roundish, stuffed in young, yellowish to yellowish brown in age, unchanging; stipe central, 4–9 cm long, 1–2 cm across, bulbous when young becoming equal, base subradicating, light brownish in the apex, whitish yellow below, reticulate in the upper half; flesh firm, white, unchanging.

Spores olive brown in mass, 12–16(17) × 4–5.5 μm, ellipsoid, subfusiform, inequilateral in profile, yellowish to olive yellow in KOH, inamyloid, smooth, hilum distinct; basidia (27)30–40(45) × 9–12 μm, clavate, 4 spored; pleurocystidia scattered 40–55(65) × 7–15 μm, narrowly fusoid ventricose, thin-walled; cheilocystidia similar.

Tube trama divergent; pileus cutis a palisade-like trichodermium of hyphae, collapsing at maturity 8–12 μm wide, hyaline to pale in KOH, yellowish in Melzer's; stipe cutis of loosely interwoven hyphae, 4.5–8 μm wide, with a disrupted caulohymenium; caulocystidia 25–55(60) × 9–18 μm, clavate to ventricose, thin-walled; clamp connections absent. Chemical spot tests: KOH: Flesh-pinkish white, cuticle-reddish brown; NH_4OH: Flesh-pinkish white, cuticle-light brown; $FeSO_4$: Flesh-negative to greyish, cuticle-negative, Melzer's-Flesh and cuticle-negative.

Habit and habitat: Scattered to gregarious under *Cedrus deodara* Hook. and *Pinus wallichiana* Jack., mycorrhizal with the former.

Material examined: Acc. Nos: Shimla; HPUB 265, 1699, 1758, 1768, 1770, 2007, 3091; Kullu; HPUB 3160, 3161, 3162, 3239; Chamba; 3328.

Comments: *B. edulis* has never been recorded under/with *C. deodara* and *P. wallichiana*[4]. This is, therefore, first report of its occurrence outside the earlier recorded range.

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1. Garcha, H. S., *A manual of mushroom growing*, Punjab Agricultural University, Ludhiana, 1984, p. 71.
2. Kornerup, A. and Wanscher, J. H., *Methuen Handbook of colour* (3rd edn), Eyre Methuen, London, 1978, p. 252.
3. Manjula, B., *Proc. Indian Acad. Sci. (Plant Sci.)*, 1983, **92**, 81.
4. Smith, A. H. and Thiers, H. D., *The boletes of Michigan*, The University of Michigan Press, Ann Arbor, 1971, p. 428.

PATTERN OF ACID PHOSPHATASE ACTIVITY DURING SHOOT ORGANOGENESIS IN NORMAL AND VARIANT CALLUS CULTURES OF *NICOTIANA TABACUM* L.cv. WHITE BURLEY

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Enzyme studies in tissue cultures under different culturing conditions leading to different end results can be a useful index in understanding the cellular or subcellular events[1–3]. Phosphatases form a group of important enzymes involved in different cellular functions. These are also important for their role in the mobilization of food reserves[4,5]. Acid phosphatases were studied under non-shoot-forming (NSF) and shoot-forming (SF) conditions in normal and variant callus cultures of *Nicotiana tabacum* L.cv. White Burley to determine whether different callus cultures follow the same pattern during shoot formation. A slow-growing stable variant with different leaf morphology, internode length and flowering pattern appeared spontaneously during regeneration of normal callus cultures. The morphological features were maintained during successive cultures. Normal callus and callus developed from this variant were used as materials.

Callus cultures were established from leaf midrib explants on LS medium[6] supplemented with 3 mg/l napthalene acetic acid and 1 mg/l benzyladenine in the dark at 25 ± 2°C. Callus was subcultured and maintained in the same medium. For shoot regeneration, small pieces of calli (approximately 100 mg fresh weight) were transferred to LS medium fortified with 2 mg/l indole acetic acid, 2 mg/l kinetin, 160 mg/l adenine sulphate and 340 mg/l sodium dihydrogen orthophosphate and were kept at 25 ± 2°C under diffused light. Shoots appeared on the 10th and 12th days of transfer, in normal and variant callus cultures respectively. Acid phosphatase activity was assayed every alternate day from the day of transfer to callusing/shoot forming medium using the Jones[7] method.

Acid phosphatase activity under NSF and SF conditions in normal and variant callus is shown in figure 1. The specific activity increased considerably under NSF conditions in normal callus. However in variant callus cultures, the acitivity was low. Activities were quite comparable under SF conditions. The peak activity appeared two days prior to shoot

