

New records for three *Cercospora* species from Almora Hills, Uttarakhand, India

MANJU LATA UPADHYAYA
RAMESH CHANDRA GUPTA
Dept. of Botany
Kumaun University
R. S. J. Campus
Almora, Uttarakhand, India
Email: manjulata707@gmail.com

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Abstract: Three phytopathogenic fungi are reported for the first time from Kumaun Himalaya, Uttarakhand, India: *Cercospora ricinella* on *Ricinus communis*, *C. boerhaavicola* on *Boerhaavia diffusa* and *C. withaniae* on *Withania somnifera*. Colour illustrations of the characteristic leaf spots and microcharacters are provided.

Zusammenfassung: Drei phytopathogene Pilze werden erstmals von Kumaun Himalaya, Uttarakhand, Indien, berichtet: *Cercospora ricinella* auf *Ricinus communis*, *C. boerhaavicola* auf *Boerhaavia diffusa* und *C. withaniae* auf *Withania somnifera*. Farbbilder der charakteristischen Blatflecken und der Mikromerkmale sind beigefügt.

Ricinus communis is cultivated for leaf, flower colours and oil production. Castor oil obtained from the seeds is traditionally used as herbal medicine. The seeds of the plant are used as fertilizer after the oil is extracted from the seeds and cooked to destroy the toxins and incorporated into animal feed. The seed extract produce antioxidant, antinociceptive, antiasthmatic, antifertil, antihistaminic, hepatoprotective, anti-inflammatory, antimicrobial, antidiabetic activities and it also has wound healing capacity (JENA & GUPTA 2012).

Leaves of *Ricinus communis* were found to be infected with *Cercospora ricinella* SACC. & BERL. causing defoliation and losses. On infected leaves of the host plant rather small pale brown spots with dark brown raised borders are developed (Fig. 1). The disease is widely distributed throughout the tropics (ELLIS 1971, BUTLER & BISBY 1931, UPPAL & al. 1935, PAYAK 1949, SALAM & RAMACHAR 1956, PRASAD & SINHA 1962, RANGASWAMY & al. 1968, CHOWDHURY 2000).

Medicinal plants have a vital role to preserve human healthy life. *Boerhaavia diffusa* is a species of flowering plants commonly known as 'punarnava' (which rejuvenates or renews the body). It is taken as herbal medicine and believed to improve and protect eyesight. It has diuretic properties and is used by diabetics to lower blood sugar. It has shown antibacterial activities also. Leave extracts have shown antioxidant and hepatoprotective properties in pharmacological models. Punarnavin, an alkaloid isolated from this plant has some anticancer, antiestrogenic, immunomodulatory and antiamebic activity. It is a source of antioxidants and may be effective against arsenic trioxide and also possess cardioprotective properties.



Fig. 1. *left* Infected leaf of *Ricinus communis*, *right* *Cercospora ricinella* conidia, $\times 700$



Fig. 2. *left* Infected leaf of *Boerhaavia diffusa*, *right* *Cercospora boerhaavicola* conidia, $\times 650$



Fig. 3. *left* Infected leaf of *Withania somnifera*, *right* *Cercospora withaniae*, conidia, $\times 250$

Leaves of *Boerhaavia diffusa* grown in the Department of Botany, Kumaun University, Almora were found to be infected with *Cercospora boerhaavicola* THIRUMALACHAR & GOVINDU. Leaf spots were circular to irregular, 2–5 mm in diameter, yellowish brown, with greyish centre, the stroma composed of few cells in substomatal space and compact, the conidiophores 1–3 septate, unbranched and geniculate, laterally coalesced at the base. The conidia were obclavate to cylindrical, 1-septate, straight or curved (Fig. 2) (THIRUMA-LACHAR & GOVINDU 1953, RAO 1962, PANDOTRA & GANGULY 1966).

Withania somnifera, commonly known as ‘ashwagandha’, is a herb used in ayurvedic medicine for various health problems. It is classified as a rasayana and expected to promote physical and mental health, rejuvenates the body in debilitated conditions and increases longevity. It is used to treat a number of disorders that affect human health including central nervous system disorders, particularly in epilepsy, stress and neurodegenerative diseases and even in the management of drug addiction, in diabetes, kidney disorders and even in cancer.

During the present investigation leaves of the host plants were found to be infected with *Cercospora withaniae* SYD., colonies were hyphophyllous, effuse olivaceous, velvety, conidiophores fasciculate, sometimes branched, mid pale golden brown 15–50 × 3–4 µm. The conidia were straw coloured 2–5 septate, 35–65 × 3–4 µm (Fig. 3) (ELLIS 1976, MUNJAL & al. 1959, JOSHI & VASHISHTA 1959, CHIDDARWAR 1962, PANDOTRA & GANGULY 1964, PAVGI & SINGH 1970, GUPTA & MADAN 1982).

The three species of *Cercospora* were reported from other parts of India but this is the first report from Kumaun Himalaya, Uttarakhand.

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Autor(en)/Author(s): Upadhyaya Manju Lata, Gupta Ramesh Chandra

Artikel/Article: [New records for three Cercospora species from Almora Hills, Uttarakhand, India 33-36](#)