

Natural Enemies of Rhyparochrominae (Lygaeidae: Heteroptera) From Southern India*

K THANGAVELU

Central Institute for Cotton Research Regional Station, Coimbatore 641003

and

K S ANANTHASUBRAMANIAN

Department of Zoology, Loyola College, Madras 600034

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Several predators of Rhyparochrominae from Southern India are identified and reported for the first time, they include ants (3 spp.), lygaeid (1 sp.), nabids (2 spp.), reduviids (2 spp.), roaches (2 spp.), gryllids (3 spp.), frogs (3 spp.), reptiles (5 spp.), birds (3 spp.), monkeys (2 spp.), spiders and centipedes (unidentified). Frogs and monkeys are reported to be predatory on rhyparochromines for the first time. The probable role of these predators in population regulation is discussed.

Key Words : Rhyparochrominae, Natural enemies, Southern India

Introduction

Natural enemies are one of the most important density-dependent factors in regulating the population of insects. Most of the species of Rhyparochrominae feed on seeds and dwell in the litter layer of the soil and therefore their role in the litter niche is of paramount ecological significance (Sweet 1960). Several workers from different zoogeographic regions have identified many predators and a few parasites of rhyparochromines; however, no attempt appears to have been made so far to correlate the predator and host species. Insects

(Corby 1947, Southwood & Leston 1959, Thompson & Simmonds 1964, Sweet 1964, Malipatil 1979), spiders and centipedes (Thomas 1955), lizards (Wilson 1938, Knowlton, et al. 1946, Miller 1956) and birds (Knowlton 1944, Knowlton & Nye 1946) are recorded to be predatory on rhyparochromines. Among parasites of rhyparochromines, insects (Michalk 1935, Risbec 1941, Eyles 1963a, 1963b; Ashlock & O' Brien 1964, Sweet 1964 & Malipatil 1979), mites (Michalk 1938) and fungi (Eyles 1963a) are on record. It is known

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from these records on the natural enemies of Rhyparochrominae that there are many predators (forty species of insects, four species of spiders, three species of lizards and one species of each centipede and bird), while only a few Rhyparochrominae are parasitised by insect parasites and other pathogens. Four species of Tachinidae (Diptera), one species of Bethyilidae (Hymenoptera), two species of mites (*Thrombidium* sp. & *Allothrombidium* sp.) and three species of fungi (*Entomophthora* sp. & *Poecilomyces* sp.) are known to parasitise the rhyparochromines. There appears to be no record of the natural enemies of Rhyparochrominae from the tropical region and this forms the first report of the same, even though the Rhyparochrominae are well represented in the Oriental region (Slater 1964).

Material and Methods

An extensive as well as intensive search was made to study the species composition, endemicity and distribution pattern of the common Rhyparochrominae from Southern India comprising the entire states of Tamil Nadu, Kerala, Andhra Pradesh, Karnataka and part of Maharashtra, and Madhya Pradesh southern to Vindhya Hills during the period 1974–1979; during such survey the natural enemies were also recorded. Casual preying on any species of Rhyparochrominae is not considered as predation while repeated and regular preying on the rhyparochromines is noted to be predation. The vertebrate predators were confirmed by dissecting through the digestive tract of the predator to note the rudiments of the rhyparochromines in the system. A large number of eggs, nymphs and adults of several common rhyparochromines were collected during the different seasons from their natural habitat and reared in petridishes in the laboratory for observation on the emergence of parasites.

All the lygaeids mentioned in this paper

were identified by Dr J A Slater, University of Connecticut, USA, several species of Heteroptera were identified by Dr M S K Gauri, British Museum (Natural History), London, the other insects and vertebrates were identified from the Zoological Museums, Madras Christian College, Madras and Loyola College, Madras.

Results

During the present investigation many predators were recorded (tables 1 & 2) but hitherto neither parasite nor pathogen was recorded on any of these common Rhyparochrominae from southern India. Often ants, roaches, nabids, reduviids, and lygaeids (table 1) are known to prey on eggs, nymphs and adults of the Rhyparochrominae both in the laboratory and in field; frogs and lizards readily prey on the rhyparochromines attracted to light; the lizards spend no time in approaching the just alighted rhyparochromine on the white walls and glass surfaces of houses and shops. The other vertebrate predators include the garden lizard *Varanus* sp. and birds which regularly feed on large number of rhyparochromines (table 2). Birds like common hen (*Gallus domesticus*), common mynah (*Acridotheres tristis*) and Brahminy mynah (*Temenuchus pagodarum*) were observed to search through the lawns and other open habitat of ground litter. In one extraordinary situation, a monkey (*Macaca radiata*) held by a charmer collected a large number of the rhyparochromine (*D. discoguttatus*) attracted to light and readily consumed them and also readily accepted when a large number of them were collected and offered. All these predators, particularly the vertebrates, are not specific, rather, they prey on several of these common rhyparochromines.

