cellular, septate, branched, developing numerous dark reddish-brown resting spores. Young spores are at first thin-walled, hyaline and pyriform, and turn deep brown and warty as they mature. The mature spores are reddish-brown, globose-oval, thick-walled, covered with pyramidal warts, measuring 22.5–32.5 μ (Fig. 2). Studies on germination of resting spores and other cultural studies are in progress.

As regards the identity of the pathogen, the fungus is a species of *Protomyces*, which is indicated by the warty nature of its exospore and other characters. *Synchytrium phaseoli* Patel, Kulkarni and Dhande was reported from Jalgaon, Bombay State, by Patel *et al.*¹, as inciting leaf spots on mung beans. A portion of the type material was examined by us through the kindness of Dr. M. K. Patel. The results suggest that the fungus reported as *S. phaseoli* is identical with the fungus found by us. The intercellular hyphae and resting spores distributed in the spaces indicate that it bears no relation to *Synchytrium*. The name *Synchytrium phaseoli* Weston precedes *S. phaseoli* Patel *et al.*, consequently the *Protomyces* species under study is designated *P. patelii* Pavgi and Thirumalachar *nom. nov.* in honour of Dr. M. K. Patel, who has contributed greatly to our knowledge of Indian fungi.

A detailed account will be published elsewhere.

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¹ Patel, M. K., Kulkarni, Y. S., and Dhande, G. W. *Curr. Sci.*, **18**, 171 (1949).

Preservation of the Virus of Tomato Spotted Wilt in Dried Plant Material

It is difficult to obtain accurate information about the properties of viruses which lose their infectivity *in vitro* too quickly. Tomato spotted wilt virus is one of these, and investigations on it are further limited by the fact that it is inactivated at comparatively low temperatures (35° C.). The *in vitro* life of tomato spotted wilt virus was reported by Bald and Samuel¹ to be about four hours in undiluted expressed juice held at room temperature. Subsequent work by Best and Samuel² and by Best³ showed that the factors causing inactivation were the pH value of the juice and a tyrosinase catalysed oxidation, and that by controlling the pH value and redox potential of the medium⁴ the virus could be maintained infective in solution for thirty-five days at 2° C.

Slow drying of infective plant tissue near the freezing point was not successful.

Transferring freshly harvested infective material to a 'deep-freeze' at –20° C. met with partial success: strain⁵ A survived for thirty-two days but not for seventy-four days, and strain E remained infective for thirty-six days but not for seventy-eight days.

The most successful method yet tried is to freeze-dry tissue and store it at a low temperature. Tomato leaflets infected with strain A and tissue of *N. glutinosa* infected with strain E were put into a deep freeze at –20° C. as soon as they were harvested. Within two hours the leaves were removed, cut as quickly as possible into pieces about 5 mm. square

and put into a flask of a freeze dryer actuated by a high-vacuum pump and suitable refrigerants. The temperature in the bulb was about –30° C. It took about eight hours to dry 11 gm. (fresh weight) of tomato leaflets. This operation was kindly performed for us by Mr. Zwar, of the Section of Plant Physiology of the Commonwealth Scientific and Industrial Research Organization. After eight hours, all but the last traces of water were removed and the material was transferred to screw-top bottles and stored (in the presence of air) in a deep-freeze at –20° C. After 36, 82 and 125 days of storage, portions of each sample were withdrawn suspended in buffer solution of pH 7.5 made 0.01 molar in respect to sodium sulphite. Inocula prepared in this way were inoculated on to plants of tomato, tobacco and *N. glutinosa* by methods described in our previous papers. After storage for thirty-six and for eighty-two days, all inoculated plants became infected with the virus. The reaction of plants inoculated 125 days after harvesting showed that both strain A and strain E of tomato spotted wilt virus had survived; but there was some evidence that the mild strain E is not holding out as well as strain A.

The tests are still in progress.

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¹ Bald, J. G., and Samuel, G., *Coun. Sci. Ind. Res. (Australia) Bull.* **54** (1931).

² Best, Rupert J., and Samuel, G., *Ann. App. Biol.*, **23**, 509 (1936).

³ Best, Rupert J., *Aust. J. Exp. Biol. Med. Sci.*, **15**, 191 (1937).

⁴ Best, Rupert J., *Aust. J. Exp. Biol. Med. Sci.*, **17**, 1 (1939); *J. Aust. Inst. Agric. Sci.*, **5**, 94 (1939).

⁵ Best, Rupert J., and Gallus, H. P. C., *Aust. J. Sci.* (in the press).

Causes of Coconut Nutfall and Gumosis

WAY¹ has reported that the coreid bug *Theraptus* sp. is the cause of nutfall and gumosis of coconuts in East Africa. During more recent investigations to discover economical methods of combating this pest, it has been found that *Theraptus* sp. is only one of at least four insect pests causing either nutfall or gumosis or both. The larvæ of the weevil *Diocalandra frumenti* F. will cause both nutfall and particularly gumosis of immature nuts. Mansfield-Aders² noted the presence of *D. frumenti* in coconuts in Zanzibar and suggested that it might be a cause of nutfall and gumosis. *D. frumenti* thrives best in areas infested by *Theraptus* sp. and *Anoplolepis longipes* Jerd. It is preyed upon by both *Anoplolepis custodiens* Smith and *Oecophylla smaragdina* L., var. *longinoda* Latr. The larvæ of the moth *Lamoria* sp. cause considerable nutfall in palms foraged by *A. longipes* and *Pheidole* sp. by boring into and eating the bases of the young nuts. A major cause of nutfall in areas where *Theraptus* sp., *D. frumenti* and *Lamoria* sp. have been either eradicated or controlled by insecticides is the ant *Polyrhachis schistacea* Gerst., vars. *rugulosa* Mayr and *militaris* F. These ants nest both in the ground and in the palms, and feed mostly on pollen and nectar. They are so efficient at removing the nectar from flowering nuts that they remove the lining of the stigmata and prevent fertilization. In palms heavily foraged by *Polyrhachis* sp. complete loss of nuts occurs.