## THE GENUS *QUADRUSPINOSPORA* (PROTOZOA: SPOROZOA)—A NEW DEFINITION

IN 1969, Sarkar and Chakravarty[1] created a new genus *Quadruspinospora* to accommodate the cephaline gregarines inhabiting the various parts of the midgut of the grasshopper, *Aelopus* sp. The genus was characterised by "(*a*) solitary, elongated trophozoite having a subspherical epimerite with eight to 12 stumpy digitiform processes, hemispherical protomerite and granular deutomerite which is broadest immediately behind the septum; (*b*) spherical nucleus with several karyosomes; (*c*) spherical, thick-walled gametocysts dehiscing by simple rupture; (*d*) oval spores with a pair of very long spines at each pole, and (*e*) intracellular developmennt".

While studying the cephaline gregarines from various insects of this locality[2], we have observed that grasshoppers of different species are infested with a cephaline gregarine belonging to the genus *Quadruspinospora* Sarkar and Chakravarty. We have already described *Q. chakravartyei*[3] and *Q. atractomorphii*[4] from the grasshoppers *Spathosternum* sp. and *Atractomorpha crenulata* (Fabr.) respectively. Preliminary studies have revealed that three other species of cephaline gregarines of the same genus parasiting the grasshoppers are also likely to be new to science (unpublished data). In all the five species, the number of digitiform processes attached to the epimerite does not conform to the number as given by Sarkar and Chakravarty: in *Q. chakravartyei* the number is 20 to 24, in *Q. atractomorphii* it is 12 to 18, and in the other three species the number varies between 10 to 23. Moreover, the shape of the nucleus in the adult trophozoite is not always spherical but may be subspherical or elliptical also. In all the five species, however, the spore contains a pair of very long spines at each pole which, according to us, is the most diagnostic character of the genus. The intracellular development takes place inside the epithelial cells of the hepatic caeca only. We, therefore, propose a new definition of the genus *Quadruspinospora* to accommodate these parasites under this genus as follows:

(1) Solitary, elongated trophozoite with a subspherical epimerite having a variable number of stumpy digitiform processes; (2) hemispherical protomerite and granular deutomerite broadest immediately behind the septum; (3) spherical, subspherical or elliptical nucleus in the adult trophozoite; (4) thick-walled, spherical gametocysts dehiscing by simple rupture; (5) oval spores with four very long spines, two at each pole; and (6) intracellular development, confined to the epithelial cells of the hepatic caeca.

We thank Prof. G. K. Manna, Head of the Department of Zoology, for laboratory facilities.

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## EFFECT OF CERTAIN GRANULAR INSECTICIDES ON THE NODULATION BY NITROGEN-FIXING BACTERIA IN COWPEA (*VIGNA SINENSIS* L.)

IT has been reported that application of granular insecticides to soil for the control of insect pests of crops, are known to interfere with the soil flora, particularly microbes including nitrogen fixing bacteria[1,2]. Hence the present study was designed to elucidate the effect of different systemic and non-systemic insecticides on the nodulation in cowpea and the results are presented in this paper.

The experiment was conducted with four replications in the pots with various granular insecticides as described earlier by Swamiappan *et al.* (1974). The seeds were coated thoroughly with the suspension of bacterial culture and seeded in the pots. The plants at 35 and 55 days age were carefully uprooted and the observations were made on the total number and weight of nodules.

The results (Table I) indicate that phorate, an organophosphorus systemic insecticide has enhanced the nodulation by 313% over untreated check. However the weight of nodules has not progressively increased with the increase in the number of nodules. On the other hand, the positive influence in the process of nodulation by the other two granular insecticides, namely, endrin and chlorfenvinphos indicates that the soil application of granular insecticides did not affect either the nodulation or activity of the bacteria. Similar results were reported earlier with the other legumes where it has been found that application of soil insecticides has beneficial effects on the soil flora[1,3,4]. This might possibly be due to the breakdown and degradation of organic phosphorus of the applied toxicants and utilization of the same by the microbes for their metabolic activities.