

developed only to be lost in due course. In the absence of direct evidences, the above suggested function remains tentative.

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## BIOCHEMICAL CHANGES DURING ANDROGENESIS IN *DATURA INNOXIA*

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POLLEN grains can be induced to form embryoids and subsequently haploid plants under appropriate cultural conditions<sup>1,2</sup>. Our knowledge about the biochemical changes associated with this profound morphogenetic shift in the pollen grains is meagre. Some studies on nucleic acid metabolism have been carried out using cytochemical and autoradiographic techniques<sup>3,4</sup>. In the present investigation, changes in activities of peroxidase and  $\alpha$ -amylase and the isozyme pattern of peroxidase have been studied vis-a-vis development of pollen grains *in vivo* and of pollen embryoids in cultured anthers of *Datura innoxia* Mill.

Excised anthers (6 mm) were cultured on MS medium<sup>5</sup> supplemented with 0.001 mg/l of kinetin. They exhibited swelling by the 10th day of planting and emergence of embryoids by the 25th day. Anthers (6 mm long) developing *in vivo* had uninucleate microspores, whereas those measuring 8–12 mm had binucleate pollen grains. The pollen

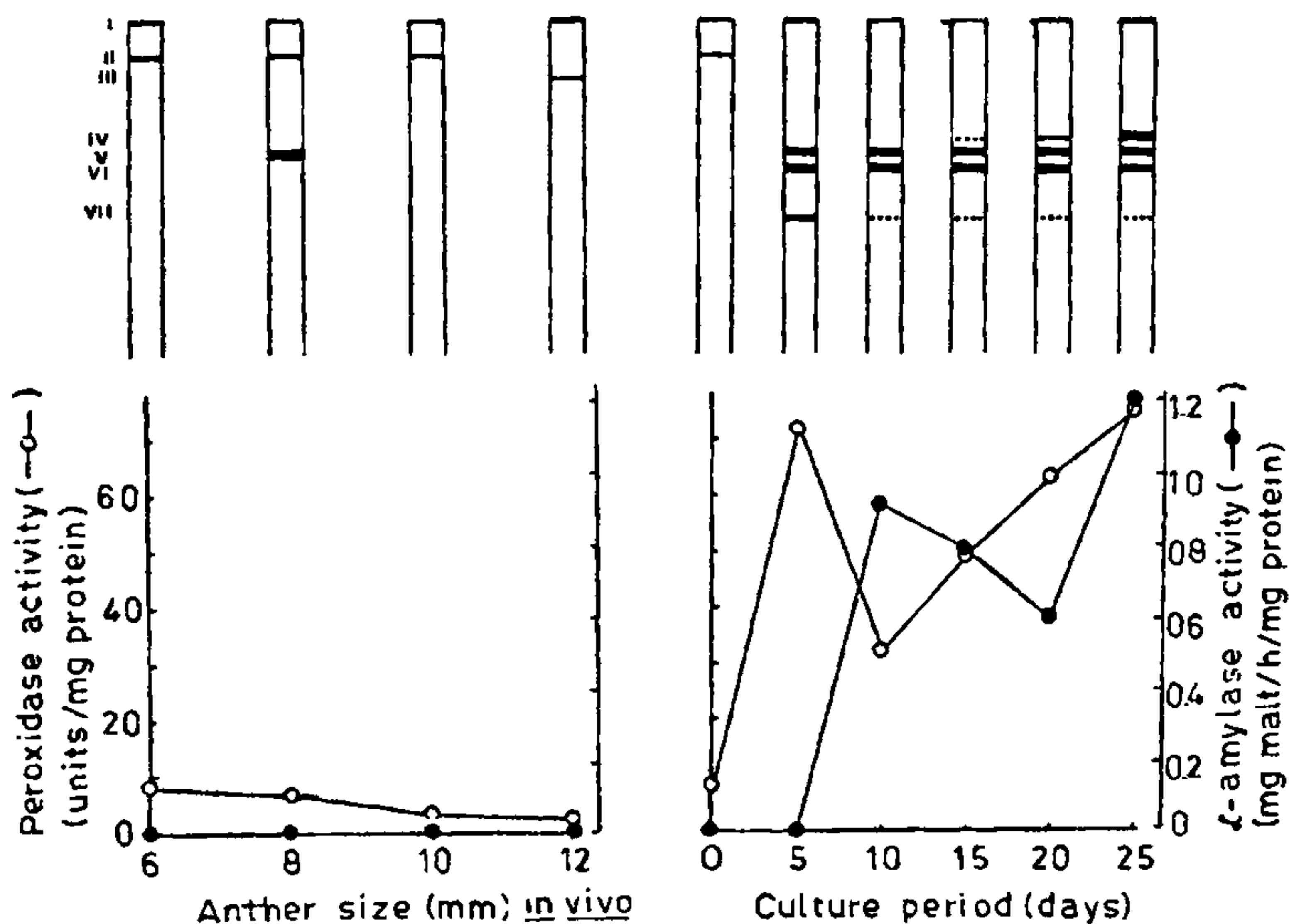


Figure 1. Changes in activities of peroxidase and  $\alpha$ -amylase and isozyme pattern of peroxidase during development of anthers *in vivo* and *in vitro*.

grains contained in the 10 and 12 mm long anthers had thick exine. Starch was present in the pollen in the 12 mm long anthers. The anthers at various stages of development *in vivo* and *in vitro* were analysed biochemically for peroxidase<sup>6</sup> and  $\alpha$ -amylase<sup>7</sup> activity. Isoperoxidases were separated on 6.5% polyacrylamide gels<sup>8</sup> and were visualized by guaiacol-H<sub>2</sub>O<sub>2</sub><sup>9</sup>.

Peroxidase activity (1 unit = 0.001 change in absorbance per second) increased more than nine-fold in the cultured anthers on days 5 and 25 while it did not vary appreciably in anthers *in vivo* (figure 1). Four new isoperoxidases appeared in the anthers cultured *in vitro*. Peroxidase activity has been implicated in IAA catabolism<sup>10</sup>.

The rise in peroxidase activity in cultured anthers suggests that endogenous IAA is oxidized during androgenesis. The appearance of cathodic isoperoxidases, reported to be involved in IAA catabolism<sup>11</sup>, also supports this view.

