



Fig. VIII

ZAMBEZE DELTA ECOLOGY

Holistic Ecological Research Project

PROF. Alan GARDINER & DR Byron DU PREEZ

FINDING FROGFOOT

Remarks Orange-yellow or brown with long tails splayed out like a frog's hindlegs. Although it is not very common, it is one of our most spectacular species.

Distribution This subspecies is found in the Zambezi valley and Mozambique, but the typical *daltoniae*, which is much larger, occurs in north-east Tanzania.



REDISCOVERING *Antistathmoptera rectangulata*

The spectacular Frogfoot moth *Antistathmoptera rectangulata* is known from only a few specimens mostly collected over half a century ago; this is interesting considering the size and beauty of the species, such that even the layman is likely to notice it. The most recent records, from southern Malawi, are likely to be extinct as “*the exact area where I caught these although a designated Forest Reserve, was cut down by the locals, turned into charcoal and is now maize gardens*” (Bouyer 2006). The only other known encounters of the species since the 1960’s are photographs taken in 2007 in Coutada 12 (J. Francis) and 2015 in Catapu (I. Riddell), which lie to the south-east and north-west of Coutada 11 respectively.

Intrigued by the mystery of such few sightings of such an amazing moth, Prof. Alan Gardiner (*one of Africa’s foremost lepidopterists*) has been searching for the Frogfoot for nearly 30 years. It has eluded him until now. Dr Byron du Preez (*specialising in higher-level phyla*) joined the expedition as the Delta resident ecologist.



A gaggle of Pseudobunaea Emperor moths – the fact that they are relatively common here takes nothing away from their beauty



SURVEYING MOTHS: *the Basics*

Moths are relatively easy to survey, given their overwhelming addiction to luminescence; all that is needed is a light source surrounded by a transparent surface from which the moths can be picked like flowers. The real challenges lie in the unpredictability of the weather (*cold weather especially has a negative effect on moth capture rates; whilst rain and wind affect the trapping equipment – all of which was unfortunately in abundance during our survey*), and, in the case of the Frogfoot, an understanding of the ecological niche in which the target species is likely to occur.



The centre of the moth's universe – light-trap in action

Our set-up consisted of: a light-bulb attached and extension lead attached to a generator, suspended inside a mosquito net supported by a small collapsible gazebo. Rain covers for the bulb and generator were used as required. The lights were lit at 18h00 and extinguished at 04h00, and were checked at regular intervals throughout the night, encompassing the peak activity periods of the different sexes of Emperor moths in general.



Light-trap on the edge of an open pan



Light-trap under Brachystegia canopy



FINDING THE FROGFOOTS

The majority of the previous records of Frogfoot encounters occurred during November, and thus our survey was planned around the no-moon period so as to maximise the efficacy of the light-traps. Unfortunately, it has been unseasonably cold, and this no doubt affected the moth capture rate, with less taken the cooler it got.

However, despite the weather, **we got the Frogfoot!**



*The first Mozambican *A. rectangulata* collected since the 1960's*

13 *Antistathmoptera rectangulata* were collected in total during the survey between the 4th and 10th of November 2018, and 2 more have been subsequently collected in an ongoing trapping effort that will continue over no-moon periods in December 2018 and January 2019. This represents the largest sample ever taken, and is potentially a wealth of information regarding habitat types, individual variation, and an index of attempted bat predation levels.



Light-trap in Brachystegia forest where the Frogfoot was recorded



Frogfoot habitat – belt of Brachystegia forest along a vleilijn

INCREDIBLE



& Inedible?



FROGFOOT ANTI-PREDATOR DEFENCES

There is no doubt the Frogfoots wings resemble dead leaves, camouflaging the moth from visual predators, such as birds, both when on the forest floor or perched on a branch. However, the distinctive characteristic of the Frogfoot, which makes it interesting that so few have been noticed, is the long tail trailing from the hind-wing and twisted at the tip. This fascinating feature in other species (such as the African moon moth *Argema mimosae*) has been shown deflect sonar detection and act as a decoy that confuses the bat and significantly reduces nocturnal predation rates on the active moths.



Survivor of a bat predation attempt, camouflaged on the forest floor

For more information, see:

Barber et al. 2015 – *Moth tails divert bat attack: Evolution of acoustic deflection*

Hofstede & Ratcliffe 2017 – *Evolutionary escalation: the bat-moth arms race*

Rubin et al. 2018 – *The evolution of anti-bat sensory illusions in moths*



DR. E. J. P. J.

DEFINITION: *Lepidopterrorist*



GENERAL ZAMBEZE DELTA ENTOMOLOGY

This survey at the beginning of the wet season (*4th – 10th November 2018*), whilst focussed on finding the Frogfoot, follows on from the entomological survey at the beginning of the dry season (*3rd – 7th April 2018*) earlier this year, which focussed on butterflies; logging 115 species around the Coutada 11 camps (*which is double the total number of species found in the whole of the United Kingdom*).



A praying mantis helps itself to a cicada at one of the light-traps

Insects, and butterflies and moths in particular (*being highly conspicuous and relatively easy to identify*), are useful indices of the overall biodiversity of an ecosystem, as well as the general health of the environment over time. Surveys such as these are therefore incredibly important in prioritising key areas for conservation, and as a first indication of habitat degradation and loss. We plan to continue these surveys to produce a comprehensive species list that we can monitor over time to inform local conservation management.



THE LAST WORD IN IGNORANCE IS THE MAN WHO SAYS OF AN ANIMAL OR PLANT, “*What good is it?*”

If the land mechanism as a whole is good, then every part is good, whether we understand it or not.

If the biota, in the course of aeons, has built something we like but do not understand, then who but a fool would discard seemingly useless parts?

TO KEEP EVERY COG AND WHEEL IS THE FIRST PRECAUTION OF INTELLIGENT TINKERING

Leopold 1966