

The dragonflies and damselflies of Botswana – an annotated checklist with notes on distribution, phenology, habitats and Red List status of the species (Insecta: Odonata)

With 12 figures and 3 tables

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Kurzfassung

KIPPING, J.: Die Libellen Botswanas – eine kommentierte Checkliste mit Angaben zu Verbreitung, Phänologie, Habitaten und Rote Liste Status der Arten (Insecta: Odonata)

Zwischen den Jahren 2000 und 2010 wurden in Botswana und dabei besonders im nördlichen Landesteil 111 Libellenarten nachgewiesen. Gemeinsam mit weiteren publizierten Funden und Nachweisen anderer Sammler vergrößert sich damit die Checkliste der Libellen Botswanas auf 127 Arten. Davon sind 21 Arten neu für die Fauna des Landes. Die hier vorgelegte Checkliste liefert für jede Art Angaben zur Verbreitung, der Phänologie, den besiedelten Habitaten und dem aktuellen Rote Liste Status des IUCN. Die einzelnen Nachweise werden detailliert aufgeführt, im Anhang werden die vom Autor selbst untersuchten Fundorte beschrieben. Die Verbreitungsmuster der Libellenarten in den einzelnen Süßwasser-Ökoregionen werden diskutiert.

Schlüsselwörter: Odonata, Libellen, Afrika, Botswana, Okavango Delta, Checkliste, Rote Liste, IUCN

Abstract

Between 2000 and 2010, 111 species of Odonata have been recorded mainly from northern Botswana. Together with other published and unpublished records, this increases the checklist of the Odonata of Botswana to 127 species, of which 21 species have not been recorded before in Botswana. This updated checklist provides information for each recorded species on distribution, phenology, preferred habitats and specific notes, where appropriate. A detailed list of records is given, the localities sampled by the author are described in the appendix. The Red List status according to the IUCN assessment is given. Distribution patterns of the Odonata species in different freshwater ecoregions are discussed.

Key words: Odonata, dragonflies, Africa, Botswana, Okavango Delta, checklist, Red List, IUCN

1 Introduction

Freshwater systems across much of Madagascar and the African continent are under increasing pressure from the combined onslaught of water withdrawals, overall land use change, pollution from burgeoning populations and industries, dams and introduced species (THIEME et al. 2005). This multitude of threats on a wide front requires conservationists to establish priorities and to set goals and targets for the conservation of aquatic systems and their rich biodiversity. Such conservation action needs to be based on knowledge about the occurrence of major freshwater groups, e. g. fish, molluscs or dragonflies, which can be used as indicators for freshwater ecosystem health (CLAUSNITZER & JÖDICKE 2004, SAMWAYS 1999). In this paper I aim to contribute towards a better insight into the Odonata fauna of southern Africa and their distribution pattern through an updated checklist of the Odonata of Botswana.

The dragonfly fauna of Botswana is still poorly known as only a few papers about it have been published in the past. The first verifiable records were provided by RIS (1908), who referred to some localities in the southern part of the country. Some specific papers, dealing with special issues in Botswanan Odonata, followed (BALINSKY 1963, 1967). PINHEY (1967a) carried out his first expedition to the Okavango Delta in 1967 and provided some remarkable new records. The first checklist of the Odonata of Botswana was published by PINHEY (1976), which summarized all the records from Botswana known at that time. Several taxonomic monographs on different Odonata groups (PINHEY 1970a, 1970b, 1974, 1980) or checklists of neighbouring countries (PINHEY 1981, 1984) also include Botswanan records, but do not offer additional data. Until recently the northern part of the country, with its vast wetlands and perennial rivers, was the main focus of odonatological interest, making the Okavango Delta's Odonata fauna one of the best known on the African continent. Until 1976 approximately 20 expeditions focussing on odonates visited the Okavango Delta, Linyanti Swamps and Chobe River (PINHEY 1976), whereas only five took place afterwards till 2000, including some holiday trips by odonatologists. The very promising south-eastern part of Botswana received little attention and most parts of the Kalahari, which covers about two thirds of the country, remains underresearched. In neighbouring Namibia the arid landscape has received much more attention, but even there the southern Kalahari basin is underrepresented (MARTENS et al. 2003, SUHLING & MARTENS 2007).

The paper presented here deals mainly with material gathered from 2000 to 2010 in the framework of thesis studies by the author (KIPPING 2003a) in partnership between Anhalt University of Applied Sciences, Bernburg, Germany and the Okavango Research Institute (ORI, the former Harry Oppenheimer Okavango Research Centre, HOORC) of the University of Botswana in Maun, and other recent research activities in the country (e. g. KIPPING 2007). It includes some additional unpublished records by other odonatologists and material in several museum collections.

2 Study Area

Botswana is a large landlocked country in southern Africa with an arid to semi-arid climate. Much of the country is flat, with gentle undulations and occasional rocky outcrops in the north-west and south-east. The mean altitude a. s. l. is about 1000 m and rises above 1350 m in the east. Two thirds of the territory is covered by Kalahari sandveld, which is almost free of permanent surface water. Evergreen forests are restricted to the immediate banks of perennial rivers in the

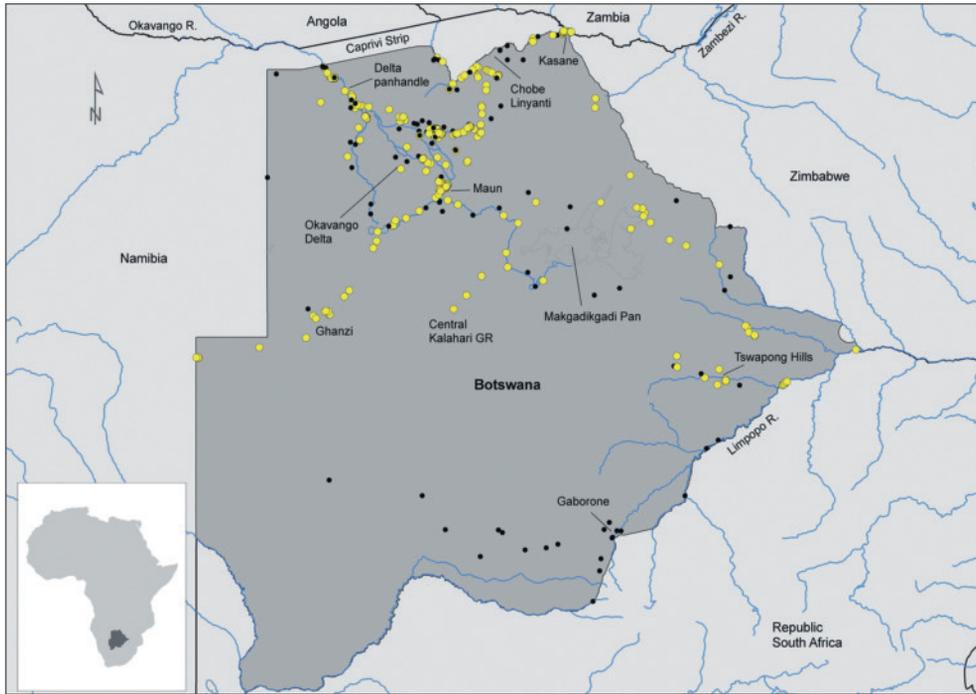


Fig. 1: Map of Botswana, showing some of the places mentioned in the text and all localities sampled for Odonata before 1999 (black dots) and sampled from 2000 till 2010 (yellow dots).

north and high mountains are completely absent. Mean annual rainfall ranges from over 650 mm in the north-east to less than 250 mm in the south-west. Almost all the rainfall occurs during the summer months, from October to April; the period from May to September is generally dry, with some exceptions in recent years. Evaporation rates are high, ranging from 1800 mm to over 2200 mm annually for surface water.

The only perennial rivers are the Kwando, Linyanti and Chobe, which belong to the Zambezi River catchment in the more humid north-east and the Okavango River forming the famous Okavango Delta in the north-west. Apart from the vast Okavango Delta, the north contains extensive swamps, such as the Savuti Marsh and Linyanti Swamps with Lake Liambezi on the border of the Caprivi region of Namibia. The Okavango and the Chobe may be temporarily connected via the Selinda Spillway after intense rainfall and floods in southern Africa. A detailed overview on the hydrology of this region is given by ALLANSON et al. (1990). The outstanding importance of the Okavango Delta is the permanent presence of water under arid conditions due to the special flood regime. For the ecology and flooding of the Okavango Delta see WILSON & DINCER (1976), ELLERY & ELLERY (1997), MCCARTHY et al. (2000), MENDELSON & EL OBEID (2004) and MENDELSON et al. (2010). The complex history of the large rivers of northern Botswana and Zambia with drainage change, recombination of river catchments and river ‘piracy’ is described by MOORE & LARKIN (2001) and had much consequence also for the Okavango Delta. The Limpopo River forms the border to South Africa in the south-east, but is ephemeral in this area. A few permanent springs and streams are to be found at the Tsodilo Hills (1375 m a. s. l.) in the north-west and much more at the Tswapong Hills and others near Palapye in the south-east. Parts of Botswana are characterized by extensive salt pans, which may be temporarily filled mainly after rain in the

