al cultivo *in vitro* y la excelente capacidad de florecer y producir semilla de los regenerantes. El particular modo reproductivo permitió la perpetuación de los nuevos citotipos una vez establecidos.

Por lo cual se concluye que el método es valido para ampliar la variabilidad en complejos apomícticos como el pasto llorón, generando cambios en cultivares estables, como *Morpa*, e incrementando la capacidad natural de producirlos, como en *Kromdraai*.

GENETIC ENGINEERING OF CEREALS: TRANSGENE EXPRESSION IN MAIZE AND WHEAT

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Introduction

Maize and wheat are two of the most important crops plowed around the world. The potential of plant breeding is limited by the existent incompatibility of sexual crossing within different species. Plant genetic engineering offers to overcome the incompatibility barrier by mean of the recombinant DNA technology. Methodologies development to the genetic transformation of plants, including cereals, implies to have available a complementation tool for traditional plant breeding, that makes easier to improve the grain production in quantity as well as in quality. In this communication, we report the stable transformation of maize and wheat using two homemade microprojectile accelerators with selectable markers, reporter and agronomic interest genes.

Materials and Methods

Embryogenic calli from commercial cultivars of maize and wheat were transformed by using either a gun-power (1) or a helium-drive microparticle accelerator, both of them built at CEFOBI. Gold or tungsten microparticles were coated with plasmids containing either the hpt or bar gene as selectable markers and the uidA gene as reporter. In addition, genes of interest-agronomic traits such as resistance to herbicides, insects and fungi were also introduced in the same plasmid or, more frequently, by co-transformation. Resistant calli to a selective agent were identified after two months of culture and resistant plantlets were regenerated.

Transgenic plants were detected by PCR and Southern blots and enzymatic activity of the introduced genes.

Results and Discussion

We were able to reach the stable transformation of wheat and maize using two microparticle accelerators developed and built at our laboratory. Molecular analyses of regenerated resistant plants revealed a transformation efficiency higher than 5 % (transgenic plants per bombarded explant) in the case of wheat (2) and higher than 1 % in the case of maize. When a mixture of two plasmids was used, co-transformation efficiency was between 40 and 60 %. *In vitro* and *in vivo* activity of the enzymes, products of the introduced genes, was detected in transgenic plants of different generations. Transgenes were stably integrated into the plant genomes and transmitted to the (wheat) and fourth (maize) generation following the Mendelian fashion. Transformation of wheat was achieved with varieties and hybrids with genes expected to improve bread-making and nutritional quality, and resistance to rust and *Fusarium*. Transformation of maize was reached using the F1 hybrid A188/B73 and a commercial interest one, which shows the attractive possibility of introducing agronomic traits into commercial germplasm.

1. Reggiardo MI, Arana JL, Orsaria LM, Permingeat HR, Spitteler MA, Vallejos RH. Transient transformation of maize tissues by microparticle bombardment. Plant Sci 1991;75:237-243.

2. Órtiz JP, Reggiardo MI, Altabe S, Cervigni GD, Spitteler MA, Morata MM, Elias FE, Vallejos RH. Hygromycin resistance as an efficient selectable marker for wheat stable transformation. Plant Cell Rep (in press) 1995.