tein like substance[4], the formation of which is influenced by the age of the host plant, is responsible for the development of acquired local as well as systemic resistance in this host.

Division of Virology, K. CHANDRA.
Central Drug Research Institute, B. M. GUPTA.
Lucknow.
and
Department of Botany, H. N. VERMA.
Lucknow University, Lucknow,
October 17, 1977.

1. Bawden, F. C. and Freeman, G. G., *J. Gen. Microbiol.*, 1952, 7, 154.
2. Gupta, B. M. and Price, W. C., *Phytopathology*, 1950, 40, 642.
3. — and —, *Ibid.*, 1952, 42, 45.
4. —, Chandra, K., Verma, H. N. and Verma, G. S., *J. Gen. Virol.*, 1974, 4, 211.
5. Paul Khurana, S. M., Singh, S. and Nagaich, B. B., 26th Annual Scientific Report, Central Potato Research Institute, Simla, 1975, p. 128.
6. Stahman, H. A. and Gothoskar, S. S., *Phytopathology*, 1958, 48, 362.

EFFECT OF ALTOSID ON THE BLOOD PROTEIN OF CATERPILLAR OF *SPODOPTERA LITURA* FB. (NOCTUIDAE : LEPIDOPTERA)

Introduction

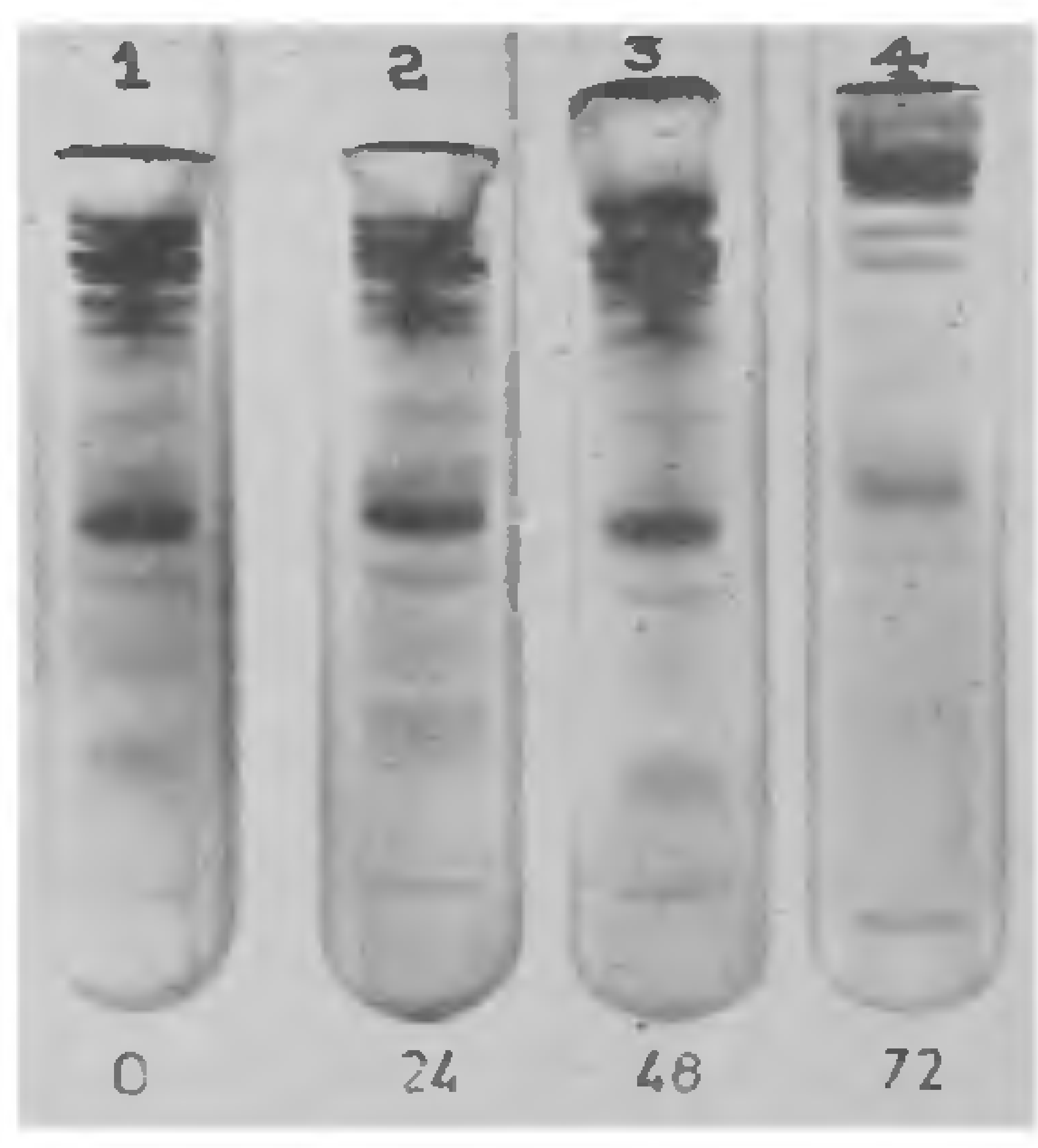
ALTHOUGH considerable progress has made with chemistry[2] and morphogenetic effects of insect growth regulators[9], not much is known on their effects on the physiology of insects. Williams[8] has advanced a theory that juvenile hormone may block the derepression of transcription or utilization of fresh genetic information. It has also been known that juvenile hormone blocks DNA synthesis or structural proteins[4] and in certain systems stimulates the synthesis of RNA and protein. As not much information is available on the protein synthesis in the blood of larvae, treated with insect growth regulator, the present investigation was undertaken with tobacco caterpillar *Spodoptera litura*.

