

Sucessive karyotypic changes revealed for comparative cytogenetic mapping in the *Leptostachyus* group, *Phaseolus* (Fabaceae)

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Abstract/Resumo

Polyploidy and disploidy have been reported as the main events in karyotype evolution of plants. In the genus *Phaseolus* L., numerically stable ($2n = 22$), a small monophyletic group of three species from Mexico and Central America, the *Leptostachyus* group, presents the dysploid karyotype ($2n = 20$) and one larger chromosome pair. Many rearrangements, including translocations, inversions and a Nested Chromosome Fusion (NCF), were observed in *P. leptostachyus* Benth, revealing a high rate of karyotype evolution. The analysis of the first diverging species of this clade, *P. macvaughii* Delgado, revealed that the NCF event is a synapomorphy of the *Leptostachyus* clade, resulting in the descending dysploidy. Thus, this study aimed to understand the karyotype evolution of this group, verifying if *P. macvaughii* shares with *P. leptostachyus* the same rearrangements in the homeologs to *P. vulgaris* chromosomes Pv1, Pv2, Pv4 and Pv8. For this, fluorescence *in situ* hybridizations (FISH) were performed on *P. macvaughii* mitotic slides using nine sequences of *P. vulgaris* cloned into bacterial artificial chromosomes (BACs) and previously mapped on *P. leptostachyus* chromosomes. Sequences selected for Pv1 hybridized collinearly in *P. macvaughii*, contrasting to the observed in *P. leptostachyus*, which showed synteny break. Markers from Pv2 showed loss of synteny in both species, due to a translocation. Part of the long arm of chromosome 2 translocated to the short arm of chromosome 1, altering the arm ratio of these chromosomes in *P. macvaughii*. The chromosomes Pv4 and Pv8 kept their collinearity to *P. vulgaris* in *P. macvaughii*, different to the observed in *P. leptostachyus*. The presence of shared and non-shared rearrangements indicates a progressive accumulation of karyotypic changes in the *Leptostachyus* group.

Keyword/Palavras-chave: BAC-FISH; Karyotype evolution; Dysploidy; Nested Chromosome Fusion

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