Genetic structure and fungicide resistance profile of *Botrytis* spp. populations causing postharvest gray mold of pomegranate fruit in Greece and California

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Abstract

Gray mold is the main postharvest disease of pomegranate fruit worldwide caused by *Botrytis cinerea*. However, recent advances in phylogeny of *Botrytis* spp. revealed that *B. cinerea* is a complex species. In this study, in total 150 and 246 *Botrytis* spp. isolates were collected during 2015 and 2016 from Greek and Californian pomegranate packinghouses, respectively, and used to investigate the disease etiology, the fungal population structure and the fungicide resistance profile of the isolates. Identification of causal agents showed that, both in Greece and California, gray mold of pomegranate is caused by a complex of *Botrytis* species/groups that includes *B. cinerea, B. pseudocinerea* and *Botrytis* group S. *B. cinerea* sensu stricto was the predominant species associated with the disease, although *B. pseudocinerea* was also identified at relatively high frequencies. *B. pseudocinerea* is reported for first time as an agent of the disease on pomegranates. The population structure was investigated using as marker the presence of two transposable elements (TEs, Boty and Flipper). Results showed that boty and transposa isolates (both TEs present) were predominant in the *B. cinerea* subpopulations in Greece and California, respectively, while vacuma (both TEs absent) and boty isolates were found to be predominant in the *B. pseudocinerea* subpopulations. Measurements of fungicide sensitivity revealed the complete absence of fungicide resistance in the fungal population originating from Greece, while in the Californian subpopulations high frequencies of fungicide resistance were observed in *B. cinerea* sensu stricto isolates but not in *B. pseudocinerea* and *B. cinerea* group S. The higher frequencies of resistance were observed for QoIs, SDHIs and benzimidazoles. In summary, this study provided a description of the structure of *Botrytis* species complex on pomegranate fruit in 2 different geographic regions of the world and on their fungicide resistance status that will be useful for a better adaptation of the disease control strategies and a better understanding of the risk for fungicide resistance development.