Table 1 *Comparison of mean performance of the mutant with the parent*

Character	Parent (Pusa 105)	Clustered mutant
Plant height (cm)	59.00 ± 5.87	52.40 ± 6.50
No. of branches	2.00 ± 1.00	2.40 ± 0.55
Days to flowering	34.00 ± 1.58	31.80 ± 1.48
No. of pods/cluster	4.40 ± 0.89	10.60*± 1.82
No. of pods/plant	52.00 ± 8.15	100.00*± 8.92
No. of seeds/pod	11.40 ± 0.89	4.00*± 1.58
Pod length (cm)	7.22 ± 0.75	4.90*± 0.26
100-seed weight (g)	3.66 ± 0.09	4.16*± 0.10
Yield/plant (g)	32.40 ± 2.70	30.00 ± 1.58

*Significant at 1% level.

progeny of the mutant, normal and mutant plants segregated in 1:1 ratio.

Presence of an association of four chromosomes in PMCs in the present study indicates a gamma-irradiation-induced interchange which had a direct bearing on fertility, depending upon the orientation of interchange multivalent. With alternate and adjacent orientation results in a 1:1 ratio, there will be 50% sterility. Preponderance of adjacent orientation results in higher sterility. The sterility in this mutant can be attributed to the chromosomal damage associated with translocation.

The other interesting observation is that the interchange heterozygote is always associated with phenotypic changes such as 'clustering of pods', increased pod number and seed size. It is evident that "clustering" is the result of mutation and has a strong linkage with translocation. It can also be presumed that this is a dominant heterozygous mutant showing linkage with heterozygous translocation.

We thank Prof. J. Sybenga, Wageningen for his valuable suggestions. One of us (HRP) thanks CSIR, New Delhi for financial assistance.

10 February 1987

1. Burnham, C. R., *Discussions in cytogenetics*, Burgess Publishing Company, Minneapolis, 1962.
2. Kush, G. S., *Cytogenetics of aneuploids*, Academic Press, New York, 1973.
3. Gupta, P. K. and Bahl, J. R., *Cytogenetics of crop plants*, Macmillan India Limited, New Delhi, 1983, p. 405.

α-AMYLASE ACTIVITY AND MORPHOGENETIC POTENTIAL IN CALLUS CULTURES OF *SOLANUM SURATTENSE*

P. L. SWARNKAR, S. P. BOHRA and N. CHANDRA

Department of Botany, University of Rajasthan, Jaipur 302 004, India.

THERE are several reports that callus cultures lose morphogenetic potential when cultivated through several passages[1–4]. The loss might be due to changes in chromosomal complement of cells[1–2] or physiological changes[3,4]. Addition of kinetin was found to restore the morphogenetic potential in carrot cultures[4]. The physiological basis of the loss of morphogenetic potential in callus cultures has not been fully understood. In the present communication, we report that α-amylase activity may be one of the determinants of morphogenetic potential in callus cultures of *Solanum surattense* Burm. f. (syn. *S. xanthocarpum* Schrad and Wendl.).

Internode segments (1 cm) of plants grown *in vitro* were inoculated on MS medium[5] supplemented with 0.05 mg/l of kinetin and 3 mg/l of 2,4-dichlorophenoxyacetic acid for callus initiation. This callus after isolation was maintained on the medium containing 0.05 mg/l of kinetin and 5 mg/l of indolebutyric acid (IBA) and subcultured regularly every 30th day. For induction of shoot buds, the stock callus during its fourth passage was transferred to the medium supplemented with 3 mg/l of kinetin. Analysis of α-amylase activity[6] revealed a sharp peak on day 9 (figure 1). The increased activity of α-amylase prior to the formation of shoot buds has been suggested as a means of utilizing the starch accumulated in the vicinity of loci which would ultimately give rise to bud primordia[7,8]. Incorporation of gibberellic acid (GA, 2 mg/l) to the medium increased to enzyme activity marginally maintaining the typical peak on 9th day but did not affect the differentiation of shoot buds. This callus lost the potential to differentiate shoot buds after two years (24 passage) of initial isolation and also failed to exhibit the characteristic peak of amylase activity. The callus when transferred to a medium containing 2 mg/l of GA in addition to kinetin (0.05 mg/l) and IBA (5 mg/l) regained the capacity to differentiate shoot buds on the inductive medium and also exhibted the characteristic peak activity of α-amylase. These observations suggest that the callus must have lost the capacity to synthesize GA and consequently lost the potential to differentiate shoot

