The main symptoms of the disease were the appearance in the form of circular or oval, brown to dark brown, small lesions (2–5 mm dia) on the stem base which soon coalesced to form bigger linear patches up to 1·5 cm × 4 mm (Fig. 1) which spread over the upper part of the stem later. On account of severe infection, the whole stem turned brownish black (Fig. 2). Under high humidity, a white cottony mycelial growth of the fungus appeared on the host which disappeared in dry weather. In continued wet weather the pathogen started colonizing the older leaves also. Naturally infected potato plant in a state of collapse is given in Fig. 3.

The young lesions from the affected stems were cut and transferred on Potato Dextrose Agar (PDA) after surface sterilization in 0·1% mercuric chloride solution and the plates were incubated at 25° C. The fungus grew well within 8 days at 25° C. The fungus was identified to be *Fusarium acuminatum* Ell. & Ev. (I.M.I. 230655 at C.M.I., England).

The 40-day old healthy plants of two important commercial varieties Kufri Chandramukhi and Kufri Jyoti were inoculated by two different methods. In the first method the plants were inoculated under four sets of conditions: (i) stem portions were slightly injured in the form of slight surface bruises and the mycelium applied on these; (ii) the mycelium was applied on uninjured surfaces of the stem; (iii) stem portions were injured as in the first case but without mycelium; (iv) stem portions were left uninjured [the plants under sets (iii) and (iv) served as controls]. All the plants were maintained at 15–20° C.

In the second method, young plants were transplanted in pots containing soil heavily infested with the test fungus and shifted to the glasshouse where regular irrigations were provided for high soil moisture. For control, plants were kept in sterilized soil in which the inoculum of the test fungus was not incorporated.

In the first method of inoculation the fungus started growing on the injured surfaces of the stem (set i) after 24 hr and quickly covered the whole stem within 72 hr and the plants collapsed at the point of infection. The appearance of the disease symptom on the uninjured surfaces (set ii) was found to be delayed by 24 hrs. In control the plants remained healthy throughout.

In the second method symptoms appeared in the form of dark brown lesions on the stem bases by the 10th day and the infection spread to the upper part of the stem in another three or four days. Control plants failed to develop the symptoms.

Fusarium acuminatum has been reported to cause stem rot of maize[1] in USSR. The pathogen also causes crown bud rot of Alfalfa[2], foot and root rot of legumes[3,4] but there is no earlier report of stem rot of potato and is a new report.

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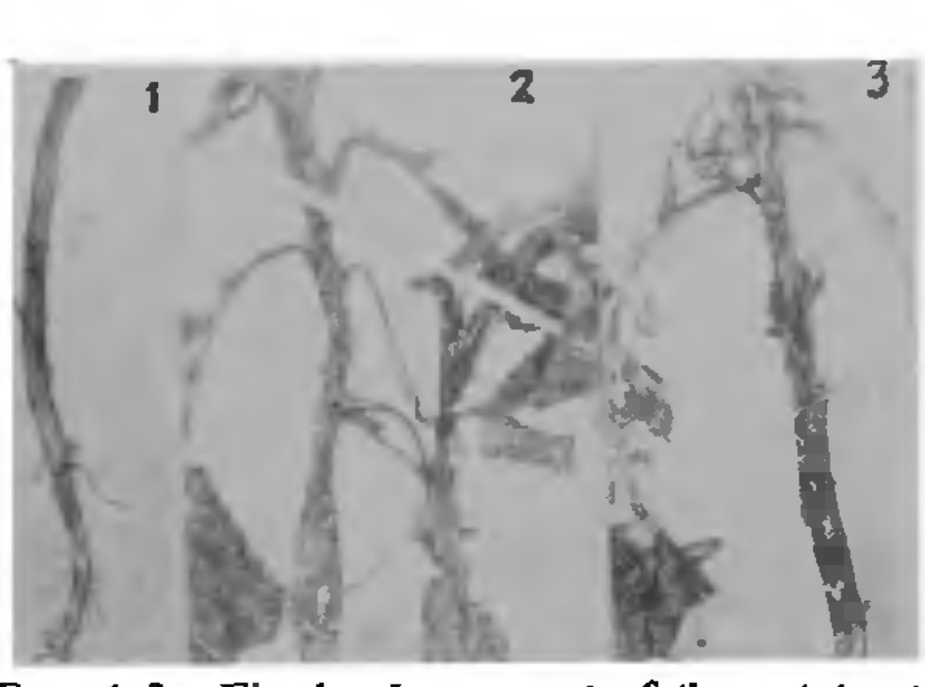

FIGS. 1–3. Fig. 1. Lower part of the potato stem showing linear dark brown patches on account of infection with *Fusarium acuminatum*. Fig. 2. Naturally infected potato plants showing blackening of the entire stem portions resulting in collapse. Fig. 3. Naturally infected potato plant in a state of collapse showing longitudinal grooves on the stem due to desiccation.

