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Research Note

Parasitoids of some insects in the Andaman Islands

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ABSTRACT: **During the course of studies on the life histories of insects of the Andaman Islands we observed 38 species of hymenopterous parasitoids belonging to 15 families and one dipteran parasitoid of the family Tachinidae. Eight species of Braconidae, four species each of Scelionidae, Encyrtidae, and Ichneumonidae, 3 species each of Pteromalidae, Eulophidae and Eupelmidae, 2 species of Bethylidae, one species each of Elasmidae, Eurytomidae, Chalcididae, Ceraphronidae, Chrysididae, Torymidae, Eucharatidae and Tachinidae are recorded from these islands on different insect hosts. An undescribed *Ooencyrtus* sp. is being recorded from the eggs of the endemic subspecies *Elymnias cottonis cottonis*. *Podagrion* sp., hitherto recorded from mantid oothecae, is recorded on the larvae of two species of Lepidoptera for the first time.**

KEY WORDS: Andaman Islands, biological control, hyperparasitoids, parasitoids

The Andaman Islands are a group of about 200 Islands in the eastern Indian Ocean flanked by the Indian Mainland to the west, Burma to the north and Burma and Thailand to the east. The Nicobars are the southern extension of these Islands. Volcanic in origin, these Islands have never been connected by land bridges to any of these neighbouring landmasses (Prashanth and Veenakumari, 1996). Though politically a part of India, their biotic affinities are closer to that of Burmese and Malayan forms.

In the past, some attempts were made to import agents for the biological control of insect pests to these Islands. The viral pathogen, *Baculovirus oryctes* was introduced from mainland India for the control of the coconut rhinoceros beetle (*O. rhinoceros* Linnaeus) (Jacob, 1996), while the predatory snails *Euglandina rosea* (Ferussac) and *Gonaxis quadrilateralis* (Preston) were introduced for the control of *Achatina fulica* Bowdich, the giant African snail (Srivastava, 1976). The former proved to be successful, but the latter was a failure with the predatory snails failing to establish. These Islands have however never been used as a source for natural enemies of insect pests. This is probably because the pest and natural enemy fauna of these islands are very poorly known. As a first step, remedial action in this regard would involve the documentation of the insect-natural enemy component of these Islands. Over the years, while studying the life histories of the insects of these islands we encountered egg and larval

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parasitoids as well as some hyperparasitoids of native species of Lepidoptera and a few species of Coleoptera and Hemiptera (Tables 1 and 2). We detail the locality of occurrence of these parasitoids and establish their host associations.

The majority of the species enumerated are primary internal parasitoids of Lepidoptera while a few belong to Coleoptera, Hymenoptera, Neuroptera and Diptera.

Egg parasitoids

The majority of the egg parasitoids could not be identified (by specialists at the NHM, London) to the species level indicating that at least some of them could be new species. The species of *Ooencyrtus* from the eggs of the endemic subspecies *Elymnias cottonis cottonis* is in fact new and is yet to be described (Noyes, Pers. Comm.). The unidentified species of *Telenomus* were all collected from the eggs of butterflies endemic to the Andaman and Nicobar Islands. *Pachliopta rhodifer* is an endemic papilionid while the others are all subspecies endemic to these islands.

Leurocerus ovivorus is an egg parasitoid of butterflies belonging to the families Amathusiidae and Satyridae and was so far known to occur only in Malaysia, Indonesia, Hong Kong and southern China (Subba Rao, 1976). This is the first time it is being recorded from India and also from the eggs of a non-butterfly host.

Larval parasitoids

It is interesting to note that some larval parasitoids like *Cotesia glomerata, Charops obtusus* and *Glyptapanteles colemani* have earlier been recorded from mainland India. *G. colemani,* hitherto thought to be confined to mainland India is being recorded from a place other than the Indian mainland for the first time.

Cotesia glomerata is an extremely widespread species known from the Palaearctic, Indian and Australian regions. Although it has been recorded from a number of lepidopteran hosts, many of these are dubious records requiring verification (Noyes, 1994). In the Andaman Islands it is a confirmed parasitoid of the endemic danaid *Euploea (Core) andamanensis* Atkinson.

Both the pteromalid parasitoids are cosmopolitan in distribution known to be associated with beetles in stored products.

Melittobia and *Goniozus* are gregarious parasitoids that attack a wide range of hosts. Since the former attack hymenopteran species it is the latter that is of interest from the biological control point of view as the species in this genus attack concealed larvae of a number of Microlepidoptera.

