Table 1 *Different combinations of hormone used for regeneration experiment*

Set	Hormone combination (mg l)	
	IAA	BAP
1	0.2	1
2	0 2	2
3	0.2	4
4	0.2	5
5	0.5	1
6	0.5	2
7	0 5	4
8	0.5	5

grew vigorously in the same medium after subsequent subcultures without any organogenesis, but adenine, at the concentration of 1 mg/l, stimulated the formation of shoot from these nodular structures (figure 4). From such shoots roots developed and the rooted plant was later maintained for further growth in half saturation of MS medium (figure 5).

Organogenesis from callus culture is an interaction of several exogenous and endogenous factors of the tissue. Since the critical assay of endogenous factors is difficult to demonstrate the indirect manipulation of several endogenous factors is much more important. Previous work[2] on tissue culture of root cells of *V. faba* showed the formation of callus tissue using 2,4-D and yeast extract and no organogenesis occurred. In the present experiment the callus tissues were formed from the radicle of the embryo using NAA/BAP combination. There is no earlier report of regeneration of plantlets in this plant. However, in the present experiment, the use of NAA/BAP instead of 2,4-D has some beneficial effect in the later developmental stages with the production of green nodular structures in the callus tissue. These nodules developed into shoot buds and ultimately plantlets when adenine was added in the media. Since adenine is the basic structure of cytokinin, it can be said that the incorporation of adenine in the cells of nodular structure may cause biochemical changes to bring about a morphogenetic response in the callus tissue. The observation also explains that the presence of auxin like NAA and IAA is essential for the pre-developmental stage of organogenesis but is not required in the final step leading to organogenesis.

The financial assistance by the University Grants Commission, New Delhi is gratefully acknowledged.

20 November 1984; Revised 25 March 1985

1. Binding, H. and Nehls, R., *Z. Pflanzenphysiol.*, 1978, **88**, 327.
2. Grant, M. E. and Fuller, K. W., *J. Exp. Bot.*, 1968, **19**, 667.
3. Mitchell, J. P. and Gildow, F. E., *Physiol. Plant.*, 1975, **34**, 250.
4. Mitchell, J. P. and Gildow, F. E., *J. Histochem. Cytochem.*, 1978, **26**, 230.
5. Roper, W., *Z. Pflanzenphysiol*, 1981, **101**, 75.
6. Venketeswaran, S., *Phytomorphology*, 1962, **12**, 300.
7. Murashige, T. and Skoog, F., *Physiologia Plant.*, 1962, **15**, 473.

A NEW DISEASE ON BANANA MAIN STALK

M. NARAYANAPPA and M. M. MUSTAFFA
Central Horticultural Experiment Station, Chethalli 571 248, India.

DURING January 1983, a severe disease incidence was observed on the main stalk of the banana bunch at the Central Horticultural Experiment Station, Chethalli (Kodagu). The infection was noticed on the proximal end of the main stalk as minute greenish-brown streaks which later spread to the fruit and backwards towards the curved portion of the main stalk. The affected tissues shrivelled, dried and shreaded leading to dry-rot. The infected fingers showed yellowish streaks and they became soft without rotting. The incidence was observed particularly in the variety 'Hill banana' (locally Marabale) (figures 1–3). The infected bunches weighed 2.5 kg in contrast to the healthy bunches which weighed 10.2 kg.

Figure 1. Infected bunch with main stalk showing the symptoms.

