factors : (i) the presence of certain specific inhibitor for filter paper activity or (ii) the very low concentration of the enzyme present in the crude culture filtrate. The specific activities of the other two enzymes, *viz.*, *β*-glucosidase measured using *o*-nitrophenyl-*β*-D-glucoside[3] and intracellular CMCase estimated by the DNS method[5] were found to reach maximum in between 6–9 days of the growth of the fungus

Extracellular CMCase activity was also detected when solid medium was used for the growth of the fungus. The enzyme activity was detected by 1% cetryltrimethyl ammonium bromide[9]. The clear zone was formed due to the production of C_x-cellulase or CMCase. The production of other exrtacellular enzymes was detected by growing the pathogen in solid media supplemented with different carbon sources. The results thus obtained suggest that extracellular amylase as tested by iodine solution[10] and lipolytic activity detected by the method described by Sierra[11] were found to be positive (The data not given). When *M. phaseolina* was grown in solid medium containing 0·4% gelatin, extracellular protease activity was also detected. The protease activity was detected by both TCA and saturated solution of ammonium sulfate as described by Hankin and Anagnostakis[10].

At this point it is worth mentioning that *M. phaseolina* has already been reported to produce extracellular cellulase (C_x-activity) when grown in a medium containing carboxymethyl cellulose[12]. However, Dube and Gour failed to detect the extracellular CMCase activity by using DNS method. On the other hand our results strongly suggest that both CMCase and " Filter paper activity ", if there be any, produced in the culture media of *M. phaseolina* could be detected by the DNS method. Moreover, we report here the nature of increase in both extra and intra-cellular *β*-glucosidase activities estimated by using *o*-nitrophenyl *β*-D-glucoside[7]. The results given in the inset of Fig. 1 indicate that extracellular *β*-glucosidase activity increased gradually after inoculation of the fungus *M. phaseolina* and follows the same pattern like that of extracellular CMCase. No extracellular CMCase activity could be detected when sucrose was used as the carbon source instead of carboxymethyl cellulose. From the results presented in this communication it can be concluded that the jute pathogenic fungus *M. phaseolina* can produce several extracellular enzymes including C_x-activity in the culture filtrate.

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TWO NEW HOSTS FOR *XANTHOMONAS VESICATORIA* (DOIDGE) DOWSON

A BACTERIAL leaf spot disease of *Argemone mexicana* L and *Tinospora cordifolia* (Willd.) Miers belonging to the families Papaveraceae and Menispermaceae, respectively was observed during routine surveys at Indian Institute of Horticultural Research, Hessaraghatta farm, Bangalore, for the first time in August, 1978. Some of these infected plants were growing as weeds in tomato crop. The symptoms produced on these hosts were as follows :

(*a*) *Argemone mexicana*

The infection starts as water-soaked spots on the leaves which soon become dark brown to black in colour, circular to irregular in shape and 5 to 10 mm in size (Fig. 1). The spots may appear on any part of the leaf lamina but they generally originate from margin and tips. The infection is also observed on the stem as minute dark brown to black spots.

(*b*) *Tinospora cordifolia*

The disease is characterised as minute water-soakde spots on the leaves. Later, these spots become pale

to brown in colour, circular to irregular in shape measuring 2 to 8 mm in size and surrounded by yellowish halo. Generally shot holes were produced. Under favourable weather conditions spots start from margins and progress towards the centre of the leaf, usually in 'V' shape with base of V towards the peticle (Fig. 2).

