

## OUTBREAK OF CHARCOAL DISEASE ON *Quercus* SPP AND *Zelkova carpinifolia* TREES IN FORESTS OF ZAGROS AND ALBORZ MOUNTAINS IN IRAN

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### Abstract

During the last four years (2009- 2012) several reports of forest tree decline were received, complaining about serious damage and death of many trees. The disease has been spread throughout forests of Zagros mountains which extend from north west to south west of Iran covering approximately 4,000,000 ha. Also the disease has been spread throughout forests of Alborz mountains in the north of Iran. The infected tree species included *Q. brantii*, *Q. castaneifolia* and *Zelkova carpinifolia*. *Q. brantii* Lindl. (Persian oak) has dominated in all parts of Zagros mountains from north to south, especially on the southern side of mountain in Ilam, Lorestan, Kohgiluyeh va Boyer-Ahmad, Fars and Kermanshah provinces. *Zelkova carpinifolia* (Pall.) Dippel, and *Quercus castaneifolia* C.A.Mey are native to the Caucasus and Alborz mountains in northern parts of Iran. The decline began with browning of the leaves, viscous liquid exudation on the branches and trunks resulting in a brown-black discoloration of bark and woody tissues. In the winter of the next year fungal growth induces a typical charcoal-black surface on diseased branches and trunks. The perithecia of *B. mediterranea* were observed in a black carbonaceous layer on the stem surface erupting from the declined trees and the ascospores were visible under light microscope. Perithecia were obovoid, containing, amyloid asci, with dark brown ellipsoid ascospores, with straight germ slits along the spore-length. On the basis of these morphological characteristics, the fungus was identified as *Biscogniauxia mediterranea*. Pathogenicity tests were conducted using an isolate of *B. mediterranea* on six-month-old *Q. brantii* seedlings using a mycelial plug of *B. mediterranea* colonized potato-dextrose agar and the symptoms were observed after two months and the same fungus was re-isolated. Based on previous studies infections occur in healthy living trees as endophyte and then become invasive under water stress conditions in most reports. *B. mediterranea* has been reported to be aggressive on drought stressed hosts. During the last ten years climate changes has occurred in Zagros forests and resulting drought stress extending desert areas followed by occurrence of the fine dust phenomenon has reduced the photosynthesis of the forest trees and making them more vulnerable to the disease. In spite of tolerance of Persian oak species to the range of temperatures from -31°C until +45, the incidence of charcoal disease has been increased dramatically on *Q. brantii* forests. On the basis of our current knowledge, *Q. brantii* represents a new host of *B. mediterranea* and this is the first report of Persian oak charcoal disease outbreaks throughout Zagros mountain forests of Lorestan, Ilam, Fars, Kohgiloye va Boyer – Ahmad and on *Zelkova carpinifolia* in Daland forests of Gorgan area.

**Keywords:** Charcoal disease, *Biscogniauxia mediterranea*, *Quercus brantii*, *Zelkova carpinifolia*, Zagros, Alborz mountains forests

See Persian text for figures and tables (Pages ۷۵۷-۷۶۳).

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