Alpha-amylase isoenzyme pattern of callus cultures remained unchanged, when cultured onto MSR or B_3 medium. Only one band with a R_f values of 0.158 was observed in each case. However, distinctive changes in the isoperoxidase pattern were observed during root or shoot differentiation in callus cultures. Peroxidase isoenzymes could be classified into two groups (i) those with intermediate electrophoretic mobilities (R_f—0.25 and 0.27) and (ii) fast moving isoperoxidase (R_f—0.40 and 0.50) (figure 1). The most significant change was observed in the fast migrating group, which developed in cultures incubated in MSR and B_3 media. While in cultures incubated in MSR medium, only one band with a R_f value of 0.40 was observed, two bands with R_f values 0.40 and 0.50 developed in cultures incubated in B_3 medium.

Comparison of α-amylase and peroxidase activities in callus promoting and root and shoot forming conditions revealed that there was more pronounced activity of the two enzymes prior to shoot and root formation. Similar increases in α-amylase and peroxidase activities have been demonstrated prior to root or shoot differentiation[9-11]. Increased α-amylase which precede differentiation may be necessary for increased mobilization of carbohydrate reserves concomitant with high synthetic activities which occur during organogenesis[9]. Differences in isoperoxidase pattern associated with shoot and root differentiation have also been elegantly demonstrated[9,11]. Fast moving anodic bands have been shown to be associated with lignification[12]. The changes in band patterns in this study can be interpreted as creating situations conducive to shoot or root formation. Such isoperoxidases thus provide useful biochemical signals for morphogenetic events that follow.