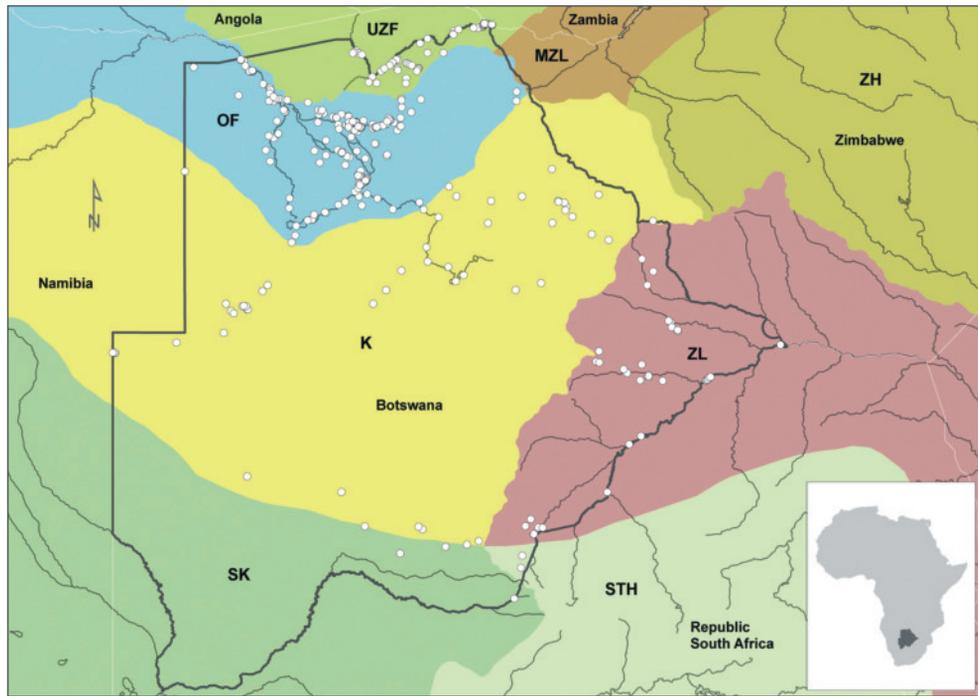


Fig. 2: Map of Botswana, depicting the distribution of all Odonata records (white dots), and the country's freshwater ecoregions: UZF – Upper Zambezi Floodplains; OF – Okavango Floodplains; K – Kalahari; SK – Southern Kalahari; STH – Southern Temperate Highveld; ZL – Zambezi Lowveld; and outside Botswana: ZH – Zambezi (Plateau) Highveld; MZL – Middle Zambezi Luangwa (modified after THIEME et al. 2005).

interior of Botswana. The Makgadikgadi Pan may receive overflow from the Okavango Delta via the Boteti River and Lake Ngami via the Kunyere River after a high flood level, what in fact happened within the last five years. Large artificial dams are to be found mainly in the south-eastern part of Botswana around Gaborone, Palapye, Selebi-Phikwe and Francistown.

According to THIEME et al. (2005) Botswana includes larger parts of six of the 93 African freshwater ecoregions (vide figure 2), consisting of:

Upper Zambezi Floodplains – the extreme northern part of the country that drains to the Zambezi River, it contains the Savuti area and Chobe-Linyanti floodplains, and the Kwando and Zambezi Rivers in Namibia. Major habitat types are floodplains, swamps and lakes. In the Botswanan part the average annual precipitation is about 550–650 mm, which is the highest for the country. The Chobe-Linyanti floodplains form a mosaic of freshwater habitats and woodland.

Okavango Floodplains – its major part in Botswana is the Okavango Delta, a highly diverse mosaic of freshwater and terrestrial habitats forming one of the most important wetlands in southern Africa and is a RAMSAR site. The swamps vary in character due to the perennial or intermittent occurrence of floodwaters. The mean annual precipitation is about 450–550 mm. Around the Delta and to the east the terrestrial habitats are dominated by Mopane woodland (*Colophospermum mopane*) or thorn scrub.

Kalahari – this xeric region covers most of the country. It is semi-arid and has no perennial natural surface water. It includes the large endorheic Nxai and Makgadikgadi salt pans, which is one of the major pan systems in southern Africa, being fed by the episodic Boteti and Nata Rivers or rainfall. After rainfall or flood a large area can be inundated for weeks or months. In addition numerous small temporary pans are widely scattered throughout the ecoregion. Outside the pans the region is covered by Kalahari sand and characterized by grassland and more or less dry thorn scrub. Annual average rainfall is about 250–450 mm

Southern Kalahari – in the south-western part of the country is also a xeric system with the lowest annual rainfall in Botswana from less than 230 to 250 mm. It is free of natural perennial surface water. A few artificial waterholes and scattered small pans may hold water for short periods after the irregular rainfall.

Zambezi Lowveld – the Tuli Block and the south-eastern part of the country forms part of to this region. Whereas most of Botswanan country is flat, this part is characterized by hills like the Tswapong or Shoshong Hills. These hills have some deep gorges with permanent springbrooks and even little waterfalls. Rivers in dry forest, like the ephemeral Limpopo River on the border to South Africa, are major habitat types. In the region some larger dams are important for the freshwater fauna. Rainfall is irregular around 400 mm per year.

Southern Temperate Highveld – only a very small part of it reaches into Botswana. It is located south of Gaborone around Lobatse and is very similar to the Zambezi Lowveld.

In the north-east, between Kasane and Pandamatenga, the Middle Zambezi Luangwa ecoregion intrudes into Botswana by a few square kilometres, but it is not considered in the discussion.

3 Material and Methods

3.1 Own Records

My own records resulted from 10 journeys to Botswana: 8 April – 3 August 2000; 1 – 12 March 2001; 5 February – 17 April 2002; 27 February – 7 April 2005, 14 January – 27 February 2006, 05 January – 26 February 2007, 19 November – 16 December 2007, 14 January – 12 February 2009, 30 January – 20 February 2010 and 05 – 14 September 2010. Some of the expeditions were made under the auspices of the Okavango Research Institute (ORI Maun), of Conservation International or in late 2007 within a project of the Botswana Department of Wildlife and National Parks (DWNP) (KIPPING 2007). Altogether I collected/observed dragonflies at around 150 collection sites, mainly in northern and eastern Botswana, most of them visited several times. A list of these localities, the dates of visits, coordinates and a short habitat description is provided in the appendix. These localities are grouped in four blocks: OP – Okvango Delta-north, panhandle and permanently flooded part of the Delta; OS – Okvango Delta-south, seasonally flooded part of the Delta; CL – Chobe/Linyanti River system; and OL – other localities outside the first three groups. A map with all the localities of all available Odonata records from Botswana is given in figure 1.

Names of localities are according to the maps »Okavango Delta 1 : 350.000« and »Chobe 1 : 350.000«, (Department of Surveys and Lands, Gaborone), the »Botswana 1 : 1.000.000« (Reise-Know-How Verlag, Bielefeld, Germany) and the »Botswana , 1 : 1.750.000« (Freytag & Berndt, Wien, Austria). Coordinates were taken with various »Garmin« GPS devices and are given as WGS84 datum.

A simple handnet was used to collect Odonata imagoes and for recording purposes identification was also with close-focus binoculars (8 × 32). In 2000, some larvae were netted, kept in small basins and bred to adults. Exuviae were collected wherever it was possible, some were identified with the keys of CHELMICK (1999, 2001) and SAMWAYS & WILMOT (2003), but most of them are still unidentified. About 1500 adult specimens and 100 exuviae were collected. At the moment the material is in the author's possession and some in the Nationaal Natuurhistorisch Museum Naturalis, Leiden (RMNH), and in the National Museum of Namibia, Windhoek (NMNW), but in the future the bulk will be deposited in the collection of the Okavango Research Institute (ORI) in Maun.

Data of observations and of collected specimens are organised in the Odonata Database for Africa (ODA), which is maintained by the author. This database started as a regional database of the dragonflies of the Okavango Delta in 2000, was later merged with other regional databases of colleagues and is now the ultimate database tool for the whole African continent (KIPPING et al. 2009).

3.2 Other Records

Sources of other records included in the checklist are:

- previous records are taken from published lists and papers, mainly from former lists of PINHEY (1967a, 1976);
- published records of DUMONT (2007);
- the collection of the Botswana National Museum, Monuments & Art Gallery, Gaborone, Botswana (BNMG). The different collectors are unknown;
- the collection of the Museum für Naturkunde, Humboldt-Universität, Berlin, Germany (ZMHB). Odonata were collected by J. Deckert, U. Göllner, F. Koch and G. Peters;
- the Namibian National Collection of Insects, National Museum of Namibia, Windhoek, Namibia (NMNW), the collector was E. Marais;
- the collection of the Northern Flagship-Transvaal Museum, Gauteng, RSA (TMSA), the collector was mainly B. I. Balinsky, but also M. Scoble and R. Toms;
- the collection of the Albany Museum Grahamstown, RSA (AMGS), the collector was M. Chutter;
- the collection of the Natural History Museum Bulawayo, Zimbabwe (NMBZ), collectors were J., N., V. and W. Goodwin;
- the private collection of D. R. Paulson (Seattle, USA), collectors were E. C. G. Pinhey and R. Buskirk;
- the unpublished records of J. Silsby (Purlington, GB), of M. Parr (Stembridge, GB), of P. Hancock (Maun, Botswana), of W. Tarboton (Modimolle, RSA), of M. J. Samways, P. Grant and of J. Pryke (Stellenbosch University, RSA);
- the mainly photographic records of W. Kappes and others (KAPPES & NEHLS 2004);
- the unpublished records of E. Schuran (Anhalt University of Applied Sciences, Bernburg, Germany);
- the photographic records of R. Busse, collected in 2010.