Neanastatus trochantericus emerged from the galls of *Dipterocarpus* sp. in S. Andaman. *N. trochantericus* has been recorded earlier from plant galls on the Indian mainland. They are known to be parasitoids of Cecidomyiidae (Diptera) associated generally with grasses and other herbaceous plants.

Since all the parasitoids emerged from insects reared in captivity, the host records are beyond doubt. Knowledge of the parasitoid fauna along with their host and their localities of occurrence is essential to enable us to utilize these Islands as a potential reservoir of natural enemies. As these Islands have biotic affinities with Burma and Southeast Asia, with high degrees of endemism in certain groups, it is necessary to focus studies on the insect natural enemies present here. With this knowledge we could select species or superior strains of natural enemies different from those on the Indian mainland, which could be exploited in pest management programmes. This study strongly suggests the presence of new species of natural enemies, which may be of value in the biological control of crop pests once their potential as agents for control is assessed. While studies on the natural enemies of insects on these islands are to be intensified, the Nicobar Islands too should be studied on the same lines as they have biotic elements that are different from that of the Andamans as well as mainland India and so are likely to yield novelties.

Table 1. Egg parasitoids of some insects in South Andaman

Natural enemy	Host	Period of occurrence	Locality
HYMENOPTERA			
Scelionidae			
Telenomus sp. (*Aholcus* group)	*Pachliopta aristolochiae goniopeltis* Rothschild (Lepidoptera: Papilionidae)	July - Oct.	Garacharma
	Pachliopta rhodifer Butler (Lepidoptera: Papilionidae)	Nov. - Jan.	Garacharma Mt. Harriet
Telenomus sp.	*Elymnias cottonis cottonis* Hewitson (Lepidoptera: Satyridae)	Oct. - Nov.	Garacharma Mt. Harriet
	Ambadra rafflesi Moore (Lepidoptera: Notodontidae)	Oct. - Nov.	Garacharma
	Polyura schreiber tisamenus Fruhstorfer (Lepidoptera: Nymphalidae)	May - July	Chidiyatapu
Telenomus ?seychellensis Kieffer	*Dysphania andamana* Moore (Lepidoptera: Geometridae)	Apr. - Jan.	Garacharma Mt. Harriet
	Unidentified Hemiptera	July - Aug.	Garacharma
Telenomus remus Nixon	*Scirpophaga incertulas* (Walker) (Lepidoptera: Pyralidae)	July - Sept.	Bloomsdale
Pteromalidae			
Trichomalopsis apanteloctena (J. C. Crawford)	*Borbo cinnara* Wallace (Lepidoptera: Hesperiidae)	June - July	Bloomsdale
Eupelmidae			
Gen. *et* sp. indet.	*Lebeda* sp. (Lepidoptera: Lasiocampidae)	June - July	Garacharma Mt. Harriet
Anastatus sp.	*Paralebeda* sp. (Lepidoptera: Lasiocampidae)	June - July	Mt. Harriet
	Elymnias cottonis cottonis Hewitson (Lepidoptera: Satyridae)	Oct. - Nov.	Garacharma Mt. Harriet
Encyrtidae			
Ooencyrtus sp. (undescribed)	*Elymnias cottonis cottonis* Hewitson (Lepidoptera: Satyridae)	Oct. - Nov.	Garacharma Mt. Harriet
Leurocerus ovivorus Crawford	*Ambadra rafflesi* Moore (Lepidoptera: Notodontidae)	Oct. - Nov.	Garacharma