PISTILLODY IN A COMMERICAL SUGARCANE VARIETY

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PISTILLODY has been noticed frequently in the wild species, *Saccharum spontaneum* and its derivatives and a solitary instance in the cultivated species *Saccharum officinarum*. Involvement of *S. spontaneum* clones SES 49 and SES 50 as seed parents against Co 419,

a commercial sugarcane variety has been reported to result in F_1 progeny with different stages of pistillody[2]. The expression of the character has been attributed to be genic[1] as well as environment-induced[3].

During the flowering season of 1980, a commercial sugarcane variety of Punjab (India) CoJ 73 was noticed to exhibit pistillody. The variety came to flowering in the last week of October. At random 25 arrows (sugarcane inflorescence) were examined and in each arrow 25 spikelets collected from different portions of the inflorescence were examined. Besides the normal pair of stigmatic branches, all the three or one or two anthers in part or in full were converted into stigmatic branches. Even when anthers were present they were not well developed and remained non-functional. Protogyny was noticed in all the instances when anthers were present.

The variety is a derivative of Co 62175 as seed parent and Co 1148 as pollen parent. Co 62175 is a shy flowerer and Co 1148 a profuse flowerer both with normal floral parts. The report on the occurrence of pistillody in a commercial sugarcane variety is probably the first of its kind and can be traced to *S. spontaneum* parent(s) involved in the geneology and not to the immediate parents as both do not have the character.

In the absence of functional anthers, the possibility of utilising the variety as a male sterile seed parent was tested. Seeds of the variety from open pollinated arrows and selfs were collected and examined for seed-setting. No seedling could be obtained by selfing and very little from open pollinated crosses. The former observation confirms the male sterility in the variety while the latter indicates the poor cross-compatibility and (or) female sterility. Further studies are in progress to overcome the difficulty of seed-setting in this variety through a wide spectrum of parental combinations and other aspects of post-fertilisation phenomenon.

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PENICILLINASE ACTIVITY OF A BLUE-GREEN ALGA *SYNECHOCOCCUS CEDRORUM*

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Several workers have used penicillin to obtain mutants of antibiotic resistant strains of blue-green algae[1]. Kushner and Breuil[2] reported the occurrence of penicillin breaking enzyme penicillinase (β-lactamase) from *Coccochloris elebens* and *Anabaena* Sps. Penicillinase was first recognized as inducible enzyme in organisms of subtilis group *Bacillus licheniformis*[3]. However, Richmond and Sykes[4] reported in gram-negatives that penicillinase is often constitutive but rarely inducible. Our studies on four strains of *Synechococcus cedrorum* obtained by us, parent, penicillin resistant (Pen–R), streptomycin resistant (Strep–R) and polymyxin resistant (Polym–R) strains showed resistance to penicillin (10 units) as tested with Bacto–Unidisk[5]. We report here induction and activity of penicillinase in the above four strains.

The penicillinase activity has been studied by macro-iodometric method of Perret[6] which is based on the estimation of the hydrolysis products of penicillin.

The four strains of *Synechococcus cedrorum* were grown in modified Hughes medium[7] at pH 8·5 for 48 h. The algae were transferred to growth medium containing 0·2 μg/ml penicillin-G (benzyl penicillin, sodium salt). Samples were taken at intervals of 0, 6, 24 and 50 h and one ml of sodium tungstate (0·05%) was added to stop enzymatic activity. After centrifuging the suspensions to remove the cells, equal amount of 0·01 M iodine solution was added to the supernatant and incubated for 30 minutes at 28°C after which it was titrated with 0·01 N sodium thiosulfate using starch as indicator. For calculation it was taken that eight equivalents of iodine to correspond to one molecule of penicilloic acid[8]. The enzyme activity is expressed as μ moles penicilloic acid formed/mg protein. Protein was estimated by the method of Lowry *et al.*[9].

All the four strains of *Synechococcus cedrorum* did not show any penicillinase activity in the absence of the drug in the medium. They developed considerable penicillinase activity by 6 hr in the presence of penicillin which further increased by 24 hr (Fig. 1). The highest amount of activity was present in the Pen-R strain, which in fact could grow in the presence