anterior and posterior ends broadly rounded, fusiform in dorsal view, width less than height, inner lamella broad; appendage well developed, caudal furcae with strong musculature, furcal support robust.

The specimens were collected from a pond near Ludhiana (Punjab) on August 3, 1976. The water of the pond was green due to predominance of floating flora, *viz.*, *Volvox* sp., *Euglena* sp., *Wolffia* sp., *Azolla* sp., and rooted plants.

Associated ostracod species include *Cypris* sp., *Cyprinotus* spp., *Centrocypris* sp. Besides ostracoda, aquatic insects and gastropod molluscs were common in the pond.

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EFFECTS OF INSULIN ON BLOOD GLUCOSE LEVEL, GLUCOSE TOLERANCE AND GLYCOGEN CONTENT OF THE FOOT AND HEPATOPANCREAS IN *CRYPTOZONA BELANGERI* (DESHAYES) (MOLLUSCA: GASTROPODA)

THE physiological role of insulin in Deuterostomian and Protostomian invertebrates is not well-understood[1] and in particular the information available in molluscan species is contradictory[2]. In the present study on the terrestrial pulmonate gastropod *Cryptozona belangeri* the influence of varying doses of commercial mammalian insulin (INSULIN, The Boots Company (India) Ltd., Lot No. 341) has been studied. Pilot studies have shown the blood sugar level to be low in this snail and to demonstrate the role of insulin, snails were given a glucose load, an hour following insulin treatment. Blood glucose was estimated following the colorimetric microprocedure of Folin-Malmros as modified by Murrel and Nace[3] and the glycogen content of the foot muscle and hepatopancreas was estimated following the colorimetric micromethod of Kemp and Kits.[4]

The normal blood sugar level is about $4 \cdot 9 \pm 0 \cdot 4$ mg/100 ml and in PBS injected controls (Phosphate Buffer Solution, pH 7·5) no appreciable change in the carbohydrate content is noticed. A low dose of insulin (25 IU/Kg BW) did not elicit any significant alteration in the blood glucose level while the snails were resistant to larger doses of insulin (75 IU/Kg BW). Administration of a low dose of glucose (0·5 gm/Kg BW) elevated the blood sugar level immediately but the glucose content decreased gradually and attained normalcy in about eight hours.

Administration of insulin (25 IU/Kg BW) one hour prior to injection of glucose (0·5 gm/Kg BW) resulted in a sharp increase in the blood glucose level followed by a drop. The values are significant at the 3rd and 4th hour after insulin injection, compared to controls ($P < 0 \cdot 01$). Injection of a higher dose of insulin (50 IU/Kg BW) one hour prior to the same glucose load produced significant decrease at all intervals of times ($P < 0 \cdot 01$), excepting at the eighth hour when normalcy was attained (Fig. 1).