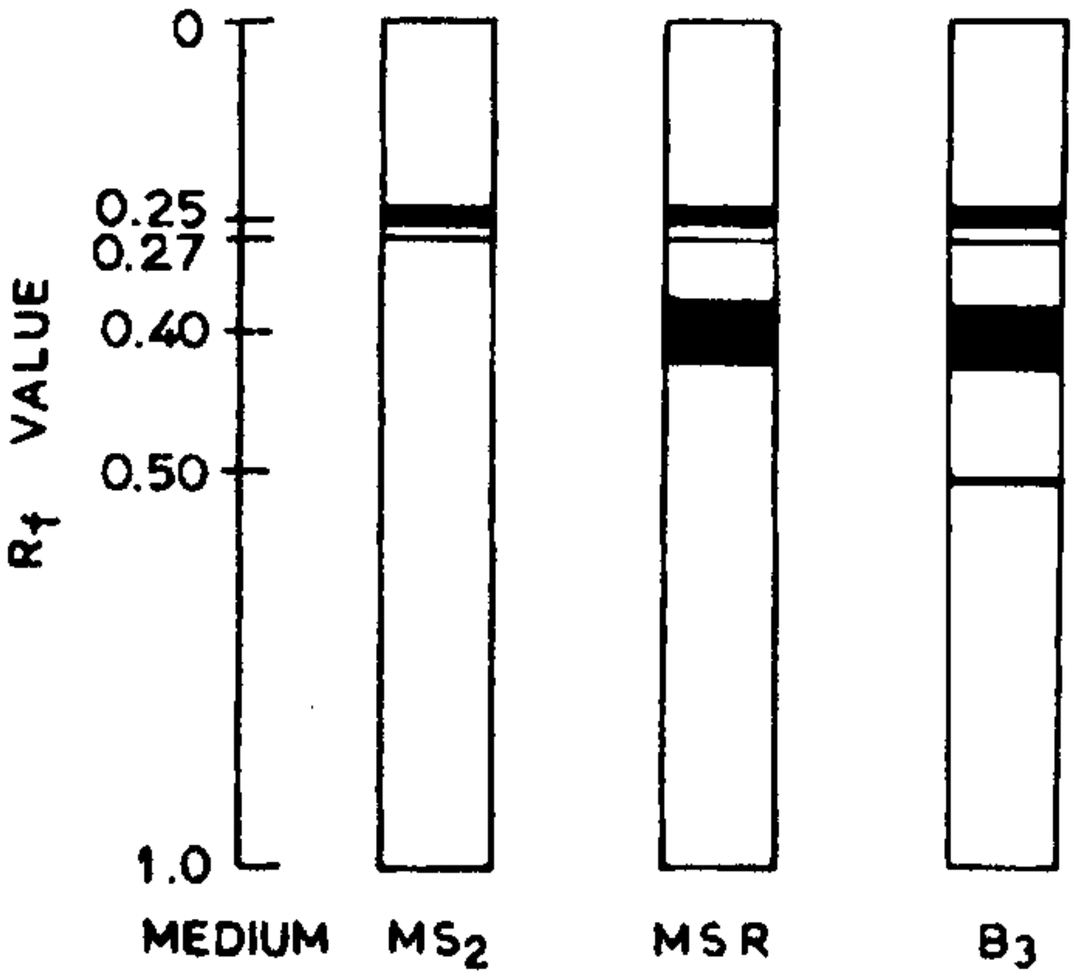

Figure 1. Peroxidase isoenzyme pattern in cultured cells of *Datura innoxia* after 20 days of incubation in different media.

6 May 1986

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RELATIONSHIP OF RICE GRASSY STUNT VIRUS WITH ITS PLANTHOPPER VECTOR

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GRASSY stunt of rice, a disease caused by grassy stunt virus (GSV), was first observed in the Philip-

pines and *Nilaparvata lugens* (Stål), the notorious brown planthopper (BPH), was found to be the vector of the virus[1]. Although the occurrence of the disease in India had been suspected[2] in 1967, it was confirmed experimentally[3] after the severe outbreak of the same and its vector in Kerala in 1973. The only serious attempt so far to investigate the GSV-BPH relationship in this country[4] provided some useful information but not adequate enough to gain insight into the intricacies of transmission. Elaborate studies by the present authors yielded a comprehensive picture of the vector-virus relationship, revealing the entire range of variations in transmission threshold due to seasonal and other factors like the growth stages, morphs and ecotypes of the vector. The study attained great depths due to application of the techniques of mechanical inoculation of the vector by gut-puncturing and injecting clarified extracts of diseased plants or viruliferous insects or haemolymph of infective vector individuals, some of the approaches being altogether new in respect of GSV. The salient findings are briefly presented here which will greatly enrich the existing knowledge.

The minimum access for successful acquisition of virus by the vector was found to be 30 min but rendering only 10% of the hoppers infective. Vector efficiency increased with increase in acquisition access, reaching the peak (61.5%) at 72 hr. Incubation period in the vector showed a wide range of variations, indicating an inverse relationship with the prevailing temperature, ranging from 5–15 days during April to September to 18–30 days during November to January under glasshouse conditions in Delhi (table 1, figure 1). Interestingly enough, the lower extreme of 5-day incubation period, observed in quite a number of cases, is just half of that reported from India[3,4] so far. Likewise, the incubation period in plants ranged from 9–35 days (mostly 14–21) during April to September to 43–95 days (mostly 66–72) during November to January.

There was no significant difference in transmission ability between nymphs and adults or between males and females of macropterous and brachypterous forms, the incubation periods being more or less the same in any particular season. The overall percentages of infective individuals were 66.6, 57.1, 62.5 and 60.0 in the case of macropterous females, macropterous males, brachypterous females and brachypterous males, respectively. The findings sharply contradict an earlier report[4] about inability of the macropterous morphs to transmit GSV. This point is of great significance from the epidemiological aspect since the macropterous females are properly equipped for dispersal to suitable hosts for raising new colonies and are, therefore, likely to play a crucial role in field spread of the disease.

