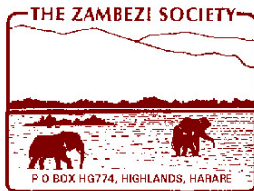


Published for
The African Wildlife Foundation's
FOUR CORNERS TBNRM PROJECT
 by
THE ZAMBEZI SOCIETY and
THE BIODIVERSITY FOUNDATION FOR AFRICA
2004



The Zambezi Society
 P O Box HG774
 Highlands
 Harare
 Zimbabwe
 Tel: +263 4 747002-5
 E-mail: zambezi@mweb.co.zw
 Website : www.zamsoc.org

The Biodiversity Foundation for Africa
 P O Box FM730
 Famona
 Bulawayo
 Zimbabwe
 E-mail: bfa@gatorzw.com
 Website: www.biodiversityfoundation.org

The Zambezi Society and The Biodiversity Foundation for Africa are working as partners within the African Wildlife Foundation's Four Corners TBNRM project. The Biodiversity Foundation for Africa is responsible for acquiring technical information on the biodiversity of the project area. The Zambezi Society will be interpreting this information into user-friendly formats for stakeholders in the Four Corners area, and then disseminating it to these stakeholders.

THE BIODIVERSITY FOUNDATION FOR AFRICA (BFA) is a non-profit making Trust, formed in Bulawayo in 1992 by a group of concerned scientists and environmentalists. Individual BFA members have expertise in biological groups including plants, vegetation, mammals, birds, reptiles, fish, insects, aquatic invertebrates and ecosystems. The major objective of the BFA is to undertake biological research into the biodiversity of sub-Saharan Africa, and to make the resulting information more accessible. Towards this end it provides technical, ecological and biosystematic expertise.

THE ZAMBEZI SOCIETY was established in 1982. Its goals include the conservation of biological diversity and wilderness in the Zambezi Basin through the application of sustainable, scientifically sound natural resource management strategies. Through its skills and experience in advocacy and information dissemination, it interprets biodiversity information collected by specialists like the Biodiversity Foundation for Africa and uses it to provide a technically sound basis for the implementation of conservation projects within the Zambezi Basin.

THE PARTNERSHIP between these two agencies was formed in 1996 as a result of mutual recognition of their complementarity. They have previously worked together on several major projects, including the biodiversity component of IUCN's Zambezi Basin Wetland project and the evaluation of biodiversity in Tete province described in detail in the first Four Corners TBNRM Biodiversity Information Package.

ISBN 0-7974-2835-6

RECOMMENDED CITATION:

Timberlake, J.R. & Childes, S.L. 2004. *Biodiversity of the Four Corners Area: Technical Reviews Volume Two* (Chapters 5-15).
 Occasional Publications in Biodiversity No 15,
 Biodiversity Foundation for Africa, Bulawayo/Zambezi Society, Harare, Zimbabwe.

ACKNOWLEDGEMENTS

In addition to all the authors of the chapters in this document, The Zambezi Society and the Biodiversity Foundation for Africa wish to thank the following for peer review or additional assistance:-

John Burrows
Colin Craig
Barbara Curtis
Cornell Dudley
Kevin Dunham
Peter Frost
Debbie Gibson
Mike Griffin
Michael Irwin
Bas Jongeling
Linley Lister
Gillian Maggs
Anthony Mapaura
Brian Marshall
Susan Ringrose

We also wish to thank Henry Mwima, Nesbert Samu, Othusitse Lekoko, Daudi Sumba, Gitonga Kathurima, Maureen Mashingaidze and Simon Metcalfe of the African Wildlife Foundation

CHAPTER 10. BUTTERFLIES OF THE FOUR CORNERS AREA

CONTENTS

PUBLISHERS' DETAILS	i
ACKNOWLEDGEMENTS	ii
TABLES	iii
APPENDICES	iii
CHAPTER 10. BUTTERFLIES OF THE FOUR CORNERS AREA	383
10.1 INTRODUCTION	383
10.2 REVIEW OF INFORMATION AND COLLECTIONS.....	383
10.3 BUTTERFLY BIOLOGY	384
10.3.1 Higher Classification.....	384
10.3.2 Butterfly Migrations.....	385
10.4 LEPIDOPTERA OF ECONOMIC AND SOCIAL IMPORTANCE.....	385
10.5 BUTTERFLY FAUNAS	387
10.5.1 Wetland	387
10.5.2 Riparian Woodland	387
10.5.3 Dry Miombo & <i>Cryptosepalum</i> Woodland	388
10.5.4 <i>Baikiaea</i> Woodland.....	388
10.5.5 Mopane, <i>Acacia</i> and <i>Terminalia</i> woodland	388
10.6 SPECIES OF INTEREST.....	388
10.7 CONSERVATION IMPLICATIONS	395
10.7.1 Threats to Species	395
10.7.2 Areas of Conservation Importance	395
10.7.3 Climate Change.....	396
10.8 FURTHER RESEARCH PROJECTS	396
10.9 BUTTERFLY MONITORING	396
10.10 REFERENCES	397

TABLES

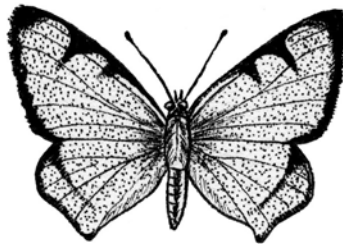
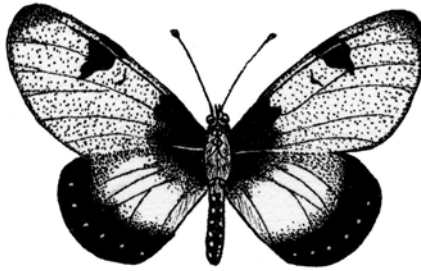
Table 10.1. Major Lepidopteran pests occurring in the Four Corners area.....	386
--	-----

APPENDICES

Appendix 10.1. Butterfly species recorded from the Four Corners area.....	401
---	-----

CHAPTER 10. BUTTERFLIES OF THE FOUR CORNERS AREA

Alan Gardiner



Sue Bell
04

Acraea anemosa, Broad-bordered Acraea (top)
Erikssonia alaponoxa, Norman's Copper

CHAPTER 10. BUTTERFLIES OF THE FOUR CORNERS AREA

Alan Gardiner

10.1 INTRODUCTION

This chapter presents a review of the butterflies of the Four Corners area. Although the focus of this paper is butterflies, some information is also given on other lepidoptera of economic importance (section 10.2). Butterflies were specifically chosen as they are the only lepidopteran group from which meaningful taxonomic and ecological conclusions can be drawn. Ecological conclusions are limited, as African butterflies have not been studied to nearly the same extent as those on other continents.

African studies that have taken place tend to focus on forest butterflies and the effects of deforestation (Lawton *et al.* 1998). Very little is known on the broad ecology of the butterflies of the Four Corners area. There are likely to be many factors influencing the populations of the different species. For instance, one may speculate that some of the migrating species (such as *Catopsilia florella*) may be limited by the availability of its food plant. Other taxa, such as *Papilio dardanus*, may be more dependent on rainfall. Owen (1971) gives a general account on the ecology of tropical African butterflies. This review attempts to bring out ecological considerations for which we have some evidence. The different butterfly faunas are a reflection of what we know about their ecology. For species of interest, information is given on habitat, habits and food plants.

As butterflies have mostly been collected by amateur lepidopterists, a history spanning over a century of the Four Corners area has developed. This is presented in section 10.2 together with other available information for the area. Conservation issues concerning butterflies are discussed in section 10.7. Other possible factors influencing butterflies are also briefly discussed in this section, along with the potential of lepidoptera for community based resource management. Monitoring of invertebrates, in most cases, is project specific. For this reason details are not given, but references are provided which can act as guide lines to a monitoring programme.

10.2 REVIEW OF INFORMATION AND COLLECTIONS

Over the years many naturalists have added to our knowledge of the butterflies of the Four Corners area. Collecting and observations in the Victoria Falls area started early. Oates (1881) was one of the earliest to document butterflies from the this area, providing beautiful and accurate colour plates of a number of species. About this time F.C. Selous (Selous 1893) collected many butterflies from the Falls area and along the Zambezi which were identified and reported on in various papers by Trimen (1887a, 1887b, 1889). Due to these early collections, a number of species have their types from the Victoria Falls, for instance *Acraea atergatis*, *A. atolmis*, *A. axina* and *A. aglaonice* (Westwood 1881). Trimen (1891) also reported on a collection made by A.W. Eriksson who made a trip through Namibia along the Caprivi Strip and into southern Angola. Half a century later, Stevenson (1940) added to the collections from this area, but he did not give precise localities for many of his specimens. Eliot Pinhey contributed significantly to the information we have, collecting and reporting on species found in Zimbabwe (Pinhey 1949a, 1949b 1965), Botswana (Pinhey 1968a, 1968b, 1971, 1972, 1974) and Zambia (Pinhey & Loe 1977, a small guide to some of Zambia's butterflies). Information is available for species found at the Victoria Falls in the useful Handbook (Pinhey 1975).

Most of the specimens collected by Pinhey and subsequent curators of Entomology at the Natural History Museum in Bulawayo are housed there. Mike Gardiner and myself have also made comprehensive collections for Zimbabwe and Zambia. The Livingstone Museum also houses some material caught around Livingstone and the Victoria Falls. Torben Larsen (1991) produced detailed work for Botswana which contains reliable information for the Chobe system, while Lunderstedt (1991) provides records from a trip to north east Botswana. For Zambia Heath, Newport & Hancock (2002) produced a comprehensive checklist (with a CD-ROM providing pictures of almost all the Zambian butterflies), a major update on Denning's 1979 checklist.

As most of the butterfly collecting has concentrated around the Victoria Falls, the Zambezi River, the Zimbabwe part of the Four Corners and the Chobe and Okavango systems, we have a good idea of what butterflies occur here. In addition, for most of these species we know their foodplants and general habits and behaviour (Carcasson 1995, Pringle *et al.* 1995). There is, however, still a lack of information for the Zambian portion of the Four Corners area, as illustrated by the discovery of a new species, *Erikssonia alaponoxa*, near Kataba in 2001 (Henning & Henning 2001). There is also practically no information available for the southeastern part of Angola, for which one has to rely on more general accounts of African butterflies, e.g. Carcasson's (1995) African Butterflies.

There are very few African studies on the effects of land use change or even climatic change on the butterfly fauna. The few ecological studies done have concentrated on butterfly behaviour within botanical gardens in South Africa (Wood & Samways 1991) and changes in butterflies with the removal of tropical forest (Lawton *et al.* 1998).

