TABLE I

Sl. No.	Lead found by the[1] classical method (%)	Lead found by the new method (%)
1	44·22	44·55
2	33·13	33·27
3	19·25	19·50
4	12·35	12·18
5	11·30	11·48
6	8·87	8·98
7	6·41	6·30
8	3·38	3·32
9	1·89	2·03
10	0·63	0·58
11	0·18	0·21
12	0·07	0·07

are not very low. This involves the precipitation of the lead (in the cold) with a measured excess of standard dichromate solution, making up the volume to 250 ml., keeping overnight, decanting through a dry filter-paper and determining the excess dichromate with ferrous sulphate. The precipitation of lead with the excess dichromate can also be effected in hot solution and the liquid decanted after keeping for two hours instead of overnight.

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SOME STORAGE DISEASES OF FRUITS

DURING the survey of storage diseases of fruits and vegetables, undertaken by the authors since 1962, a number of diseases were observed, of which many were previously not described from India. The present note describes three such diseases:

1. *Anthracnose of* Averrhoa carambola L.—In the initial stages light brown shallow pits appear on the ribbed margin of the fruits. Later they enlarge and many of them coalesce. Subsequently, salmon coloured masses of spores oozing from the acervuli make their appearance on such lesions.

The disease is caused by *Colletotrichum gloeosporioides* Penz. Pathogenicity test indicated that every fruit got infected when the fungus was inoculated after inflicting even slightest injury to the fruits, but only 30% infection was observed on unwounded fruits.

2. *Asperigillus Rot of* Spondias mangifera *Willd.*—Initially the disease appears as water-soaked lesion which later becomes dull light brown in colour. It gradually enlarges and gets depressed. In advanced stages black conidial heads appear on the infected tissue.

The disease is incited by *Aspergillus niger* van Tiegham. Injury has been found prerequisite for initiation and development of the infection.

3. *Scab of* Pisum sativum L.—Scab like spots appear on the surface of the pods, which are usually dark brown or black, irregular in shape and slightly raised. Inside wall beneath the scab lesions frequently shows white felty or hair-like proliferations.

Scab is brought about by *Cladosporium sphœrospermum* Penzig. The fungus on inoculation to pea pods produced typical symptoms characteristics of scab. A similar type of scab is, however, known to be incited by *C. pisicolum* Snyder] in the United States of America.

The authors are grateful to Dr. J. C. F. Hopkins, ex-Director, Commonwealth Mycological Institute, Kew, Surrey, England for confirming the specific identity of the scab and anthracnose fungi.

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A ROOT ROT OF GRAPES IN ANDHRA PRADESH

IN recent years, with the intensive cultivation, the grape grower is facing with several pest, disease and agronomic problems.

In the last 2 or 3 years, death of mature vines of *Anab-i-Shahi* and Selection 7 has been observed in several vineyards in and around Hyderabad. Single vines, occasionally contiguous ones are also affected. The onset of the disease is insidious. The leaves turn chlorotic, the vines become moribund. The

symptoms generally appear following the monsoon rains. The pruned vines either fail to recover or having recovered partially die-back. The roots and collar of the affected vines, in a few instances, had some evidence of ecto-parasitic nematodes, but in most cases, there was typical decomposition of the bark and cortical cells brought about by fungi. On several specimens examined in the laboratory, *Phytophthora cinnamomi* Rands was invariably present although occasionally the following fungi were also noticed. Two *Fusarium* spp, each belonging to *elegans* and *martiella* sections, an undetermined species of *Rosellinia, Melanospora brevirostrata* Moreau, *Diplodia natalensis* Desm., *Neocosmospora vasinfecta* E.F.S. *Pythium aphanidermatum* (Eds.) Fitzp. and an undetermined species of *Phytophthora*. A brief description of *Phytophthora cinnamomi* from a composite collection is given below :

PHYTOPHTHORA CINNAMOMI RANDS in *Meded. Inst.* PlZiekt., *Buitenzorg.*, 54, p. 41, 1922.