A comparative evaluation of the performance of Kerala and Delhi ecotypes of the vector revealed that the percentage of active transmitters was

Table 1 *Monthly average temperatures in the glasshouse*

Months	Mean max.	Mean min.
January	32.2	13.3
February	35.5	20.0
March	39.7	21.0
April	40.0	21.1
May	40.5	23.3
June	42.3	26.7
July	41.3	25.5
August	38.7	25.3
September	39.9	25.5
October	38.2	18.3
November	30.8	17.5
December	30.5	15.5

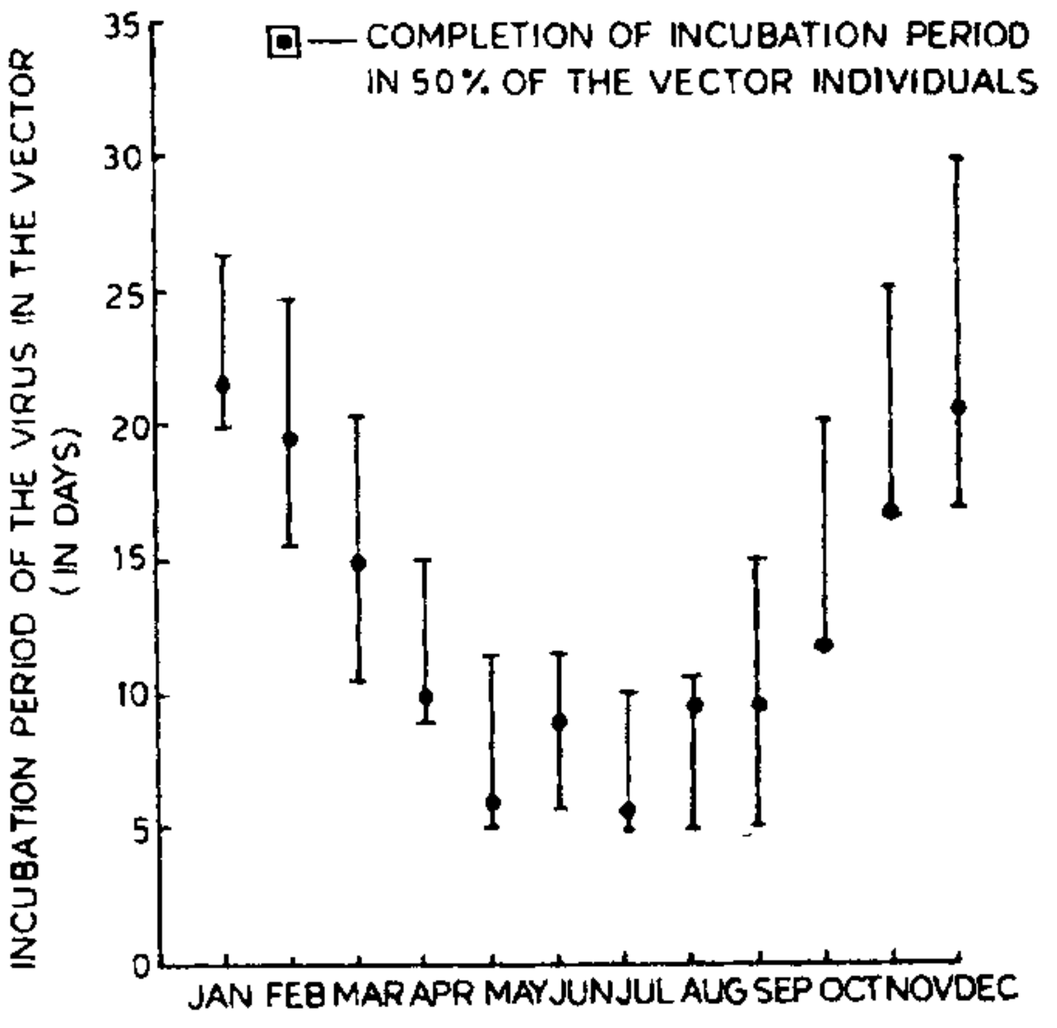

Figure 1. Incubation period of the virus in the vector during different periods of the year.

consistently more in the Kerala ecotype, the difference however, being limited to 15% approximately.

Puncturing of the midgut of the test hoppers shortly before or immediately after acquisition access, marginally enhanced the percentage of infective individuals but much more remarkable was the considerably reduced incubation period in such vectors, being 2–4 days against the known minimum of 5 days when acquired through feeding during July to September. Injection of partially purified sap of diseased plants rendered 7% of the test hoppers infective while the corresponding figure for extract or viruliferous individuals was nearly 11. When test hoppers were injected with freshly drawn haemolymph of infective individuals, about 12% became infective within 7–10 days during September against 5–15 days in control.