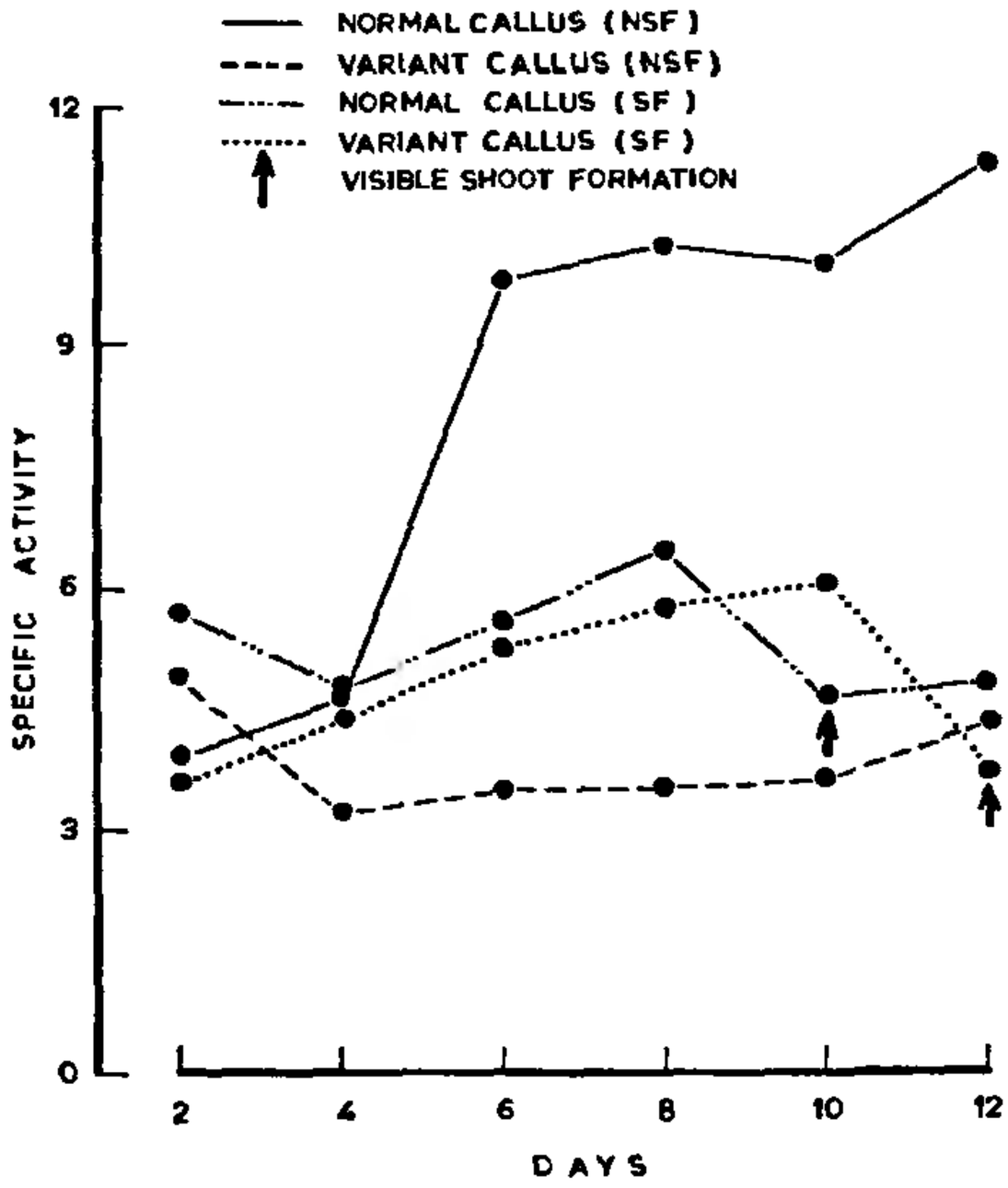

Figure 1. Acid phosphatase activity in NSF and SF calli of normal and variant callus cultures of *Nicotiana tabacum* L.cv. White Burley.

appearance. In normal callus where shoots appeared on the 10th day, the activity was at its peak on the 8th day. Similarly in variant callus, peak activity appeared on the 10th day while shoots were visible on the 12th day.

Comparison of the pattern presented in figure 1 suggests that the normal callus cultures under NSF conditions had higher activity than under SF conditions. On the contrary, variant callus exhibited greater activity under SF conditions than under NSF conditions. But the pattern of activity in the shoot-forming normal and variant callus remains the same which agrees with an earlier report[8]. According to these, shoot regeneration was obtained in different media in the same variety in 25 days. The peak acid phosphatase activity appeared on the 13th day before the visible organogenesis. Using different media under which the time schedule for shoot formation was altered, a similar pattern is observed in our study (i.e. peak of acid phosphatase activity preceeded the visible organogenesis). This indicates that under different sets of conditions, shoot formation follows a similar pattern and the biochemical events leading to it are also similar.

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1. Thorpe, T. A., Thanh Van, M. T. and Gasper, T., *Physiol. Plant.*, 1978, **44,** 388.
2. Mehta, A. R., *Plant tissue culture, genetic manipulation and somatic hybridization of plant cells*, (eds) P. S. Rao, M. R. Heble and M. S. Chadha, BARC, Bombay, 1980, p. 100.
3. Jain, R. K., Maherchandani, N. and Chowdbury, V. K., *Curr. Sci.*, 1986, **55,** 1244.
4. Gahan, P. B., *Ann. Bot.*, 1978, **42,** 755.
5. Flinn, A. M. and Smith, D. L., *Planta*, 1967, **75,** 10.
6. Linsmaier, E. M. and Skoog, F., *Physiol. Plant.*, 1965, **18,** 100.
7. Jones, K. C., *Plant Physiol.*, 1969, **44,** 1695.
8. Subhadra, M.Sc. thesis, Haryana Agricultural University, Hisar, 1981.

CHAETOMIUM SHEATH BLOTCH: A NEW DISEASE OF RICE

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CHAETOMIUM sheath blotch, a new rice disease was identified on low land rice variety 'Gopalbhog' during September 1985 from the Balugan area of Orissa. The disease initiated on the leaf sheath as large oval to elliptical blotches which were brown to dark brown in colour (figure 1). The margins of individual blotches were deep brown to amber in colour with greyish white centre. The blotch measured 23–30 mm in length and 6–8 mm in breadth. In an affected sheath 1–3 blotches were observed. Sometimes one or more such spots coalesced to form large irregular necrotic blotches. The corresponding leaf blades of affected sheaths became pale, chlorotic and often withered. Symptoms were quite similar[2] to that of sheath blotch incited by *Pyrenochaeta oryzae*.

Figure 1. Symptom showing *Chaetomium* sheath blotch on rice leaf sheath (Gopalbhog).