There was no  $\alpha$ -amylase activity (mg maltose liberated per hour per mg protein) in anthers *in vivo*. The  $\alpha$ -amylase activity appeared only in the cultured anthers reaching to a maximum level on days 10 and 25. The first peak of enzyme activity coincided with the swelling of anthers on the 10th day which might be due to the formation of sugars (osmoticum) from starch. The appearance and rise in  $\alpha$ -amylase activity during androgenesis suggests that the enzyme plays some important role in carbohydrate metabolism during induction and formation of embryoids in cultured anthers.

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## OUTBREAK OF STUNT NEMATODES ON WHEAT IN GUJARAT

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DURING 1985-86, a wheat crop in the field of College Agronomy Farm of this University, showed symptoms of severe yellowing, stunting and leaf blight with typical dwarfing of plants. To ascertain the cause of malady, soil samples from the rhizospheres of diseased and healthy plants were taken for estimation of plant parasitic nematodes, if any. Upon examination of these soil samples, the presence of 984 and 44 stunt nematodes, *Tylenchorhynchus* spp. per 100 g soil was recorded in samples collected from diseased and healthy plants respectively indicating the stunt nematodes to be the possible cause of the abnormality. The nematodes were identified as *Tylenchorhynchus vulgaris* by Dr. E. Khan, Taxonomist, Division of Nematology, IARI, New Delhi. In order to check nematode infestation, the diseased plot was treated with Aldicarb (Temik 10 G) at 1 kg/ha by applying it in the soil between the rows followed by irrigation. The adjoining infected plot was kept untreated.

To our great surprise, the diseased treated plot showed recovery of plants after 21 days of treatment and emergence of earhead started. The soil samples taken after 21 days of treatment from diseased treated plot had 246 stunt nematodes per 100 g soil. Thus, due to aldicarb treatment there was 75% reduction in population of stunt nematodes. The diseased plot recovered after aldicarb treatment gave grain yield of 2750 kg/ha; while the adjoining untreated plot yielded 981 kg/ha giving 180% higher yield over untreated plot. This showed that the cause of the said disease is *T. vulgaris*. Upadhyay and Swarup<sup>1</sup> also reported stunt nematode, *T. vulgaris*, (1000 or more/kg soil) to induce significant reduction in the growth of wheat crop.

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