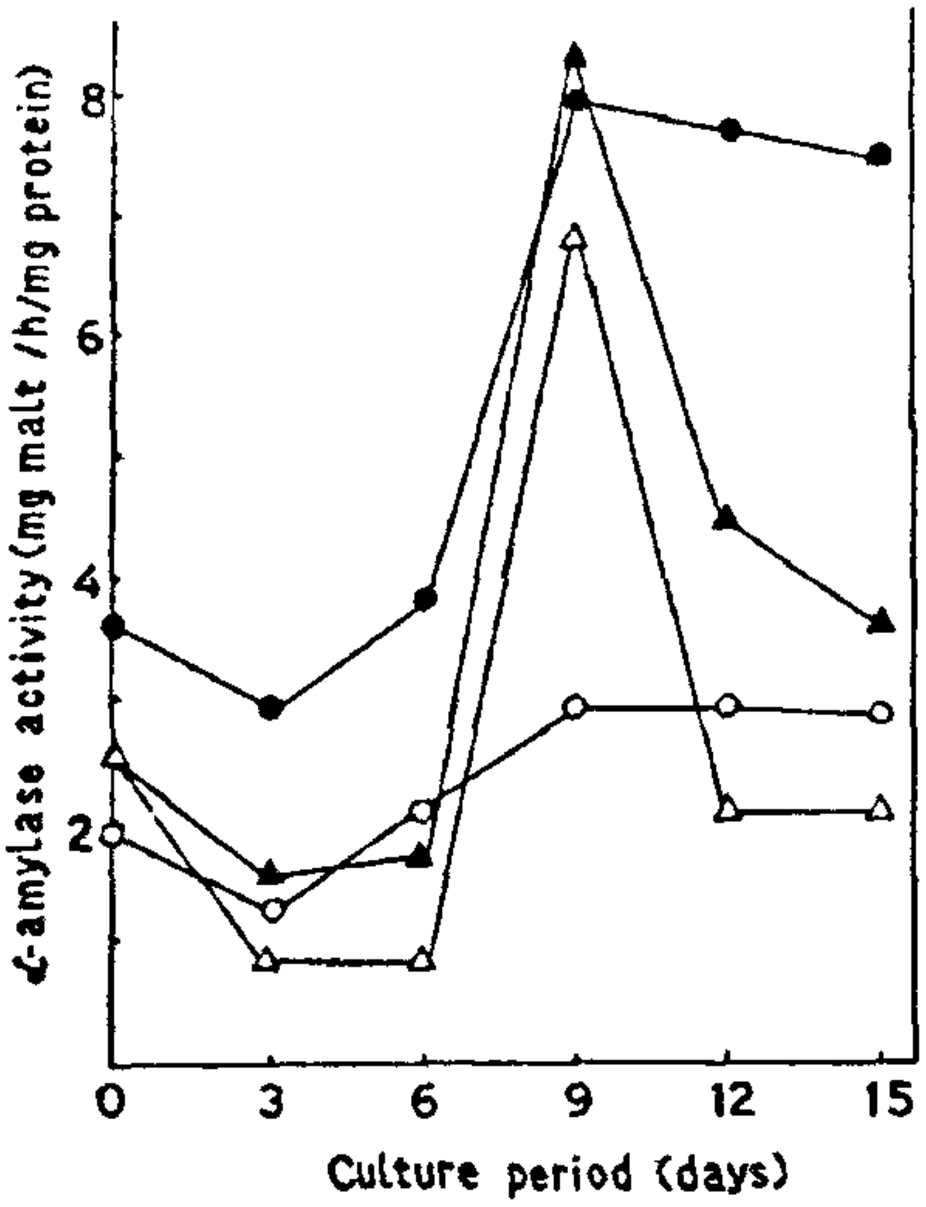

Figure 1. Changes in activity of α-amylase with time in organogenic and non-organogenic cultures of *Solanum surattense*. Δ–Organogenic callus on MS + kinetin (3 mg/l); ▲–Organogenic callus on MS + kinetin (3 mg/l) + GA (2 mg/l); ○–Non-organogenic callus on MS + kinetin (3 mg/l); ●–GA induced organogenic callus on MS + kinetin (3 mg/l).

buds. This investigation further envisages that α-amylase activity could be suitably taken as a biochemical marker of morphogenetic potential of callus cells. This finding substantiates the earlier view that the loss of morphogenetic potential in callus cultures might be due to some physiological changes induced during prolonged cultural conditions[3].

One of us (PLS) is thankful to UGC, New Delhi, for a fellowship.

5 March 1987

1. Haddon, L. and Northcote, D. H., *J. Exp. Bot.*, 1976, **27**, 1031.
2. Torrey, J. G., *Physiol. Plant*, 1967, **20**, 265.
3. Reinert, J., Backs-Hüsemann, D. and Zerban, H., *Centre Natl. Rech. Sci., Paris*, 1971, **193**, 261.
4. Wochok, Z. S. and Wetherell, D. F., *Experientia*, 1972, **28**, 104.
5. Murashige, T. and Skoog, F., *Physiol. Plant.*, 1962, **15**, 473.
6. Bernfeld, P., *Methods Enzymol.*, 1955, **1**, 149.
7. Thorpe, T. A. and Meier, D. D., *Physiol. Plant*, 1972, **27**, 365.
8. Thorpe, T. A. and Meier, D. D., *J. Exp. Bot.*, 1974, **25**, 288.

AN UNUSUAL STRAIN OF *APODACHLYA MINIMA* COKER AND LEITNER

G. S. MER and S. C. SATI
Department of Botany, Kumaun University, Nainital 263 002, India.

