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Morphological, pathological and molecular variability in *Botryodiplodia theobromae* (Botryosphaeriaceae) isolates associated with die-back and bark canker of pear trees in Punjab, India

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ABSTRACT. Thirteen isolates of *Botryodiplodia theobromae* collected from pear varieties grown in various regions of Punjab were studied for morphological, pathological and molecular characterization. The mycelial growth of *B. theobromae* isolates was classified as fluffy or depressed, uniform to irregular and cottony white turning to black. Colony growth rate varied from 19.1 to 24.9 mm per day. Pycnidia were produced either on the edge, centered or scattered on Petri dishes after 20 to 34 days of incubation. Pycnidia and pycnidiospores ranged in size from 118.0 to 240.0 µm and 14.5-35.5 x 6.5-14.5 µm, respectively. Lesion length produced by different isolates ranged from 1.9-7.2 x 0.8-

3.3 cm with 49.4-90.9% infection. Using nine SSR and seven RAPD markers, amplified DNA bands ranged from 0.2 to 1.5 and 0.18 to 2.0 kb, respectively. Polymorphism information content values ranged from 0.44 to 0.71 and 0.63 to 0.93 for SSR and RAPD markers, respectively. A dendrogram based on molecular data, grouped the isolates into three major clusters with 65 to 79.5% genetic similarity; most of the isolates showed variety-specific grouping. The isolates prevalent on pear cultivars 'Patharnakh' and 'Baggugosha' in Ludhiana, Amritsar and Hoshiarpur districts were found to have a high degree of similarity; these isolates were also considerably distant from mango isolates and from other isolates on other pear cultivars. The isolates from cultivars Punjab Beauty, LeConte and Kieffer also had a high degree of similarity. Isolates from cultivar Smith were different from other pear isolates but showed more similarity with mango isolates.

Key words: *Botryodiplodia theobromae*; Molecular markers; Pear; Punjab; Variability

