

BUTTERFLIES AS PREY FOR *ORTHETRUM AUSTENTI* (KIRBY) (ANISOPTERA: LIBELLULIDAE)

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Abstract — In Lagos, Nigeria, *O. austeni* appears highly specialised as a predator of butterflies. Field observations are recorded, and a list of Rhopalocera spp. taken as prey or observed under attack is presented.

Introduction

In the untidy and not very interesting bush cum kitchen gardens of the Airport Hotel in Lagos, Nigeria I came across (22 Nov. 1980) a male dragonfly eating a specimen of the butterfly *Acraea eponina* (Cramer) (Acraeidae). It was kindly identified as *Orthetrum austeni* (Kirby) by Mr S.J. Brooks of the British Museum (Natural History).

The observations made during this and the next few days are recorded below.

Record of the observations on feeding behaviour in a male specimen

13.50 Encountered eating *Acraea eponina*.

Photographed (cf. Fig. 1)

13.51 Contact lost

14.03 Refound on same perch eating a specimen of *Colotis evippe*

14.07 Sortie after *Euchrysops malathana*, physical contact

14.09 Unidentified sortie

14.11 Sortie for *E. malathana*; abortive

14.16 Sortie after *Neptis* sp.; physical contact

14.18 Sortie after *E. malathana*; abortive

14.19 Sortie after *A. eponina*; physical contact

14.21 Brief sortie, false alarm

14.21 Sortie after *E. malathana*; physical contact

14.21 Sortie after *A. eponina*; physical contact

14.22 Sortie after *E. malathana*; physical contact



Fig. 1. *Orthetrum austeni* (Kirby) eating *Acraea eponina* (Cramer) (Lagos, Nigeria, December 1980).

14.22 Sortie after Pieridae sp.; abortive

14.23 Sortie after *A. eponina*; no contact

14.24 Sortie for *Junonia oenone*, physical contact

14.25 Brief unidentified sortie

14.25 Sortie after *Eurema brigitta*; no contact

14.25 Unidentified sortie

14.26 Sortie after *Catopsilia florella*; no contact

14.27 Sortie for *A. eponina*; physical contact

- 14.28 Sortie for *J. oenone*; no contact
 14.29 Sortie for *J. oenone*; physical contact
 14.29 Two attempts at the same *E. malathana*;
 physical contact
 14.30 Unidentified sortie
 14.33 *J. oenone* nearly captured; dragonfly
 bit through leaf in misapprehension it was
 prey; my investigation of this scared it
 away; contact lost till 15.10
 15.10 Refound on its perch eating *A. eponina*
 15.13 False alarm sortie
 15.14 Sortie for *J. terea*; physical contact
 15.15 Unidentified sortie
 15.16 Captured *E. malathana* and flew off to
 a perch 10 m distant
 15.25 Dragonfly captured for identification.

Further observations and discussion

On 1 December 1980 at 17.10 I came across another male dragonfly of the same species sitting at the favourite perch of the first specimen. It was eating a male *Bicyclus dorothea* (Cramer) (Satyridae); beneath the perch were the wings of a male *Appias epaphia* (Cramer) (Pieridae). The specimen was more restless than the first and although I met with it from time to time during the following week, I never had the chance of protracted observation. However, the pattern appeared generally similar.

On 6 December 1980 at about 11.00 I was able to manage another series of observations for a period of about 40 minutes from the same perch. I observed the following activities. I had no pencil on me, so the degree of detail is less:

- 1 unsuccessful sortie for *Pelopidas* sp.;
- 1 unsuccessful sortie for *Tagiades flesus*;
- 2 unsuccessful sorties for *Coeliades forestan*;
- 2 unsuccessful sorties for *Appias epaphia*;
- 1 unsuccessful sortie for *A. sylvia*;
- 1 unsuccessful sortie for *Catopsilia florella*;
- 1 unsuccessful sortie for *Junonia sophia*;
- 3 unsuccessful sorties for *Zizeeria knysna*;
- 1 unsuccessful sortie for *Euchrysops malathana*;
- 9 unidentified sorties, mostly false alarms;
- 1 successful sortie, capturing *Acraea encedon* which was eaten at another perch.

The similarity of the general pattern

between the first and second series of observations, with the dragonfly using the very same perch, was uncanny. I was momentarily left wondering whether I had actually captured the first specimen!

I had contact with the first specimen for 85 minutes during which time I physically saw it eating 4 butterflies. The second specimen made 1 kill in 40 minutes. Thus it would appear that on a reasonable day a male of this dragonfly makes a kill every half hour, or about twenty kills a day.

During 36 minutes of direct observation the first specimen made a total of 28 sorties. The second made 23 sorties in 40 minutes, at a time when the weather was less propitious. The total number of sorties made by a male during a nine hour working day would thus seem to be about 400 — one in twenty of which are successful.

