MASS PRODUCTION OF *Scotinophara coarctata* FAB. EGGS FOR MASS REARING *Telenomus triptus* (NIXON) PARASITOID

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ABSTRACT

Telenomus triptus (Nixon) (Hymenoptera: Scelionidae) is an efficient egg parasitoid of the Malayan black bug (MBB) *Scotinophara coarctata* (Fab.) (Hemiptera: Pentatomidae), a serious pest of rice in Palawan Island, Philippines. The success in mass rearing *T. triptus* is dependent on the availability of MBB eggs. The study dealt on the development of techniques in mass producing eggs of MBB for use in mass rearing of *T. triptus*. Two MBB egg production techniques were described and mass rearing technique of *T. triptus* was developed.

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KEY WORDS: Malayan Black Bug. *Scotinophara coarctata.* Egg mass production. *Telenomus triptus*. Parasitoid. Mass rearing.

INTRODUCTION

The Malayan black bug (MBB) *Scotinophara coarctata* Fab. (Family Pentatomidae, Order Hemiptera), is a serious pest of rice in Palawan Island, Philippines. In September 1979, an infestation of MBB on rice was reported for the first time in Bonobono, Bataraza southern Palawan (Miyamoto *et al.*, 1983). An outbreak followed in March - June 1982 and the spread progressed to central and northern Palawan covering 4,500 hectares of rice lands (Barrion *et al.*, 1982). MBB nymphs and adults damaged rice plants by sucking the sap from stems. In heavily infested fields, plants completely dry up showing a characteristic "bug burned" areas.

To control MBB, Heinrichs *et al.* (1985) recommended foliar spraying with Dimethoate EC and Malathion EC at 0.9 kg a.i./ha. However, chemical control is too expensive for Palawan farmers.

On the other hand, biological control with the use of predators, parasitoids and insect pathogens is the method considered at present. These natural enemies regulate the population density of the pest.

Corbett and Yusope (1974) mentioned that although the adults exercise maternal care over the eggs until after hatching, they are only partially protected from the activities of a scelionid egg parasitoid. In Palawan Island, IRRI (1985) reported that over 50% of 200 egg masses were parasitized but less than 25% of eggs were parasitized by *Telenomus triptus* Nixon.

MBB population observed in the field ranged from 4 - 25 bugs/hill which was higher than the reported economic injury level of 3 bugs/hill (Perez, 1987). This suggests inability of the indigenous natural enemies to suppress MBB population below damaging levels.

The concept of mass releasing laboratory reared *T. triptus* to supplement field population aimed to bring down MBB population was tried. However, before this activity can be carried out, mass production of *T. triptus* needs to be done. This study was conducted to develop techniques of mass producing *S. coarctata* eggs for use in mass rearing the parasitoid *T. triptus*.

MATERIALS AND METHODS

Culture of Malayan black bug for egg production

Two techniques of rearing MBB for egg production were developed. The first method used 45 - 60 day-old rice plant transplanted into 15.5 cm diameter clay pot. The plant was covered with mylar cage[1] . Thirty caged potted plants were maintained to culture MBB for egg production.

MBB culture started by collecting adults from the field. These were brought to the laboratory and introduced to the caged potted plants. The

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[1]The cage was made of mylar sheet fastened on both edges with rugby to form cylindrical tube measuring 13 cm in diameter and 52 cm in height. One end was covered with fine mesh nylon cloth glued in place with rugby. An 11 cm^2 window covered with fine mesh nylon cloth was provided for ventilation. At opposite end, two pieces of wooden pot label were stapled as peg of the cage in the clay pot.

adults were then allowed to feed, mate and oviposit. Eggs were collected daily and were placed in Petri dish lined with moist tissue paper. These eggs could be stored at 14°C in the refrigerator for up to one week.

Preliminary test was conducted to determine the most appropriate size of the bug colony that will give maximum egg production. Based on the result of this trial, a colony of four males and seven females MBB was cultured per rearing cage.

In the second method, 2 x 6 cm sections of taro, *Colocasia esculenta* (L.) Schott petioles were used instead of rice plants as MBB food and oviposition substrate. Two to three petiole sections were placed in Petri dish (1.6 x 10 cm) with four males and seven females MBB (Fig. 1). MBB fed and oviposited on the host.

