Table 2 *Effect of physical mutagen (X-ray) on growth and yield in Hibiscus esculentus (L)*

Parameters	Control	25 kW	50 kW	75 kW
Height of the plant (cm)	30±1.0	46±1.0	38±0.6	20±0.2
Number of fruits	12±0.0	16±0.0	12±0.1	8±0.3
Length of fruit (cm)	11±0.4	15±0.3	9±0.8	7±0.9
Weight of the fruit (g)	11±0.4	15.2±1.1	12±0.0	3.8±1.4
Total number of seeds in a fruit	38±0.4	61±1.0	40±1.0	30±0.2
Weight of the seeds (g)	1.5±0.1	1.9±0.1	1.7±0.2	1.6±0.3

The values are the mean of 10 replication ± S.E.

tionship. The doses that suppress the growth of the main shoot (height) may not have a noticeable effect on processes such as photosynthesis, respiration and absorption of mineral substances[8]. In the present study, at higher dose (75 kW) there is a general reduction in plant height which affected the leaf area, the carbon fixation and the protein content thus contradicting the statement made by Vasiliev[8]. Since there is a growing belief that certain developmental processes are regulated through hormonal balances, individual genes in a group that mediate the same plant process may participate by controlling either the promotory or inhibitory effects[9].

Sinnot[1] found that X-ray irradiation can stimulate genes for leaf size. He considers some of the abundant evidence for the existence of genes for size, form and shape. Thus in contrast, Linde-Laursen[10] observed that the number of roots in a mutant barley was reduced, which shows the inhibitory effect of mutations.

A significant increase in the number of roots in the present study (control = 12, 25 kW X-rays = 28) can be regarded as a mutation.

Thus as the genetic information accumulates, it may be possible to select mutants for desirable characters.

The authors thank Prof. V. S. Rama Das for suggestions and encouragement.

2 May 1987; Revised 24 June 1987

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ON THE OCCURRENCE OF *LYCOPERDON PERLATUM* IN *PINUS PATULA* PLANTATIONS IN TAMIL NADU

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DURING our studies on the ectomycorrhizal fungi associated with *Pinus patula* in Kodaikanal and Nilgiris in Tamil Nadu *Lycoperdon perlatum* was found as one of the predominant fungal species in the plantations. The rhizomorphs from the sporocarps were traced up to the mycorrhizal roots. *L. perlatum* has so far not been reported to be associated with *P. patula*[1] and a good description of this species occurring in India is lacking. Hence the fungus is described below. The colour terminology used is that of Kornerup and Wanscher[2].

Lycoperdon perlatum Pers., Syn. Meth. Fung., 148, (1801), figure 1a–e.