Materials and Methods

The caterpillars were reared on castor bean leaves as described earlier[10]. Freshly moulted last instar larvae were topically treated with 100 μg of Altosid [Isopropyl (2E, 4E)-11-methoxy-3, 7, 11-trimethyl-2-4 dodecadionate; Zoecon Corporation, Calif., U.S.A.] as described by Sundaramuthy[11]. The haemolymph was quickly drawn from the larvae by severing prolegs and immediately assayed. The total protein was quantified by the method of Lowry *et al.*[5]. Ten μl of the whole blood in 40% sucrose solution was electrophoresed on 10% polyacrylamide gel by following the method outlined by Davis[3]. The results are presented in Figs. 1 to 7 and Table I.

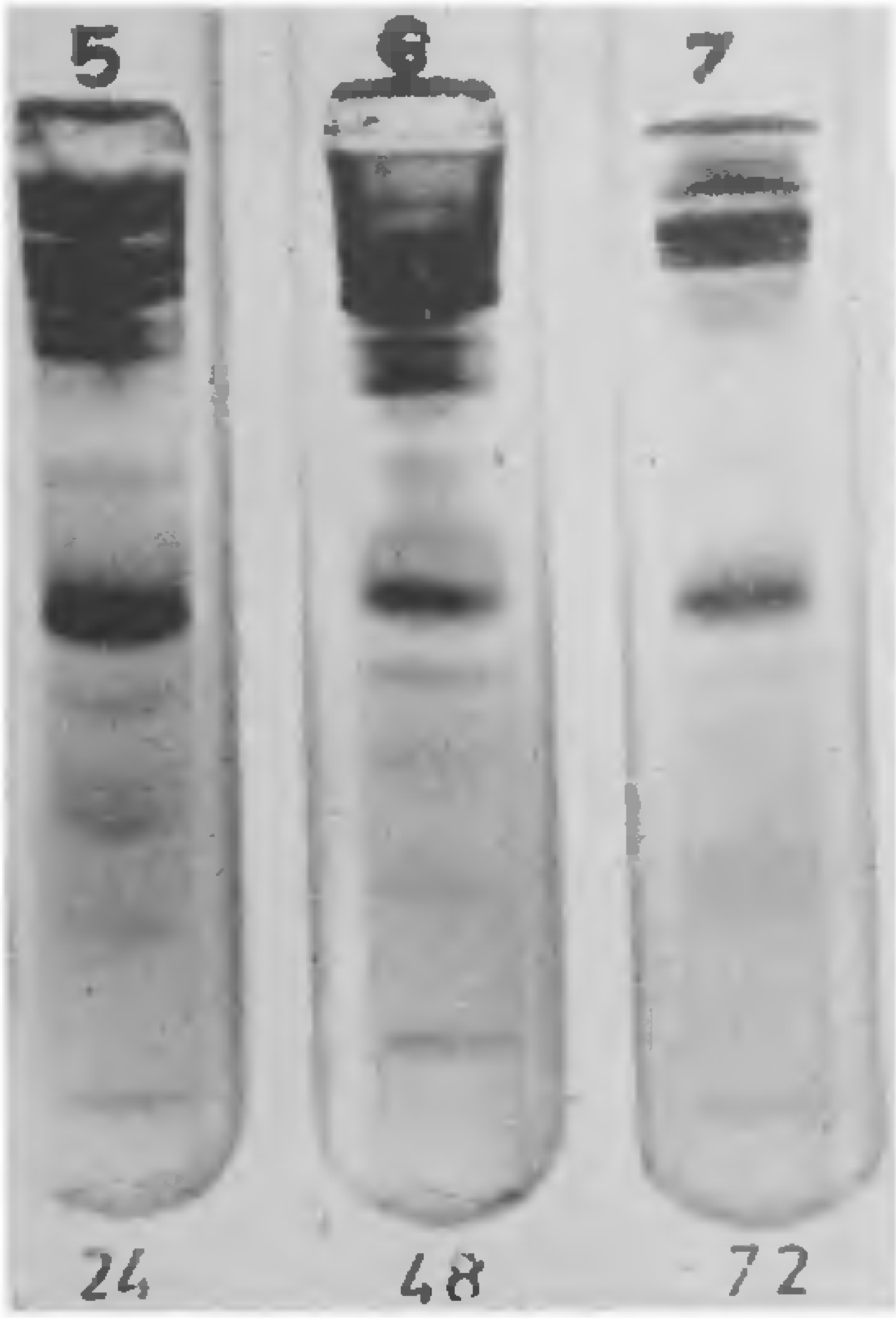
Results and Discussion

The exogenous application of insect growth regulator has totally prevented the larvae to transform into pupae, but allowed them to moult into superlarvae. The superlarvae lived only for 36 h after eclosion as against 6–8 days reported in the earlier study[11]. The short life span of the superlarvae observed in the present investigation might be due to non-feeding of larvae as the mouth parts of superlarvae got modified variously[12]. The results also demonstrate that eighteen protein bands which included intense ones near the start and fast moving ones of low intensify at the rear were discrened at the start of the experiment (Fig. 1). The number of protein bands in the normal caterpillar increased gradually from 18 (Fig. 1) to 20 (Fig. 3) and decreased to 16 (Fig. 4) when they approached to form pupae. A similar change in the protein bands was known to occur in the blood of larvae of the insects during their growth and differentiation[1]. The total protein was also found to be on the increase in the blood of insects with the growth and reached a maximum towards the end of larval period[1] as was observed in the present study.



FIGS. 1–4. The electrophoretic pattern of the blood protein of normal caterpillar of *S. litura*.