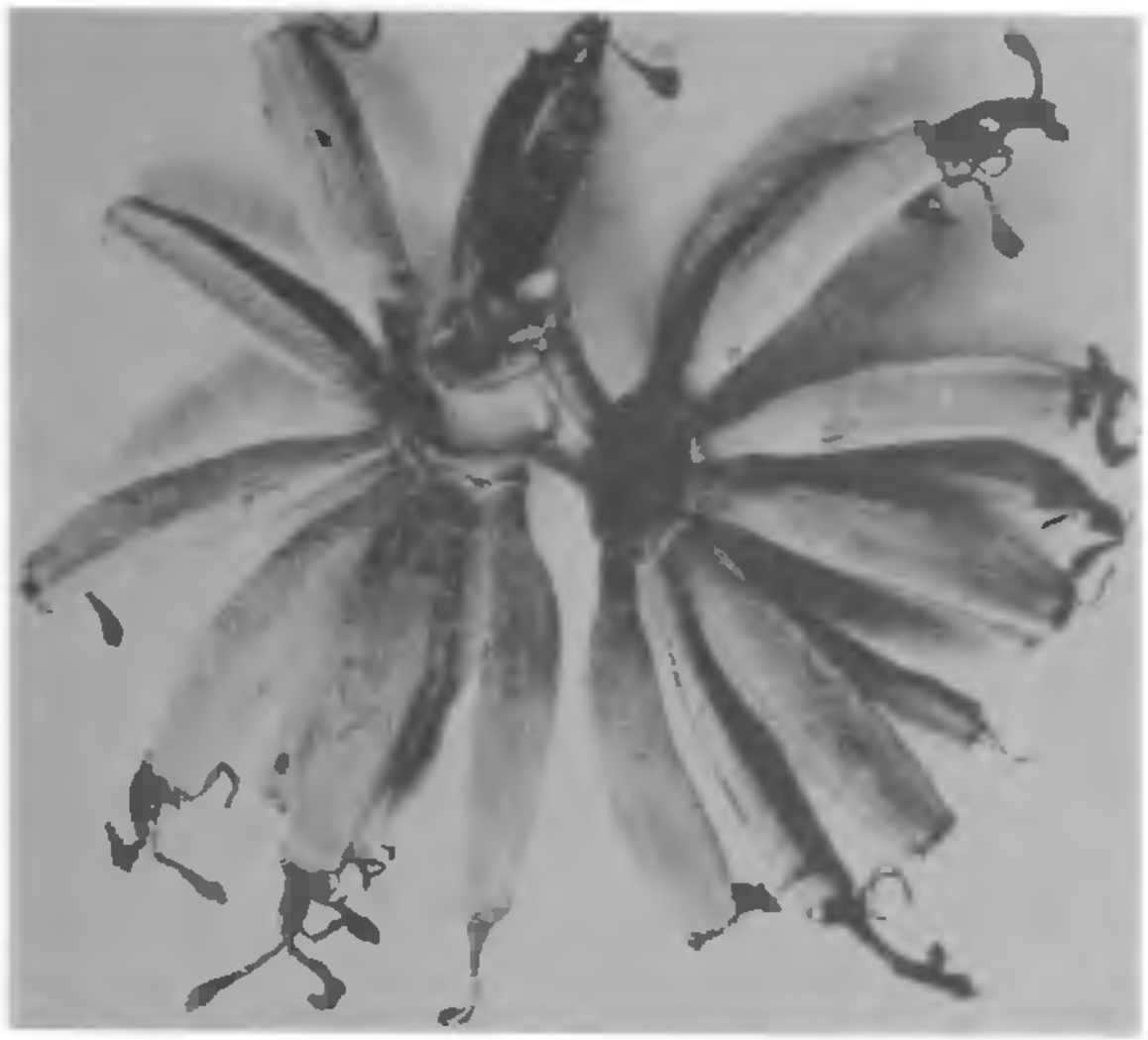

Figure 2. Infected fingers and hand showing underdeveloped fingers.

Figure 3. Cross-section of the main stalk showing the infection.

The pathogen was isolated from the infected tissues on potato dextrose agar (PDA) and pathogenicity was proved. The infection developed 25–30 days after inoculation. The pathogen was identified as *Botryodiplodia theobromae* Pat. (CMI No. 281503) and forms the first report from India[2].

Banana main stalk rot was also caused by *Ceratocystis paradoxa* (Moreau) Dade and *Gloeosporium musarum* Cke and Massee in banana[1].

Authors are thankful to the Director, Commonwealth Mycological Institute, England for confirming the identity of the fungus.

15 June 1984; Revised 8 April 1985

1. Wardlaw, C. W., *Banana disease*, Longmans Green, London, 1961, p. 488.
2. Bilgrami, K. S., Jamaluddin and Rizwi, M. A., *Fungi of India* (Part. I), Today & Tomorrow's Printers & Publishers, New Delhi, 1979, p. 30.

VARIATIONS IN INFLORESCENCE AND FLORAL CHARACTERS FOLLOWING IRRADIATION IN YAM BEAN (*PACHYRRHIZUS EROSUS* LINN)

S. G. NAIR and SUSAN ABRAHAM
Department of Botany, University of Kerala, Kariavattom, Trivandrum 695 581, India.

IN the course of mutation induction studies in yam bean (*Pachyrrhizus erosus* Linn), a sterile plant showing characteristic change in inflorescence and floral characters was noticed in the M_1 generation raised from gamma irradiated seeds. Of the 415 plants raised from 10, 15, 20, 25, 30 and 35 kR treated seeds, only one plant in the 20 kR treatment showed this variation. Untreated plants have trailing vines (figure 1) and the flowers are borne on fascicled pedicels in racemes (figure 3). The variant was distinctly different in habit, and possessed erect and sturdy vines (figure 2). Marked proliferation and heavy branching of the inflorescence was observed and this resulted in profuse bud formation (figure 3). A close examination of the inflorescence showed that each bud consisted of 5 to 6 scaly sepal-like structures only (figure 4). The absence of male and female reproductive organs was characteristic of all the buds. The buds did not open but remained in the inflorescence till the harvest time. Attempts to propagate the plant from tubers proved unsuccessful.

Chronic irradiation of *Tradescantia paludosa* resulted in marked proliferation and over-growth of flower buds and many abnormal axillary buds[1]. Mutant devoid of reproductive part was reported in the M_2 generation of EMS treated rice[2]. In *Oxalis*, a flower head receiving 625 r per day for several months developed only bracts or petal like structures[3]. Shifts in physiological balance, change in enzyme systems, disturbances in the production of growth substances etc have been found to be responsible for the occurrence of these changes. The deviations in inflorescence and floral characters now observed may also be due to gene mutations suppressing the expression of normal inflorescence and floral characters.