Although a large number of eggs and nymphs were collected from the natural habitat and reared through adult stage, no

Table 1 List of insect predators and their prey (*Rhyparochrominae*) species from southern India

Predators	Prey species
HYMENOPTERA	
<i>Monomorium</i> sp.	Eggs of <i>Elasmolomus sordidus</i> (F.)
<i>Camponotus</i> sp.	<i>Dieuches discoguttatus</i> (D.) and <i>Naphiellus dilutus</i> (Horv.)
<i>C. compressus</i>	Eggs and nymphs of the above species
HETEROPTERA	
<i>Geocoris tricolor</i> F. (Lygaeidae)	Nymphs and adults of <i>Poantius festinus</i> Dist.
<i>Nabis</i> sp. (Nabidae)	<i>Dieuches</i> spp.
<i>Alloerhynchus</i> sp.	<i>Pachybrachius</i> sp.
<i>Pasira perpusiella</i> Walk	Nymphs and adults of <i>Elasmolomus lineosus</i> (Dist.)
<i>Ectomocoris cordatus</i> Wolff (Redurviidae)	Nymphs of <i>Dieuches</i> sp.
DICTYOPTERA	
<i>Periplaneta americana</i> (Linn.)	Eggs and nymphs of many
<i>Blatta orientalis</i> Linn.	Rhyparochrominae
<i>Gryllodes sigillatus</i> (Walk)	Nymphs of <i>E. sordidus</i> & <i>N. dilutus</i>
<i>Gryllodes</i> sp.	
<i>Gryllus domesticus</i> (Linn.)	Nymphs of <i>E. sordidus</i> & <i>D. discoguttatus</i>

Table 2 Vertebrate predators of rhyparochromines from Southern India

Predators*	Prey species
AMPHIBIA	
<i>Rana hexadactyla</i> Lesson (Common frog), <i>R. tigrina</i> Daudin. and <i>Bufo melanostictus</i> Schneider	Adults of <i>D. discoguttatus</i> , <i>E. sordidus</i> , <i>P. festinus</i> , and <i>Pachybrachius</i> spp.
REPTILIA	
<i>Hemidactylus brooki</i> Gray	Adults of <i>Metochus uniguttatus</i> (Thun.)
<i>Hemidactylus</i> sp. and <i>Calodactylus</i> sp. (House lizards)	<i>E. sordidus</i> , <i>L. singalensis</i> (Dorhn). <i>P. guttus</i> (Dall.)
<i>Calotes versicolor</i> (Daudin) (garden lizard) and <i>Varanus</i> sp.	Nymphs and adults of <i>M. uniguttatus</i> , <i>D. discoguttatus</i> , <i>Dieuches</i> spp. <i>D. discoguttatus</i>
AVES	
<i>Gallus domesticus</i> Linn. (Common hen)	Adults and nymphs of <i>E. sordidus</i> , <i>E. lineosus</i> , <i>Horridipamera</i> sp., <i>Pachybrachius</i> sp.
<i>Acridotheres tristis</i> Linn. (Common mynah), <i>Temenuchus pagadarum</i> (G ^o melin) (Brahminy mynah)	<i>Lachnethus singalensis</i> (Dohrn) and <i>Pachybrachius</i> spp.
MAMMALIA	
<i>Macaca mulatta</i> (Zimmermann) and <i>M. radiata</i> L. (Common monkey)	Adults of <i>D. discoguttatus</i>

*Common names given in parentheses wherever possible

parasite could be recorded. This may be so because the rhyparochromines lay eggs rather deep among the sand particles and debris in the ground litter and among humus and the eggs are sticky and hence dust and sand particles adhere to the egg surface preventing parasitisation. This habit of laying eggs in the deep litter and the sticky outer surface of the eggs might be an adaptation to escape parasitism. There are a few mantids, spiders and centipedes preying regularly on rhyparochromines which remain to be identified.

Discussion

Among the various density-dependent factors involved in regulating the population, natural enemies often play a major role during outbreaks of certain insects.

The several predators of Rhyparochrominae (tables 1 & 2) reported from southern India often play an important role in controlling the population as these predators consume voraciously the eggs, nymphs and adults of rhyparochromines. Often the predators are

not specific in their selection of prey. Of the several predators, roaches and ants are the most important natural enemies of Rhyparochrominae in this region, besides lizards, frogs, centipedes, spiders and birds. Ants and roaches are found in very large numbers and they readily carry away the eggs and immature stages of the rhyparochromines. Ants and roaches are also more numerous during the peak population period of rhyparochromines. The rhyparochromines are abundant in their natural habitat during the period September–November, each year in southern India (Thangavelu 1979).

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