Names of localities and geographical coordinates are according to the maps mentioned above. Where historical locality citations were unclear, the names were crosschecked with the gazetteer of IRISH (1988).

4 Results

Between April 2000 and September 2010 I collected ~ 3900 datasets of 111 dragonfly species from Botswana. Several other collectors provided data with further data and species (~320 datasets, see Material and Methods). The entire Odonata database for Botswana currently contains about 5850 records. Nowadays Botswana and parts of the Okavango Delta belong to the best surveyed areas for Odonata on the African continent (KIPPING et al. 2009).

The updated checklist of the Odonata of Botswana now contains 127 species. Of these, 21 species have been recorded for the first time in Botswana. The newly recorded species include seven Zygoptera: *Lestes tridens*, *L. virgatus*, *Africallagma subtile*, *Agriocnemis angolensis*, *Agriocnemis* sp. nov., *Pseudagrion hageni tropicanum* and *P. kersteni*; and 14 Anisoptera: *Gynacantha manderica*, *Lestinogomphus silkeae*, *Neurogomphus cocytius*, *N. zambeziensis*, *Bradinopyga cornuta*, *Crocothemis divisa*, *Orthetrum abbotti*, *O. guineense*, *O. julia falsum*, *O. stemmale*, *Palpopleura portia*, *Trithemis donaldsoni*, *T. furva* and *T. palustris*. The general distribution of all Odonata species in the different types of freshwater ecoregions occurring in Botswana was found to be quite varied. Whereas the species number exceeded 90 in the Upper Zambezi Floodplain and the Okavango Floodplains, the diversity in the Southern Kalahari is below 20 species. The species numbers well reflect the humidity gradient from NE to SW. The occurrence of species in the different freshwater ecoregions of Botswana is provided in table 1.

4.1 Checklist of the Odonata of Botswana

Species with first records for Botswana are marked with an asterisk in the checklist (*). A double asterisk (**) marks those species which are not found on Botswanan territory, but at rivers bordering the country, e. g. the Kwando, Chobe or Limpopo Rivers.

Each species entry is divided into sections, as follows:

Last record: The year with the most recent record of a species.

Number of records: The total number of all available record from Botswanan territory according to the Odonata Database for Africa (ODA).

Rank: Ranking of a species from 1–127 according to the number of records. In alphabetical order if the number of records is the same.

Red List Status: It provides the current Red List status according to the IUCN Red List of threatened species (IUCN 2010). For the regional assessment of Southern Africa see SUHLING et al. (2009).

Africa distribution: The distribution of a species on the African continent. To avoid duplication and repetition, this section only appears when a species is a Botswana special and does not occur in Namibia. In all other cases I refer to SUHLING & MARTENS (2007), where this information is already provided in detail.

Botswana distribution: This main section gives information about the current knowledge of the species occurrence in Botswana. A short summary provides an overview about the occurrence in the country, with reference to the previous published records.

Other records: This contains all the findings gathered by other collectors/observers, including some few old records which were not included by PINHEY (1976).

Own records: This part contains exclusively my own records; here the locality code (vide appendix) is used. Some of the localities were visited several times. In such cases, the locality code is combined

with the month and year of the record. The months are abbreviated by small roman letters, starting with 'i' for January, 'ii' for February and so on. The term 'v.-vii.' means May till July, but 'v.,vii.' means May and July. Further abbreviations are: abun = abundant/en masse; ex = exuvia; loc = locality; mfl = maiden flight; juv = juvenile/freshly emerged; ovip = oviposition. Special locality abbreviations are: MGR = Moremi Game Reserve (Okavango Delta); WCI = West Chiefs Island (Okavango Delta); MWS = Maun Wildlife Sanctuary. Other abbreviations are explained in the text. The term panhandle means the northern, narrow part of the Okavango Delta.

Flight period: Here the phenology of a species is given considering all available records from Botswana. The period when a species can be encountered as an adult flying insect.

Habitat: A short summary of the habitat preference of a species is provided, which is also based exclusively on the knowledge gathered at Botswanan localities.

Notes: Special remarks or taxonomic comments for a species where relevant.

The nomenclature follows BRIDGES (1994) and later taxonomic revisions (MAY 2002; CAMMAERTS 2004; DIJKSTRA 2003, 2005, 2006; DIJKSTRA et al. 2006; MITCHELL & SAMWAYS 2005). Families are ordered according to DAVIES & TOBIN (1984, 1985) and BRIDGES (1994), while taxa below the family rank are ordered alphabetically.

ZYGOPTERA

CALOPTERYGIDAE

Phaon iridipennis (BURMEISTER, 1839)

Last record: 2006.

Number of records: 6

Rank: 88/127

Red List: Least Concern.

Botswana distribution: Upper panhandle of the Okavango Delta at Shakawe, Chobe Rapids at Kasane and Notwane River, S of Gaborone (PINHEY 1976).

Other records: Matakota, Limpopo River, 1 ♂, 24.iv.1957, B. I. Balinsky (TMSA).

Own records: CL3-ii.2006; CL4-v.2000.

Flight period: Recorded from September to May.

Habitat: Associated with fast flowing water and shady woodland, often on rocky ground.

Notes: Probably absent from most parts of the Okavango Delta, where stagnant or slow flowing water dominates.

CHLOROCYPHIDAE

Platycypha caligata caligata (SELYS, 1853)

Last record: 2007.

Number of records: 14

Rank: 72/127

Red List: Least Concern.

Botswana distribution: Chobe River and south-eastern Botswana.

Other records: Tswapong Hills, Moremi Gorge, 29.iii.2002, 15.xii.2002, W. Goodwin (NMBZ); Chobe River at Kubu Lodge, near Kasane, 10.xi.2003 (KAPPES & NEHLS 2004).

Own records: CL4-iii.2002, i.2007; OL5-ii.2006, abun, exuviae.

Flight period: Records between September and end of March.

Habitat: Permanent and shady rivers and streams with turbulent current.

Notes: Restricted to few isolated localities due to absence of its habitat in most parts of Botswana.

LESTIDAE

Lestes dissimulans FRASER, 1955

Last record: 2006.

Number of records: 7

Rank: 83/127

Red List: Least Concern.

Botswana distribution: Two records from the Okavango Delta at Mohembo and Khwai River and a third from Notwane River in the south (PINHEY 1976).

Own records: OL7-ii.2006.

Flight period: Records from December to March, but more information needed.

Habitat: Temporary or permanent waters with rich vegetation.

Notes: More common in West Caprivi, Namibia (e. g. floodplains of Okavango and Kwando Rivers), close to the Botswanan border (SUHLING & MARTENS 2007).

Lestes pallidus RAMBUR, 1842

Last record: 2010.

Number of records: 105

Rank: 19/127

Red List: Least Concern.

Botswana distribution: From all over Botswana, mainly in the north but few records from the Kalahari and the south-eastern part (RIS 1908, PINHEY 1976, 1980).

Other records: Serowe, v.1988 (BNMG).

Own records: OP30-ii.2006; OP31-ii.2006; OS13-v.2000, iv.2002; OS14-iv.2002; OS15-iv.-v.2000; OS16-v.2000; OS25-i.2007; OS26-i.2007; CL18-xii.2007; CL20-xii.2007; CL21-xii.2007; OL2-iv.2000; OL7-ii.2006; OL8-ii.2006; OL9-ii.2006; OL11-ii.2006, exuviae; OL12-i.2006; OL13-ii.2006; OL14-ii.2006; OL15-ii.2006; OL22-i.2010; OL25-i.2009; OL26-i.2009; OL27-i.2009, ovip; OL30-ii.2010; OL31-ii.2010; OL32-ii.2010.

Flight period: Depending on rainfall. Mainly recorded during the rainy season from December to May, but less numerous throughout the wintermonths.

Habitat: At rainfilled temporary pans and pools. In the Delta only found at seasonal pans and pools.

Notes: Locally common even in parts of the Kalahari after intense and extended rainy seasons. It was absent from most parts of the central Okavango Delta, where *L. pinheyi* was abundant.

Lestes pinheyi FRASER, 1955

Last record: 2010.

Number of records: 96

Rank: 21/127

Red List: Least Concern.

Botswana distribution: Northern Botswana, Okavango Delta, Linyanti Swamps and Chobe River.

Other records: Chiefs Island, Okavango Delta, 1 ♂, 13.v.1984, M. Parr; Okavango Delta, Xhudum Lodge, 28.xi.2009, 1 ♂, E. Schuran.