Administration of Altosid to the caterpillars has sharply modified the electrophoretic mobility of blood proteins (Figs. 5, 6, 7). With no reduction in the total protein synthesized (Table I) the number of protein bands increased to 19 (Fig. 5) from 19 (Table I) and decreased to 16 (Fig. 6) within 24 h. However, the reduction observed at 48 h was brought up to the original level of 19 (Fig. 7) as the treated larvae moulted into superlarvae. The small increase in total protein (Table I) and decrease in the number of protein bands observed in the blood of treated larvae at 48 h (Fig. 6) may be due to rapid synthesis of short lived m-RNA which in turn synthesized more of the protein. The decrease observed in total protein in the haemolymph of treated individuals at 72 h is due to the fact that the treated larvae did not lend themselves for transformation into pupae at which stage, the blood of the insects is expected to have more of protein, due to occlusion of disintegrating cells into



FIGS. 5–7. The electrophoretic pattern of the blood protein of juvenilized caterpillar of *S. litura*. The numbers at the bottom of tubes indicate the period in hours.

TABLE I

Effect of insect growth regulator on the protein content of haemolymph of Caterpillar of S. litura

	Mean total protein μg/μl of blood			
	At start	24 hrs.	48 hrs.	72 hrs.
Normal Caterpillar	20·00	25·60	26·30	50·50*
Treated Caterpillar	..	24·70	28·50	45·30**

* Transformed into prepupa.
** Super larva.

the blood cells. The reduction in the number of protein bands and increase in the quantity of total protein recorded at 72 h in the blood of pre-pupa of normal animal strengthen the above view and suggests that missing bands of protein in the normal animal may be responsible for their transformation, into pupae since they are present in the superlarvae. The extra protein bands in superlarvae may be juvenile hormone bound protein which perhaps helped the animal to maintain the extra-larval instar instead of terminating the larval stage.

Dept. of Agricultural Entomology and Dept. of Biology,
Tamil Nadu Agricultural University,
Madurai 625 104,
Tamil Nadu, India, *October* 28, 1977.

V. T. SUNDARAMURTHY*.
N. MUSHTAQ AHMED.

* Present Address: Department of Agricultural Entomology, Tamil Nadu Agricultural University, Coimbatore 641 003, Tamil Nadu, India.

1. Chen, P. S., *Adv. Insect Physiol.* (Eds. J. E. Treherne and V. B. Wigglesworth), Vol. 3, Academic Press, London and New York, 1966, p. 53.
2. Dahm, K. H., Roller, H. and Trost, B. M. *Life Sci.* (Oxford), 1968, **7**, 127.
3. Davis, B. J., *Ann. N.Y. Acad. Soc.*, 1964, **121**, 404.
4. Ilan, J., Ilan, J. and Patel, N. G., *Insect Juvenile Hormone Chemistry and Section* (Eds.) J. J. Mann and M. Beroza, Academic Press, New York, 1972, p. 43.
5. Lowry, O. H., Rosebrough, N. J., Farr, A. L. and Randall, R. J., *J. Biol. Chem.*, 1951, **193**, 265.
6. Patel, N. and Madhavan, K. J., *Insect Physiol.*, 1969, **15**, 2141.
7. Socha, R. and Sehnal, F., *Ibid.*, 1972, **18**, 317.
8. Williams, C. M., *Biol. Bull.*, 1961, **121**, 572.
9. Willis, J. H., *A. Rev. Ent.*, 1974, **11**, 97.
10. Sundaramurthy, V. T., *Ph.D. Thesis*, Tamil Nadu Agricultural University, Coimbatore (India), 1974, p. 66.
11. —, *Phytoparasitica*, 1976, **4**, 19.
12. —, Submitted to *Cur. Sci.*

A NEW SPECIES OF *DICTYUCHUS* FROM ALKALINE PONDS OF INDIA

DURING the course of a study of the mycoflora of alkaline mud and water, the authors isolated a new species of the genus *Dictyuchus* which is described here.

Dictyuchus lucknowensis sp. nov.

Myceliis in semine *Cannabis sativae* modestus densis, hyphis in basi 19–86 μm. Gemmis ex articulis