Carcasson (1995) provides the most recent information on the taxonomy of African butterflies and gives a country distribution. More general information on African butterflies can be found in D'Abrera (1980, 1997), Evans (1937) for African Hesperioidea and Henning (1989) on the African Charaxinae butterflies. There are also a number of texts covering either Zimbabwe or Southern Africa (Cooper 1973, Henning *et al.* 1997, Pringle, Henning & Ball 1995, Swanepoel 1953, Van Son 1949, 1955, 1963, 1979).

A list of the 295 butterfly species so far recorded in the Four Corners area is given in Appendix 10.1. This has been compiled from published and personal records.

10.3 BUTTERFLY BIOLOGY

10.3.1 Higher Classification

Butterflies form two superfamilies - the Hesperioidea, comprising one African family (the Hesperioidea), and the Papilionoidea with five families (Nymphalidae, Pieridae, Lycaenidae, Riodinidae and Papilionidae). The Hesperioidea differ from the Papilionoidea in having the antennae set widely apart at the base and the peripheral veins of both wings not stalked.

Most butterflies are brightly coloured, the tips of their antennae are swollen and they fly by day. The caterpillars are seldom hairy, although some are armed with spines. With the exception of some of the more primitive species, the pupae are not enclosed in cocoons. A more fundamental difference between butterflies and moths is that the wings on each side of a butterfly are not linked together by a jugum or a frenulum- except in a few of the most primitive species found in Australia. Instead, the hind wing has a rounded lobe in front, known as the humeral lobe, which presses against the underside of the forewing when the insect is in flight.

10.3.2 Butterfly Migrations

There are notable migrations of butterflies in the Four Corners area. The most obvious species in these migrations, the whites, belong to the family Pieridae, namely *Catopsilia florella*, *Belenois aurota* and *B. creona*. *Catopsilia florella* feeds on species of the plant *Cassia* while *Belenois* feeds on various tree and shrub species of the Capparaceae family. Together with these, there are other more colourful migrants which normally occur in lower numbers, such as *Graphium antheus*, *Graphium porthaon*, *Phalantha phalanta*, *Junonia hierta*, *Junonia oenone*, *Acraea atergatis*, *A. atolmis* and *A. eponina*. On occasions these can also migrate in large numbers, particularly the *Graphium* species.

The only documented reports of butterfly migration for this region are by Williams (1930), who describes how on 20 December 1922 individuals of *C. florella* were seen flying in a south direction ".....thin flight, weather stormy, heavy rain previous day. Flight continued till end of month at Salisbury and noted till last week in January in some places. Flying in small bunches. Extended across whole colony and reported in Northern Rhodesia. Speed guessed at 10 to 15 miles per hour". Williams also reported another large migration of *C. florella* and *P. phalanta* from Dec 20 1928 until the 12 Jan 1929 in a south west direction. Personal observations from the Victoria Falls area indicate the butterflies tend to fly in an easterly direction. Roodt (1998) says *Belenois aurota* always migrates in a north-easterly, direction but this is probably the case for butterflies further south as in the eastern and northern part of South Africa the migrating butterflies usually fly from the south west to the north east (Henning 1983). Pennington (1967) gives details on the South African migrations.

Little is known about the distances the migrations cover and where the migrations begin or end. The 1966 migration in South Africa covered 650 kms in a front through the former Transkei, Natal and Transvaal. There is little documented evidence providing reasons for the migrations. Although I do not necessarily agree with all the statements given by Henning (1988), they are provided below as it is the only published account concerning the types and 'objectives' of butterfly migration for Southern Africa.

Principal migration types:

- a) Population preservation. Mass movement of a population to a warmer climate to over-winter and returning the following season to breed. The objective is the preservation of the breeding population. This has not been recorded in the Four Corners area.
- b) Population dispersion. Mass movement of surplus individuals from a stable population to create or reinforce temporary breeding populations. The objective is the dispersal of the breeding population.
- c) Population reduction. Mass movement of the excess population from an over-populated habitat. The objective is the reduction of the breeding population.

Secondary migration type:

- d) Induction. Certain individuals of other species are induced to migrate with principal migrants.

10.4 LEPIDOPTERA OF ECONOMIC AND SOCIAL IMPORTANCE

There are many lepidoptera of economic and social importance. In the Four Corners area there are many lepidopteran pests, the most important are given in Table 10.1. They have the potential to damage the crops of small-scale farmers and the few commercial farmers within the area, but the extent of the damage is not known. They probably cause substantial losses to the large farms in the Pandamatenga region of Botswana. Species like the Maize Stalk Borer possibly reduce a

Table 10.1. Major Lepidopteran pests occurring in the Four Corners area.

Pest species	Common name	Crop attacked
<i>Busseola fusca</i>	Maize stalk borer	maize and other grain crops
<i>Spodoptera exempta</i>	Army worm	grasses and cereals
<i>Spodoptera exigua</i>	Lesser army worm	maize, cereals and dicotyledonous vegetable crops
<i>Agrotis ipsilon</i>	Black cutworm	polyphagous pest
<i>Agrotis longidentifera</i>	Brown cutworm	polyphagous pest
<i>Agrotis segetum</i>	Common cutworm	polyphagous pest
<i>Heliothis armigera</i>	American bollworm	polyphagous can be a major pest of many crops
<i>Earias biplaga</i> & <i>E. insulana</i>	Spiny bollworms	cotton
<i>Chilo partellus</i>	Sorghum stem borer	sorghum & maize

crop on average by 10%; the extent of damage will depend on the timing of the moths hatching in November and the planting of the crop (Annecke & Moran 1982).

Probably the most economically important lepidoptera are the edible species such as the mopane worm, *Imbrasia belina*. In its larval form it is collected and dried for human consumption, being a common part of the human diet from the northern Transvaal through to central Zambia. In some parts of its range the cost of this insect per kilogram is more than the price of dried meat (Gashe & Mpuchane 1996). This emperor moth tends to occur wherever there are large stands of the mopane tree, *Colophospermum mopane*, and is particularly common in the southeastern part of the area. A second edible emperor moth, *Gynanisa maja*, also feeds on mopane. It usually occurs in smaller numbers than *I. belina*, except in certain parts of the Zambezi Valley where it replaces *I. belina* as the dominant species. Another emperor moth larva important as a food source is *Cirina forda*. It occurs in the Four Corners area wherever its food plant *Burkea africana* is present. Around Victoria Falls and towards Choma in southwestern Zambia tree branches are broken in order to collect the caterpillars.

There is a renewal of interest in another moth genus, *Gonometa*. This genus belongs to the family Lasiocampidae and produces cocoons that can be used for silk production. There are two species in south central Africa being considered - *G. postica* and *G. rufobrunnea*. *Gonometa rufobrunnea* is probably of more importance in the study area as one of its favoured foodplants is mopane. In the 1980s a project was started near Francistown for the commercial use of silk produced by this moth. However this failed owing to poor management policies and a drop in the world silk prices. The silk from these moths is now becoming popular and with an increase in silk price its future as a feasible economic species is looking more likely. In addition, the emperor moths *Argema mimosae*, *Epiphora bauhiniae* and *E. mythimnia*, all of which occur in the Four Corners area, also produce silk that could have commercial value.

Edible moth larvae and the silk producing moths both have good potential for being used in community-based projects. With good management policies these species could be used as candidates for the sustainable use of a natural resource, and lend themselves to being incorporated into conservation projects.

10.5 BUTTERFLY FAUNAS

There are five major butterfly faunas within the Four Corners area. As butterflies are associated with the vegetation I have given the faunas the name of the vegetation type, which also tend to reflect underlying geology. The five faunas are: (1) Wetland/Grassland, (2) Riparian, (3) Dry Miombo & *Cryptosepalum* woodland, (4) *Baikiaea* woodland, and (5) Mopane/*Acacia* woodland.

Within the Four Corners area there are also many butterfly species that are particularly adaptable, termed eclectic species, which are able to establish themselves in a great variety of habitats. Most of them are species of open vegetation formations and occur almost everywhere, except on the higher mountains and in extreme desert conditions. Their presence within forest is usually due to their ability to colonize such man-made habitats as road edges, footpaths, clearings, plantations and gardens. This group is represented by the following species: *Papilio demodocus*, *Belenois gidica*, *B. creona*, *B. aurota*, *Mylothris agathina*, *Catopsilia florella*, *Eurema hecabe*, *E. brigitta*, *E. desjardinsii*, *Danaus chrysippus*, *Hamanumida daedalus*, *Neptis saclava*, *Byblia anvatarata*, *Byblia ilithyia*, *Eurytela dryope*, *Hypolimnias misippus*, *Junonia oenone*, *J. hierta*, *J. orithya*, *Cynthia cardui*, *Acraea encedon*, *A. eponina*, *Deudorix antalus*, *Anthene definita*, *Lampides boeticus*, *Zizula hylax*, *Zizeeria knysna*, *Coeliades forestan*, *Tagiades flesus* and *Pelopidas mathias*.

10.5.1 Wetland

The term 'wetland species' means species restricted to swamps, marshes and dambos, or have strong affinities for these habitats (Gardiner 2000). For some the larvae feed on swamp plants such as *Polygonum*, while a few others are associated with vegetation alongside rivers and are not found far from water. The following are found in the Four Corners area: *Leptosia alcesta inalcesta*, *Mylothris rubricosta*, *Cigaritis modestus modestus*, *Eicochrysops hippocrates*, *Leptotes pulcher*, *Cacyreus lingeus*, *Cupidopsis cissus*, *Ypthimomorpha itonia*, *Acraea rahira rahira*, *Catacroptera cloanthe*, *Junonia ceryne ceryne*, *Neptis jordani*, *Kedestes monostichus* and *Parnara monasi*. Species that although not yet recorded are likely to occur are *A. ventura ventura* and *Acraea acerata*.

From a conservation viewpoint, the most important are the true marsh species *Mylothris rubricosta* and *Leptotes pulcher*, and a dambo species *Cigaritis modestus modestus*. These are dealt with in more detail later. Details on the other wetland species are given in Gardiner (2000).