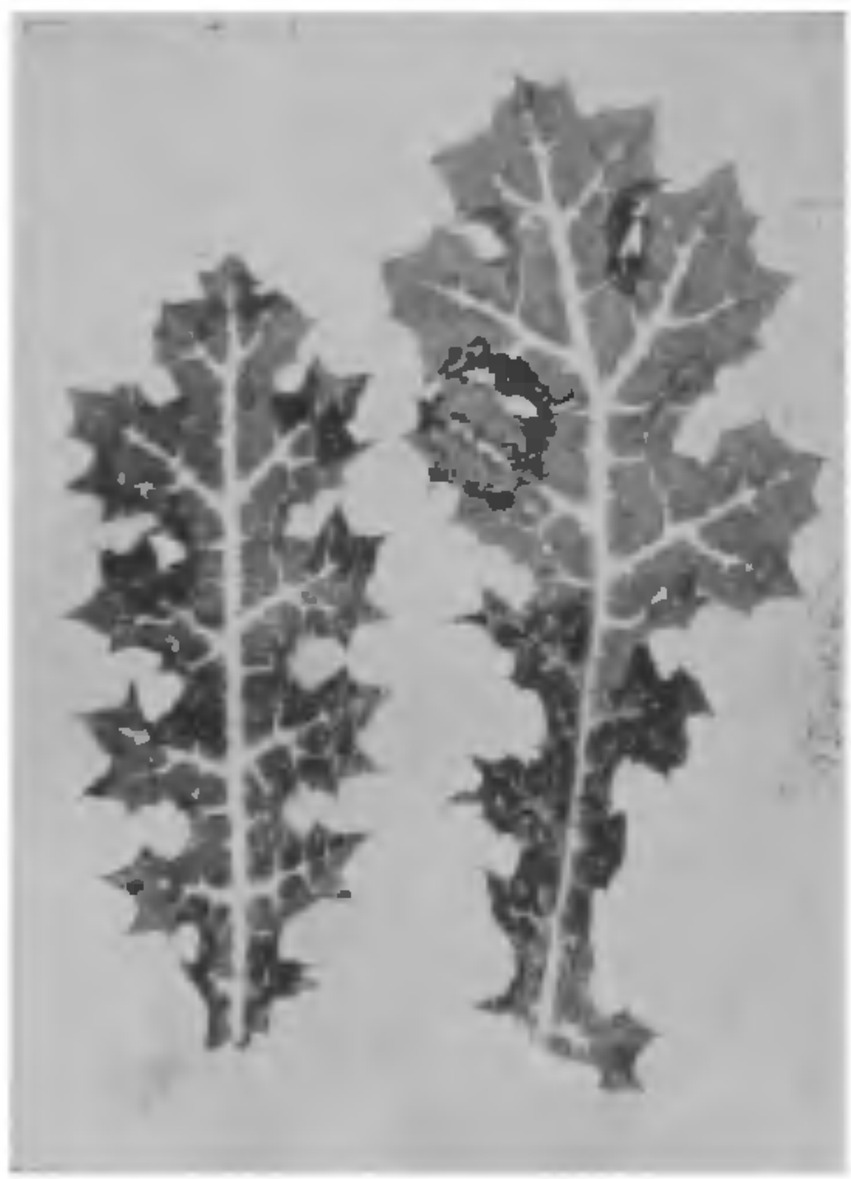

FIG. 1. *X. vesiecatoria* on *A. mexicana* leaves.

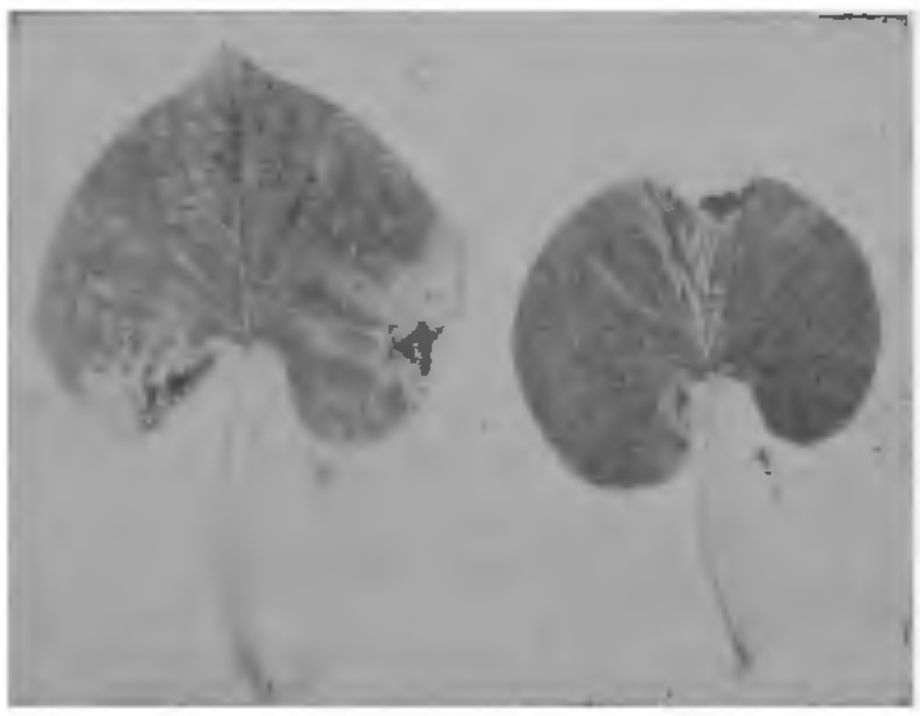

FIG. 2. *X. vesicatoria* on *T. cordifolia* leaves.

Diseased portions from both the hosts always showed profuse bacterial oozing when examined under microscope. The bacterium was isolated on nutrient agar medium and its pathogenicity was proved by inoculating the healthy plants of *A. mexicana* and *T. cordifolia* by pin prick method with their respective isolates (10^7 cells/ml) and typical symptoms of the disease appeared within 7 days.

The morphological and biochemical characters of the bacterium isolated closely resembled with the description of *Xanthomonas vesicatoria* (Doidge) Dowson as given by Buchanan and Gibbons[1].

Isolates of *X. vesicatoria* were raised from infected chilli, bell pepper, tomato, datura, *A. mexicana* and *T. cordifolia* plants. All of them cross infected other hosts on artificial inoculation (10^7 cells/ml) and produced typical disease symptoms thereby showing similarity. A bacterial blight of *A. mexicana* caused by *X. argemonea* was reported from Maharashtra by Srinivasan *et al.*[2]. They described the symptoms as V-shaped lesions extending into the leaf through hydathodes, vascular invasion often results in systemic infection leading to premature wilt; the root turns dark and fragile with bacterial masses in the vascular bundle. According to them the pathogen was host specific, whereas in the present study the symptoms produced are entirely different and the bacterium is cross inoculable to other hosts including tomato and chilli There is no report on the occurrened of a bacterial disease on *T. cordifolia.* The bacterium is thus identified as *X. vesicatoria* (Doidge) Dowson. Its occurrence on *A. mexicana* and *T. cordifolia* in nature is considered as new host records which are probably playing an important role in its survival during the season when there is no tomato crop in the field.

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A LEAF REDUCTION DISEASE OF *CICER ARIETINUM* IN INDIA, CAUSED BY A CUCUMO VIRUS

CHICKPEA (*Cicer arietinum* L.) in India is known to be affected by two viral diseases causing tip necrosis[2] and stunting[9]. But, during the last three years, 2–5% of the plants of several cultivars of chickpea—specially BG–2 and G–113–were found affected with another severe virus disease. Diseased plants, both