Figures 1a–b. a. Right: healthy lemon plant, Left: lemon plant infected with rubbery wood after one year. **b.** Lemon plant three years after infection showing defoliation and die-back symptoms. Numerous branches develop at right angle.

developed from the curved main shoot at right angles (figure 1b). The leaves of such branches fell down and plants developed dieback symptoms. Swelling of buds was also noted in inoculated Eureka lemon plants. However, no symptoms developed in inoculated plants of mosambi, Rangpur lime, sour orange and sweet lime and also control plants. In Khasi mandarin, flexibility of branches was observed but severity of the disease was less as compared to Kagzi lime and lemon. The disease was back-transmitted from lime, lemon and Khasi mandarin on to healthy Eureka or Lisbon lemon.

The disease was not transmissible by mechanical inoculations from glasshouse-infected plants to Eureka lemon, Kagzi lime and 30 plant species of herbaceous hosts. It could also not be transmitted by aphids, *Myzus persicae* and *Aphis gossypii*.

More than 10 years of studies on this malady suggest that this is one of the serious diseases of lime and lemon plantations in the country. It needs special attention as the affected trees become completely unproductive and die within few years after infection. Since no such malady of citrus is known in the literature, it has been considered to be a new disease of citrus caused by virus-like pathogen and tentatively named as 'Rubbery-wood'. Further studies are in progress.

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1. Raychaudhuri, S. P., Nariani, T. K. and Ahlawat, Y. S., *Proc. Int. Soc. Citricult.*, 1977, **3**, 914.

LOSS OF IONS IN PEARL MILLET SEEDS TREATED WITH HONEYDEW OF *CLAVICEPS FUSIFORMIS* LOV.

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PEARL MILLET (*Pennisetum americanum* L (Leeke) ergot (*Claviceps fusiformis* Loveless)[1,2] is a national problem in India. Though elaboration of unidentified phytotoxins by the fungus in culture media[3] and presence of toxic metabolites in sclerotial filtrate have been reported[4], the earliest effects of toxic metabolites of fungus origin detectable through the electrolyte leakage pattern of the tissues after treatment with toxins[5–7] have not been investigated. This note reports the permeability changes in seed and leaf tissues after treatment with toxins.

Honeydew collected 4 days after its appearance on artificially inoculated earheads of pearl millet hybrid BJ 104, was centrifuged in a refrigerated centrifuge at 20,000 r.p.m. at 4°C for 15 min. The supernatant was collected and diluted (1:5). This served as a crude toxin preparation, hereafter referred to as honeydew toxin (HDT). The grains (2.5 g) and 1-cm-diameter leaf discs (500 mg) were weighed and treated with HDT or glass-distilled water (GDW) for 15 min. The treated materials were thoroughly washed with GDW and were immediately suspended in 100 ml GDW. The conductivity of ambient solutions was recorded at 0 hr and then after every 30 min for 2 hr on a direct reading conductivity meter (Systronics, Ahmedabad). The flasks containing the samples were shaken on the horizontal shaker with 120 strokes min. The experiment was repeated thrice.

The results obtained with grains and leaf tissues are depicted in figure 1. The loss of ions from seeds treated with HDT was considerably higher than from the seeds treated with GDW. The increase in loss was maximum after 2 hr and it was twice greater than the controls. The leaf tissues did not show any loss of ions.

Loss of a few electrolytes from susceptible oat seeds treated with HV-toxin was observed[8]. In the present study electrolyte leakage was detected from seeds but not from leaves. In nature, the pathogen infects only earheads particularly the ovaries, and not leaves. This correlation suggests that permeability alterations may be involved in ergot pathogenesis. The results also indicate the possibility of existence of toxic metabolites in honeydew oozing from infected earheads. These metabolites may trigger permeability alterations which may constitute some of the very early changes in cell biochemistry under attack.