10.5.2 Riparian Woodland

The riparian vegetation along the edges of the major rivers has its own fauna, particularly evident in the "rainforest" at the Victoria Falls. The microclimate around the waterfall has produced a forest where a number of the interesting riparian butterflies are common. R.W. Barney recorded *Cigaritis brunnea* in the Palm Grove at the Falls in 1938, but no specimens have been seen from the Four Corners area since. Another butterfly, *Acraea anemosa* form *alboradiata*, has only been collected at the Falls, the surrounding woodland and at Katimo-Mulilo. Buchanan captured the only specimens known from the area of *Thermoniphas micylus colorata*, a species normally found on the edges of low-lying East African forests. It is of interest to quote Buchanan's experience: "On the afternoon of 11 September 1961 I crossed in a canoe from the Zambian bank of the Zambezi to Livingstone Island, a wooded islet which separates the Devil's Cataract from the main Victoria Falls. In the centre of the island there is a grass-bordered rivulet caused by spray from the falls, which flows back into the upstream waters of the Zambezi. Along the banks of this stream I observed and then captured a few specimens of a slender and beautifully tinted Lycaenid. The female with its silvery coloured upperside was most

distinctive. The male also exhibited a most unusual shade of blue." (quoted in Pringle *et al.* 1995). These butterflies were identified as *Thermoniphas micylus colorata*. Mike Gardiner collected the only Zimbabwean specimen of the rare *Abantis vidua* at the Falls in October 1966. Other riparian species found commonly there include *Papilio constantinus*, *Nephronia thalassina*, *Nephronia argia*, *Pentila tropicalis*, *Pentila pauli obsoleta*, *Tagiades flesus* and *Charaxes druceanus*.

10.5.3 Dry Miombo & *Cryptosepalum* Woodland

This and the following faunal assemblage have strong affinities with one another. The most obvious link is the two species of *Acraea*, *A. atolmis* and *A. atergatis*, that are found commonly in dry Miombo and *Baikiaea* woodland. Both seem to be linked to the Kalahari sand system. The main difference between the two faunas is that the Miombo and *Cryptosepalum* fauna tends to be more species-rich than that of *Baikiaea*. A few species such as *Charaxes fulgurata* and *Junonia artaxia*, are also more common in *Baikiaea* woodland. Further north, 80-100 km south of Mwinilunga, *Cryptosepalum* woodland houses a beautiful endemic butterfly, *Mylothris mavunda*, the specific name being the colloquial name of the woodland. The *Cryptosepalum* within the Four Corners area has yet to be collected and it is possible this species may be found there. Species characteristic of these woodlands are *Charaxes guderiana*, *Acraea atolmis*, *A. atergatis*, *Charaxes bohemani*, *Bicyclus angulosus selousi*, *Acraea acrita*, *Charaxes penricei*, *Neptis kiriakoffi*, *Neptis penningtoni*, *Junonia actia* and *Junonia cuama*.

10.5.4 *Baikiaea* Woodland

This woodland type includes butterfly species more typical of the Kalahari system. It still contains elements from the Zambesian region, such as *Charaxes bohemani* and *C. guderiana*, but at lower numbers. Species characteristic of this type are: *Charaxes fulgurata*, *Charaxes phaeus*, *C. zoolina*, *Graphium porthaon*, *G. leonidas*, *Anthene amarah*, *Azanus jesous*, *A. moriqua*, *Epamera mimosae*, *Gegenes pumilio*, *Sarangesa seineri*, *Leucochitonea levubu* and *Spialia delagoae*. Both *Acraea atergatis* and *A. atolmis* are particularly common in the Livingstone-Victoria Falls area and through the north west part of Zimbabwe and west through Botswana to Ovamboland in Namibia.

10.5.5 Mopane, *Acacia* and *Terminalia* woodland

Mopane and *Acacia* woodland tend to occur in the hotter, low-lying areas where the genus *Colotis* is well represented. The *Colotis* have various colours at the tips of their forewings; examples are *C. vesta*, *C. celimene amina* (the male with its crimson streaked wingtips), *C. ione* (the male with purple wingtips), *C. danae annae* (the male with its scarlet apical patches), *C. antevippe gavisa* (the male with its reddish-orange apices), *C. eris* (the male with golden apical spots), *C. euipe mediata*, *C. auxo auxo*, *C. evenina*, *C. pallene* and *C. evagore antigone* (the smaller yellow or orange tipped *Colotis*). Most of them are fairly widespread; in particular the small *C. amata* which is also found in hot dry places in south Asia. The Zebra White, *Pinacopteryx eriphia*, is found almost everywhere in drier localities. The larvae of *Colotis* feed on plant species of the family Capparaceae, which are often common in Mopane and *Acacia* woodland. The small white *Nepheronia buquetii buquetii* occurs in the more open places, while the large satyrid *Melanitis leda* can be found commonly in the shady ravines or thickets. Other typical species are: *Charaxes saturnus*, *Dixeia doxo parva*, *Appias epaphia contracta*, *Lepidochrysops glauca* and *Bicyclus ena*.

10.6 SPECIES OF INTEREST

Species from the area of particular interest are listed below along with their broad habitat. The reasons for their listing, ecological and taxonomic notes are given for each. There is no Red Data

List for the butterflies of this area - their conservation status was obtained by taking into account the criteria given for the IUCN Red List Categories(1994). If there was not enough information to give a status it is stated to be not known. Taxa indicated with an asterisk are near-endemic to the Four Corners area and those with a double asterisks are endemic.

PAPILIONOIDEA

Pieridae: Pierinae

Mylothris rubricosta rubricosta [wetland]

Nymphalidae: Acraeinae

Acraea acrita ambigua * [miombo woodland]

Acraea anemosa f. *alboradiata* ** [riparian woodland]

Nymphalidae: Satyrinae

Ypthima rhodesiana [miombo woodland]

Nymphalidae: Limenitinae

Neptis jordani [wetland]

Nymphalidae: Charaxinae

Charaxes fulgurata [*Baikiaea* woodland]

Charaxes penricei [miombo woodland]

Lycaenidae: Theclinae

Erikssonia alaponoxa ** [miombo woodland]

Hypolycaena (Hemiolaus) caeculus tsodiloensis * [rocky outcrops]

Iolaus penningtoni [miombo woodland]

Cigaritis brunnea [riparian woodland]

Cigaritis modestus modestus * [grassland]

Lycaenidae: Polyommatainae

Leptotes pulchra [wetland]

Thermoniphas micylus colorata [riparian woodland]

HESPERIOIDEA

Hesperiidae: Pyrginae

Abantis vidua [riparian/miombo woodland]

Hesperiidae: Hesperinae

Kedestes monostichus [wetland]

Platylesches tina [riparian woodland]

Tsitana wallacei [miombo woodland]

Mylothris rubricosta rubricosta (Swamp or Papyrus Dotted Border)

Reason for listing: An interesting swamp species, which often occurs completely away from land.

Diagnosis: The species is readily recognized by its white colour and the costa on the under and upperside being bordered by a distinctive orange streak (hence the specific name *rubricosta*). In the past *M. rubricosta* was considered to be a subspecies of *M. bernice*.

Habitat & habits: The larval food plant (*Polygonum*) is intermixed with papyrus, so the butterfly often lives completely away from solid ground. The flowers of *Polygonum* are a favourite nectar source for the butterflies. Records are from August to April. The flight is light and floating with an occasional fluttering movement. It always flies low down and often amongst the reeds, and it is seldom seen more than a few meters away from its swamp habitat.

Conservation status: Low Risk, Least Concern.

Distribution 4 Corners: The species is found along the Zambezi River above the Victoria Falls, although local. In Botswana it is only known to occur in the panhandle of the Okavango and in the northwestern part of the delta, but it is also likely to occur in the Kasane area since there are records from the Kazangula Rapids on the Zimbabwe side.

African distribution: There are two subspecies, one in East Africa from Ethiopia through to Zambia, Angola, N Botswana, NW Zimbabwe and Malawi, and a second subspecies in the east of the DRC.

Foodplants: The larval food plants are *Polygonum* spp. (Polygonaceae).

***Acraea acrita ambigua* (Fiery Acraea)**

Reason for listing: A rare subspecies of *Acraea acrita*.

Diagnosis: The male of this butterfly can be recognized by the combination of an unusually intense and fiery orange ground colour, the unusually large and precise black spots, the well-defined marginal lunules of the hindwing upperside, and in this subspecies the broad black apex of the forewings. The female is darker on the upperside but has the same general pattern.

Habitat & habits: A butterfly of miombo woodland, which just extends into northern Botswana. It is presumably on the wing mainly during the summer months.

Conservation status: Not known.

Distribution 4 Corners: Trimen (1891) mentions that he received a single male from just south of the confluence of the Chobe and Zambezi rivers (F.C. Selous). It should be in northern Botswana according to Pierre (1987), who monographed the difficult *A. acrita* complex. There are also records from the Okavango River in Namibia and Angola. Gardiner recently found it in western Zambia at Kataba. *Acraea acrita ambigua* seems somewhat elusive.

African distribution: The range of subspecies *ambigua* is N Botswana, W Zambia and S Katanga. Nominate *A. acrita* occurs from Tanzania to Zambia and Zimbabwe.

Foodplants: *Adenia* species (Passifloraceae).

***Acraea anemosa f. alboradiata* (Broad-bordered Acraea)**

Reason for listing: This form of *A. anemosa* is restricted to the Victoria Falls and Katima Mulilo areas.

Diagnosis: It has a very broad hindwing black border and a paucity of discal spots. Form *alboradiata* is remarkable for its extensive white suffusion in the hindwing.

Habitat & habits: Found in the Victoria Falls rainforest and surrounding woodland. It has a slow floating flight unless disturbed, when it can put on a rapid turn.

Conservation status: Conservation Dependent.

Distribution 4 Corners: Restricted to the Victoria Falls and Katima Mulilo area.

African distribution: Although this form is restricted to a small area *A. anemosa* occurs from South Africa to the Kenyan coast.

Foodplants: *Adenia digitata*, *A. glauca*, *A. venenata* (Passifloraceae).

Ypthima rhodesiana (Pale Ringlet)

Reason for listing: A rare species of *Brachystegia* woodland.

Diagnosis: A dull gray butterfly similar to other members of the genus *Ypthima*. It can be distinguished by the dark discal line on the hindwing underside, which is almost evenly rounded and more or less parallel with the wing margin. In the other species the line is jagged and irregular. In *Y. rhodesiana* this discal line is normally also discernible on the upper surface of the hindwing.

Habitat & habits: Found in *Brachystegia* woodland with a rather weak flight, often flying through or amongst the grass.

Conservation status: Not known.

Distribution 4 Corners: *Brachystegia* woodland in the north western part of the 4 Corners (Zambia).

African distribution: Found in Zimbabwe, Zambia, southern DRC, Tanzania and SE Kenya.

Foodplant: Unknown.

Neptis jordani (Jordan's Sailer)

Reason for listing: Although widespread this species is only locally common along rivers and in grassy marshes.

Diagnosis: All *Neptis* species have a characteristic black and white appearance. This small distinctive species has its forewing submarginal lines in areas three, four and six clearly interrupted by dark veins and the white band narrows towards the costa, giving the outer edge a kink. The sexes are similar.

