

BATHUA (*Chenopodium album*): FIRST REPORT IN BANGLADESH AS ALTERNATE HOST OF *Stemphylium botryosum*

¹K. H. Alam* and ²M. H. Rashid

¹Senior Scientific Officer, Fruit research Station, Bangladesh Agricultural Research Institute, Rajshahi, Bangladesh,

²Principale Scientific Officer, OFRD, Bangladesh Agricultural Research Institute, Khulna, Bangladesh

*Corresponding Authors' Email: khadolon@gmail.com

ABSTRACT

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Different infected weed samples showing symptoms of *Stemphylium* spp. were collected from farmer's lentil field covering eleven major lentil growing districts of Bangladesh during cropping season of 2012-2013. Laboratory studies of the experiment was conducted at Plant Pathology Division, Regional Agricultural Research Station, Rahmatpur, Barisal. Conidia of *Stemphylium botryosum* were isolated

using V-6 juice agar media (modified V-8 agar media) only from the collected leaf samples of bathua weed (*Chenopodium album*). Pathogenicity test was done following standard procedure. Bathua (*Chenopodium album*) was identified as an alternate host of *S. botryosum* and it appears to be the first report in Bangladesh.

Key words: Bathua (*Chenopodium album*), Lentil, Alternate host, *Stemphylium botryosum*

INTRODUCTION

Stemphylium blight is a major disease of lentil (Kumar *et al.* 2013). The diverse host range of *Stemphylium botryosum* that includes leguminous and non-leguminous crops in different parts of the world indicate its adaptability to different environments (du Toit and Derie 2004). Genus *Stemphylium* spp. was proposed by Wallroth in 1833 with *Stemphylium botryosum* as the type species (Simmons 1985). More than 50 species of *Stemphylium* have been described and they are commonly isolated from a range of plants (Farr and Rossman 2014). Aly (2010) reported that *Stemphylium botryosum* was isolated from leaves of bathua weed (*Chenopodium album*) collected in Egypt. Both saprotrophic and pathogenic forms of *Stemphylium* spp. occur in a wide range of plants and many species are economically important of agricultural crops. They are known as the causal agents of foliar diseases such as the leaf spot of lettuce, onion, garlic, tomato and potato, which are diseases of economic importance in many countries (Camara *et al.* 2002). In Bangladesh, *Stemphylium* blight disease on lentil was first recorded during 1981 and was further confirmed in 1986 (Bakr and Zahid 1986). The present research work was undertaken to search of alternate host of *Stemphylium botryosum* in different weed species grown in lentil field.

MATERIALS AND METHODS

Different weed samples which were suspected as *Stemphylium* spp. infected and were collected from

farmer's lentil field during cropping season of 2012-2013 throughout the major lentil growing area of Bangladesh. Lentil growing 11 districts *viz.* Jessore, Kushtia, Faridpur, Pabna, Rajshahi, Maherpur, Madaripur, Barisal, Jhalokathi, Khulna and Satkhira in Bangladesh were included in this study. Laboratory part of the experiment was conducted at Plant Pathology Division, Regional Agricultural Research Station (RARS), Rahmatpur, Barisal of Bangladesh Agricultural Research Institute (BARI). Different types of weed grown in the lentil fields were concentrated to infection of *S. botryosum*. When any leaf spot symptom developed in any weed species grown in the lentil fields were collected in the air tied polyethylene bag and then each polythene bag was taken to the Plant Pathology laboratory. V-6 juice agar media was used in this experiment for culture the *Stemphylium botryosum*. V-6 juice agar media was made by extract of six vegetables that media were basically modified of V-8 juice agar medium described by Alam (2016).

Diseased leaf samples of different weeds were cut into small pieces (0.5-1.0 cm) for isolation of pathogen by tissue planting method. Purification was done using single spore isolation technique. A germinated spore was then picked up under a microscope and transferred to a previously prepared V-6 juice medium slant and incubated at 25±1°C under 12 hr darkness alternate with 12 hr florescence light or near ultra-violet light (NUV light) for 10 days to allow growth and sporulation. The pure culture of the pathogen thus obtained was then preserved at 4°C in the refrigerator. For identification, conidia were taken from mature colonies and examined for size, shape and color.

Details of the cultural characters and microscopic details were noted and the fungus was identified following Ellis (1971). Pathogenicity test of *Stemphylium* blight of bathua was done following Koch's Postulates.

