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Transformation of Plants by Agropine-Type *Agrobacterium Rhizogenes*: Organization of the Transferred DNA (T-DNA) and Its Use to Introduce New Genes into Plants

F. CASSE-DELBART, L. JOUANIN, V. PAUTOT, C. ROBAGLIA, M. TEPFER, J. TOURNEUR and F. VILAINE

Laboratoire de Biologie Cellulaire, INRA, Route de Saint-Cyr F78000, Versailles, France.
Tel. (1)30-21-74-22 Telex INRAVER 695269 F

Abstract

Structure and organization of the T-DNA originated from an agropine-type *Agrobacterium rhizogenes* strain was determined in transformed tobacco.

The overall strategy for introducing new genes into plants using an intermediate vector and the wild-type Ri plasmid is presented.

Transformed plants can be regenerated from roots induced on sensitive plants by *Agrobacterium rhizogenes.* Structure and organization of the T-DNA (Fig. 1) was determined by Southern analysis of genomic DNA in transformed tobacco. *Nicotiana plumbaginifolia, Convolvulus arvensis* and rapeseed (*Brassica napus*) plants regenerated from roots induced by an agropine-type strain (A4) (Jouanin et al. (submitted)).

The T-DNA is derived from two non-contiguous regions (TL and TR) of the root-inducing plasmid (pRiA4) (Jouanin, 1984). The length of the TL-DNA is about 20 kb (Slightom et al., 1985; Slightom et al., 1986) except in tobacco where it is always shorter; the TR-DNA can either be absent in transformed plants, or range in size from 5 up to 30 kb (Jouanin et al. (submitted)). In some plants, the TR-DNA is linked to the TL-DNA, but in inverted orientation relative to its position on the plasmid.

The overall strategy for introducing new genes into plants using the wild-type Ri plasmid consists in the use of an intermediate vector possessing: a ColE1 origin allowing autonomous replication in *E. coli* but not *Agrobacterium*; an antibiotic resistance marker for selection in bacteria; a fragment from the pRi T-region providing homology for recombination with the wild type Ri plasmid; a chimaeric gene or other gene to be introduced into plant cells. Chimaeric genes have been constructed whose expression in plants is expected to modulate sensitivity to antibiotics, heavy metals, or viruses.

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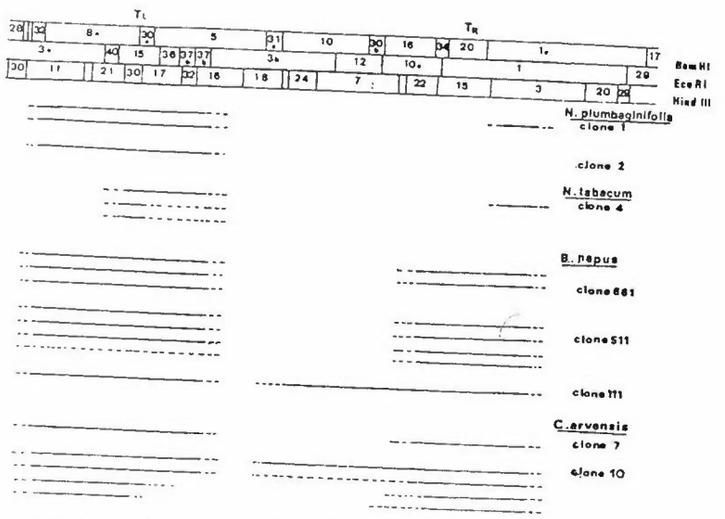

Figure 1. Under the restriction map of the T-region of pRiA4 are indicated the size and copy number of the T-DNA in transformed plants.

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