Habitat & habits: Shows a preference for riverine and grassy marshes. Its flight is low and comparatively slow and it frequently settles on low-growing vegetation close to the edge of the water.

Conservation status: Not under any threat.

Distribution 4 Corners: Has been recorded along the Chobe River and will probably be found along the main rivers and marshes in the Zambian and Angolan portions.

African distribution: From N Botswana to Zambia, Zaire, Rwanda, Burundi, Tanzania, Malawi, Mozambique and E Zimbabwe.

Foodplant: *Polygonum strigonum* (Polygonaceae).

Charaxes fulgurata (Lightning Charaxes)

Reason for listing: Although fairly widespread its main area of occurrence is in *Baikiaea* woodlands.

Diagnosis: A medium sized 'black' *Charaxes* with a green hue along the costa and outer margin. The subcostal spots are particularly large, the two subapical ones being lunule-shaped. In well-marked individuals there is a wavy green postdiscal line on the forewing as well as on the hind wing, underside ground-colour grayish brown flushed with rusty-red. The female has many different forms the commonest being blue and black while a rare second form has a white band above the blue on the forewing. The lunule-shaped markings are always present on the forewing.

Habitat & habits: Found in woodland and bush country. A strong fast flier not seen unless feeding at water or dung.

Conservation status: Not threatened.

Distribution 4 Corners: Across much of the area except in swamps and the drier south and south western regions.

African distribution: E Angola, DRC (Lualaba, Lomami), Zambia and NW Zimbabwe.

Foodplants: *Amblygonocarpus andongensis* (Fabaceae: Mimosoideae).

Charaxes penricei penricei (Scarce Savanna Charaxes)

Reason for listing: A rare species throughout its range.

Diagnosis: A medium sized *Charaxes*, bluish-black with a greenish blue basal sheen and a bluish white median band across both wings which breaks up into spots in the apical half of the forewing. Sexes similar but female usually larger, longish tails. The underside is whitish and strongly marked with dark red and black.

Habitat & habits: A woodland species that is fast and seldom seen.

Conservation status: Not known.

Distribution 4 Corners: Miombo and possibly *Baikiaea* woodland in Zambia, E Angola and Zimbabwe.

African distribution: S Tanzania, Malawi, Zimbabwe, Zambia, southern DRC and E Angola.

Foodplant: *Securidaca longipedunculata* (Polygalaceae), *Entada* species (Fabaceae: Mimosoideae).

Erikssonia alaponoxa (Norman's Copper)

Reason for listing: Only recorded from the type locality, Kataba, in S Zambia.

Diagnosis: Similar to *E. acraeina*, with an orange upperside with narrow black borders. The underside resembles an *Acraea* due to several black spots. Differs from *acraeina* by having its forewing more elongate, the outer margin and costa being straighter; hind wing tornus slightly more produced. Upperside dark margins and forewing costal margin narrower and generally less boldly marked on both wing surfaces.

Habitat & habits: Miombo woodland on Kalahari sands. It sits on the ground or low bushes from where the males make short flights.

Conservation status: Endangered.

Distribution 4 Corners: Only known from Kataba in the Western Province of Zambia.

African distribution: As above

Foodplant: Not known.

Hypolycaena (Hemiolaus) caeculus tsodiloensis (Azure Hairstreak)

Reason for listing: This subspecies is restricted to the Tsodilo hills area of Botswana and the neighbouring parts of Namibia.

Diagnosis: The male is bright blue above, with a black apex and narrow margin on the forewing. The female is similar but of a duller blue. The underside separates it from similar species. In addition to the usual markings of *Iolaus* and *Hypolycaena*, there is a line crossing the middle of the forewing cell.

Habitat & habits: Found in dry woodland. Pinhey found his specimens sitting on the bare twigs of *Acacia* trees.

Conservation status: Not threatened.

Distribution 4 Corners: Restricted to the Tsodilo hills area of Botswana.

African distribution: Subspecies restricted to the Tsodilo hills area of Botswana and the neighbouring parts of Namibia. The nominate species occurs from southern and eastern Africa to the Kenyan coast.

Foodplant: *Olax dissitiflora* (Olacaceae).

Iolaus (Epanera) penningtoni (Pennington's Sapphire)

Reason for listing: A rare species.

Diagnosis: A smallish species with a blue uppersurface and silvery white underside. It has characteristic orange bars on the underside. It closely resembles *I. aemulus* but the stripes are orange-red not red; they are thicker, and can be defined as bands rather than

striae. The postdiscal stripe of the hindwings is quite straight while, in the case of *I. aemulus*, it is slightly wavy.

Habitat & habits: A woodland species, the males fly at the tops of trees and are not often seen.

Conservation status: Not threatened.

Distribution 4 Corners: Woodland in Zambia, Zimbabwe and extreme NE Botswana.

African distribution: S Zambia, NE Botswana and Zimbabwe.

Foodplant: *Helixanthera kirkii* (Loranthaceae).

Cigaritis brunnea (Little Bar)

Reason for listing: A very scarce species.

Diagnosis: Upperside dark, apex of forewing with an orange patch and dark broad irregular stripes, underside background colour light yellow, with bars fragmented into spots edged with dark brown.

Habitat & habits: nothing is known about the habits or habitat. At Victoria Falls they were caught in the Palm Grove.

Conservation status: Not known.

Distribution 4 Corners: Only recorded from Victoria Falls.

African distribution: From Victoria Falls north through Zambia to DRC (Kivu), W Tanzania and Uganda.

Foodplant: Not known.

Cigaritis modestus modestus (Modest Bar)

Reason for listing: A very scarce species.

Diagnosis: Upperside dark with a blue tint, apex of forewing with a large orange patch and dark stripes. Underside background colour light yellow to green, with unclear bars. Has only one tail at the end of the hindwing at vein 1A+2A.

Habitat & habits: Flies in dambos. It appears to be active during warmer parts of the day, the males flying rapidly within territories and landing on shrubs or grass stems.

Conservation status: Not known.

Distribution 4 Corners: Near Kataba, Zambia.

African distribution: Only known from N Ovamboland from specimens caught by Eriksson in 1890-1891, although it is now thought this locality is in S Angola near the Namibian border, and near Kataba in Zambia.

Foodplant: Not known.

Leptotes pulcher (Beautiful Zebra Blue)

Reason for listing: Although widespread this species is local, restricted to marshy and wet areas and quite rare.

Diagnosis: The upperside ground colour of the male of this small butterfly is a light and vivid blue, while the underside has more striking whitish marginal and submarginal markings than other members of the genus.

Habitat & habits: Almost exclusively tied to marshy habitats.

Conservation status: Although rare this species is not under any threat.

Distribution 4 Corners: Found intermittently along the main rivers and in marshy areas. In Botswana it is chiefly found in the Okavango and Chobe river systems. Larsen (1991) states "where the Chobe river runs over stony ground between Kasane and Kazangula the species may be quite common, but it is usually not numerous".

African distribution: There are records from most of Africa, but it appears to be absent from many areas.

Foodplants: Recorded on *Sesbania aegyptica* (Fabaceae: Papilionoideae).

Thermoniphas micylus colorata (Tinted Blue)

Reason for listing: A rare subspecies, which in Central Africa has only been taken above the Victoria Falls.

Diagnosis: The male is blue above with a narrow black marginal border; the female is milky-white with black apical, marginal, and submarginal markings. The underside of both sexes is white with fine dark brown striae where most other species have rounded spots.

Habitat & habits: Normally found in wet areas near forest or along streams. A weak flying species.

Conservation status: Endangered.

Distribution 4 Corners: It has only been found on Livingstone Island just above Victoria Falls.

African distribution: The nominate subspecies is found from Sierra Leone to Nigeria, and subspecies *colorata* from Mozambique to Kenya.

Foodplants: *Calvoa orientalis* and *Dissotis* species (Melastomataceae).

Abantis vidua

Reason for listing: A rare species with a restricted distribution.

Diagnosis: Upperside and underside brown with blackened veins, forewing without hyaline spots.

Habitat & habits: Riverine forest and deciduous woodland.

Conservation status: Not known.

Distribution 4 Corners: One record from Victoria Falls.

African distribution: Zambia and DRC.

Foodplant: Unknown.

Kedestes monostichus (Single-stich Ranger or AWOL Skipper)

Reason for listing: Although fairly widely distributed it is very scarce.

Diagnosis: A medium-sized skipper with a characteristic pattern on the underside of the hindwing, having a single series of black submarginal spots, the basal spots arranged in an X-shaped pattern, and a continuous black marginal line.

Habitat & habits: Wet grassy and marshy areas

Conservation status: Endangered.

Distribution 4 Corners: Probably occurs in wet grassy areas of the Okavango as a paratype female was taken at Rundu along the Okavango in Namibia.

African distribution: A few scattered records in Zimbabwe and one from NE Namibia.

Foodplant: Unknown.

Platylesches tina (Small Hopper)

Reason for listing: A widely distributed but rare species.

Diagnosis: A tiny, very dark skipper and with much reduced hyaline spotting.

Habitat & habits: In well wooded bushveld areas or in riverine bush. A very fast flier and difficult to follow, sitting briefly on leaves or flowers.

Conservation status: Not known.

Distribution 4 Corners: Probably along the riparian parts of the Okavango, Chobe and Zambezi rivers.

African distribution: From the Transvaal through the wetter regions of Zimbabwe, Zambia, Malawi, through Tanzania to the South Kavirondo in Kenya.

Foodplant: *Parinari curatellifolia* (Chrysobalanaceae).

Tsitana wallacei

Reason for listing: A rare species.

Diagnosis: The male and female are similar, dark brown with a slightly uneven row of clear white postdiscal spots on the forewing and a faint row of white postdiscal dots on the hind wing. The hind wing underside has white veins and a prominent row of white postdiscal spots in line. Underside somewhat similar to *Metisella willemi*.

Habitat & habits: In *Brachystegia* woodland and thickets, flying among grass, under trees. At times flight can be quite fast, especially when going from one tree patch to the next.

Conservation status: Not known.

Distribution 4 Corners: Only in Zambia, in the north and north eastern part of the area.

African distribution: Zambia, DRC (Shaba) and SW Tanzania.

Foodplant: possibly *Ehrharta* species (Poaceae).

There are a few additional species that are worthy of mention. At Mongu, just outside the Four Corners area, Cottrell recorded a rare and interesting species, *Erikssonina acraeina* (see Henning 1984 and Henning & Henning 1984). A few scattered populations of this insect have been found in Central and Southern Africa and it may occur in the Four Corners area. It is on the IUCN list for South Africa as Vulnerable.