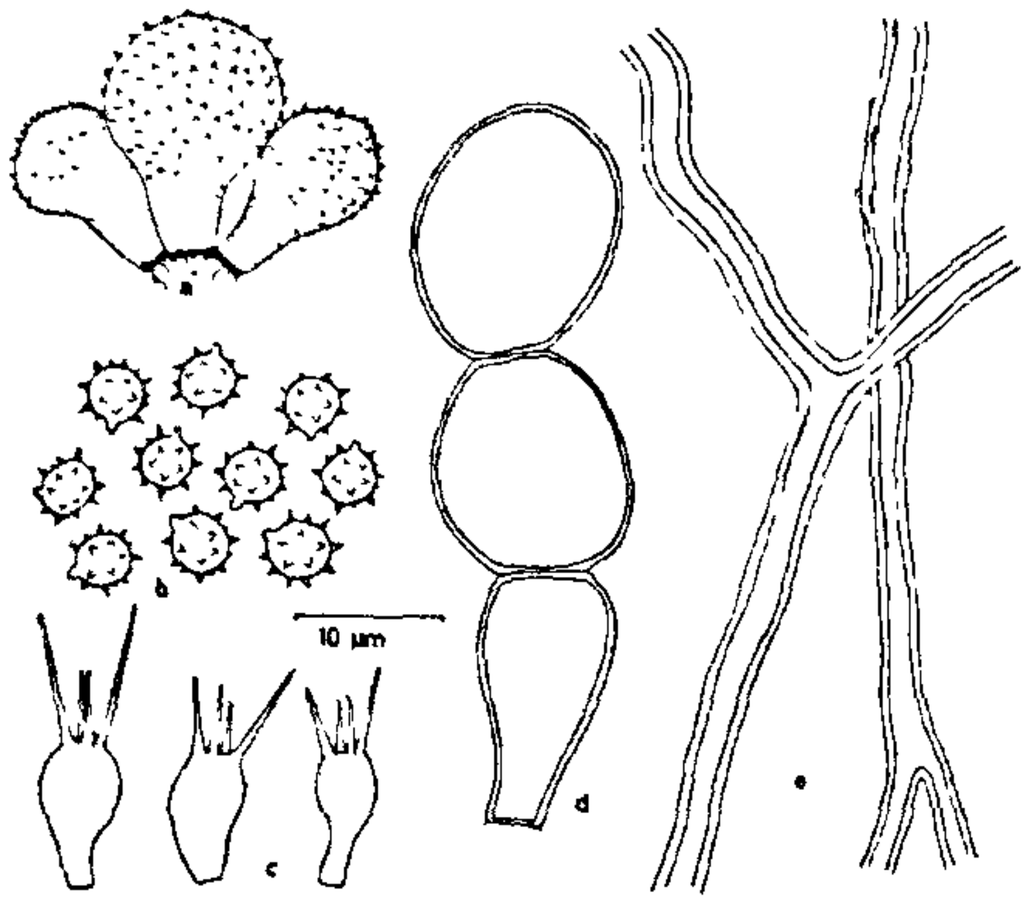

Figure 1. a. Habit; **b.** Spores; **c.** Basidia; **d.** Peridial structure; **e.** Capillitial threads.

Sporocarps epigeal, 2–5 cm high and 1–3 cm broad, obconical to pyriform with a distinct base which is elongated and stalk-like (subgleba). Surface orange grey (5B2) at the centre, creamish all over when young and becoming brownish orange (5C3) to dark blond (5D4) when old. The surface spiny, spines bigger and numerous towards apex and lesser and smaller towards base; in older sporocarps spines fall off and leave depressed areas; dehiscence is by apical torn aperture. Sterile base (subgleba) chambered, occupying almost half of the length of the sporocarp, chambers up to 1 mm diam., brown, separated from the gleba by a conspicuous diaphragm, confluent with the endoperidium. Gleba white when young, brownish olivaceous when mature, composed of minute chambers which are lined with hymenium; the chambers collapse when spores mature. Basidiospores brown with a distinct olive tint, globose, 3–4 μm, asperulate, pseudomyloid and cyanophilic; spines up to 1 μm long. Basidia clavate, 7–9 × 4–5 μm, tetrasporic, bearing 4 unequal, long, slender 5–10 μm long sterigmata. Capillitium thread-like, continuous with the inner peridium and subgleba, 2–4 μm, diam., sparingly branched, thick-walled (1–1.5 μm thick), aseptate with pitted walls. The mounds or the spines on the surface are formed by groups of pseudoparenchymatous hyphal chains, individual elements of which are globose to elliptical, 13–40 × 9–35 μm, thick-walled (up to 1 μm thick). Clamp connections absent.

In group, in *Pinus patula* plantations, Kodaikanal and Nilgiris in Tamil Nadu, India.

Pure culture from the sporocarps has been obtained for further *in vitro* studies of mycorrhizal synthesis.

Thanks are due to Dr V. Demoulin of Liege University, Belgium for confirming our identification of the fungus. One of us (KBP) is grateful to UGC, New Delhi for a fellowship.

1 May 1987

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SERODIAGNOSIS OF TYPHOID FEVER BY INDIRECT HAEMAGGLUTINATION USING CRUDE LYSATE ANTIGEN

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ENTERIC fever is prevalent all over the world. In India most of the infections are caused by *Salmonella typhi*[1,2]. The diagnosis is confirmed by the isolation of causative organism or by the detection of specific antibody from clinical samples. Several immunodiagnostic procedures such as widal agglutination[3], haemagglutination inhibition[4], indirect haemagglutination[5], counterimmunoelectrophoresis[6] etc are available for diagnosis of typhoid fever.

Culture methods are time-consuming and counterimmunoelectrophoresis is less sensitive[7]. Indirect haemagglutination is not routinely practised and moreover the antigen coated on the RBCs should be pure[8]. George and Vaugham[9] showed that mixed antigens can also be coated on the RBCs but their coating efficiency decreases considerably.

Gupta and Rao[10] used centrifuged ultrasonic lysate antigen in counterimmunoelectrophoresis for detection of typhoid. This lysate contains several antigenic components including lipopolysaccharides and protein. Tanned RBCs coat for protein and untanned RBCs coat for lipopolysaccharides. In this communication we attempted to evaluate the efficacy of *S. typhi* lysate antigen in IHA (indirect haemagglutination) by coating on to both tanned and untanned SRBC (sheep erythrocytes).

Fifty-five serum samples from suspected typhoid patients admitted at the GR Medical College, Gwalior were collected during the first and second week of fever. Serum samples were inactivated at