Own records: OP9-ii.2006; OP21-iii.-v.2005; OP22-10.v.2005, E. Schuran; OP30-ii.2006; OP34-i.2009; OP35-xii.2007; OP37-ii.2007, i.2009; ; OP41-xii.2007; OP44-i.2009; OS1-xii.2007; OS3-iii.2001; OS6-iv.-vi.2000; OS7-iv.-vi.2000, exuviae; OS8-v.-vii.2000, abun, juv; OS9-v.-vii.2000, juv; OS10-ii.2002; OS16-iv.-vii.2000; OS18-xi.2007; OS24-xii.2007, xii.2009; OS30-xi.2007; OS34-xi.2007; OS41-ix.2010; OS43-ix.2010, abun, juv; OL6-10.viii.2005, 1 ♂, E. Schuran.

Flight period: Highest abundances in April/May with emerging individuals, the lowest in June. At end of July, few individuals started emerging in the Okavango Delta floodplains, in September in large numbers. Rare in February and March. In the Okavango Delta obviously on the wing throughout the year in variable numbers.

Habitat: Most common at temporary floodplains and backswamps with dense sedges which dry up only a few months per annum.

Notes: The one record of a male from a waterhole in the Central Kalahari Game Reserve indicates the ability of long-distance dispersal, probably supported by a rainstorm.

Lestes plagiatus (BURMEISTER, 1839)

Last record: 2002.

Number of records: 10

Rank: 79/127

Red List: Least Concern.

Botswana distribution: Okavango Delta and south-eastern part of the country. PINHEY (1976) mentioned only one historical record from the Notwane River in southern Botswana.

Other records: Khwai River, north-eastern Okavango Delta, 2 ♂♂, 20.ix.1964, B. I. Balinsky (TMSA).

Own records: OS13-iv.2002, 1 ♂.

Flight period: Records from September to May.

Habitat: More information needed.

**Lestes tridens* McLACHLAN, 1895

Last record: 1963.

Number of records: 1

Rank: 121/127

Red List: Least Concern.

Botswana distribution: New to Botswana, north-eastern Okavango Delta.

Other records: Khwai River, Okavango Delta, 23.xii.1963, 1 ♂, B. I. Balinsky (TMSA), specimen identification was kindly confirmed by W. Tarboton (pers. comm.).

Own records: None.

Flight period: More information needed.

Habitat: At grassy ponds and pools.

Notes: Several South African records in the Limpopo River basin close to the border (TARBOTON & TARBOTON 2005) make also the occurrence in south-eastern Botswana very likely.

**Lestes virgatus* (BURMEISTER, 1839)

Last record: 2002.

Number of records: 2

Rank: 107/127

Red List: Least Concern.

Botswana distribution: New to Botswana, southern Okavango Delta.

Own records: OS10-ii.2002, 1 ♂; OS14-ii 2002, 1 ♂.

Flight period: Data deficient, more information needed.

Habitat: In submerged grass along small rivers.

Notes: Known from several localities in neighbouring Zimbabwe (PINHEY 1984), e. g. from Tuli River; therefore it may occur also in the south-eastern Botswanan Tuli Block.

COENAGRIONIDAE

Aciagrion gracile (SJÖSTEDT, 1909)

Last record: 1976.

Number of records: 1

Rank: 112/127

Red List: Least Concern.

Botswana distribution: PINHEY (1976) mentions a doubtful record of a teneral female from Notwane River, south of Gaborone, in 1976.

Own records: None.

Flight period: Data deficient, only the one record from April.

Habitat: Data deficient, more information needed.

Notes: The status of this species in Botswana remains unclear. The Botswana record lies about 800 km south of the known distribution area (PINHEY 1972).

Aciagrion steeleae KIMMINS, 1955

Last record: 2010.

Number of records: 17

Rank: 67/127

Red List: Least Concern.

Africa distribution: North and central Zambia (PINHEY 1967b), Malawi, DR Congo and Botswana (PINHEY 1972).

Botswana distribution: Okavango Delta only, common around Four Rivers, Xakanaxa and Khwai River in MGR, some records from the lower panhandle at Sepopa, one from Xhudum Lodge and some from south of Chiefs Island.

Other records: Okavango Delta, Xhudum Lodge, 28.xi.2009, 1 ♂, E. Schuran.

Own records: OP34-i.2009; OP35-xii.2007, OP37-i.2009; OP43-xii.2007; OS43-ix.2010.

Flight period: Records from December to February and September.

Habitat: Swampy rivers and pools.

Africallagma glaucum (BURMEISTER, 1839)

Last record: 2010.

Number of records: 7

Rank: 82/127

Red List: Least Concern.

Botswana distribution: Southern Botswana and the outer Okavango Delta with temporary swamps.

Only three historical Botswanan records so far. As *Enallagma schultzei* from Severelela-Kooa (Kalahari) in southern Botswana (RIS 1908). One from the Notwane River near Gaborone (PINHEY 1976).

Other records: Kolobeng Dam, near Gaborone, 1 ♂, 12.xi.1983, M. Parr.

Own records: OS23-i.2006; OS39-ii.2010.

Flight period: Data deficient, records from October to May.

Habitat: Obviously temporary water bodies.

Notes: BRINCK (1955) recorded it in South Africa »en masse« from a brackish lake in the Molopo river bed, which partly forms the border to Botswana. In Namibia mainly found higher than 1200 m a. s. l. (SUHLING & MARTENS 2007), which could be an explanation for its absence from large parts of Botswana, where it seems to be more common in arid parts of the country. This species has previously been placed in the genus *Enallagma* CHARPENTIER, 1840 (MAY 2002).

**Africallagma subtile* (RIS, 1921)

Last record: 2010.

Number of records: 1

Rank: 113/127

Red List: Least Concern.

Botswana distribution: New to Botswana, panhandle of the Okavango Delta.

Other records: Okavango Delta panhandle, near Ikogha – Crocodile research camp in 2005 (here loc. OP22), 10.vi.2005, 1 ♂, E. Schuran.

Own records: None.

Flight period: More information needed.

Habitat: This one specimen was caught in a shallow and short-time inundated floodplain close to the river main channel.

Notes: PINHEY (1976) expected it to occur at the Chobe River because it was common around Victoria Falls. So far there are no records from the Caprivi but a recent record is from the middle Okavango River (SUHLING & MARTENS 2007). Formerly this species has also been placed in the genus *Enallagma* CHARPENTIER, 1840 (MAY 2002).

**Agriocnemis angolensis* LONGFIELD, 1947

Last record: 2002.

Number of records: 1

Rank: 114/127

Red List: Least Concern.

Botswana distribution: New to Botswana, northern Okavango Delta panhandle.

Own records: OP5-ii.2002, several adults.

Flight period: The only available records are from February.

Habitat: Rivers and channels with submerged grass at the bank.

Notes: PINHEY (1976) supposed the occurrence in the region, since it was found in the Namibian Caprivi in 1960 and 1974. The new Botswanan finding is situated only 15 km downstream of the next known locality in the West Caprivi, it surely occurs also at the Kwando River where it has been recorded in Namibia (vide SUHLING & MARTENS 2007).

Agriocnemis exilis SELYS, 1872

Last record: 2010.

Number of records: 263

Rank: 1/127

Red List: Least Concern.

Botswana distribution: Okavango Delta and northern perennial river systems. Locally abundant in all parts of the Okavango Delta. Further records from Boteti, Chobe River and Savuti-Linyanti area (PINHEY 1976).

Other records: Gemsbok Pan, xii.1963; Khwai River, xii.1963; Ngamiland Game Reserve, i.1964; Moremi Game Reserve, vii.1968, all B. I. Balinsky (TMSA); Guma Lagoon, 12.vi.2000; Jao flats, W of Chiefs Island, 16.vi.2000, C. C. Appleton; Duma Tau (Linyanti), Vumbura and Chitabe (Okavango Delta), iv.2002, M. Samways; Shakawe, 2.iv.2007, W. Tarboton.

Own records: OP2-vi.2000; OP5-ii.2002, iv.2005; OP8-ii.2002; OP11-ii.2002; OP16-ii.2002; OP21-iii.2005; OP22-iii.-v.2005; OP25-iv.2005, ii.2010; OP26-iv.2005; OP29-ii.2006; OP30-ii.2006; OP34-i.2009; OP37-i.2009; OP44-i.2009; OS1-iii.2001; OS2-iii.2001, xii.2007; OS3-xii.2007; OS6-v.-vii.2000, abun, juv, iv.2002; OS7-v.-vi.2000, abun, juv, iv.2002; OS8-v.-vii.2000, abun, juv; OS9-v.-vii.2000; OS10-ii.2002; OS11-iv.2000; OS12-iv.2000; OS13-iii.-iv.2002; OS14-v.2000, ii.-iv.2002; OS16-iii.-v.2000, abun, juv, i.2007; OS17-ii.-iii.2002, iii.2005; OS18-i.2006, xi.2007; OS21-iii.2005; OS24-xii.2007; OS26-i.2007; OS29-i.2007, ii.2010; OS30-ii.2010; OS32-ix.2010; OS37-i.2010; OS38-i.2010; OS39-ii.2010; OS43-ix.2010; CL2-iii.2002; CL3-iii.2002; CL4-iii.2002, iii.2005; CL5-iii.2002; CL7-iii.2005; CL11-i.2007; CL12-iii.2005; CL14-iii.2005; CL17-xii.2007; CL18-xii.2007; CL21-xii.2007.