During periods of low MBB population in the field, light trapped MBB were used in the culture for egg production.

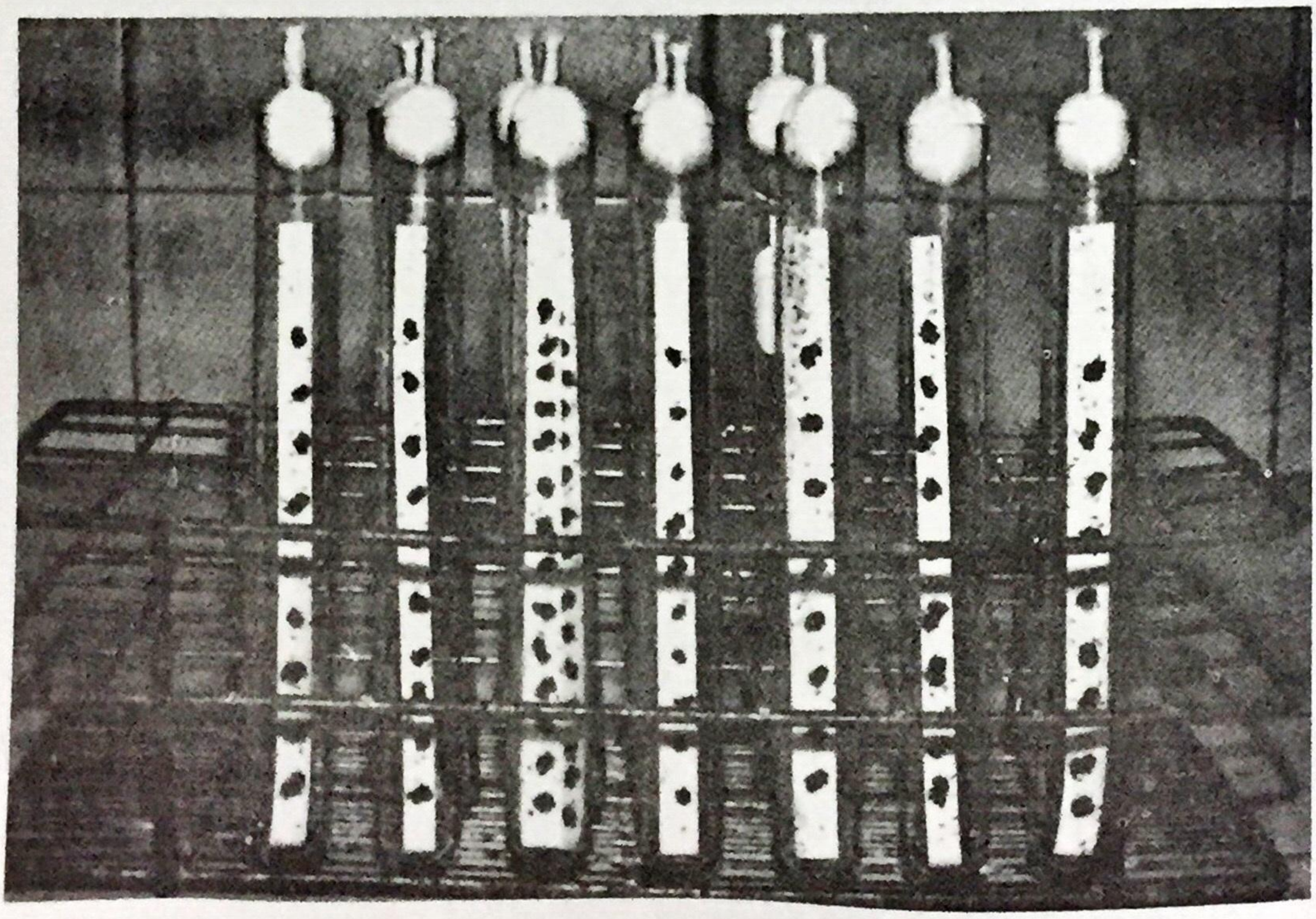

Figure 1. Sections of taro, *Colocasia esculenta* stem used in rearing MBB for egg production.