No difference in longevity was noted between infective and GSV-free individuals of the vector.

While evidences like transstadial passage, a well-defined latent period between acquisition and attaining infectivity, prolonged retention of infectivity and vector-to-vector passage through mechanical inoculations are more than enough to prove the virus to be circulative, it is still uncertain whether the virus is propagative in the vector or not. Basic work on purification of the virus and successful application of the injection technique may resolve the issue unequivocably.

24 March 1986; Revised 28 August 1986

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HENDERSONIA PUNITHALINGAMII SP NOV FROM INDIA

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DURING the mycoflora survey of Andhra Pradesh, India, a pycnidial fungus was isolated from the forest soil of Mannanur (pH 7.3; temperature 27°C) using dilution plate method[1] and soil plate method[2] employing acidified potato dextrose agar medium and tomato agar medium, respectively. On critical examination it was assigned to the genus *Hendersonia* Sacc as the fungus produced dark and ostiolate pycnidia with yellowish brown, 0–3 septate conidia. Subsequently, the fungus was compared with *Hendersonia* spp with similar conidial dimensions reported in the literature. A survey of literature indicated that Sprague[3] had described many species of *Hendersonia* producing 3-septate and 3–5 septate conidia on grasses. Wehmeyer[4] had described eight species of *Hendersonia* from North–Western India. The present isolate differs from previously described isolates in having smaller conidia, hence described[5,6] as a new taxon, *Hendersonia punithalingamii* Thulasi Reddy and Manoharachary sp nov (figure 1) (named in honour of Dr E. Punithalingam, C.M.I., Kew, U.K.).

Conidiomata pycnidia, solitaria vel aggregata, brunnea vel nigra, subglobosa vel globosa, 120–130 μm diam., ostiolata, cellulae conidiogenae globosae vel doliiformes, hyaline, phialidicae, Conidia flavobrunnea vel pallide brunnea, cylindrica, basi truncata, apice rotundata, 0–3 septata, conidia unicellularia 6–8 × 2.0 μm. Conidia uniseptata 6–11 × 2.5 μm. Conidia 2–3 septata 10–14 × 2–3 μm.

Eterra silvatica; Mannanur, Mahabubnagar District, Andhra Pradesh, India, V. R. Thulasi Reddy and C. Manoharachary, 10–7–1978, OUFS 3 (IMI 232556) holotypus.

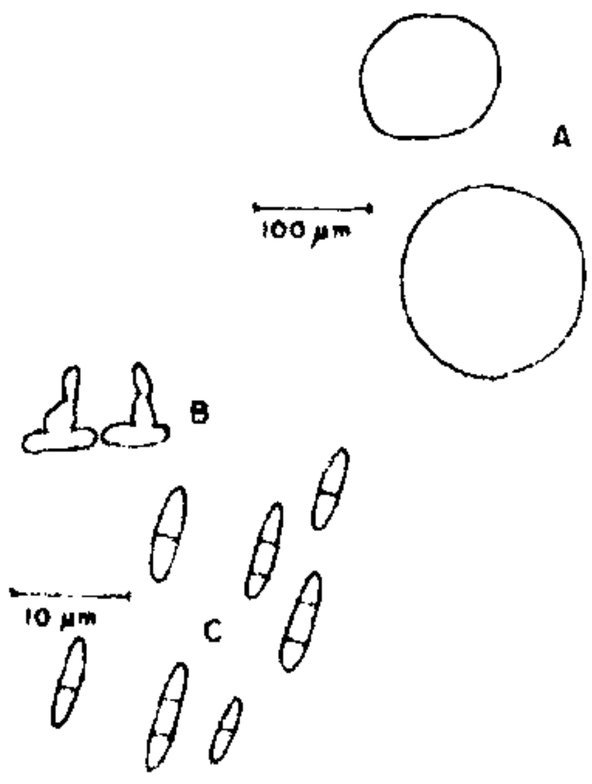

Figure 1. *Hendersonia punithalingamii* sp nov **A.** Pycnidia; **B.** Phialides with developing conidia; **C.** Conidia.