Flight period: Probably throughout the year. Present in the Okavango Delta during all the time, with highest numbers in mid-April/mid-May, only a few in mid-June.

Habitat: Pools, backswamps and floodplains with submerged grass and reed-like vegetation.

*****Agriocnemis* sp. nov.**

Last record: 2007.

Number of records: 1

Rank: 115/127

Red List: Data Deficient (suggestion).

Botswana distribution: New to Botswana. In the Namibian Caprivi at Kwando River bank at Bum Hill campsite near Kongola. As *Agriocnemis angolensis* at Lianshulu Lodge at the Botswana border, 13.xii.2004, F. Suhling (vide SUHLING & MARTENS 2007), but belongs in fact to this new species.

Flight period: Records from December till March.

Habitat: At rivers with swampy margins and grassy vegetation.

Notes: The Kwando records near Lianshulu on Namibian side are also counted as Botswana records, since the river is only 20 m wide with the boundary in the middle of it. The species should be expected at other localities along the Kwando and Linyanti Rivers.

Agriocnemis gratiosa GERSTÄCKER, 1891

Last record: 2009.

Number of records: 26

Rank: 57/127

Red List: Least Concern.

Botswana distribution: In Botswana restricted to the north, e. g. the Okavango Delta panhandle and the Chobe River. Seven records in PINHEY (1976).

Other records: Guma Lagoon, 12.vi.2000, 2 ♂♂, C. C. Appleton.

Own records: OP2-vi.2000; OP5-ii.2002, iv.2005; OP18-ii.2002; OP21-iii.2005; OP24-iii.2005; OP25-iv.2005, ii.2006; OP44-i.2009; OS9-vii.2000, juv; OS16-iv.2000; CL5-iii.2002; CL11-i.2007; CL17-xii.2007.

Flight period: Mainly during the rainy season from January till April, but one individual freshly emerged in July.

Habitat: Grassy fringes of open flowing watercourses.

Agriocnemis ruberrima albifrons BALINSKY, 1947

Last record: 2010.

Number of records: 38

Rank: 47/127

Red List: Least Concern.

Botswana distribution: The ssp. *albifrons* is known from northern Botswana. In the Okavango Delta, it is locally common (PINHEY 1976).

Other records: Moremi Game Reserve, Okavango Delta, iv.1962, vii.1968, B. I. Balinsky (TMSA); Okavango Delta, Xhudum Lodge, 28.xi.2009, 1 ♂, E. Schuran.

Own records: OP24-iii.2005; OP25-ii.2010; OP29-ii.2006; OP30-ii.2006; OP35-xii.2007; OP38-ii.2007; OP39-xii.2007; OP41-xii.2007; OS1-xii.2007; OS7-v.2000, iv.2002, juv; OS24-xii.2007; OS26-i.2007; OS32-i.2007; OS39-ii.2010; OS43-ix.2010.

Flight period: Most common in December till April, one record from July.

Habitat: At swampy verges of rivers and channels in dense submerged grass and sedges or in the lower stratum of *Papyrus* close to the waterline.

Notes: The status of this ssp. is not certainly clear. Nominal race *A. r. ruberrima* is currently known only from a small area at Richards Bay in South Africa and differs strongly in coloration and habitat but is similar in the male appendages (M. Samways pers. comm., SAMWAYS 2008). A male from Mongu, Barotse Floodplain in Zambia looks like the *albifrons* males from the Okavango Delta and indicates a larger distribution area as known so far (in coll. Stellenbosch University, RSA).

Agriocnemis victoria FRASER, 1928

Last record: 2010.

Number of records: 47

Rank: 42/127

Red List: Least Concern.

Botswana distribution: Locally common in the seasonal flooded part of the Okavango Delta and the Savuti-Linyanti system. PINHEY (1976) mentioned seven localities.

Other records: Moremi Game Reserve, Okavango Delta, iv.1962, vii.1968, B. I. Balinsky (TMSA); Vumbura and Chitabe (Okavango Delta), iv.2002, M. Samways; Okavango Delta, Xhudum Lodge, 28.xi.2009, 1 ♂, E. Schuran.

Own records: OP34-i.2009; OP35-xii.2007; OP39-xii.2007; OP42-xii.2007; OS1-xii.2007; OS2-xii.2007; OS3-xii.2007; OS6-v.-vii.2000, juv, iv.2002; OS7-v.2000; OS8-v.2000; OS9-v.2000; OS24-xii.2007; OS36-xii.2007; OS39-ii.2010; OS43-ix.2010.

Flight period: Phenology is most likely similar to that of *A. exilis* and it is expected to be found throughout the year in variable numbers.

Habitat: Extended swamps and floodplains with highly diverse vegetation close to rivers.

Azuragrion nigradorsum (SELYS, 1876)

Last record: 2010.

Number of records: 6

Rank: 86/127

Red List: Least Concern.

Botswana distribution: PINHEY (1976) gives only one record as *Enallagma nigradorsum* from the Gomane River, NW of Francistown.

Own records: OS23-i.2006; OL7-ii.2006; OL11-ii.2006; OL32-ii.2010.

Flight period: So far known from January and February, but more information needed.

Habitat: At well-vegetated temporary rain ponds with floating-leaf plants.

Ceriagrion corallinum CAMPION, 1914

Last record: 1976.

Number of records: 1

Rank: 117/127

Red List: Least Concern.

Botswana distribution: Recorded as *C. bidentatum* from a single locality at the Linyanti Swamps in iii.1976 (PINHEY 1976). This is the only Botswanan record so far.

Own records: None.

Flight period: Only this record from March; at the Kwando River recorded in December, February and March (SUHLING & MARTENS 2007).

Habitat: Swampy river sections.

Notes: Next known localities are the Kwando River in the Namibian Caprivi, where it is locally common (SUHLING & MARTENS 2007 and own observations), and further north the upper Zambezi, Zambia (PINHEY 1984 and own records).

Ceriagrion glabrum (BURMEISTER, 1839)

Last record: 2010.

Number of records: 147

Rank: 9/127

Red List: Least Concern.

Botswana distribution: Records from all parts of the Okavango Delta, from Chobe River, Linyanti Swamps, Nxai Pan, south-eastern Botswana (PINHEY 1976) and Kalahari near Ghanzi.

Other records: Kolobeng Dam, near Gaborone, 12.xi.1983; Ghanzi Camp, Okavango Delta, 13.v.1984, 1 ♀, M. Parr; Xugana Safari Camp, N of MGR, 1991, J. Silsby; Shakawe Fishing Camp (near loc. OP5), 07.iv.1998, 1 ♂, J. Deckert (ZMHB); Selebi-Phikwe, 1 ♂, 21.xii.2001, W. Goodwin (NMBZ); Duma Tau (Linyanti), Vumbura and Chitabe (Okavango Delta), iv.2002, M. Samways; Drotzky's Cabins, Okavango Delta, 2 ♀♀, 8.ix.2002, W. Goodwin (NMBZ).

Own records: OP1-iv.2005; OP2-vi.2000; OP5-ii.2002, iv.2005; OP7-ii.2002, ii.2006; OP8-ii.2002, ii.2006; OP10-ii.2002, abund; OP11-ii.2002; OP13-ii.2002, abund; OP16-ii.2002; OP18-ii.2002; OP19-ii.2002; OP22-iii.2005; OP24-iii.2005; OP25-ii.2006, ii.2010; OP29-i.-ii.2006; OP30-i.-ii.2006; OP31-ii.2006; OP34-xii.2007, i.2009; OP35-xii.2007; OP36-ii.2007; OP37-i.2009; OP39-xii.2007; OP40-xii.2007; OP42-xii.2007; OP43-xii.2007; OP44-i.2009; OS1-iii.2001, xii.2007; OS2-iii.2001, xii.2007; OS3-iii.2001, xii.2007; OS6-iv.-vi.2000, iv.2002; OS7-iv.-vi.2000, abund, iv.2002; OS8-v.2000; OS9-v.2000; OS10-ii.2002; OS13-iii.-iv.2000; OS16-iv.-v.2000, mfl; OS17-iv.-v.2000, ii.2002; OS18-i.2007; OS24-xii.2007; OS26-i.2007; OS30-ii.2010; OS32-i.2007; OS34-xi.2007; OS36-xii.2007; OS39-ii.2010; OS43-ix.2010; CL3-iii.2002, iii.2005; CL17-xii.2007; CL19-xii.2007; OL28-ii.2009.

Flight period: Recorded from September till early June. It is likely that *C. glabrum* is to be found throughout the year, perhaps with a short winter break in July-August.

Habitat: In backswamps, floodplains and swampy rivers with diverse vegetation. Females and teneral males often in adjacent shady woodland.

Ceriagrion katamborae PINHEY, 1961

Last record: 2010.

Number of records: 63

Rank: 32/127

Red List: Data Deficient.

Botswana distribution: Described from Katambora, left Zambezi bank in Zambia, close to the Botswanan border. All Botswana records from the Okavango Delta, none from the Chobe River or Linyanti (PINHEY 1976).

