

DISEASE NOTE

FIRST REPORT OF *FUSARIUM EQUISETI* CAUSING STEM AND ROOT ROT ON *BRASSICA JUNCEA* IN INDIA

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Mustard (*Brassica juncea*) plants grown on the premises of the Indian Agricultural Research Institute, New Delhi, showing wilting of leaves and twigs and necrosis of stem, crown and roots were observed in four consecutive years (2013 to 2016), with an incidence of up to 20%. To determine the causal agent of the disease, small pieces of stems and roots were surface-sterilized with 3% sodium hypochlorite, washed in sterile distilled water, placed on potato dextrose agar (PDA) plates and incubated at 25°C for seven days. A dense white mycelium developed, that turned first beige, finally buff brown. Single-spore cultures produced falcate macroconidia with a pedicellate foot cell, and 4-7 distinct septa 21-58 × 3-6 µm in size, developing from lateral phialides. Chlamydoconidia were intercalary, in chains or solitary, brown-pigmented, 6-9 µm in diameter. The fungus was morphologically identified as *Fusarium equiseti* (Corda) Sacc. (Booth, 1977; Leslie and Summerell, 2004). To confirm the identity at the molecular level, the internal transcribed spacer (ITS) region and the translation elongation factor (*tef-1*) were amplified using the respective primers (White *et al.*, 1990; Leslie and Summerell, 2004). The sequences (GenBank accession Nos. KT380024 for ITS and KY271154 for *tef-1*) matched those of *F. equiseti* in BLAST analysis. For pathogenicity tests mustard seedlings pot-grown in a glasshouse at 23 ± 2°C with 75% relative humidity and 16 h light cycle/day were inoculated with 5 ml of a conidial suspension (10⁴ conidia ml⁻¹) at the root and collar region. Seedlings treated with sterile water served as control. The same symptoms seen in the field were shown within 30 days by inoculated plants only, from which *F. equiseti* was re-isolated. To the best of our knowledge, this is the first report of *F. equiseti* causing stem and root rot disease on mustard.

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DISEASE NOTE

FIRST REPORT OF NEW RACES OF BARLEY YELLOW RUST (*PUCCINIA STRIIFORMIS* f. sp. *HORDEI*) IN IRAN

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Barley yellow (stripe) rust, caused by *Puccinia striiformis* West. f. sp. *hordei*, has increased recently in some parts of Iran (Safavi *et al.*, 2013). In order to study and identify the barley yellow rust races, thirty-six yellow rust samples were collected during 2012-2013 from barley, wild barley (*Hordeum morinum*) and wheat in different provinces of Iran. The yellow rust samples were used to inoculate Afzal (barley cultivar) and Morocco (wheat cultivar), susceptible to all *Puccinia striiformis* f. sp. *hordei* (*Psb*) and *Puccinia striiformis* f. sp. *tritici* (*Pst*) isolates, respectively. Then we focused entirely on *Psb* isolates. Virulence factors and races of barley yellow rust were determined based on avirulence/virulence formula on barley differential seedlings (Chen *et al.*, 1995). In all, ten races were identified in this study: PSH-51, PSH-56, PSH-74, PSH-83 (having virulence on differentials 1, 5, 7, 10, 12), PSH-84 (virulent on 1, 5, 6, 7, 10, 11), PSH-85 (virulent on 1, 4, 11), PSH-86 (virulent on 1, 2, 4, 11), PSH-87 (virulent on 1, 5, 7, 9, 10, 12), PSH-88 (virulent on 1, 5, 8, 12) and PSH-89 (virulent on 1, 5, 10, 12). All the ten races were new for Iran and the study of barley yellow rust races was the first in Iran. Seven races (PSH-83, PSH-84, PSH-85, PSH-86, PSH-87, PSH-88 and PSH-89) have not been reported anywhere before (Holz *et al.*, 2013; Wan and Chen, 2012). The races PSH-87 and PSH-84 with six virulence factors each had the widest virulence spectrum; PSH-51 and PSH-85 were most narrow with three virulence factors each. None of the races had virulence on cultivar Emir having resistance genes *rpsEm1*, *rpsEm2* and only one race had virulence on each of resistance genes *Rps4* (*Yr4*), *rpsHF*, *rpsVa1*, *rpsVa2*, *Rps1.c*. The highest virulence frequency was determined for genes *rpsHi1*, *rpsHi2* (83%) and *rps2* (67%).

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