Mass rearing of T. triptus

T. triptus culture was started by collecting MBB egg masses from the field. These were glued to paper strips (0.9 x 12 cm), then inserted into

culture tubes (1.6 x 15 cm) with opening plug made of moist cotton-nylon stopper[2]. Parasitoids that emerged from these egg masses were allowed to mate and were fed with honey-water solution (Fig. 2).

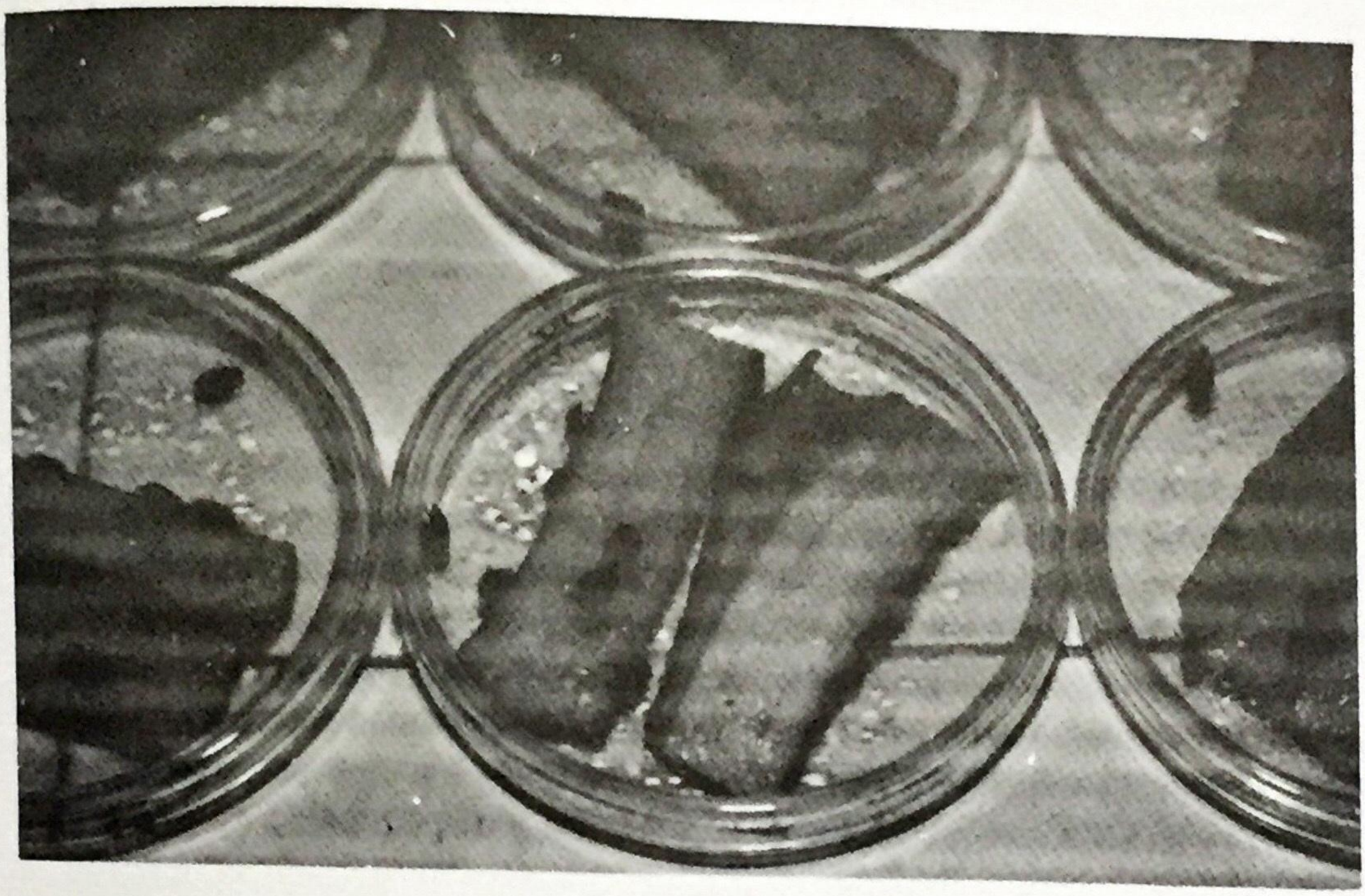

Figure 2. Mass rearing *Telenomus triptus* in culture tubes.

