

# Ecological characteristics of *Antilochus coqueberti*, a specialist natural predator of cotton stainers

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**Key words :** cotton stainer, predator, *Antilochus coqueberti*, prey preference, development

## Objectives

Cotton stainers (*Dysdercus* spp.; Heteroptera: Pyrrhocoridae) are one of the major insect pests of cotton plants. They are difficult to control by insecticide application in cotton fields because they are highly mobile and have many alternative host plants. A pyrrhocoid bug *Antilochus coqueberti* (Heteroptera: Pyrrhocoridae) was presupposed to prey upon cotton stainers, but there had been no precise study on its ecological characteristics. In this study, the food preferences and ecological characteristics of *A. coqueberti* were investigated in order to elucidate its validity as a biological control agent against cotton stainers.

## Results

*Antilochus coqueberti* adults and nymphs prey upon two species of cotton stainers (*D. cingulatus* and *D. decussatus*) in the fields of Ishigaki-jima Island (Fig. 1). Laboratory experiments showed that *A. coqueberti* also preys upon all the pyrrhocorids and alydids; however, lygaeids, largids, coreids, and rhoparids are not preyed upon by *A. coqueberti*, although all of these species bear considerable visual resemblance to cotton stainers (Table 1).

Developmental periods from oviposition to adult emergence of *A. coqueberti* fed with *D. cingulatus* under each environmental condition are shown in Table 2. Based on these values, developmental zero and the effective cumulative temperature from oviposition to adult emergence were estimated to be 12.8°C and 606.1 day degrees, respectively.

Reproductive traits of female *A. coqueberti* are shown in Table 3. These values clearly reflect the high reproductive potential of this species.

Female *A. coqueberti* did not exhibit reproductive diapause even if they were reared under short day lengths (10L-14D). The nymphal developmental period and preovipositional period were shorter when compared to those under long day lengths (Table 2).

The results detailed above show that, as a specialist natural predator, *A. coqueberti* is a promising biological control agent against cotton stainers, and its utilization should be highly recommended when this species is artificially reared.



Fig. 1. *Antilochus coqueberti* in copulation preying on *Dysdercus cingulatus*.

Table 2. Developmental periods from oviposition to adult emergence of *Antilochus coqueberti* fed with *Dysdercus cingulatus*.

Temp (°C)	Day Length	Number of insects	Duration (Days; Mean ± SE)
20.0	14L-10D	21	87.1 ± 1.4
22.5		22	62.3 ± 0.4
25.0		36	49.3 ± 0.5
27.5		8	41.9 ± 0.5
30.0		19	35.5 ± 0.7
22.5	10L-14D	32	56.7 ± 0.3
25.0		23	42.8 ± 0.2

Table 1. Suitability of bug species as prey of *Antilochus coqueberti*.

Bug superfamily	Bug family	Bug species	Suitable?
Lygaeoidea	Lygaeidae	<i>Oncopeltus nigriceps</i>	no
		<i>Spilostethus hospes</i>	no
		<i>Graptostethus servus</i>	no
		<i>Thunbergia sanguinaria</i>	no
Pyrrhocoroidea	Largidae	<i>Physopelta cincticollis</i>	no
		<i>Physopelta gutta</i>	no
	Pyrrhocoridae	<i>Dysdercus cingulatus</i>	yes
		<i>Dysdercus poecilus</i>	yes
		<i>Dysdercus decussatus</i>	yes
		<i>Dysdercus philippinus</i>	yes
		<i>Dysdercus</i> sp. probably <i>D. mesiostigma</i>	yes
		<i>Dysdercus</i> sp. probably <i>D. solenis</i>	yes
		<i>Armatullus</i> sp.	yes
Coreoidea	Coreidae	<i>Dasynus coccocinctus</i>	no
	Alydidae	<i>Riptortus clavatus</i>	yes
		<i>Daclera levana</i>	yes
	Rhopalidae	<i>Leptocoris augur</i>	no
		<i>Leptocoris rufomarginatus</i>	no

Table 3. Reproductive traits of *Antilochus coqueberti* fed with *Dysdercus cingulatus* under 14L-10D at 25°C.

Properties	value(Mean ± SE)	[min.-max.]
Preoviposition period (days)	10.7 ± 0.7	[10-12]
Adult longevity (days)	97.2 ± 56.9	[34-186]
No. of oviposition	10.9 ± 5.9	[4-20]
Egg batch size	55.2 ± 15.5	[20-91]
Total fecundity	601.7 ± 294.5	[222-990]

## Reference

K. Kohno, K. Takahashi and M. Sakakibara (2002) : New pre-predator association in aposematic pyrrhocorid bugs: *Antilochus coqueberti* as a specialist predator on *Dysdercus* species. Entomological Science, 5 (4) (in press).

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