There are a number of species that are rare within the Four Corners area but commoner and more widespread outside, including *Pseudacraea poggei*, *Pseudacraea boisduvalii*, *Charaxes brainei* and *Aloeides simplex*.

10.7 CONSERVATION IMPLICATIONS

10.7.1 Threats to Species

Most of the wetland species are closely linked to wetlands and would not be able to survive without them (with the possible exceptions of *Cacyreus lingeus*, *Leptosia alcesta*, *Cupidopsis cissus*, *Ypthimomorpha itonia* and *Catacroptera cloanthe* that can survive in drier habitats). However, most of the wetland species are widely distributed in Africa and on a continental basis are not under any threat. There are three exceptions within the Four Corners area. The first *M. rubricosta rubricosta*, although having a wide distribution is rather localised. If its habitat is destroyed it could be threatened. The second is *K. monostichus*. This appears to be very rare and few specimens have been collected. The habitats in which they were caught in Zimbabwe have been destroyed due to the drainage of the wetlands to make way for crops and cattle. It therefore seems the wetland areas of the extreme west and northern parts of the study area may be important refugia for the species. The third, *Cigaritis m. modestus*, occurs in dambos. Although we know nothing of its conservation status it has only been caught a few times and the dambos of the area are probably important for its conservation.

Butterflies associated with riparian habitat are also tightly linked to this vegetation type. If vegetation along the rivers is cleared it will result in the loss of such species.

10.7.2 Areas of Conservation Importance

The spray from Victoria Falls appears to have produced a micro-climate with, for the area, an exceptionally rich fauna. Apart from having rare species such as *Cigaritis brunnea* and *Abantis vidua*, there is also the rare and endemic form *alboradiata* of *Acraea anemosa*. The continued health of this small forest patch is very important.

The other broad area of importance is the woodlands and dambos stretching from western Zambia through to the extreme south eastern part of Angola. This is illustrated by the presence of the only butterfly endemic to the Four Corners area, *Erikssonina alaponoxa*. It was only recently discovered and is known only from its type locality near Kataba in western Zambia. This species occurs in mature dry miombo woodland on Kalahari sand. The introduction of too many elephants into this area may change the habitat which could present a most serious threat to its continued existence. The near-endemic *C. modestus modestus* is also found in this woodland-dambo area.

10.7.3 Climate Change

It is difficult to know what effect global climate change will have on the butterfly fauna. Although studies have been carried out in the Northern Hemisphere, and changes in butterfly distribution have been found, nothing is known for Africa. If vegetation is affected this will undoubtedly affect the butterflies. Drying out of habitats will also decrease populations of species adapted to wetter conditions and may cause local extinction. Conversely, it would cause an increase in the population area of the drier-adapted species. It may, rarely, cause the extinction of localized species such as *Erikssonina alaponoxa*.

10.8 FURTHER RESEARCH PROJECTS

There is still a paucity of records and information for the woodlands in Zambia and south east Angola. Further collecting is required here to obtain a more complete list, and there is also the possibility that other endemics await discovery. Even with our present knowledge it is likely that within the Four Corners the woodlands of Zambia and Angola are probably the most important when one considers just the woodland vegetation, both in terms of species number and rare species. Further studies are required to identify and protect important woodland patches within the area.

A great deal of work still needs to be done on the effects of man-induced changes on the butterflies of the African savannas. As butterflies are the best known group of invertebrates as far as taxonomy is concerned, they could be used as an indicator group to study the affects of such changes. For instance, what happens to the butterfly fauna in areas were the land is used by agriculture or by wild megaherbivores? How does fire affect the butterfly diversity? By answering some of these questions we would be able to put forward more reliable management policies to maintain both butterfly diversity and, hopefully, the diversity of other invertebrates.

There is great potential for the utilization of invertebrates, which can be used as a source of income for rural communities. Amongst the lepidoptera, the edible moth species and silk-producing lasiocampids have been highlighted. These could form part of a conservation project where natural resources are utilized by the resident communities, although for sustainability this must be done in a sound ecological manner.

10.9 BUTTERFLY MONITORING

Butterflies are the best known invertebrate group in terms of both taxonomy and distribution. This, in addition to other biological traits, makes them an important group for biodiversity studies (Scoble 1992, p. 170). It has been suggested all integrated conservation and development projects (ICDPs) should have a comprehensive ecological monitoring programme (Kremen, Merenlender & Murphy 1994), which should assess the effects on biodiversity and overall ecosystem health by tracking indicator assemblages across space and through time.

There are a number of advantages of using butterflies for monitoring. Firstly, they are sensitive to changes in the environment. Secondly, large numbers may be present, so that time spent in the field quickly yields a substantial data set. Thirdly, groups that are relatively easy to identify can be selected (for some regions detailed taxonomic information is available), and fourthly they can be collected in a quantitative and qualitative manner.

Gardiner (1995, 1997) gives details on the use of butterflies in surveys and monitoring programs in south central Africa. Other useful references for surveying and monitoring of butterflies are Pollard & Yates (1993), Sparrow *et al.* (1994) and Pullin (1995). These methods can be adapted to the aims and area of study as the exact design of the monitoring programme will depend on the area and questions asked.

10.10 REFERENCES

- Annecke, D.P. & Moran, V.C. (1982). *Insects and Mites of Cultivated Plants in South Africa*. Butterworths, Durban/Pretoria.
- Carcasson, R.H. (1995). *Carcasson's African Butterflies - An Annotated Catalogue of the Butterflies of the Papilionoidea and Hesperioidea of the Afrotropical Region* (edited by P.R.Ackery, C.R. Smith & R.I. Vane-Wright). CSIRO, Canberra.
- Cooper, R. (1973). *Butterflies of Rhodesia*. Longmans Rhodesia, Salisbury.
- D'Abrera, B. (1980). *Butterflies of the Afrotropical Region*. Lansdowne Press, Melbourne.
- D'Abrera, B. (1997). *New and Revised Edition Butterflies of the Afrotropical Region*. Part I Papilionidae, Pieridae, Acraeidae, Danaidae and Satyridae. Hill House Publishers, Melbourne.
- Denning, R.C. (1979). [Checklist of the Zambian butterflies]. Manuscript deposited in Library of the British Museum (Natural History), London.
- Evans, W.H. (1937). *A Catalogue of the African Hesperidae in the British Museum*. British Museum (Natural History), London.
- Gardiner, A.J. (1995). Insect Fauna: Entomology Results of the Kalomo Expeditions. In: *SAVSKILL: A Methodology to Measure and Monitor Biodiversity in Central African Savannas* (edited by F.P.D. Cotterill), pp. 45-57. Occasional Publications in Biodiversity No. 1. Biodiversity Foundation for Africa, Bulawayo.
- Gardiner, A.J. (1997). The potential use of butterflies and dung beetles in environmental impact studies: an example from Zimbabwe. *Metamorphosis* suppl. **3**: 129-132.
- Gardiner, A.J. (2000). Review of wetland lepidoptera of the Zambezi Basin. In: *Biodiversity of the Zambezi Basin Wetlands* (edited by J.R. Timberlake), pp. 565-600. Consultancy report for IUCN ROSA. Biodiversity Foundation for Africa, Bulawayo/Zambezi Society, Harare.
- Gashe, B.A. & Mpuchane, S.F. (1996). Phane. Proceedings of the First Multidisciplinary Symposium on Phane. Dept. Biological Sciences, University of Botswana, Gaborone.
- Heath, A., Newport, M.A. & Hancock, D. (2002). *The Butterflies of Zambia*. African Butterfly Research Institute & The Lepidopterists' Society of Africa. Content Solutions Online, Pretoria.

- Henning, G.A. (1983). Butterfly migration in Southern Africa. *Metamorphosis* **2**: 4-5.
- Henning, G.A. (1988). Butterfly migration. *Metamorphosis* **20**: 6-10.
- Henning, S.F. & Henning, G.A. (1984). Life history and behaviour of *Erikssonia acraeina* Trimen (Lepidoptera; Lycaenidae). *Metamorphosis* **5**: 1-4.
- Henning, G.A. & Henning, S.F. (2001). Review of the genus *Erikssonia* Trimen (Lepidoptera: Lycaenidae: Theclinae) with a description of a new species. *Metamorphosis* **12**: 69-78.
- Henning, G.A., Henning, S.F., Joannou, J.G. & Woodhall, S.E. (1997). *Living Butterflies of Southern Africa*. Volume 1, Hesperiiidae, Papilionidae and Pieridae of South Africa. Umdaus Press, Hatfield, South Africa.
- Henning, S.F. (1984). Life history and behaviour of the rare and myrmecophilous Lycaenid *Erikssonia acraeina* Trimen (Lepidoptera: Lycaenidae). *J. Entom. Soc. Sth. Afr.* **47**: 337.
- Henning, S.F. (1989). *The Charaxinae Butterflies of Africa*. Aloe Books, Johannesburg.
- IUCN (1994). IUCN Red List Categories. IUCN Species Survival Commission, Gland.
- Kremen, C., Merenlender, A.M. & Murphy, D.D. (1994). Ecological monitoring: a vital need for Integrated Conservation and Development Programs in the tropics. *Cons. Biol.* **8**: 388-397.
- Larsen, T.B. (1991). The butterflies of Botswana and their natural history. Manuscript deposited with the Botswana Collection, University of Botswana, Gaborone.
- Lawton, J.H., Bignell, D.E., Bolton, B., Bloemers, G.F., Eggleton, P., Hammond, P.M., Hodda, M., Holt, R.D., Larsen, T.B., Mawdsley, N.A., Stork, N.E., Srivastava, D.S. & Watt, A.D. (1998). Biodiversity inventories, indicator taxa and effects of habitat modification in tropical forest. *Nature* **391**: 72-76.
- Lunderstedt, M. (1991). Trip to Botswana and Zimbabwe from 14/ix/1990 to 15/x/90. *Metamorphosis* **2**: 27-29.
- Main, M. (1992). *Zambezi: Journey of a River*. Southern Books, Halfway House.
- Oates, F. (1881). Matabele Land and the Victoria Falls. London.
- Owen, D.F. (1971). *Tropical Butterflies: the Ecology and Behaviour of Butterflies in the Tropics with Special Reference to African Species*. Clarendon Press, Oxford.
- Phillipson, D.W. (1975). *Mosi-oa-Tunya: a Handbook to the Victoria Falls Region*. Longman Zimbabwe, Harare.
- Pierre, J. (1987). Les *Acraea* du groupe 'acrita': revision, especes nouvelles, phylogenie. *Nouvelle Revue d'Entomologie (Nouvelle Serie)* **4**: 5-27.
- Pinhey, E. (1949a). Records of Southern Rhodesian butterflies (Rhopalocera) (Collected up to March 1948). *Occ. Papers Nat. Mus. Sth. Rhodesia* **2**: 276-341.