Other records: MGR, Okavango Delta, 1962–1968, B. I. Balinsky; Txatxanika (Xakanaxa) in MGR, 15.viii.1975, N. Tett (all TMSA); Vumbura (Okavango Delta), iv.2002, M. Samways.

Own records: OP16-ii.2002; OP19-ii.2002; OP21-iii.2005; OP24-iii.2005; OP29-i.-ii.2006; OP30-i.-ii.2006; OP32-ii.2006; OP34-xii.2007, i.2009; OP35-xii.2007; OP37-i.2009; OP38-ii.2007; OP39-xii.2007; OP40-xii.2007; OP41-xii.2007; OP42-xii.2007; OP43-xii.2007; OS2-xii.2007; OS6-iv.2000, iv.2002; OS7-iv.2002; OS8-iv.2002; OS10-ii.2002; OS13-iv.2002, i.2006; OS17-ii.2002; OS18-i.2007; OS28-i.2007; OS29-i.2007; OS32-i.2007; OS43-ix.2010, juv.

Flight period: From December till mid April, one exception from mid August.

Habitat: Grassy and swampy verges of open stagnant or slowly flowing water, which is rich in submerged and floating-leaf plants. Also in dense sedges of shallow floodplains.

Notes: The species is restricted to the Palaeo Chambeshi-Katanga swamp area and has a stronghold in the Okavango Delta. The absence from Linyanti Swamps and the well-studied Chobe River is surprising, it was recorded at the Kwando River in Namibian Caprivi in 2009 (own record). Outside the Okavango Delta it is known from the type locality and Chingola in central Zambia (PINHEY 1984), but so far it has not been found in the Lake Bangweulu swamps (PINHEY 1967b).

Ceriagrion suave Rts, 1921

Last record: 2010.

Number of records: 36

Rank: 49/127

Red List: Least Concern.

Botswana distribution: PINHEY (1976) mentioned only records from the Okavango Delta and the large perennial rivers in the north. New findings also from the Kalahari and east Botswanan Tuli Block.

Own records: OP2-vi.2000; OP5-ii.2002; OP7-iii.2005, i.2009; OP11-ii.2002; OP12-ii.2002; OP17-iii.2005; OP21-iii.2005; OP22-iii.2005, abun; OP26-iv.2005; OS40-ii.2010; CL14-iii.2005; OL7-ii.2006; OL8-ii.2006; OL9-ii.2006; OL11-ii.2006; OL16-ii.2006; OL32-ii.2010.

Flight period: Mainly rainy season from September till June.

Habitat: In backswamps of rivers or temporary rainfed pools and pans with sedges and submerged grass.

Ischnura senegalensis (RAMBUR, 1842)

Last record: 2010.

Number of records: 263

Rank: 2/127

Red List: Least Concern.

Botswana distribution: Widespread and common, occurs in many parts of Botswana. Several records in PINHEY (1976).

Other records: Nnywane Dam, 15 km N of Lobatse, 5.xi.1983, 1 ♀, M. Parr; Serowe, v.1988 (BNMG); Motloutse River, Selebi-Phikwe, vii.2001, v., x., xi.2002; Letsibogo Dam, Mmadinare, vii.2001, Goodwins (NMBZ); Duma Tau (Linyanti), iv.2002, M. Samways.

Own records: OP1-iv.2005; OP2-vi.2000; OP5-iv.2005; OP7-vi.2000; OP9-vi.2000; OP11-ii.2002; OP16-ii.2002; OP17-ii.2002, iii.2005; OP22-iii.-iv.2005; OP24-iii.2005; OP25-iv.2005; OP35-xii.2007; OP37-ii.2007, i.2009; OP39-xii.2007; OS1-iii.2001; OS2-iii.2001; OS3-i.2001; OS6-iv.-vii.2000, abun, ovip, iv.2002; OS7-iv.-vii. 2000, abun, ovip, iv.2002; OS8-iv.-vii.2000, ovip;

OS9-iv.-vii.2000, ovip; OS10-ii.2002, abun; OS11-iv.2000; OS13-ii.-iv.2000, abun, ovip; OS14- v.-vii.2000, ii.-iv.2002, i.2006, abun, ovip; OS16-iv.-vii.2000; OS17-iv.-vii.2000, ii.-iii.2002, ovip; OS18-iii.2001, iii.2005, xi.2007; OS19-iii.2002; OS20-i.2006; OS21-iii.2005, i.2006; OS24-xii.2007; OS25-i.2007; OS26-i.2007; OS29-xi.2007, ii.2010; OS30-ii.2010; OS31-xi.2007; OS32-i.2007, ix.2010; OS33-xi.2007; OS36-xii.2007; OS37-i.2010; OS38-i.2010; OS39-ii.2010; OS40-ii.2010; OS41-ix.2010; OS42-ix.2010; OS43-ix.2010, abun; CL1-iii.2002; CL2-iii.2002; CL3-iii.2005; CL4-iii.2002, iii.2005; CL11-iii.2005; CL12-iii.2005; CL13-iii.2005; CL14-iii.2005; CL17-xii.2007; CL18-xii.2007; OL2-iv.2000; OL7; OL11; OL12; OL13; OL14; OL16; OL17; OL18; OL19; OL20 all ii.2006; OL22-i.2010; OL26-i.2009; OL27-i.2009; OL28-ii.2009.

Flight period: Throughout the year in variable numbers.

Habitat: A wide variety of freshwater habitats from rivers, swamps to temporary ponds and brackish pools in salt pans.

Pinheyagrion angolicum (PINHEY, 1966)

Last record: 2010.

Number of records: 14

Rank: 71/127

Red List: Least Concern.

Africa distribution: Shows a disjunct distribution pattern and is very local. Only known from two localities in Angola, two in north-eastern Zambia near Lake Bangweulu and Lake Chila (PINHEY 1967b, 1984), and eight in northern Botswana.

Botswana distribution: Okavango Delta and Savuti. BALINSKY (1967) recorded it in 1964 from the Moremi Game Reserve without further local specification. In PINHEY (1976) mentioned as *Enallagma angolicum* at four localities of the north-eastern Okavango Delta and one in the Savuti area.

Own records: OP29-i.-ii.2006; OP30-ii.2006; OP34-xii.2007, i.2009; OS43-ix.2010, juv.

Flight period: Rainy season from September till March.

Habitat: Swampy rivers with adjacent floodplains.

Notes: The species is restricted to the Palaeo Chambeshi-Katanga swamp area and has a stronghold of its known distribution within the Okavango Delta. The species caused a lot of taxonomic confusion. Described by RIS (1931) as *Enallagma minutum*, it was renamed and redescribed several times (vide BALINSKY 1967, PINHEY 1962, 1966, 1976). Recently MAY (2002) placed it in the genus *Pinheyagrion*.

Pseudagrion acaciae FÖRSTER, 1906

Last record: 2009.

Number of records: 31

Rank: 54/127

Red List: Least Concern.

Botswana distribution: At large and perennial rivers in the north and the Limpopo River in the south-east. Shakawe and the Chobe Rapids, Kasane (PINHEY 1976).

Other records: Matakota, Limpopo River, 25.iv.1957, B. I. Balinsky (TMSA); Drotzky's Cabins, Okavango Delta, 8.ix.2002, 1 ♂, W. Goodwin (NMBZ).

Own records: OP5-ii.2002, abun, iv.2005, ovip; OP7-ii.2002, iii.2005, ovip, ii.2006, abun, i.2009; OP8-ii.2002, ii.2006, abun; OP20-iii.2005; OP26-iv.2005; OP44-i.2009; OS13-iii.2002; OS18-i.2006; CL3-iii.2002; CL4-iii.2002; CL11-i.2007; CL14-iii.2005.

Flight period: Mainly from December till April, one record from September. At the Okavango in the Delta panhandle it was replaced by *P. sjoestedti* in June.

Habitat: Large perennial rivers with riverine forest.

Pseudagrion assegaii PINHEY, 1950

Last record: 2010.

Number of records: 43

Rank: 45/127

Red List: Least Concern.

Botswana distribution: Okavango Delta, Savuti area and Chobe River (PINHEY 1976).

Other records: Ngamiland Game Reserve (MGR), Okavango Delta, xii.1963, B. I. Balinsky (TMSA); Third Bridge Lodge, MGR, 10.iii.1993, J. Deckert (ZMHB); MGR, Okavango Delta, v.2003, 1 ♂, (PERKINS & RAMBERG 2004).

Own records: OP35-xii.2007; OP39-xii.2007; OP42-xii.2007; OS2-xii.2007; OS3-xii.2007; OS6-v., vii.2000, mfl; OS7-v.2000; OS9-vii.2000, juv, exuviae; OS18-i.2007; OS26-i.2007; OS32-i.2007; OS41-ix.2010.

Flight period: Records from November till May, and with freshly emerged individuals from July. In the Okavango Delta probably throughout the year with a winter break in June.

Habitat: Extended swamps along rivers.

Pseudagrion coeleste LONGFIELD, 1947

Last record: 2010.

Number of records: 6

Rank: 88/127

Red List: Least Concern.