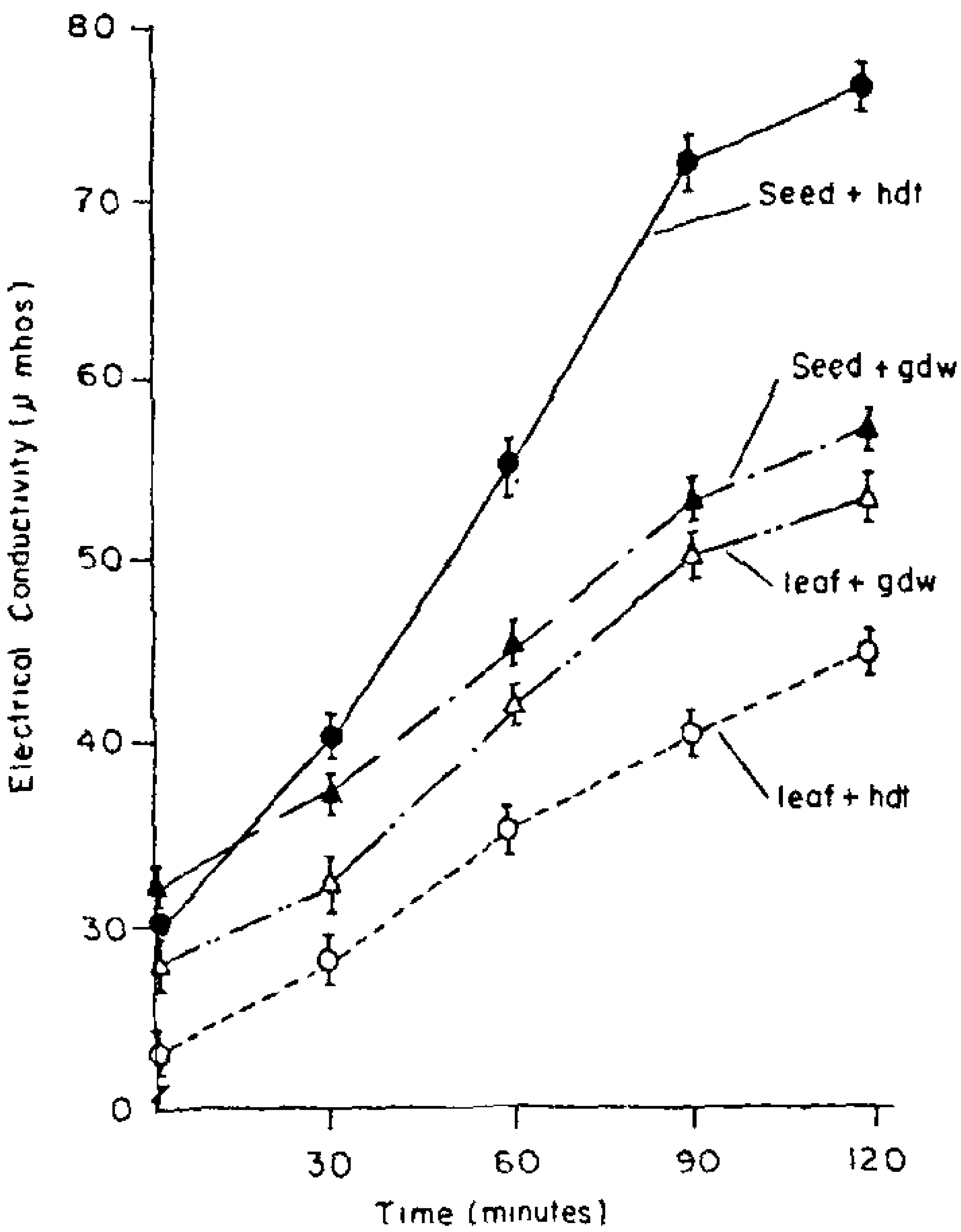

Figure 1. Loss of electrolytes from seeds and leaf tissues treated with honey dew toxins (HDT) and glass distilled water (GDW).

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1. Arya, H. C. and Kumar, A., In: *Recent advances in the biology of microorganisms* (Pt. II) (eds) K. S. Bilgrami and K. M. Vyas (B. Singh and M. P. Singh Dehra Dun, India) 1982, p. 439.
2. Ramaswamy, C., *Curr. Sci.*, 1968, **37**, 331.
3. Kannaiyan, J. Vidhyasekaran, P. and Kandaswamy, T. K., *Indian J. Exp. Biol.*, 1974, **12**, 473.
4. Kumar, A., *Seed Sci. Technol.*, 1980, **8**, 347.
5. Gaumann, E., *Phytopathology*, 1980, **48**, 670.
6. Thatcher, F. S., *Am. J. Bot.*, 1939, **26**, 449.
7. Wheeler, H. and Black, H. S., *Am. J. Bot.*, 1963, **50**, 686.
8. Samaddar, K. R. and Scheffer, R. P., *Plant Physiol.*, 1970, **45**, 586.

COMMENSAL LUMINOUS BACTERIA OF THE COELENTERATE, *PTEROEIDES* SP.

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STUDIES on the association of luminous bacteria with lower invertebrates is scanty. During a survey of the commensal microflora of marine invertebrates, the authors isolated bright light emitting luminous colonies from the coelenterate *Pteroeides* sp. collected from trawls operating at a depth of 20 meters along PortoNovo coast (Lat. 11° 29′N, Long. 79° 46′E). The luminous microflora were collected by swabbing the surface of live *Pteroeides* using sterile cotton swabs; transferring them to sterile sea water and plating the washings into petriplates containing SWC (Sea water complete) agar medium. The coelomic fluid of the animal was also collected under sterile conditions by cutting open the peduncle of the animal and plating it as before. Surface samples of water and samples of sediment adhered to the trawl were also collected and plated and all the samples were incubated at 28 ± 2°C for 24 hr. The water, sediment and the organism were subjected to microbiological tests. The schemes of Nealson[1] and Baumann *et al.*[2] were followed for identification and nomenclature of the isolates respectively. The results are given in table 1.

Twenty five isolates were screened from the animal's body surface, coelomic fluid, environmental water and