RESULTS

A total of 8 weed species *viz.* Bermuda grass, Goose grass, Crabgrass, Lambs quarter, Clammy ground cherry, Purple nut sedge, Smart weed and Wild lentil were recorded grown in lentil fields during survey period (2012-2013) at 11 districts. The weed species are listed in the table1.

Table 1: List of different weed species grown in the lentil field in Bangladesh

Sl. No.	Common name	English name	Scientific name	Family
1	Durba	Bermuda grass	<i>Cynodon dactylon</i>	Poaceae
2	Chapra	Goose grass	<i>Eleusine indica</i>	Poaceae
3	Anguli	Crabgrass	<i>Digitaria sanguinalis</i>	Poaceae
4	Bathua	Lambs quarter	<i>Chenopodium album</i>	Chenopodiaceae
5	Foska begun	Clammy ground cherry	<i>Physalis heterophylla</i>	Solanaceae
6	Mutha	Purple nut sedge	<i>Cyperus rotundus</i>	Cyperaceae
7	Bishkatali	Smart weed	<i>Polygonum hydropiper</i>	Polygonaceae
8	Ban masur	Wild lentil	<i>Vicia sativa</i>	Leguminosae

Isolation of the pathogen from weed

Conidium of *S. botryosum* was isolated from the collected leaf samples of bathua weed (*Chenopodium album*). Other weed leaf spot samples were tested but *S. botryosum* was not found.

Pathogenicity test

Diseased leaf samples of bathua were collected from standing lentil crop in the field. Healthy bathua plants were grown in an earthen pot. Pathogenicity test was done at vegetative stage following steps mentioned in Koch's Postulates. Conidia of *S. botryosum* were found in the infected bathua leaf collected from the field. After inoculation, the reisolated *S. botryosum* was the same fungus initially isolated from collected infected bathua leaf and which has produced the same symptom as recorded on bathua leaf while collected from the field (Plate 1).

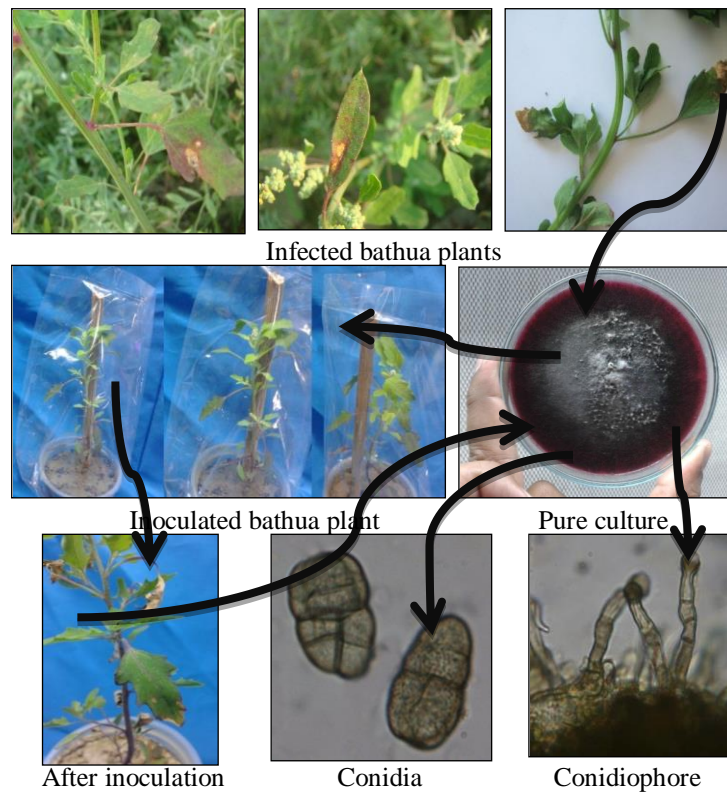


Plate 1: Koch's Postulates for proof of pathogenicity test

DISCUSSION

Eight different weed species were found growing in lentil fields in 11 districts. From the collected weed samples and after investigation under compound microscope *Stemphylium botryosum* were found only from bathua weed (*Chenopodium album*). Pathogenicity test were successfully carried out in case of stemphylium blight of bathua by following Koch's postulates procedure. Consulting the available literature, it was considered as the first report in Bangladesh. The results were in agreement with the findings of Aly (2010) who reported that *S. botryosum* was isolated from leaves of bathua weed (*C. album*) collected in Egypt. Hanse *et al.* (2015) had also similar observation that in the Netherlands, during the summer of 2007, *C. album* was identified as hosts in an assay of plants grown and inoculated in climate rooms.

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