Botswana distribution: Northern Botswana, mainly from the temporary flooded part of the Okavango Delta. Also Lake Ngami, Boteti and Chobe Rivers (PINHEY 1967a, 1976).

Other records: Okavango River, iv.1962; Khwai River, xii.1963, B. I. Balinsky (TMSA); Okavango R., 50 miles before Maun, 17.viii.1966, M. Chutter (AMGS); Chiefs Island, Okavango Delta, 13.v.1984, 1 ♂, M. Parr.

Own records: OP5-iv.2005; OP22-iii.2005; OP23-iii.2005; OP24-iii.2005; OP26-iv.2005; OP30-ii.2006, mfl; OP38-ii.2010; OP40-xii.2007; OP41-xii.2007; OP44-i.2009; OS1-iii.2001; OS2-xii.2007; OS3-iii.2001; OS6-v.-vii.2000, ovip, juv, exuviae; OS7-v.-vii.2000, juv; OS8-vi.2000; OS9-vii.2000, juv; OS13- iii.-iv.2002, i.2006; OS14-v., vii.2000, iii.2002; OS16-iv.-vii.2000, juv, i.2007; OS17- v.2000, iii.2005; OS18-iii.2005, i.2006, i.2007; OS21-iii.2005, ovip, i.2006; OS23-i.2006; OS25-i.2007; OS26-i.2007; OS29-i.2007, xi.2007, ii.2010; OS30-xi.2007; OS32-i.2007, ix.2010; OS37-i.2010; OS41-ix.2010; OS42-ix.2010; OS43-ix.2010; CL10-i.2007.

Flight period: In the Okavango Delta on the wing throughout the year. Emergence observed in February to May and in large numbers at end of July.

Habitat: Quiet and swampy rivers with rich vegetation of sedges, submerged grass and floating-leaf plants. One of the species which I observed following the incoming flood in the southern Okavango Delta.

Notes: The species is almost restricted to the Palaeo Chambeshi-Katanga swamp area and has a stronghold of its known distribution within the Okavango Delta.

Pseudagrion commoniae nigerrimum PINHEY, 1950

Last record: 1984.

Number of records: 6

Rank: 89/127

Red List: Least Concern.

Botswana distribution: Mainly the drier parts of Botswana in the east and south. Records from the Chobe River and its rapids and one from the Notwane River in the south (PINHEY 1976).

Other records: Matakota, Limpopo River, 25.iv.1957, 2 ♂♂, B. I. Balinsky (TMSA); Serowe, x.1984 (BNMG).

Own records: None.

Flight period: Records from March, April and October, more information needed.

Habitat: Probably riverine, not enough information.

Pseudagrion deningi PINHEY, 1961

Last record: 2010.

Number of records: 6

Rank: 88/127

Red List: Least Concern.

Botswana distribution: Recorded in all parts of the Okavango Delta, from the Savuti Marsh, Linyanti Swamps and Chobe River.

Other records: Okavango River, iv.1962, Ngamiland Game Reserve, i.i.1964, Ngamiland, Maxwee (Okavango Delta), 9.vii.1968, B. I. Balinsky (TMSA); Shakawe, 14.viii.1966, 2 ♂♂, M. Chutter (AMGS); Okavango Delta, 27.vi.1986, 1 ♂, M. Parr; Vumbura (Okavango Delta), iv.2002, M. Samways; Okavango Delta, Xhudum Lodge, 28.xi.2009, 1 ♂, E. Schuran.

Own records: OP1-iv.2005; OP2-vi.2000; OP4-vi.2000; OP5-iv.2005; OP7-vi.2000; OP8-vi.2000, abun; OP9-vi.2000, ovip; OP13-vi.2000, ovip; OP14-vi.2000, ovip; OP15-vi.2000; OP22-iii.2005; OP25-iv.2005; OP26-iv.2005; OP29-ii.2006; OP30-i.-ii.2006; OP34-xii.2007, i.2009; OP35-xii.2007; OP37-ii.2007; OP38-ii.2007; OP40-xii.2007; OP41-xii.2007; OS6-v.2000, ovip, vi.2000, juv; OS7-v.2000, ovip, abun, vi.-vii.2000, juv, exuviae; OS8-vi.-vii.2000, juv; OS13-iv.2002, i.2006; OS14-v.2000; OS16-i.2007; OS18-i.2007; OS25-i.2007; OS26-i.2007; OS29-i.2007; OS30-xi.2007; OS32-i.2007, xi.2007, ix.2010; OS42-ix.2010; OS43-ix.2010, abun, juv; CL10-iii.2005.

Flight period: Records from December till September. In the Okavango Delta the highest numbers from April till June, emergence started again in mid July. Probably throughout the year.

Habitat: At large lagoons as well as on swampy rivers with highly diverse vegetation, floating-leaf plants are essential. At more or less permanent water bodies. It was completely absent from Maun till 2006, after the permanent flooding from 2005 onwards it became common here.

Notes: The species is restricted to the Palaeo Chambeshi-Katanga swamp area and has a stronghold of its known distribution within the Okavango Delta. An interesting melanic form was found in January 2006 at Kaparota channel. Instead of green in the lower half of the eyes it was faded brownish, the blue coloration at the thorax and the last abdominal segments was almost absent. From a distance it seemed to be completely black. Two individuals were found, both males and clearly *P. deningi* by their appendages.

Pseudagrion fisheri PINHEY, 1961

Last record: 1975.

Number of records: 3

Rank: 105/127

Red List: Least Concern.

Africa distribution: Angola, northern Zambia and Okavango Delta, Botswana.

Botswana distribution: Recorded from two localities around Xugana Lagoon in the north-eastern Okavango Delta in 1973 and 1975 (PINHEY 1976).

Own records: None.

Flight period: Records from December, no more information.

Habitat: Likely swamps and swampy rivers, more information needed.

Notes: The species is restricted to the Palaeo Chambeshi-Katanga swamp area and represents the only species of the *Pseudagrion* Group A complex known from the Okavango Delta. So far this species is only known from the upper Zambezi catchment and the Okavango Delta, where it was last recorded in 1975. The only recent record at all from the continent is from the author: Zambia, Ikelenge, Sakeji River, 1.iii.2010.

Pseudagrion glaucescens SELYS, 1876

Last record: 2007.

Number of records: 42

Rank: 46/127

Red List: Least Concern.

Botswana distribution: Northern Botswana with its perennial rivers. Records from Maun, Shakawe, Savuti Marsh and Chobe Rapids (PINHEY 1976).

Other records: Khwai River, 22.xii.1963, Ngamiland Game Reserve (MGR), 30.xii.1963, B. I. Balinsky (TMSA).

Own records: OP5-iv.2005; OP21-iii.2005; OP22-iii.2005; OP24-iii.2005; OP25-iv.2005; OP26-iv.2005; OP41-xii.2007; OP44-i.2009; OS1-iii.2001, xii.2007; OS2-iii.2001; OS3-xii.2007; OS13-i.2006; OS36-xii.2007; CL4-iii.2002, iii.2005, ii.2006, i.2007; CL5-iii.2002; CL8-iii.2005; CL11-iii.2005, i.2007; CL13-iii.2005; CL14-iii.2005.

Flight period: Records from December till April.

Habitat: Rivers and streams with fast current.

**Pseudagrion hageni tropicanum* KARSCH, 1893

Last record: 2006.

Number of records: 6

Rank: 90/127

Red List: Least Concern.

Africa distribution: South Africa north to Tanzania, Kenya, Uganda and also Angola.

Botswana distribution: New to Botswana, south-eastern part of the country.

Other records: Tswapong Hills, Moremi Gorge, 29.iii.2002, 1 ♀, 2 ♂♂, N. Goodwin (NMBZ).

Own records: OL4-13.vii.2005, E. Schuran; OL5-ii.2006, abun.

Flight period: Records in February and July, more data needed.

Habitat: Well-vegetated edges of shady streams in forested and mountainous area.

Notes: Seems to be very local in south-eastern Botswana with its hills and rocky outcrops. Next known localities are Matopo National Park, Zimbabwe (PINHEY 1984) and Southpansberg, RSA (TARBOTON & TARBOTON 2005).

Pseudagrion hamoni FRASER, 1955

(syn. *P. whellani* PINHEY, 1956)

Last record: 2010.

Number of records: 21

Rank: 64/127

Red List: Least Concern.

Botswana distribution: Recorded both from the north, e. g. Okavango Delta and Chobe River, and eastern Botswana.

Other records: Motloutse River, Selebi-Phikwe, 16.vii.2001, 9.ix.2001, V., N. & W. Goodwin (NMBZ); Chitabe (Okavango Delta), iv.2002, M. Samways.

Own records: OP35-xii.2007; OS2-xii.2007; OS13-iv.2002; OS14-v.2000; OS23-i.2006; OS31-xi.2007; OS32-ix.2010; OS40-ii.2010; CL10-iii.2005, copula; OL7-ii.2006; CL19-xii.2007; OL9-ii.2006.

Flight period: Records from January till April, and July and September.

Habitat: Rivers, both perennial and ephemeral, but also seasonal pools with diverse vegetation.

Pseudagrion helenae BALINSKY, 1964

Last record: 2010.

Number of records: 15

Rank: 70/127

Red List: Least Concern.