Table 2. Larval and pupal parasitoids of some insects in South Andaman

Natural enemy	Host	Period of occurrence	Locality
HYMENOPTERA			
Pteromalidae			
Dinarmus basalis (Rondani)	*Bruchidius chinensis* (Thunberg) (Coleoptera: Bruchidae)	Sept. - Oct.	Garacharma
Theocolax elegans (Westwood)	*Zoophiles zeamais* Motschulsky (Coleoptera: Curculionidae)	Aug.-Sep.	Garacharma
Euliphidae			
Euplectrus sp.	*Elymnias cottonis cottonis* Hewitson (Lepidoptera: Satyridae)	Oct. - Nov.	Garacharma Mt. Harriet
Pediobius ?agaristae (Cameron)	***Euphrates*** sp. (Lepidoptera: Lymantriidae)	July-Aug.	Garacharma
Melittobia australica Girault	*Subancistrocerus sichelii* (Saussure) (Hymenoptera: Vespidae)	Apr. - May	Garacharma
Elasmidae			
Elasmus sp.	*Erionota thrax thrax* L. *E. acroleuca* Wood-Mason and de Niceville (Lepidoptera: Hesperiidae)	Sept.-Nov.	Garacharma
	Parotis marginata (Hampson) (Lepidoptera: Pyralidae)	June- July	Garacharma
Ichneumonidae			
Charops obtusus Morley	*Elymnias cottonis cottonis* Hewitson (Lepidoptera: Nymphalidae)	Oct.-Nov.	Garacharma Mt. Harriet
Enicospilus sp.	*Penicillaria jocosatrix* Guenee (Lepidoptera: Pyralidae)		Garacharma
Trathala sp.	*Herpetogramma bipunctalis* (F.) (Lepidoptera: Pyralidae)	July	Garacharma
?Venturia sp.	? Lepidopterous larvae on *Dipterocarpus* sp.	Aug.	Garachama
Eupelmidae			
Neanastatus trochantericus Gahan	From galls of *Dipterocarpus* sp.	Sept.	Garacharma
Eurytomidae			
Eurytoma sp.	*?Cryptophlebia* sp. (Lepidoptera: Tortricidae)	Mar.-Apr.	Manjeri
	Cryptophlebia sp. (Lepidoptera: Tortricidae)	Mar.-Apr.	Manjeri
Braconidae			
Pycnobracon mutator (Fabricius)	*Lycangesia longipalpis* (Swinhoe) (Lepidoptera: Noctuidae)	May	Wright Myo
Cotesia glomerata (Linnaeus)	*Euploea (Core) andamanensis* Atkinson (Lepidoptera: Nymphalidae)	Oct.-Dec.	Garacharma Mt. Harriet Chidiyatapu
Aleiodes percurrens Lyle	*Condica* sp. (Lepidoptera: Noctuidae)	July	Garacharma
Aleiodes sp.	*Hemithea* sp. (Lepidoptera: Geometridae)	Apr. - May	Manjeri

Table 2a. Larval and pupal parasitoids of some insects in south Andaman

Natural enemies	Host	Period of occurrence	Locality
Glyptapanteles colemani (Viereck)	*Euproctis* sp. (Lepidoptera: Lymantriidae)	July - Aug.	Garacharma
Phanerotoma sp.	*Scoparia* sp. (Lepidoptera: Pyralidae)	July - Aug.	Manjeri
Bracon sp.	*Matapa* sp. (Lepidoptera: Hesperiidae)	Nov. - Dec.	Mt. Harriet
	?*Cryptophlebia* sp. (Lepidoptera: Tortricidae)	Mar. - Apr.	Manjeri
Microgastrinae Gen. et sp. indet.	*Mascelia* sp.nr. *ectophoea* Hampson (Lepidoptera: Pyralidae)	Mar. - Apr.	Chidiyatapu
Ceraphronidae			
Aphanogmus manilae (Ashmead)	*Apanteles* sp. on *Thosea andamanica* Holloway (Hyperparasitoid)	Feb.	Garacharma
Chalcididae			
Brachymeria sp.	*Indomyrlaea* sp. (Lepidoptera: Pyralidae)	Mar. - Apr.	Sippighat
Bethylidae			
Goniozus sp.	*Homona permutata* Meyrick (Lepidoptera: Tortricidae)	Aug. - Sept.	Garacharma
Apenesia sp.	(Coleoptera: Cerambycidae)	Aug. -Sept.	Garacharma
Chrysididae			
Praestochrysis shanghaiensis (F. Smith)	*Thosea andamanica* Holloway (Lepidoptera: Limacodidae)	Oct. - Nov.	Garacharma Mt. Harriet
Encyrtidae			
Copidosomyia ambiguous (Subba Rao) (Pupal parasitoid)	Chrysopidae	Nov. - Jan.	Garacharma
Genus et. sp. indet.	(Diptera: Syrphidae)	July - Aug.	Chidiyatapu
Torymidae			
Podagrion sp.	*Indomyrlaea* sp. (Lepidoptera: Pyralidae)	Mar. - Apr.	Sippighat
	Nephopterix sp. (Lepidoptera: Pyralidae)	June – Oct.	Garacharma
Eucharitidae			
Schizaspidia sp.	Ants (Hymenoptera:Formicidae)	June	Sippighat
DIPTERA			
Tachinidae			
Palexorista sp.	*Agrius convolvuli* L. (Lepidoptera: Sphingidae)	July	Garacharma

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