TABLE 3

Protective response of M. marinum against M. ulcerans infection on rat foot pad

Mycobacterial Strain	Index of foot pad inflammation in m.m. ± S. E.			Decrease in foot pad inflammation (%)
	21st day	97th day	174th day	
M. marinum	0.5 ± 0.07	0.2 ±	0.1 ±	86
Control	0.7 ± 0.05	0.8 ± 0.8	0.9 ± 0.06	% Increase 29

This strain was further tested in 5 mg doses for its potency against this infection through intravenous challenge in mice. This strain afforded considerable degree of protection even through this route of infection (table 2). There is significant difference in the mean survival time (MST) of the vaccinated over the control group. This increased MST is a direct measure of the degree of protection afforded by any particular vaccinating strain over other parameters of study. Histopathologically the degree of lesions in visceral organs was much less severe than the control. The livers of vaccinated group in particular had no appearance of lesions, when unvaccinated livers had complete necrosis and areas of fatty degeneration with much extensive lesions.

In a third successive experiment in rats, through foot pad model in 2 mg dose s/c vaccination, the efficacy of this strain was further proved, (table 3) which seems to have been increased and appears to be directly proportional to the increased dose response. This study has provided us reasonable assurance and sufficient clues, through which this strain may easily be kept as a candidate vaccinal strain against this infection. It may also form a counterpart with BCG as a prelude to the preparation of a combined vaccine to combat this ailment more effectively. Further work is warranted in this direction, which is under progress.

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SEED-BORNE INFECTION OF MAIZE BY *XANTHOMONAS MAYDIS* IN KARNATAKA

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AMONG the several diseases reported on maize, the bacterial leaf spot caused by *Xanthomonas maydis* reported by Rangaswamy *et al.*[1] is an important disease from India. Noble and Richardson[2] indicated that the evidence concerning the seed-borne nature of the organism is contradictory. Recently, seedlings raised from maize seeds (CV Ganga Safed-2) received from the Seed Testing Laboratory, Hebbal showed necrotic lesions of this disease.

Maize seeds of Ganga safed-2 stored at 24° ± 2° C were tested by blotter method and paper towel method. For blotter method the seeds were sown on three layers of moistened blotters placed in Petri dishes (10 seeds per dish) and incubated at 24° ± 2° C under alternating cycles of 12 hr near day light tubes 40 cm from the top and darkness. For the paper towel method 200 seeds were sown between two layers of moistened paper at the rate of 100 seeds per paper towelling and kept under similar germinating conditions.

The infected seedlings showed very slow growth rate of the coleoptile region. The brown to black lesions were seen on the tip of the coleoptile extending downwards; ultimately the entire coleoptile region turned black (figure 1). A cut made at the infected part, was examined in a drop of water under the microscope and bacterial streaming was observed Paper towel method showed a higher percentage of seed infection than the blotter method.

Xanthomonas was readily isolated from the necrotic lesions of the coleoptile region. On nutrient agar medium, the bacterium produced smooth, buty-

Figure 1. Maize seedlings showing brown to black lesions on the tip of the coleoptile.

rous glistening yellow colonies, typical of *Xanthomonas*, after 72 hr. On staining, the bacterium proved gram negative, aerobic with single polar flagellum. The seed-borne nature of the pathogen was thus confirmed.

The bacterium has been identified as *Xanthomonas maydis* and the characteristics agree with the description reported by Rangaswamy *et al*[1]. Pure culture of the pathogen has been deposited in the Department of Plant Pathology, Agricultural College, Bangalore.

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A NEW POWDERY MILDEW DISEASE FROM INDIA

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DURING the survey of fungi of Madhya Pradesh (India), an interesting powdery mildew was noticed on the leaves of *Cissus quadrangularis* Linn. (= *Vitis quardrangularis* Wall), an ornamental plant belonging to the family Vitaceae grown in the University botanical gardens. The disease appeared in the form of small irregular patches on the upper surface of the leaf which later advanced to both surfaces of the leaves. Microscopic examination of the mildew revealed the following characters:

Mycelium branched, septate, superficial, attached to the leaves by means of appresoria, hyaline and 3–5 μm thick. Conidiophores erect, simple, septate and bearing a chain of conidia. Conidia hyaline, smooth-walled, oval to elliptical, 0–septate, having numerous vacuoles and measuring 20–24×14–16 μm. Fibrosin bodies not observed. Cleistothecia were found on both the surfaces of the leaves, dark, spherical to subspherical, superficially placed on mycelial matrix, measuring 90–98 μm and bearing numerous dark mycelioid appendages which were septate and 2–5 μm wide. Asci one per cleistothecium, globose to subglobose, double walled, walls were 2–5 μm thick, measuring 60–72 × 53–68 μm. Ascospores eight per ascus, 0–speptate, oblong, hyaline, smooth-walled and measuring 16–20×14–16 μm.

On the basis of these characteristics, the mildew was identified as *Sphaerotheca fuliginea* (Schlecht.) Pall. A review of the literature[1,2] reveals that *S. fuliginea* is hitherto not reported on any member of Vitaceae.

The speciman of *S. fuliginea* has been deposited at CMI, Kew, England as IMI No. 266353.

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