RESULTS AND DISCUSSION

Culture of Malayan black bug for egg production

Sufficient number of eggs were produced when MBB were reared either in potted rice plants or in Petri dishes containing sections of taro petiole. Preliminary tests indicated that a sex ratio of four males to seven females MBB produced the maximum number of eggs. Bigger colonies per rearing cage or dish resulted in overcrowding and lower egg production. Plants also wilted rapidly in less than a week time under such situation.

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[2]Cotton ball 1.8 cm diameter wrapped with fine mesh nylon cloth held tightly at one end with a strip of masking tape from 45 - 50 colonies.

Between the two rearing methods, however, MBB culture in Petri dish with sections of taro petiole as food and oviposition substrate was adopted because it was less laborious and saved time. Cultures in potted plants were difficult to handle due to their size and required approximately 2 - 3 hours in collecting eggs from 45 - 50 colonies. On the other hand, only one hour is required to collect eggs from 100 colonies maintained in Petri dishes.

The average rate of egg production with the first and second technique was 893 and 1,018 eggs, respectively, from 30 MBB colonies per day for a period of 10 days. The colony remained productive for about 100 days. However, egg production gradually decreased due to aging of the insects and death of some female MBB in the colony. The only disadvantage of the Petri dish technique was the rapid deterioration of the substrates. It required changing every week.

Light trapped MBB were used in the culture during low black bug population in the field. However, the females did not immediately lay eggs as in the field-collected ones. It took 7 - 8 days before the females oviposited. Most adults caught by light traps were newly emerged individuals that may be moving to colonize new habitats or possibly females that have already laid their eggs (Shepard *et al.*, 1986). Hence, there was longer interval between capture and oviposition. On the other hand, field-collected females usually lay eggs 24 hours after being introduced in rearing cages. Therefore, for rapid MBB egg production, field-collected adults can be reared in Petri dishes with sections of taro petiole.

Mass rearing of T. triptus

T. triptus was successfully mass produced in culture tubes provided with egg masses of MBB. The parasitoids preferred to oviposit on eggs not older than 1 day. However, after all the 1-day old eggs were parasitized, the parasitoids oviposited also in the 2 - 3 days old host eggs, but at a lower incidence. Hence, younger eggs were used for maintaining the parasitoid culture which got parasitized 100% and gave 99.2% parasite emergence.

LITERATURE CITED

BARRION, A.T., MOCHIDA, O., LITSINGER, J.A. and CRUZ DEL A, N. 1982. The Malayan Black Bug *Scotinophara coarctata* (F.) Hemiptera: Pentatomidae: A new rice pest in the Philippines. IRRN. 7(6):6-7.

CORBETT, G.H. and YUSOPE, M. 1974. *Scotinophara coarctata* (F.). (The Black Bug of Padi). Malay. Agric. Jour. 12(4):91-106.

HEINRICHS, E.A., PATHAK, P.L., DYCK, V.Z., CHELLIAH, S., SAXENA, R.C. and LITSINGER, J.A. 1985. Guide to the management of insect pests of lowland rice in Tropical Asia. IPC/SP/65. 13 pp.

INTERNATIONAL RICE RESEARCH INSTITUTE (IRRI). 1985. Annual Report for 1984. pp. 199-210.

MIYAMOTO, S., TORRES, N.A. HABIBUDDIN, B.H., MONTRI, R., FUJIMARA, T., THIENG, P. and MOCHIDA, O. 1983. Emerging problems of pests and diseases - The black bug in Southeast Asia. A paper presented at the International Rice Research Conference. IRRI, Los Baños, Laguna. 33 pp.

PEREZ, V.A. 1987. Indigenous natural enemies of the Malayan Black Bug, *Scotinophara coarctata* Fab. in Palawan Island, Philippines. M.S. Thesis. ViSCA, Baybay, Leyte.

SHEPARD, B.M., ARIDA, G.S. and HEONG, K.L. 1986. Sex ratio and productive status of *Scotinophara coarctata* collected from traps and rice fields. IRRN 11(3):23-24.