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Abstract

The present study documents the de novo origin of an apparent B chromosome in *Plantago lagopus.*The origin was associated with mutation (aneuploidy), chromosome fragmentation, specific DNA sequence amplification, addition of telomeric repeats, and centromeric misdivision. It originated in the progeny of trisome 2, from the excision of 5S rDNA and 18S, 5.8S, 25S rDNA sequences located on chromosome 2, and within a few generations acquired many characteristics of an apparent B chromosome. The B chromosome has preferential transmission through the male (41%,P<0.025) and female gametes (42%, P<0.01) but does not affect plant phenotype. The B chromosome is completely heterochromatic, has a functional centromere and does not pair at meiosis with any A chromosomes of the standard complement. Fluorescence in situ hybridization analysis showed that it arose from massive amplification of 5S rDNA sequences, has 18S, 5.8S, 25S rDNA sequences at the ends of both arms and telomeric repeats at both termini. Ag-NOR-banding and determination of the maximum number of nucleoli in interphase cells indicate that the nucleolar organizer regions at the ends of both arms of the B chromosome are active in organizing nucleoli. RNA blot analysis showed that the 5S rDNA sequences are not transcribed. To our knowledge, this is the first report that fully documents one of the mechanisms by which B chromosomes may arise in nature.

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