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Phenotypical impact of a floral somatic mutation in the cultivar Listán Prieto

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Abstract

The accession Criolla Chica Nº2 (CCN2) is catalogued as a floral mutation of cultivar Criolla Chica (synonym for cv. Listán Prieto). Contrary to what is observed in hermaphrodite-cultivated varieties like Criolla Chica, CCN2 exhibits a prevalence of masculinized flowers. Aiming to study the incidence and phenotypical implications of this mutation, CCN2 plants were deeply studied using Criolla Chica 'Ballista' (CCBA) as control plants. For each CCN2 plant, two inflorescences per shoot were sampled and segmented into proximal, mid and distal positions, relative to the pedicel. Flowers were observed through magnifying lens and classified according to OIV151 descriptor. CCN2 exhibited flowers of type 1 (masculinized) and 2 (intermediate), while CCBA exhibited only type 3 (hermaphrodite) flowers, as expected. CCN2 averaged more than 55% of type 1 flowers per cluster, which were predominant in the proximal position (63%), gradually diminishing towards distal positions. This distribution correlates with low fruit set rates towards proximal positions. In CCN2, a high percentage of inflorescence abscission per plant (avg. 50%) was observed, starting in stage EL-27. This phenomenon was not observed in CCBA. Additionally, histological sections of flowers at different developmental stages were performed. In type 1 flowers of CCN2, style and stigma tissues exhibited null development with atrophied ovules; these structures were present although poorly developed in type 2 flowers, potentially producing the few berries per cluster observed at harvest. Overall, the studied floral mutation identified in CCN2, strongly affects the development of female reproductive tissues and organs, drastically hindering fruit-set rate and cluster production.

Keywords: floral mutation, masculinization, inflorescence abortion, fruit set, histological analysis