ORIGIN OF NICOTIANA TABACUM AUXIN INDEPENDENT1 (AXI1) GENE

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Tobacco (Nicotiana tabacum) is a non-food crop that has high productivity and is cultivated in about 120 countries throughout the world. Moreover, it is considered a plant model for scientific research due to its well-established transformation method, easy regeneration and sequenced genome. Nicotiana (Solanaceae) comprises approximately 75 species, 48% of which are allotetraploids (36 species) that are classified into 12 sections distributed mainly in the Americas and one section found outside the Americas. Nicotiana tabacum (2n = 48, SSTT) is originated by interspecific hybridization of N. sylvestris (2n = 24, SS) with N. tomentosiformis (2n = 24, TT) followed by chromosome doubling, under 1 Ma, in an early stage of the diploidisation processes. Our group used the Auxin independent1 (Axi1) gene as an endogenous control to establish a method to determine the copy number of transgenic tobacco plants using real-time PCR and showed that Axi1 has only one copy. In this context, we aimed to discover which tobacco species was the donor of Axi1 gene from N. tabacum. N. sylvestris, N. tomentosiformis and N. tabacum plants were sown and grown in the greenhouse and genomic DNA from the leaves was extracted with Saghai-Maroof et al. (1984) method. Specific primers for Axi1 gene were designed with Primer3plus (http://www.bioinformatics.nl/cgi-bin/primer3plus/primer3plus.cgi) and a PCR was performed with the DNA from the three species. A fragment of 975 bp was amplified for the maternal parent N. sylvestris and N. tabacum. Our results demonstrated that Axi1 gene was donated by maternal parent N. sylvestris, when occurred the interspecific hybridization between N. sylvestris and N. tomentosiformis. Concerted evolution of rDNA has been documented in N. tabacum, resulting in the rDNA loci being overwritten in a few generations by one dominant progenitor copy, which usually is maternal and the same could happened with the Axi1 loci.

Keywords: *Tobacco, interspecific hybridization, diploidisation, PCR*