- Pinhey, E. (1949b). The butterflies of Rhodesia with a short introduction to the insect world. Rhodesia Scientific Association, Salisbury.
- Pinhey, E. (1965). *Butterflies of Southern Africa*. Nelson, Johannesburg.
- Pinhey, E. (1968a). An entomologist in N'gamiland. *Botswana Notes & Records* **1**: 31-41.
- Pinhey, E. (1968b). Check list of the butterflies (Lepidoptera - Rhopalocera) of Botswana: part I. *Botswana Notes & Records* **1**: 85-92.
- Pinhey, E. (1971). Check list of the butterflies (Lepidoptera - Rhopalocera) of Botswana: part II. *Botswana Notes & Records* **3**: 148-152.
- Pinhey, E. (1972). Check list of the butterflies (Lepidoptera - Rhopalocera) of Botswana: part III. *Botswana Notes & Records* **6**: 197-200.
- Pinhey, E. (1974) Check list of the butterflies (Lepidoptera - Rhopalocera) of Botswana: part IV. *Botswana Notes & Records* **8**: 269-279.
- Pinhey, E. (1975). The Insects. In: *Mosi-oa-Tunya: a Handbook to the Victoria Falls Region* (edited by D.W. Phillipson), pp. 203-220. Longman Zimbabwe, Harare.
- Pinhey, E. & Loe, E.I. (1977). *A Guide to the Butterflies of Central and Southern Africa*. Joseph Causton & Sons, Eastleigh.
- Pollard, E & Yates T.J. (1993). *Monitoring Butterflies for Ecology and Conservation*. Chapman & Hall, London.
- Pringle, E.L.L., Henning, G.A. & Ball, J.B. (1995). *Pennington's Butterflies of Southern Africa*. Struik, Cape Town.
- Pullin, A.S. (1995). *Ecology and Conservation of Butterflies* (edited by A.S. Pullin). Chapman & Hall, London.
- Roodt, V. (1998). Trees & Shrubs of the Okavango Delta: Medicinal uses and nutritional value. Shell Oil Botswana, Gaborone.
- Scoble, M.J. (1992). *The Lepidoptera Form, Function and Diversity*. Natural History Museum Publications, Oxford University Press.
- Selous, F.C. (1893). *Travel and Adventure in South-East Africa*. Rowland Ward, London.
- Sparrow, H.R., Sisk, T.D., Ehrlich, P.R. & Murphy D.D. (1994). Techniques and guidelines for monitoring Neotropical butterflies. *Conserv. Biol.* **8**: 800-809.
- Stevenson, R. H. R. (1940). Notes on some new and rare Lepidoptera from South Africa, with special reference to southern Rhodesia. *J. Entomol. Soc. Sth. Africa* **3**: 88-108.
- Swanepoel, D. A. (1953). *Butterflies of South Africa*. Maskew Miller, Cape Town.

- Trimen, R. (1887). *South African Butterflies*, I - Nymphalidae. Trubner, London.
- Trimen, R. (1887). *South African Butterflies*, II - Erycinidae and Lycaenidae. Trubner, London.
- Trimen R. (1889). *South African Butterflies*, III - Papilionidae and Hesperidae. Trubner, London.
- Trimen, R. (1891). On butterflies collected in tropical South-Western Africa by Mr. A. W. Eriksson. *Proc. Zool. Soc., London* **1891**: 59-107.
- Van Son, G. (1949). *The Butterflies of Southern Africa*. Part I, Papilionidae and Pierinae. Transvaal Museum, Pretoria.
- Van Son, G. (1955). *The Butterflies of Southern Africa*. Part II, Nymphalidae: Danainae and Satyrinae. Transvaal Museum, Pretoria.
- Van Son, G. (1963). *The Butterflies of Southern Africa*. Part III, Nymphalidae: Acraeinae. Transvaal Museum, Pretoria.
- Van Son, G. (1979). *The Butterflies of Southern Africa*. Part IV, Nymphalidae: Nymphalinae (edited by L. Vari). Transvaal Museum, Pretoria.
- Westwood, J.O (1881). Entomology. In: *Matabele Land and the Victoria Falls* (by F. Oates), pp. 331-365. London.
- Williams, C.B. (1930). *The Migration of Butterflies*. Oliver & Boyd, London.
- Wood, P.A. & Samways, M.J. (1991). Landscape element pattern and continuity of butterfly flight paths in an ecologically landscaped botanic garden, Natal, South Africa. *Biol. Conserv.* **58**: 149-166.

Appendix 10.1. Butterfly species recorded from the Four Corners area.

(Compiled from Carcasson 1995, Heath *et al.* 2002, Larsen 1991, Pringle *et al.* 1995, and personal records, A.& M. Gardiner.)

Species	Ang	Bot	Nam	Zam	Zim
Hesperioidea					
Hesperiidae					
Coeliadinae					
Coeliades forestan forestan (Stoll), 1782	X	X	X	X	X
Coeliades pisistratus (Fabricius), 1793	X	X	X	X	X
Pyrginae					
Abantis paradisea (Butler), 1870		X		X	X
Abantis tettensis Hopffer, 1855		X		X	X
Abantis venosa, Trimen, 1889		X	X	X	X
Abantis vidua Weymer, 1901				X	X
Abantis zambesiaca (Westwood), 1874		X		X	X
Calleagris jamesoni jamesoni (Sharpe), 1890		X	X	X	X
Caprona pillaana Wallengren, 1857		X		X	X
Gomalia elma elma (Trimen), 1862	X	X	X	X	X
Leucochitonea levubu Wallengren, 1857		X	X	X	X
Netrobalane canopus (Trimen), 1864		X		X	X
Sarangesa astrigera Butler, 1894				X	X
Sarangesa lucidella lucidella (Mabille), 1891		X		X	X
Sarangesa motozi (Wallengren), 1857		X		X	X
Sarangesa phidyle (Walker), 1870		X	X	X	X
Sarangesa seineri seineri Strand, 1909		X		X	X
Spialia colotes transvaaliae (Trimen), 1889		X		X	X
Spialia delagoae (Trimen), 1898		X		X	X
Spialia depauperata australis De Jong, 1978		X			X
Spialia diomus ferax (Wallengren), 1863		X		X	X
Spialia dromus (Plotz), 1884				X	X
Spialia mafa mafa (Trimen), 1870		X		X	X
Spialia secessus (Trimen), 1891				X	X
Spialia spio (Linnaeus), 1764		X		X	X
Tagiades flesus (Fabricius), 1781		X	X	X	X
Hesperiinae					
Acada biseriata (Mabille), 1893	X	X	X	X	X
Acleros mackeenii (Trimen), 1868		X		X	X
Andronymus caesar philander (Hopffer), 1855			X	X	X
Andronymus neander neander (Plotz), 1884		X	X	X	X
Borbo borbonica borbonica (Boisduval), 1833		X	X	X	X
Borbo fallax (Gaede), 1916		X		X	X
Borbo fatuellus fatuellus (Hopffer), 1855		X	X	X	X
Borbo gemella (Mabille), 1884		X		X	X
Borbo holtzii (Plotz), 1883		X	X	X	X
Borbo micans (Holland), 1896		X		X	X
Fresna nyassae (Hewitson), 1878				X	X

Species	Ang	Bot	Nam	Zam	Zim
<i>Gegenes hottentota</i> (Latreille), 1824		X	X	X	X
<i>Gegenes niso niso</i> Linnaeus, 1764		X	X		X
<i>Gegenes niso brevicornis</i> (Plotz), 1884				X	
<i>Gegenes pumilio gambica</i> Mabille, 1878		X		X	X
<i>Kedestes callicles</i> (Hewitson), 1868		X		X	X
<i>Kedestes marshalli</i> Aurivillius, 1925		X			X
<i>Kedestes monostichus</i> Hancock & Gardiner, 1982			X		X
<i>Metisella willemi</i> (Wallengren), 1857		X		X	X
<i>Parnara monasi</i> Trimen, 1889		X		X	X
<i>Parosmodes morantii morantii</i> (Trimen), 1873	X	X	X	X	X
<i>Pelopidas mathias</i> (Fabricius), 1789	X	X	X	X	X
<i>Pelopidas thrax inconspicua</i> (Bertolini), 1850	X	X	X	X	X
<i>Platylesches galesa</i> (Hewitson), 1877		X			
<i>Platylesches moritili</i> (Wallengren), 1857	X	X	X	X	X
<i>Platylesches neba</i> (Hewitson), 1877			X	X	X
<i>Platylesches tina</i> Evans, 1937		X		X	X
<i>Teniorhinus harona</i> (Westwood), 1881	X	X	X	X	X
<i>Tsitana tsita</i> (Trimen), 1870					X
<i>Tsitana wallacei</i> (Neave), 1910				X	
<i>Zenonia zeno</i> (Trimen), 1864				X	X
<i>Zophopetes dysmephila</i> (Trimen), 1868	X	X		X	X
Papilionoidea					
Papilionidae					
<i>Graphium angolanus angolanus</i> (Goeze), 1779	X	X	X	X	X
<i>Graphium antheus</i> (Cramer), 1779	X	X	X	X	X
<i>Graphium leonidas leonidas</i> (Fabricius), 1793	X	X	X	X	X
<i>Graphium porthaon porthaon</i> (Hewitson), 1865	X	X	X	X	X
<i>Graphium taboranus</i> (Oberthur), 1886				X	
<i>Papilio constantinus constantinus</i> Ward, 1871		X		X	X
<i>Papilio dardanus cenea</i> Stoll, 1891		X			
<i>Papilio demodocus demodocus</i> Esper, 1798	X	X	X	X	X
<i>Papilio nireus lyaeus</i> Doubleday, 1845	X	X	X	X	X
Pieridae					
<i>Appias epaphia contracta</i> (Butler), 1888		X		X	X
<i>Belenois aurota aurota</i> (Fabricius), 1793	X	X	X	X	X
<i>Belenois crawshayi</i> Butler, 1894				X	
<i>Belenois creona severina</i> (Stoll), 1781	X	X	X	X	X
<i>Belenois gidica abyssinica</i> Lucas, 1852	X	X	X	X	X
<i>Catopsilia florella</i> (Fabricius), 1775	X	X	X	X	X
<i>Colias electo electo</i> (Linnaeus), 1763	X	X	X	X	X
<i>Colotis agoye agoye</i> (Wallengren), 1857		X		X	X
<i>Colotis amatus calais</i> (Cramer), 1775		X		X	X
<i>Colotis antevippe gavisia</i> (Wallengren), 1857	X	X	X	X	X
<i>Colotis celimene amina</i> (Hewitson), 1866		X		X	X
<i>Colotis danae annae</i> (Wallengren), 1857	X	X	X	X	X
<i>Colotis dissociatus</i> (Butler), 1897		X	X	X	X

