International Journal of Farm Sciences **3(2)** :52-55, 2013

Study on the occurrence of perfect stage of okra powdery mildew in Himachal Pradesh

NARENDER K BHARAT

Department of Plant Pathology
Dr YS Parmar University of Horticulture and Forestry, Nauni, Solan 173 230 HP
Email for correspondence: nbharat07@rediffmail.com

ABSTRACT

Okra, *Abelmoschus esculentus* (L) Moench popularly known as Bhendi or lady's finger is one of the important vegetable crops grown throughout the country under open and protected cultivation conditions. Okra plants growing at Sharbo located at 2100 m above msl were found infected with a powdery mildew fungus. Microscopic observations revealed the occurrence of both anamorphic as well as teleomorphic stages of the fungus. The anamorphic stage included mycelium, conidiophores and conidia. The teleomorphic stage included perithecia which were dark brown, globose, with mycelloid, irregularly branched and hyaline appendages. Each perithecium contained 10-15 asci which were pedicillate, ovate to broadly ovate or ellipsoid and measured 50-70 x 25-40 µm. Each ascus contained 2-3 (usually 2) ascospores which were one-celled, hyaline and oval to sub-cylindrical. On the basis of the morphological characters of the anamorph as well as teleomorph the fungus was identified as *Erysiphe cichoracearum* DC. Previously only the anamorphic stage of the fungus was observed. In the present study occurrence of the teleomorphic stage of okra powdery mildew *Erysiphe cichoracearum* has been reported for the first time in dry temperate zone of Himachal Pradesh.

Keywords: Okra; powdery mildew; *Erysiphe cichoracearum*; perithecia

INTRODUCTION

Okra, *Abelmoschus esculentus* (L) Moench belonging to the family malvaceae popularly known as Bhendi or lady's finger is one of the most delicious and important vegetable crops grown throughout the country under open and protected cultivation conditions. The cultivation of okra crop is a good source of income to the farmers of the country. During cultivation the crop is affected by various diseases caused by fungi, bacteria and viruses. Powdery mildew caused by *Erysiphe cichoracearum* DC is one of the major diseases caused by fungi. The disease is of common occurrence wherever okra is grown throughout the world. In Himachal Pradesh the disease is reported on almost all the commercial cultivars of okra (Raj et al 1992). In mid hills of the state the disease appears during the end of rainy season and causes heavy losses to the late sown crop if the control measures are not applied

timely. The disease initiates as white minute patches first on the upper surface of lower older leaves and then spreads to younger ones. Grayish white powdery coating is visible on severely affected leaves. Leaves finally show necrosis resulting in withering, drying and defoliation. Powdery mildew affects plants of all growth stages and may result yield losses to the tune of 17 to 86.6 per cent (Sridhar and Poonam Sinha 1989). Crop yield losses are significant under favourable weather conditions if the infection takes place in early stages of plant growth (Gupta and Thind 2006). In mid hills and warmer regions of the state and other parts of the country this powdery mildew pathogen is known to produce only the conidial or anamorphic stage. The identification of the pathogen is therefore done only on the basis of the anamorphic stage. However in the present studies occurrence of the perfect or teleomorphic stage of okra powdery mildew fungus is being reported and described.

MATERIAL AND METHODS

The samples were collected from okra plants infected with powdery mildew disease at Sharbo district Kinnaur, HP located at 2100 m above msl in dry temperate zone of Himachal Pradesh during 2009-10. The powdery mildew infected plant parts were collected in paper bags and brought to the Vegetable Pathology Laboratory, Department of Plant Pathology, Dr YS Parmar University of Horticulture and Forestry, Nauni, HP. The samples were observed under microscope to study the morphology of the teleomorphic structures like perithecium, ascus and ascospores of the fungal pathogen for their identification. The measurements of these structures were taken using micrometers as per the standard procedures. The microphotographs of the perfect stage of the fungus were also taken using microscopic camera.

RESULTS AND DISCUSSION

Microscopic observations revealed the appearance of dirty white powdery mass on leaves, fruits and stem. On the infected stem dark coloured fruiting bodies of the powdery mildew fungus were also seen. Microscopic observations revealed the occurrence of both anamorphic as well as teleomorphic stages of the fungus.

The anamorphic stage included mycelium, conidiophores and conidia. Conidia were single celled, oval to roundish or barrel-shaped, hyaline, without fibrosin bodies and 25-40 x 15-25 µm in diameter. The teleomorphic stage included perithecia which were dark brown, globose, with mycelloid irregularly branched hyaline appendages and measured 85-140 µm. Each perithecia contained 10-15 asci which were pedicillate, ovate to broadly ovate or ellipsoid and measured 50-70 x 25-40 µm. Each ascus contained 2-3 (usually 2) ascospores which were one-celled, hyaline, oval to sub-cylindrical and measured 18-25 x 12-17 µm (Plate 1).