Mycelium intra and intercellular in cortical and bark tissues, sparingly anastomosing, upto 6 μ in width. Chlamydospores present, generally globose upto 50 μ in diameter, often occurring in clusters. Conidiophores undifferentiated, sympodially branched. In nature, the sporangia were observed very rarely on incubated material but in mycelial transfers on to sterile distilled water or nutritional solutions. abundant sporangial production was noticed. These are terminal, ellipsoid with an inconspicuous papilla, measuring 30-60 (–85) × 25-33 (–40) μ. Secondary sporangia were observed by proliferation through the empty ones. Biflagellate, reniform, zoospores were observed measuring 10 × 16 μ, oospores were not observed in any of the specimens collected.

There are very few records in the literature of *Phytophthora* spp. associated with diseases of vines.[1] Chiarappa[2] found that 32% of the fungi isolated from the rhizosphere and roots of grape vines in the San Joaquin Valley of California were various species of *Phytophthora*. Recently McGechan[3] isolated *Phytophthora cinnamomi* from the roots of vines resistant to *Phylloxera* in Australia.

In view of the fact that *Phytophthora cinnamomi* has been recorded in relation to root rots of several ornamental and fruit crops from all over the world, it is imperative that further investigations are carried out on the pathogenecity, biology and control of the fungi in vineyards.

In early stages of attack, the ill-effects of the fungus can be overcome temporarily by heaping up of the soil at the collar which encourages new root growth. A certain degree of temporary relief was observed by treating the soil with fixed coppers and Cheshunt compound, Bordeaux mixture, etc. As it is very likely that the fungus is a soil inhabitant it should be noted that thorough soil sanitation measures may be necessary before infilling the vacancies.