Species	Ang	Bot	Nam	Zam	Zim
<i>Colotis eris eris</i> (Klug), 1829	X	X	X	X	X
<i>Colotis euppe omphale</i> (Godart), 1819	X	X	X	X	X
<i>Colotis evagore antigone</i> (Boisduval), 1836	X	X	X	X	X
<i>Colotis evenina evenina</i> (Wallengren), 1857	X	X	X	X	X
<i>Colotis ione</i> (Godart), 1819	X	X	X	X	X
<i>Colotis pallene</i> (Hopffer), 1855		X		X	X
<i>Colotis regina</i> (Trimen), 1863		X		X	X
<i>Colotis subfasciatus subfasciatus</i> Swainson, 1823		X			X
<i>Colotis vesta mutans</i> (Butler), 1877		X	X	X	X
<i>Dixeia doxo parva</i> Talbot, 1943				X	X
<i>Dixeia pigea</i> (Boisduval), 1836				X	X
<i>Eronia leda</i> (Boisduval), 1847		X		X	X
<i>Eurema brigitta brigitta</i> (Stoll), 1780	X	X	X	X	X
<i>Eurema desjardinsii marshalli</i> Butler, 1898				X	
<i>Eurema hapale</i> (Mabille), 1882		X			
<i>Eurema hecabe solifera</i> (Butler), 1875	X	X	X	X	X
<i>Leptosia alcesta inalcesta</i> Bernardi, 1959				X	X
<i>Mylothris agathina agathina</i> (Cramer), 1779	X	X	X	X	X
<i>Mylothris rubricosta attenuata</i> Talbot, 1944		X			X
<i>Mylothris rueppellii haemus</i> (Trimen), 1879		X			X
<i>Nepheronia buquetii buquetii</i> (Boisduval), 1836		X		X	X
<i>Nepheronia thalassina sinalata</i> (Suffert), 1904		X		X	X
<i>Pinacopteryx eriphia eriphia</i> (Godart), 1819	X	X	X	X	X
<i>Pontia helice helice</i> Linne, 1764		X	X		X
Acraeinae					
<i>Acraea</i> (<i>Acraea</i>) <i>acara acara</i> Hewitson, 1865		X		X	X
<i>Acraea</i> (<i>Acraea</i>) <i>acrita acrita</i> Hewitson, 1865				X	
<i>Acraea</i> (<i>Acraea</i>) <i>acrita ambigua</i> Trimen, 1891	X	X			
<i>Acraea</i> (<i>Acraea</i>) <i>aglaonice</i> Westwood, 1881	X	X	X	X	X
<i>Acraea</i> (<i>Acraea</i>) <i>anemosa</i> Hewitson, 1856	X	X	X	X	X
<i>Acraea</i> (<i>Acraea</i>) <i>anemosa f. alboradiata</i> Aurivillius, 1898			X		X
<i>Acraea</i> (<i>Acraea</i>) <i>atergatis</i> Westwood, 1881	X	X	X	X	X
<i>Acraea</i> (<i>Acraea</i>) <i>atolmis</i> Westwood, 1881	X	X	X	X	X
<i>Acraea</i> (<i>Acraea</i>) <i>axina</i> , Westwood, 1881		X	X	X	X
<i>Acraea</i> (<i>Acraea</i>) <i>caldarena</i> Hewitson, 1877	X	X	X	X	X
<i>Acraea</i> (<i>Acraea</i>) <i>lygus</i> Druce, 1875		X		X	X
<i>Acraea</i> (<i>Acraea</i>) <i>natalica</i> Boisduval, 1847	X	X	X	X	X
<i>Acraea</i> (<i>Acraea</i>) <i>neobule neobule</i> Doubleday, 1847	X	X	X	X	X
<i>Acraea</i> (<i>Acraea</i>) <i>nohara</i> Boisduval, 1847		X			X
<i>Acraea</i> (<i>Acraea</i>) <i>omrora omrora</i> Trimen 1894			X		
<i>Acraea</i> (<i>Acraea</i>) <i>oncaea</i> Hopffer, 1855		X		X	X
<i>Acraea</i> (<i>Acraea</i>) <i>onerata onerata</i> Trimen, 1891	X	X	X		
<i>Acraea</i> (<i>Acraea</i>) <i>stenobea</i> Wallengren, 1860		X	X	X	X
<i>Acraea</i> (<i>Actinote</i>) <i>acerata</i> Hewitson, 1874	X	X	X	X	X
<i>Acraea</i> (<i>Actinote</i>) <i>encedon encedon</i> (Linnaeus), 1758	X	X	X	X	X
<i>Acraea</i> (<i>Actinote</i>) <i>eponina</i> (Cramer), 1780	X	X	X	X	X

Species	Ang	Bot	Nam	Zam	Zim
<i>Acraea (Actinote) obeira burni</i> (Butler), 1896		X		X	X
<i>Acraea (Actinote) rahira rahira</i> Boisduval, 1833	X	X	X	X	X
<i>Pardopsis punctatissima</i> (Boisduval), 1833				X	X
Nymphalidae					
Danainae					
<i>Danaus (Anosia) chrysippus aegyptius</i> (Schreber), 1759	X	X	X	X	X
<i>Tirumala petiverana</i> (Doubleday), 1847	X	X	X	X	
Satyrinae					
<i>Bicyclus angulosa selousi</i> (Trimen), 1895	X			X	X
<i>Bicyclus anynana anynana</i> (Butler), 1879	X	X	X	X	X
<i>Bicyclus cottrelli</i> (van Son), 1952				X	
<i>Bicyclus ena</i> (Hewitson), 1877		X		X	X
<i>Bicyclus safitza safitza</i> (Westwood), 1850	X	X	X	X	X
<i>Coenyropsis natalii</i> Boisduval, 1847		X	X		X
<i>Henotesia perspicua</i> (Trimen), 1873		X		X	X
<i>Henotesia simonsii</i> (Butler), 1877	X	X	X	X	X
<i>Melanitis leda helena</i> (Westwood), 1851	X	X	X	X	X
<i>Neita extensa</i> (Butler), 1898				X	X
<i>Physcaeneura panda</i> Boisduval, 1847		X			X
<i>Ypthima antennata antennata</i> van Son, 1955		X		X	X
<i>Ypthima asterope asterope</i> (Klug), 1832	X	X	X	X	X
<i>Ypthima granulosa</i> Butler, 1883	X	X		X	X
<i>Ypthima impure paupera</i> Ungemach, 1932	X	X	X	X	X
<i>Ypthima rhodesiana</i> Carcasson, 1961				X	X
<i>Ypthimomorpha itonia</i> (Hewitson), 1865	X	X	X	X	X
Argynninae					
<i>Phalanta eurytis eurytis</i> (Doubleday), 1847				X	X
<i>Phalanta phalantha aethiopica</i> (Rothschild & Jordan), 1903	X	X	X	X	X
Nymphalinae					
<i>Catacroptera cloanthe cloanthe</i> (Stoll), 1781	X	X	X	X	X
<i>Cynthia cardui</i> (Linnaeus), 1758	X	X	X	X	X
<i>Hypolimnas misippus</i> (Linnaeus), 1764	X	X	X	X	X
<i>Junonia antilope</i> (Feisthamel), 1850	X	X	X	X	X
<i>Junonia archesia archesia</i> (Cramer), 1779	X	X	X	X	X
<i>Junonia artaxia</i> Hewitson, 1864	X			X	X
<i>Junonia ceryne ceryne</i> (Boisduval), 1847		X		X	X
<i>Junonia cuama</i> Hewitson, 1864				X	X
<i>Junonia hierta cebrene</i> Trimen, 1870	X	X	X	X	X
<i>Junonia natalica natalica</i> (Felder and Felder), 1860	X	X	X	X	X
<i>Junonia octavia sesamus</i> (Trimen), 1883	X	X	X	X	X
<i>Junonia oenone oenone</i> (Linnaeus) 1758	X	X	X	X	X
<i>Junonia orithya madagascariensis</i> Guenee, 1865	X	X	X	X	X
<i>Salamis anacardii nebulosa</i> Trimen, 1881		X		X	X
<i>Salamis parhassus</i> (Drury), 1782				X	X
Limenitinae					

Species	Ang	Bot	Nam	Zam	Zim
<i>Byblia anvataracheloides</i> (Wallengren), 1857	X	X	X	X	X
<i>Byblia ilithyia</i> (Drury), 1773	X	X	X	X	X
<i>Eurytela dryope angulata</i> Aurivillius, 1898	X	X		X	X
<i>Eurytela hiarbas lita</i> Rothschild and Jordan, 1903				X	X
<i>Hamanumida daedalus</i> (Fabricius), 1775	X	X	X	X	X
<i>Neptis alta</i> Overlaet, 1955	X	X	X	X	X
<i>Neptis jordani</i> Neave, 1910	X	X	X	X	X
<i>Neptis laeta</i> Overlaet, 1955	X	X	X	X	X
<i>Neptis penningtoni</i> van Son, 1977				??	
<i>Neptis saclava marpessa</i> Hopffer, 1855	X	X	X	X	X
<i>Neptis serena serena</i> Overlaet, 1955	X	X	X	X	X
<i>Pseudacraea boisduvalii trimeni</i> Butler, 1874		X	X	X	X
<i>Pseudacraea lucretia expansa</i> (Butler), 1878		X		X	X
<i>Pseudacraea poggei</i> (Dewitz), 1879	X	X	X	X	
<i>Sallya boisduvali boisduvali</i> (Wallengren), 1857				X	X
<i>Sallya rosa</i> (Hewitson), 1877	X	X	X	X	X
<i>Sallya trimeni trimeni</i> (Aurivillius), 1898	X	X	X	X	
Charaxinae					
<i>Charaxes achaemenes achaemenes</i> Felder & Felder, 1867	X	X	X	X	X
<i>Charaxes baumanni selousi</i> Trimen, 1894				X	X
<i>Charaxes bohemani</i> Felder & Felder, 1859	X	X	X	X	X
<i>Charaxes brainei</i> van Son, 1966		X	X		
<i>Charaxes brutus natalensis</i> Staudinger, 1885	X	X	X	X	X
<i>Charaxes candiope candiope</i> (Godart), 1824	X	X	X	X	X
<i>Charaxes ethalion binghami</i> Henning, 1982				X	X
<i>Charaxes fulgurata</i> Aurivillius, 1898	X	X	X	X	X
<i>Charaxes guderiana guderiana</i> (Dewitz), 1879	X	X	X	X	X
<i>Charaxes jahlusa argynnides</i> Westwood, 1864				X	X
<i>Charaxes jahlusa rex</i> Henning, 1978		X	X	X	X
<i>Charaxes jasius saturnus</i> Butler, 1865	X	X	X	X	X
<i>Charaxes penricei penricei</i> Rothschild, 1900				X	X
<i>Charaxes phaeus</i> Hewitson, 1877	X	X	X	X	X
<i>Charaxes vansoni</i> van Someren, 1975		X		X	
<i>Charaxes varanes vologeses</i> (Mabille), 1876	X	X	X	X	X
<i>Charaxes zambeziensis</i> Henning & Henning, 1994					X
<i>Charaxes zoolina zoolina</i> (Westwood), 1850	X	X	X	X	X
Libytheinae					
<i>Libythea labdaca laius</i> Trimen, 1879	X	X	X	X	X
Lycaenidae					
<i>Actizera lucida</i> (Trimen), 1883				X	X
<i>Alaena amazoula ochroma</i> Vari, 1976		X			X
<i>Aloeides damarensis damarensis</i> Trimen, 1891		X			
<i>Aloeides damarensis mashona</i> Tite & Dickson, 1973				X	X
<i>Aloeides simplex</i> Trimen, 1893		X			
<i>Aloeides taikosama</i> Wallengren, 1857		X			X
<i>Anthene amarah amarah</i> (Guerin-Meneville), 1849	X	X	X	X	X