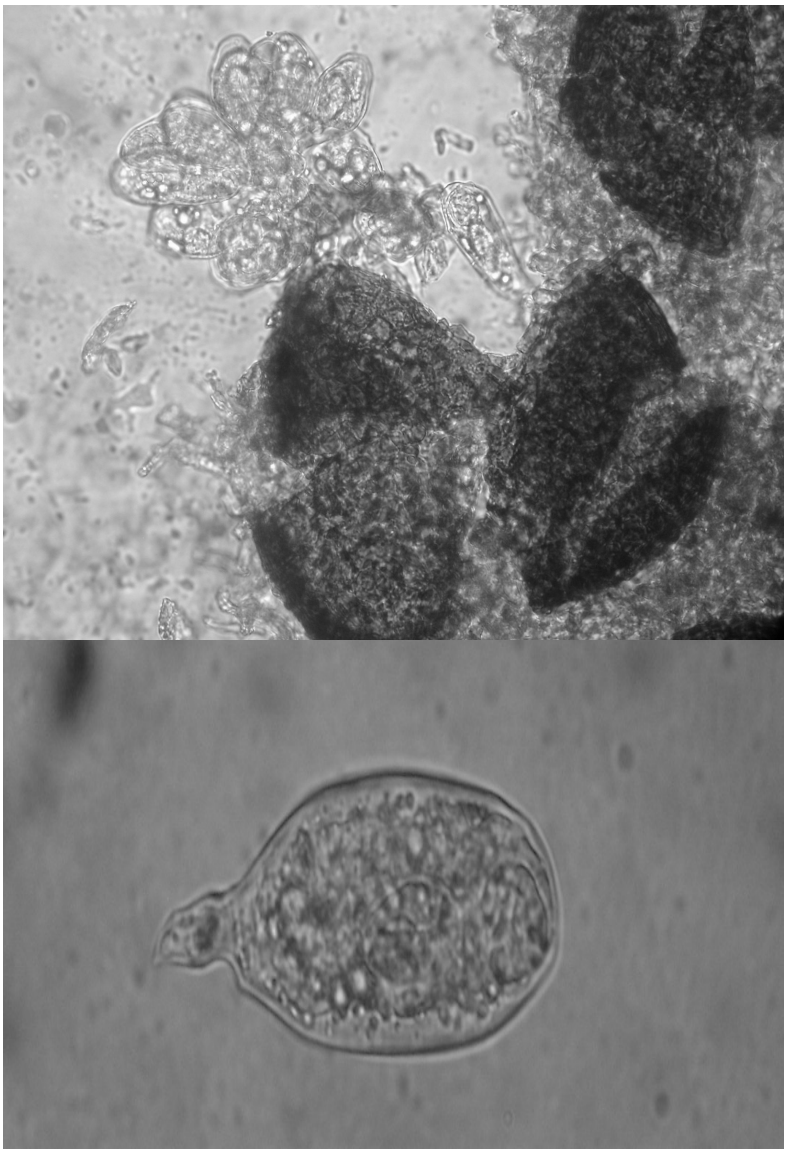

Plate 1. Perfect stage of *Erysiphe cichoracearum* (Powdery mildew of okra): Perithecium, asci and ascospores

On the basis of the morphological characters of the anamorphs as well as teleomorphs of the fungus and their analogy with that given by Kapoor (1967) it was identified as *Erysiphe cichoracearum* DC. The occurrence of imperfect stage of the same pathogen has already been reported to cause okra powdery mildew in various states of India like Karnataka (Rangaswami et al 1970), Delhi (Prabhu et al 1971), Maharashtra (Jambhale and Nerkar 1983) and Himachal Pradesh (Raj et al 1992). However in these studies the perfect stage of the fungus was not observed and described. Hence occurrence of the perfect or teleomorphic stage of okra powdery mildew *Erysiphe cichoracearum* has been reported for the first time from dry temperate zone of Himachal Pradesh.

REFERENCES

Gupta SK and Thind TS 2006. Diseases problems in vegetable production. Scientific Publishers, India, Jodhpur, 576p.

Jambhale ND and Nerkar YS 1983. Inheritance of resistance to powdery mildew in okra. National Seminar on Breeding Crop Plants for Resistance to Pests and Diseases, 25-27 May 1983, Coimbatore, Tamil Nadu.

Kapoor JN 1967. Description of phytopathogenic fungi and bacteria. No 152, CMI, England.

Prabhu AS, Pathak KD and Singh RP 1971. Powdery mildew of 'bhindi' (*Abelmoschus esculentus* (L) Moench) in Delhi state. Indian Journal of Horticulture **28**: 310-312.

Raj H, Bhardwaj ML, Sharma IM and Sharma NK 1992. Performance of commercial okra (*Hibiscus esculentus*) varieties in relation to disease and insect-pests. Indian Journal of Agricultural Sciences **63**: 747-748.

Rangaswami G, Seshadri VS and Lucy Channamma KA 1970. Fungi of south India. University of Agricultural Sciences, Bangalore, 193p.

Sridhar TS and Poonam Sinha 1989. Assessment of loss caused by powdery mildew (*Erysiphe cichoracearum*) of okra (*Abelmoschus esculentus*) and its control. Indian Journal of Agricultural Sciences **59**: 606-607.

Received: 11.2.2013 *Accepted: 15.5.2013*