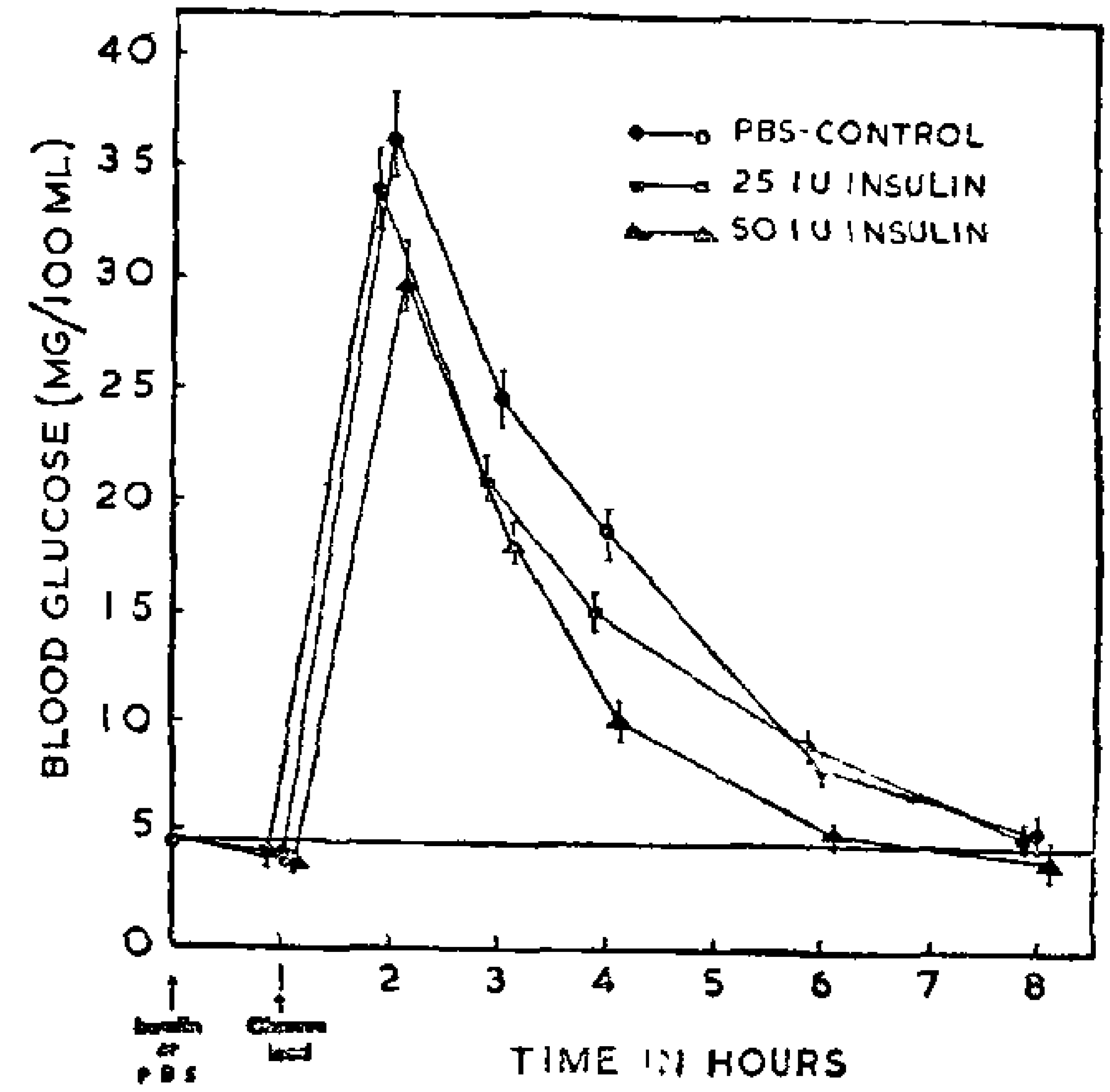

FIG. 1. Effect of insulin (25 and 50 IU/Kg/BW), PBS on a glucose tolerance test (0·5 gm/Kg/BW), started on hour later on *Cryptozona belongeri*. Ten snails were used for each stage of experiment and the values plotted on the graph represents the mean of ten separate estimations.

The normal glycogen content of hepatopancreas ($1 \cdot 18 \pm 0 \cdot 021$ mg/100 mg) and foot ($0 \cdot 86 \pm 0 \cdot 034$ mg/100 mg) did not appreciably change due to the administration of 25 IU of insulin per Kg BW.

However, administration of the same quantity of insulin, one hour prior to glucose load, produced less significant increase in the glycogen content of the hepatopancreas ($P<0\cdot05$), but a statistically significant increase in the foot muscle ($P<0\cdot01$). Injection of a higher dose of insulin (50 IU/Kg BW) an hour prior to the glucose load resulted in a significant increase in the glycogen content of both the tissues ($P<0\cdot01$).

It is inferred from our observations that in *C. belangeri*, a single low dose of insulin has not significantly altered the blood glucose level, whereas, insulin followed by a glucose load elicited significant changes in the blood sugar level, the magnitude of which run parallel to the dose of administered insulin. Further, mobilization of blood glucose for incorporation into glycogen in the foot muscle and hepatopancreas is enhanced by a higher dose of insulin. By *in vitro* experiments it has been shown that the rate of glycogen incorporation in isolated rat diaphragm muscle is directly related to the extra cellular glucose and the availability of Insulin[5]. The behaviour of insulin appears to be similar in promoting glucose utilization both in vertebrates and in a highly organized invertebrate like *C. belangeri*.

Studies by Sukumaran and Sriramulu[6] in *C. belangeri* suggest the existence of a dual mechanism, one influencing hyperglycemia and the other hypoglycemia in the regulation of carbohydrate metabolism. The present study also gives credence to such an idea and points out to the necessity for identifying and characterising the homologues of pancreatic β cells, possibly in the digestive tract. It is worth mentioning here that in a few gastropod molluscs, *Buccinum undatum*, *Pecten maximus* and *Eledon cirata* evidence has been presented for the occurrence of homologues of pancreatic β cells in the digestive tract and the production of insulin-like substances, Davidson *et al*[7] and Boquist *et al.*[8]

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FIRST RECORD OF HOST PLANTS AND ADDITIONAL DISTRIBUTION OF *NYSIUS INCONSPICUUS* DISTANT (LYGAEIDAE: HETEROPTERA)

DISTANT (1903) descrifed *Nysius inconspicuus* from Bor Ghat[1] and later reported the same from Mysore[2]. It was reported, sucking the sap from the tender parts of the growing gingelly (*Sesamum indicum*, Pedaliaceae) and to be injurious[3] to the crop. Recently the seedlings of gingelly in Tindivanam (Tamil Nadu) were severely infested by this lygaeid bug. *N. inconspicuus* is reported only from the Oriental region and nothing is known of its other host plants or biology. Since gingelly is a cultivated crop and it is not grown throughout the year, it was desirable to search for alternative host plants of this bug. During the present study it was found feeding and breeding on *Aerua tomentosa*, *Amaranthus bengalensis*, *Amaranthus viridis*, *Celosia argentea* (Amaranthaceae), *Ageratum conyzoides* (Compositae), *Euphorbia hirta* (*Euphorbiaceae*) and *Mollugo* sp. (Aizoaceae). The bug shows preference to Amaranthaceae and *Aerua tomentosa* is the most preferrel host plant. Large populations of this bug are noticed during the months of August–October and heavy incidence was recorded from Cuddalore, Kodaikanal, Madras, Mahabalipuram, Periyakulam, Tindivanam, Villupuram, Yercaud (Tamil Nadu); Pondicherry, Mysore, Seringapatam, (Karnataka) and Palghat (Kerala).

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