Species	Ang	Bot	Nam	Zam	Zim
<i>Anthene butleri livida</i> (Oberthur), 1881	X	X	X	X	X
<i>Anthene contrastata mashuna</i> (Stevenson), 1937		X		X	X
<i>Anthene definite definita</i> (Butler), 1899	X	X	X	X	X
<i>Anthene lunulata</i> (Trimen) 1894	X	X	X	X	X
<i>Anthene otacilia otacilia</i> (Trimen), 1868		X		X	X
<i>Anthene princeps princeps</i> (Butler), 1876	X	X	X	X	X
<i>Anthene talboti</i> Stempffer, 1936		X			X
<i>Aphnaeus erikssoni erikssoni</i> Trimen, 1891		X	X	X	
<i>Aphnaeus erikssoni mashunae</i> Stempffer, 1954					X
<i>Axiocerses amanga</i> (Westwood), 1881	X	X	X	X	X
<i>Axiocerses coalescens</i> Henning & Henning, 1996				X	
<i>Axiocerses tjoane</i> (Wallengren), 1857	X	X	X	X	X
<i>Azonus jesous jesous</i> (Guerin-Meneville), 1849	X	X	X	X	X
<i>Azonus mirza</i> (Plotz), 1880	X	X	X	X	X
<i>Azonus moriqua</i> (Wallengren), 1857	X	X	X	X	X
<i>Azonus natalensis</i> (Trimen), 1887				X	X
<i>Azonus ubaldus</i> (Stoll), 1782	X	X	X	X	X
<i>Baliochila singularis</i> Stempffer & Bennett, 1953		X			X
<i>Brephidium metophis</i> Wallengren, 1860		X			X
<i>Cacyreus lingeus</i> (Stoll), 1782	X	X	X	X	X
<i>Cacyreus marshalli</i> Butler, 1898	X	X	X	X	X
<i>Cacyreus virilis</i> Aurivillius, 1924	X	X	X	X	X
<i>Capys connexivus connexivus</i> Butler, 1897				X	X
<i>Chloroselas pseudozeritis</i> (Trimen), 1873		X		X	X
<i>Chloroselas mazoensis</i> (Trimen), 1898		X		X	X
<i>Cnodontes pallida</i> (Trimen), 1898		X		X	X
<i>Crudaria leroma</i> (Wallengren), 1857	X	X	X	X	X
<i>Cupidopsis cissus</i> (Godart), 1824	X	X	X	X	X
<i>Cupidopsis jobates jobates</i> (Hopffer), 1855	X	X	X	X	X
<i>Deudorix (Pilodeudorix) caerulea</i> Druce, 1890				X	X
<i>Deudorix (Virachola) antalus</i> (Hopffer), 1855	X	X	X	X	X
<i>Deudorix (Virachola) dinochares</i> Grose-Smith, 1887	X	X	X	X	X
<i>Eicochrysops eicotrochilus</i> Bethune-Baker, 1924				X	
<i>Eicochrysops hippocrates</i> (Fabricius), 1793	X	X	X	X	X
<i>Eicochrysops messapus mahallakoaena</i> (Wallengren), 1857		X		X	X
<i>Erikssonia acraeina</i> Trimen, 1891	X	X		X	
<i>Erikssonia alaponoxa</i> Henning & Henning, 2001				X	
<i>Euchrysops barkeri</i> (Trimen), 1893				X	X
<i>Euchrysops malathana</i> (Boisduval), 1833	X	X	X	X	X
<i>Euchrysops osiris osiris</i> (Hopffer), 1855	X	X	X	X	X
<i>Euchrysops subpallida</i> Bethune-Baker, 1923	X	X	X	X	X
<i>Freyeria trochylus</i> (Freyer), 1843	X	X	X	X	X
<i>Hemiolaus caeculus caeculus</i> Hopffer, 1855	X	X	X	X	X
<i>Hemiolaus caeculus tsodiloensis</i> Pinhey 1969		X			
<i>Hemiolaus caeculus vividus</i> (Pinhey), 1962				X	

Species	Ang	Bot	Nam	Zam	Zim
<i>Hypolycaena phillipus phillipus</i> (Fabricius), 1793	X	X	X	X	X
<i>Iolaus</i> (<i>Aphniolaus</i>) <i>pallene</i> (Wallengren), 1857	X	X	X	X	X
<i>Iolaus</i> (<i>Argiolaus</i>) <i>silarus</i> Druce, 1885	X	X	X	X	X
<i>Iolaus</i> (<i>Epamera</i>) <i>alienus alienus</i> Trimen, 1898		X	X	X	X
<i>Iolaus</i> (<i>Epamera</i>) <i>penningtoni</i> (Stempffer & Bennett), 1959		X		X	X
<i>Iolaus</i> (<i>Epamera</i>) <i>australis</i> Stevenson, 1937		X		X	X
<i>Iolaus</i> (<i>Epamera</i>) <i>bakeri</i> (Riley), 1928				X	X
<i>Iolaus</i> (<i>Epamera</i>) <i>mimosae rhodosense</i> (Stempffer & Bennett), 1959	X	X	X	X	X
<i>Iolaus</i> (<i>Epamera</i>) <i>nasisii</i> (Riley), 1928		X		X	X
<i>Iolaus</i> (<i>Epamera</i>) <i>sidus</i> Trimen, 1864				X	X
<i>Iolaus</i> (<i>Epamera</i>) <i>violacea</i> (Riley), 1928				X	X
<i>Iolaus</i> (<i>Iolaphilus</i>) <i>trimeni</i> Wallengren, 1875	X	X	X	X	X
<i>Iolaus</i> (<i>Stugeta</i>) <i>bowkeri tearei</i> (Dickson), 1980	X	X	X	X	X
<i>Lachnocnema bibulus</i> (Fabricius), 1793	X	X	X	X	X
<i>Lachnocnema durbani</i> Trimen, 1887		X		X	X
<i>Lampides boeticus</i> (Linnaeus), 1767	X	X	X	X	X
<i>Lepidochrysops chloauges</i> (Bethune-Baker), 1923		X	X	X	X
<i>Lepidochrysops glauca</i> (Trimen), 1887		X	X	X	X
<i>Lepidochrysops peculiaris hypoleucus</i> (Butler), 1894				X	X
<i>Lepidochrysops plebeia plebeia</i> (Butler), 1898		X		X	X
<i>Lepidochrysops solwezii</i> (Bethune-Baker), 1923				X	X
<i>Lepidochrysops vansoni</i> Swanepoel, 1949		X			X
<i>Leptomyrina</i> (<i>Leptomyrina</i>) <i>hirundo</i> (Wallengren), 1857		X		X	X
<i>Leptomyrina</i> (<i>Gonatomyrina</i>) <i>gorgias sobrina</i> Talbot, 1935				X	X
<i>Leptomyrina</i> (<i>Gonatomyrina</i>) <i>gorgias henningi</i> Dickson, 1976		X	X		X
<i>Leptotes babaulti</i> (Stempffer), 1935	X			X	X
<i>Leptotes brevidentatus</i> (Tite), 1958	X	X	X	X	X
<i>Leptotes jeanneli</i> (Stempffer), 1935	X			X	X
<i>Leptotes piriouthous piriouthous</i> (Linnaeus), 1767	X	X	X	X	X
<i>Leptotes pulchra</i> (Murray), 1874	X	X	X	X	X
<i>Mimacraea marshalli marshalli</i> Trimen, 1898				X	X
<i>Myrina silenus ficedula</i> Trimen, 1879	X	X	X	X	X
<i>Myrina dermaptera nyassae</i> Talbot, 1935				X	X
<i>Oraidium barberae</i> Trimen, 1868		X			X
<i>Pentila pauli obsoleta</i> Hawker-Smith, 1933				X	X
<i>Pseudonacaduba sichela sichela</i> (Wallengren), 1857	X	X	X	X	X
<i>Spalgis lemolea</i> Druce, 1890		X		X	X
<i>Cigaritis brunnea</i> (Jackson), 1966				X	X
<i>Cigaritis ella</i> (Hewitson), 1865	X	X	X	X	X
<i>Cigaritis modestus modestus</i> (Trimen), 1891	X			X	
<i>Cigaritis mozambica</i> (Bertolini), 1850				X	X
<i>Cigaritis natalensis</i> (Westwood), 1851	X	X	X	X	X
<i>Cigaritis phanes</i> (Trimen), 1873		X		X	X

Species	Ang	Bot	Nam	Zam	Zim
Tarucus sybaris sybaris (Hopffer), 1855	X	X	X	X	X
Thermoniphas micyclus colorata (Ungemach), 1932				X	X
Tuxentius calice calice (Hopffer), 1855	X	X	X	X	X
Tuxentius melaena melaena (Trimen), 1887	X	X	X	X	X
Uranothauma poggei (Dewitz), 1879				X	X
Zintha hintza hintza (Trimen), 1864		X	X	X	X
Zizeeria knysna (Trimen), 1862	X	X	X	X	X
Zizina antanossa (Mabille), 1877				X	X
Zizula hylax (Fabricius), 1775	X	X	X	X	X
TOTAL	140	237	160	268	274

NB. The low number of species for Angola is probably due to the lack of information for the country.