# First record of *Diplocarpon mespili* (*Drepanopezizaceae*, *Ascomycota*) on *Cydonia oblongata* leaves from Kashmir Valley, India

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Key words: Entomosporium mespili, leaf spot, foliicolous, quince, pathogenicity, pathogen. – Mycota of India.

**Zusammenfassung**: Blätter der Quitte (*Cydonia oblongata*) werden von einer Reihe von Pilzpathogenen befallen. Diese Pathogene führen zu Blattflecken verschiedener Art, die wiederum die Photosynthese und damit den Ernteertrag verringern. Die vorliegende Studie wurde durchgeführt, um Pilze zu identifizieren, die mit starken Blattflecken von Quitten assoziiert sind. Es zeigte sich, dass die asexuelle Morphe von *Diplocarpon mespili*, eines foliicolen Ascomyceten, für rötliche Flecken an Quittenblättern verantwortlich war. Dieser Pilz ist durch typische insektenförmige Konidien gekennzeichnet. Er wurde auf PDA kultiviert und 30 Tage bei  $24 \pm 2$  °C inkubiert. Pathogenitätstests an gesunden Blättern *in vitro* ergaben das Auftreten typischer Blattflecken. Dies ist der erste Bericht von *Diplocarpon mespili* als Auslöser für Blattflecken der Quitte aus dem indischen Kashmir-Tal.

**Abstract:** Quince (*Cydonia oblongata*) leaves are attacked by a number of fungal pathogens. These pathogens result in leaf spots of various types which in turn reduce photosynthesis, hence decrease the crop yield. The present study was conducted to identify a fungus associated with severe leaf spot of quince. It was revealed, that the asexual state of *Diplocarpon mespili*, a follicolous ascomycete, was responsible for reddish spots of quince leaves. The fungus is characterised by typical insect-shaped conditia. It was cultured on PDA and incubated at  $24 \pm 2$  °C for 30 days. Pathogenicity tests conducted on healthy leaves *in vitro* resulted in appearance of typical leaf spots. This is the first report of *Diplocarpon mespili* responsible for leaf spot of quince from Kashmir Valley, India.

Quince (*Cydonia oblongata* MILL.) is an important rosaceous fruit plant (MARWAT & al. 2009) that is cultivated mainly in Turkey, China, Iran, Spain and Algeria. In India, it is cultivated mainly in temperate regions of the Kashmir Valley and to lesser extent in parts of Himachal Pradesh. In Kashmir Valley about 470 hectares of land is under cultivation of quince mainly in Baramulla and Budgam districts with an annual production of 6 metric tonnes from year 2018-2019 (ANONYMOUS 2019). Fruits of quince have great medicinal and nutritional significance (SHARMA & al. 2011). Also Quince leaves have great medicinal potential as they are effective against human kidney and colon cancer, and diabetes (ASLAN & al. 2010, CARVALHO & al. 2010). Leaf extracts of quince have a protective role against UVA radiations in Catfish (OSMAN & al. 2010).

Quince leaves are attacked by a number of phytopathogens. The major diseases of quince are Fire blight caused by the bacterium *Erwinia amylovora* (BURRILL) WINSLOW u. a., and leaf blight caused by the asexual morph of the fungus *Diplocarpon mespili* (SORAUER) B. SUTTON resulting in decline of productivity of fruit crop (AL-JUMAILI & AL-DUJAILI 1989). *Diplocarpon mespili* affects also other genera in the family *Rosaceae*, i.e, pear, peach, loquat, and also infects hawthorn, medlar, pyracantha, sas-katoons, *Photinia*, and firethorn. The asexual morph, prior to one-fungus-one-name called *Entomosporium mespili*, is common, the sexual morph rare.

### Materials and methods

A survey of different sites of district Budgam was conducted in summer 2019 and infected leaves of quince with spots were collected. The infected leaves were then brought to the laboratory for preliminary examination done through sectioning and then mounting of preparation in cotton blue to lactophenol mixture. The slides were observed under a compound microscope for the presence of foliicolous fungi. To isolate the infected area was cut, surface sterilized with 1 % sodium hypochlorite for 2 min and then placed on autoclaved Potato Dextrose Agar (PDA) medium contained in 90 mm petriplates. These plates were then incubated at 25 °C for 30 days.

Taxonomic description of the fungus was made with the help of literature (AINSWORTH & al. 1973, SARBHOY & al. 1986, BILGRAMI & al. 1991, JAMALUDDIN & al. 2004).

For pathogenicity determination, a conidial suspension ( $5 \times 10^4$  conidia/ml) was prepared from two-month-old culture of *D. mespili* and inoculated on healthy detached leaves with petiole inserted in water agar (ANEJA 1996). Control leaves were not given any treatment. Voucher specimens are kept in the KASH herbarium of the Centre of Plant Taxonomy, Department of Botany, University of Kashmir with accession number HNY.KASH-2404.

## **Results and discussion**

**Morphology:** Small circular, red spots (2–5 mm) with grey centre (acervuli) on both surfaces of quince leaves during summer of 2019. On heavily infected leaves, the spots merging to form irregular blotches (Fig. 1 a, b). Fungal colony initially and after 30 days of incubation turning reddish brown due to sporulation (Fig. 1 c). Old cultures with thick-walled intercalary chlamydospores (Fig. d). Mycelium septate and well developed. Conidiophores mononematous, cylindrical, straight. Conidia 16–20 × 6–10.5  $\mu$ m, insect-like cruciform, composed of 4–6 cells, each cell isolated by a septum (Fig. e). Apical cell of the conidium spherical, 3–9  $\mu$ m × 4–6  $\mu$ m, lateral cells globose, 4–8  $\mu$ m, basal cell cylindrical, 4–5 × 3  $\mu$ m. Apical and lateral cells contain tubular, unbranched appendages. In a similar study, PIEHL & HILDEBRAND (1936) reported that *D. mespili* showed maximum growth on PDA medium.

**Pathogenicity test:** The in vitro test confirmed the association of the fungal pathogen with the disease. Symptoms similar to those in the field were observed after 14 days in inoculated leaves. Control leaves remained symptomless. In similar studies, HOLTSLAG & al. (2003) and BATOOL & al. (2014) reported development of similar symptoms on inoculated leaves of Saskatoon berry and loquat, respectively, after 15 days of inoculation.



Fig. 1. *Diplocarpon mespili. a, b* Infected leaves of quince, *c* Culture on PDA, *d* Mycelium with chlamydospores  $(100 \times) e$  insect like conidia  $(1000 \times)$ 

The fungus was identified on the basis of symptomological, cultural and morphological characteristics. To the best of our knowledge, this is the first report of *Diplocarpon mespili* on leaves of *Cydonia oblongata* from Kashmir Valley, India.

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