

## Labelling the Adults of the Tobacco Caterpillar *Spodoptera littoralis* (Boisd.) (*Prodenia littura* F.; Noctuidae: Lepidoptera) with P<sup>32</sup>

A number of methods of labelling adults of different insects with isotopes have been developed by many workers<sup>1</sup>. But only a few reports are available on labelling of lepidopteran insect pests. The adults of European pine shoot moths *Rhyacionia buoliana* (Schiff.)<sup>2,3</sup>, the Sorghum and Maize stalk borer *Chilo partellus* (Swinhoe)<sup>4</sup>, the carob moth *Ecromyelois ceratoniae* (Zeller)<sup>5</sup> and the fruit moth *Grapholitha molesta* (Busck.)<sup>6</sup> have been successfully tagged either with CO-<sup>60</sup> or P<sup>32</sup>. An attempt was made to label the adults of tobacco caterpillar *Spodoptera littoralis* (Boisd.) with P<sup>32</sup> and the results are presented in this paper.

The radio active phosphorus was purchased from the Atomic Energy Establishment, Trombay (India) in the form of 'carrier free' orthophosphoric acid solution. Small cubes of artificial diet<sup>7</sup> weighing about 1.5 g each were coated with 0.02 ml of 20 µCi radio active phosphorus solution with the help of Tuberculin syringe. The full-grown larvae, 11 days old, bred on the diet at room temperature, were fed individually with the radio-active food in a plastic cup. After 20 h feeding the larvae were removed, washed both with very dilute phosphoric acid and distilled water to remove the external contamination. The larvae were then given non-radio-active food for further development in another set of plastic cups. A small quantity of sterilized moist sand was also provided in the plastic cups as a pupation site for the larvae. The radio-activity in larvae, prepupae and pupae was recorded. The radio-active pupae were held in glass tubes for the emergence of moths. On emergence the activity of moths was recorded and egged them as described formerly<sup>8</sup>. The egg masses after assaying the activity pooled together and more than 500 eggs were collected at

random to observe the hatching percentage. On eclosion of eggs 50 newly hatched larvae and 10 larvae at indicated days were killed with chloroform and assayed for the activity.

The activity in all cases was recorded with Philips Make G. M. Counter by keeping the materials and planchette in the last cell of lead castle and counting was made only for 30 sec, as the initial count rate was very high. But with the larvae of the subsequent generation, the counting was made for 100 sec as the activity was feeble. The autoradiogram of the adult moth was also prepared with X-ray film (Table).

The results revealed that a high activity of P<sup>32</sup> was detected in all the stages of growth of insects during post-embryonic development. The activity was a little higher in the females than in the males, which might be attributable to the larger size of the female, which had laid the fertile eggs. The activity was not only traced in the eggs but also in the larvae of the subsequent generation up to 9 days. The autoradiogram shows the distribution pattern of P-<sup>32</sup> in the body of the adult moth.

The present observation will be useful in investigating the flight range and dispersal pattern, and they will not only be limited to the recovery of the released adults but also, in case where the radio-active adults escape recovery, the range of flight and dispersal pattern will be assessed by the location of either radio-active egg masses or the larvae which retain a detectable radio-activity up to 9 days of their growth. This study will also be useful in assessing the efficacy of chemical and bio-insecticides in the field.

*Zusammenfassung.* Radioaktive Markierung der Larven von *Spodoptera littoralis* mittels <sup>32</sup>P ist nicht nur in den daraus resultierenden Imagines, sondern auch in den Eiern und den daraus schlüpfenden F1-Räupchen gut nachweisbar.

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Distribution pattern of P<sup>32</sup> in the body of the adult moth.

Activity of P<sup>32</sup> in various stages of insect

Larva	Pre-pupa	Pupa	Adult moth		Eggs (100)	Larva of F <sub>1</sub> generation (age in days)			
			Male	Female		1	3	6	9
1143.7	779.8	585.5	398.4	405.2	62.5	4.0	3.6	2.1	1.8

Mean count/sec/individual.

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