DURING a course of study on soil inhabiting fungi belonging to the zoosporic series of Phycomycetes one representative of Leptomitaceae was isolated from the soils of Naina peak (2611 m altitude), Nainital. Axenic culture and identification of this isolate were carried out on the lines of Sparrow[1]. After a careful examination it was found to resemble *A. minima* in the absence of sporangia, oogonial and oospore size presence of androgynous antheridia (rarely present). However, the preponderance of sub-oogonial cell functioning as antheridia suggested its relationship to *A. brachynema* (Hild.) Pringsheim also. This strain appears to be a transitional stage between *A. minima* and *A. brachynema*.

Apodachlya minima Coker and Leitner
J. Elisha Mitchell Sci. Soc., 1938, **54**, 311–318.

Hyphae slender, segmented and branched; segments 39.6–181.5 μm long × 6.6–8.2 μm in dia on hempseed and 19.8–27μm long × 1–2.5 μm in dia on CMA; sporangia absent, oogonia numerous, pyriform and oval-shaped borne on the tips of short moniliform stalk, 11.5–19.8 μm, mostly 16.5–19.8 μm in dia wall unpitted and smooth; sub-oogonial cell functioning as antheridium, rarely androgynous; oospore single, completely filling the oogonium, eccentric, 10.7–17.5 μm in dia.

The type specimen and the preserved material have been deposited in the herbarium of the Botany Department, Kumaun University, Nainital.

The present representative of *Apodachlya* was isolated once throughout the study from pristine, strictly terricolous habitat. It failed to grow in any other media except CMA and OMA and showed extremely slow growth which hardly attained 2 cm diameter even after 20 days of incubation under normal laboratory conditions. This pattern of growth and absence of sporangia may account for its rare occurrence.