The following points list some additional observations based on field notes compiled immediately after the observations were made.

- (1) Of a total of 3 males and 1 female dragonfly observed in the field, all were interested exclusively in butterflies (Rhopalocera). Bees, flies, wasps and other insects were plentiful but evoked no response. In particular, small, black-winged Odonata — which I sometimes mistook for butterflies — were never attacked.
- (2) All species of butterfly were attacked irrespective of size, except for *Papilio demodocus* Esper, and irrespective of method of flight which varies from the very fast Hesperiidae to the slow and fluttering species such as *Eurema* (Pieridae). See Table I for a list of observed prey.
- (3) Captured prey would be brought to the perch normally used by the dragonfly, but occasionally to some rather more hidden perch. The whole butterfly was eaten except the wings, which fluttered to the ground when the body was eaten. There was no attempt first to cut off the wings as some other predators are known to do.
- (4) Species of *Acraea* (Acraeidae) were readily eaten. These butterflies are aposematic and act as models in mimicry complexes. However, many praying mantis will eat

Table 1 — Butterfly species (Rhopalocera) as prey or under attack by *Orthetrum austeni*

Species	Wingspan (mm)
Hesperiidae	
<i>Coeliades forestan</i> (Stoll)	45
<i>Tagiades fesus</i> (Fabr.)	35
<i>Pelopidas</i> sp. (? <i>Baoris fatuellus</i> Hopffer)	28
Pieridae	
* <i>Colotis evippe</i> (L.)	42
* <i>Appias epaphia</i> (Cramer)	45
<i>A. sylvia</i> (Fabr.)	50
<i>Eurema brigitta</i> (Stoll)	40
<i>Catopsilia florella</i> (Fabr.)	55
Nymphalidae	
<i>Junonia oenone</i> (L.)	48
* <i>J. sophia</i> (Fabr.)	35
<i>J. terea</i> (Dru.)	40
<i>Neptis</i> sp. (? <i>melicerta</i>)	40
Satyridae	
* <i>Bicyclus dorothea</i> (Cramer)	40
Acraeidae	
* <i>Acraea eponina</i> (Cramer)	38
* <i>A. encedon</i> (L.)	40
Lycaenidae	
* <i>Euchrysops malathana</i> (Boisduval)	22
<i>Zizeeria knysna</i> (Trimen)	18

* Observed being eaten. — A further 10 species were attacked. A total of 50 species plus were seen in the garden.

Acraea butterflies which are obviously not protected against insect predation.

- (5) Only flying butterflies were taken. Butterflies which were visible and active on flowers were ignored.
- (6) On most occasions the dragonfly would make physical contact with the prey — often audibly so — and given the speed of some of its victims a kill rate of one in twenty seems very impressive.

(7) There appeared to be an optimum range for location of prey between a radius of 1.5 to 2.5 m of the perch. Butterflies moving around under the very-eyes of the dragonfly were never attacked and those more than three metres away only rarely. However, prey was sometimes chased for a considerable distance.

(8) Movement from the perch was usually restricted to sorties of 1.5 to 10 metres, but sometimes a particularly promising butterfly would be pursued for longer than that. The altitude varied from ground level to two or three metres depending on how the prey sought its escape.

(9) The species is obviously territorial. I never saw more than one male within the gardens of the hotel, though once a further male was seen in an adjacent territory occasionally trespassing briefly. The area was about 150 x 100 m and rather well delineated. The two successive males could usually be found on the perch where the observations were made, but there were other perches, at least two of which were used by both specimens. At the end of my visit I could usually find the male within less than half an hour somewhere in the garden. They clearly had a good topographical knowledge of their territory, moving from one perch to another over a distance of 50 m + without needing to search.

(10) On one occasion I witnessed an amusing sight. The dragonfly thought it had succeeded in capturing a specimen of *Junonia oenone*, a large and powerful butterfly, which managed to escape. It chewed off the entire leaf on which it had settled with increasing frenzy, presumably wondering why such a likely meal tasted decidedly vegetarian. I inspected the leaf later; it was cut, as if with a dull knife, for a length of 2 cm.

There were at least half a dozen other species of dragonfly active in the garden, all of which seemed to have their own ecological niche, and none of which were ever seen attacking a butterfly. One was seen eating a fly.

On the basis of the observations given

above it would appear safe to conclude that *Orthetrum austeni* is highly specialised as a predator of butterflies, at least as far as the Lagos population is concerned. At the time of my visit butterflies were very plentiful in the garden (say 1500, or one per 10 m²) so the

level of predation was not too great. However, at other times of the year the level of predation by this species of dragonfly could become quite severe.

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