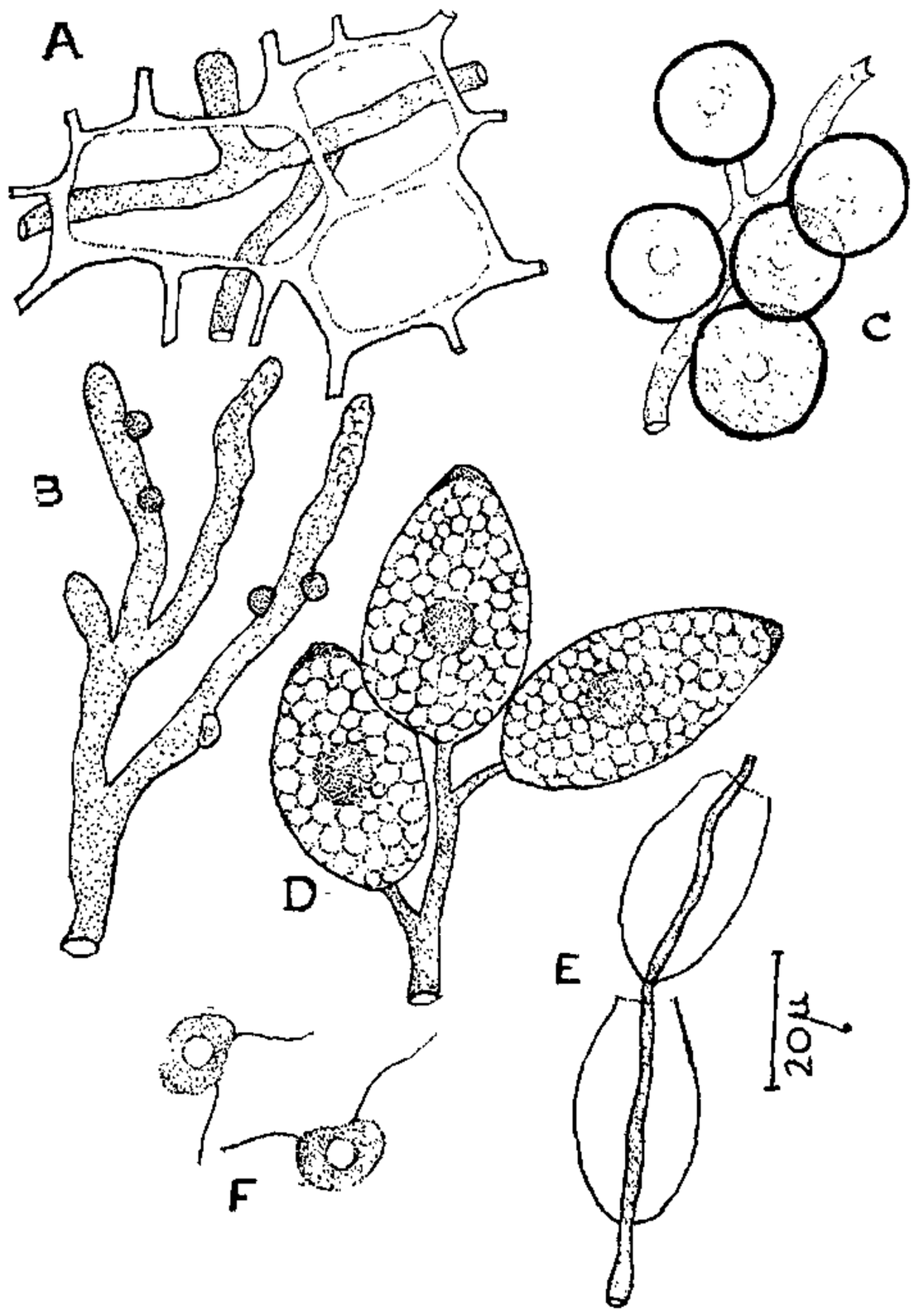

FIG. 1. *Phytophthora cinnamomi* Rands. A, Intra cellular mycelium of the fungus in bark cells : B, Mycelium from nutrient cultures ; C, Chlamydospores ; D, Sporangia ; E, Proliferating sporangia after they have emptied the spore contents. F, Biflagellate zoospores.

A survey of the role of several cultural practices in relation to the incidence of the disease, particularly water management and the extent to which the disease, is responsible for any decline in yields should be immediately investigated.

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Fertilisers and Pesticides Div.,
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OCCURRENCE OF PLASTID MUTATION AND ITS INHERITANCE IN *GOSSYPIUM*

VARIEGATION or plastid abnormalities have been reported in many plants like maize,[1] tobacco,[2] *Primula*[3] and wheat.[4,5] A reference to the Texas Experimental Station report[6] shows that variegated plants have been observed in tetraploid cotton species, *Gossypium hirsutum* and *G. barbadense*. Recently Kohel[7] reported in detail the inheritance of variegation in *G. hirsutum*.

In the present study, a variegated plant was isolated from a small population of Russian *hirsutum* (var. PRS-72) grown for the first time in Delhi in 1965. The leaves of this plant were of four types, *viz.*, (1) white, (2) yellow, (3) green and yellow mosaic, and (4) normal green (Fig. 1). Three bolls were collected from the selfed plant. Two of the three bolls were white or variegated and the third was normal green. Seeds from these bolls were sown separately and the seedlings were screened.

All the seedlings derived from the green boll were normal. The seedlings derived from the variegated and white bolls fell under three categories, *viz.*, yellow, variegated and green. To start with all seedlings looked similar but when unfolding of the cotyledons was completed, it was possible to differentiate normal and variegated seedlings. The yellow seedlings died three days after their emergence under field conditions and after five days in pots. The variegated seedlings had low survival in the field but when grown in pots their survival was improved.

In order to study the nature of inheritance of this plastid mutation, reciprocal crosses were made using the variegated plants and two other strains, C-1998 and H-14. Flowers selected from sectors which were showing

FIG. 1

chlorophyll abnormality were used in all crossings. The results are given in Table I.

TABLE I

Female	Male	F_1	F_2
PRS-72	Variegated × C-1998	Green, yellow, variegated	..
C-1998	× PRS 72 variegated	Green	Green
PRS-72	× H-14 variegated	Green, yellow, variegated	..
H-14	× PRS-72 variegated	Green	..

The F_1 and F_2 data clearly show that the inheritance of variegation is only through the female side and nuclear factors are not involved. It is now well known that DNA is present in plastids[8] and it is possible to visualise its mutation which will alter the structure and function of the plastid. This, when transmitted through the maternal side, gives the offspring the yellow or variegated phenotype depending on the inclusion of normal proplastids. The inheritance studies made by Kohel[7] also led to similar conclusion. The lethal seedlings were scored as *albino* by Kohel but in the present study, it was observed that they were yellow in colour due to the unmasking of carotenoid pigments. Hence it is suggested