Africa distribution: Only known from Botswana, Malawi and north-eastern Zambia.

Botswana distribution: Found only in the Okavango Delta with a preference for the transition zone of the permanent to seasonal flooded part of it. Surroundings of Maun and Moremi Game Reserve, also Four Rivers (PINHEY 1976).

Other records: Maun, 17.viii.1966, 1 ♂, M. Chutter (AMGS).

Own records: OP35-xii.2007; OP39-xii.2007; OS43-ix.2010, juv.

Flight period: Mainly from December till February, few records from August and September.

Habitat: Probably large swamps and swampy rivers.

Notes: The species is restricted to the Palaeo Chambeshi-Katanga swamp area and has probably a stronghold of its known distribution within the Okavango Delta. The only other new record of this species in southern Africa is from Luwomba River, Kasanka National Park, central Zambia from v.2003 (GESCHKE 2003).

**Pseudagrion kersteni* (GERSTÄCKER, 1869)

Last record: 2006.

Number of records: 6

Rank: 91/127

Red List: Least Concern.

Botswana distribution: New to Botswana, so far only known from the south-east.

Other records: Motloutse River, Selebi-Phikwe, 16.vii.2001, 9.ix.2001, Tswapong Hills, Moremi Gorge, 29.iii.2002, 15.xii.2002, all V, N. & W. Goodwin (NMBZ), OL4-13.vii.2005, E. Schuran.

Own records: OL5-ii.2006.

Flight period: December till March, July and September.

Habitat: Vegetated streams in mountainous areas.

Notes: Like *P. hageni* this species is expected to be more widespread in the south-east and the Tuli Block.

Pseudagrion massaicum SJÖSTEDT, 1909

Last record: 2010.

Number of records: 34

Rank: 51/127

Red List: Least Concern.

Botswana distribution: Periphery of the Okavango Delta, also eastern and southern Botswana (PINHEY 1967a, 1976). Scarce at the Chobe and Linyanti, probably preferring the more arid parts with seasonal water bodies.

Other records: Maun, 17.viii.1966, 1 ♂, M. Chutter (AMGS); Nnywane Dam, 15 km N of Lobatse, 5.xi.1983, 1 ♂, M. Parr; Duma Tau (Linyanti), iv.2002, M. Samways; Khwai River, Chobe Park entrance, 3.ix.2002, 1 ♂, Goodwin (NMBZ).

Own records: OS14-iv.2002; OS21-i.2006; OS23-i.2006; OS25-i.2007; OS27-i.2007; OS29-i.2007; OS30-xi.2007; OS32-i.2007; OS40-ii.2010; OL7-ii.2006; OL28-ii.2009.

Flight period: Records from August till April, probably present throughout the whole year.

Habitat: Perennial and ephemeral stagnant water bodies and rivers.

Notes: This species seems to prefer the more arid parts of Botswana and the drier edges of the large northern swamps and rivers.

Pseudagrion nubicum SELYS, 1876

Last record: 1975.

Number of records: 5

Rank: 95/127

Red List: Least Concern.

Botswana distribution: A single record from the Boteti River in April 1975 (PINHEY 1976).

Own records: None.

Flight period: Only this record from April.

Habitat: Probably ephemeral and perennial rivers and streams. In Namibia at well-vegetated and slow running waters (SUHLING & MARTENS 2007).

Pseudagrion rufostigma LONGFIELD, 1947

Last record: 2010.

Number of records: 14

Rank: 73/127

Red List: Least Concern.

Botswana distribution: Northern Okavango Delta and Linyanti area (PINHEY 1976). One new finding also in the southern Okavango Delta.

Other records: Khwai River, 22.xii.1963, 1 ♂, B. I. Balinsky (TMSA); Okavango Delta, 27.vi.1986, 1 ♂, M. Parr.

Own records: OP29; OP30; OP32, all i.-ii.2006; OP35-xii.2007; OP43-xii.2007; OS43-ix.2010, 1 ♂.

Flight period: Records from December till March, one from June, August and September respectively. Emergence was observed in January/February.

Habitat: Perennial slow flowing rivers with swampy margins and nearby woodland.

Notes: The species is restricted to the Palaeo Chambeshi-Katanga swamp area and has a stronghold of its known distribution within the Okavango Delta. This was the most common *Pseudagrion* species around Vumbura and Kaparota in January/ February 2006. SUHLING & MARTENS (2007) recently recorded it from the Kwando River.

Pseudagrion salisburyense RIS, 1921

Last record: 1983.

Number of records: 5

Rank: 96/127

Red List: Least Concern.

Botswana distribution: Only known from south-eastern Botswana (vide PINHEY 1976).

Other records: Kolobeng Dam, near Gaborone, 12.xi.1983, 1 ♂1 ♀, M. Parr.

Own records: None.

Flight period: Records from February to May, and November.

Habitat: In Botswana only known from ephemeral rivers and a reservoir, in neighbouring Namibia at running water and springbrooks (SUHLING & MARTENS 2007).

Pseudagrion sjoestedti jacksoni PINHEY, 1961

Last record: 2010.

Number of records: 48

Rank: 40/127

Red List: Least Concern.

Botswana distribution: Okavango Delta, Boteti River and Chobe Rapids (vide PINHEY 1976).

Other records: Shakawe, Okavango River, 14.viii.1966, 3 ♂♂, M. Chutter (AMGS); Drotzky's Cabins, Okavango Delta, 8.ix.2002, W. Goodwin (NMBZ); Shakawe, 2.iv.2007, W. Tarboton.

Own records: OP1-vi.2000; OP4 vi.2000, ovip; OP5-iv.2005; OP7-vi.2000, abun, ovip; OP8-vi.2000, ovip; OP9-vi.2000, ovip; OP15-vi.2000; OP26-iv.2005; OP35-xii.2007; OP38-ii.2007, ii.2010; OP41-xii.2007; CL5-iii.2002.

Flight period: Records from December till September, probably throughout the whole year. In the Delta panhandle most common in June and almost absent in January and February when the similar *P. acaciae* had its seasonal peak.

Habitat: Perennial large rivers with swampy margins and nearby woodland.

Pseudagrion sublacteum sublacteum (KARSCH, 1893)

Last record: 2010.

Number of records: 85

Rank: 25/127

Red List: Least Concern.

Botswana distribution: Mainly northern Botswana with the large perennial rivers, rare in the south-east. Matakota, Limpopo River, 24.iv.1957, B. I. Balinsky (TMSA); Drotzky's Cabins, Okavango Delta, 8.ix.2002, 1 ♂, W. Goodwin (NMBZ); Shakawe, 2.iv.2007, W. Tarboton.

Own records: OP1-vi.2000; OP2-vi.2000; OP7-ii.2002, iii.2005, ii.2006; OP8- vi.2000, ii.2002; OP15-vi.2000; OP20-iii.2005; OP21-iii.2005; OP30-ii.2006; OP34-xii.2007; OP38-ii.2007, ii.2010; OP40-xii.2007; OP41-xii.2007; OP44-i.2009; OS1-iii.2001, xii.2007; OS13-i.2006, iii.-iv.2002, abun; OS14-iv.2000; OS17-iii.2002; OS18-i.2007; OS25-i.2007; OS29-i.2007; OS32-i.2007, xi.2007, ix.2010; OS37-i.2010; OS41-ix.2010; OS43-ix.2010; CL3-iii.2002, iii.2005; CL4-iii.2002, iii.2005; CL5-iii.2002, iii.2005; CL7-iii.2005; CL8-iii.2005; CL9-iii.2005; CL10-iii.2002, iii.2005; CL11-iii.2005, i.2007; CL13-iii.2005; CL14-iii.2005.

Flight period: Probably throughout the year, records from all months except October/ November.

Habitat: Small and large rivers, most common where woodland lines the banks.

Pseudagrion sudanicum rubroviride PINHEY, 1955

Last record: 2010.

Number of records: 17

Rank: 68/127

Red List: Least Concern.

Botswana distribution: Mainly from the more humid north with the large perennial rivers, rare in the south-east.

Other records: Matakota, Limpopo River, 25.iv.1957, B. I. Balinsky (TMSA).

Own records: OP1-vi.2000; OP8-vi.2000, ovip; OP9-vi.2000; OS32-ix.2010, abun; CL5-iii.2005; CL10-iii.2005; CL11-i.2007.

Flight period: Records from January till April, June and September.

Habitat: In Botswana only at large to medium sized rivers with riverine woodland.

PLATYCNEMIDIDAE

Mesocnemis singularis KARSCH, 1891

Last record: 2007.

Number of records: 31

Rank: 53/127

Red List: Least Concern.

Botswana distribution: Okavango Delta panhandle, Chobe and Limpopo Rivers.

Other records: Matakota, Limpopo River, 25.iv.1957, B. I. Balinsky (TMSA).

Own records: OP7-ii.2006; OP8-ii.2002; CL2-iii.2002; CL3-iii.2002, iii.2005, ii.2006; CL4- v.2000, iii.2002; CL5-iii.2002, iii.2005, abun; CL8-iii.2005; CL10-ii.2006, i.2007; CL11-iii.2005, i.2007; CL13-iii.2005; CL14-iii.2005.

Flight period: Records from January to April, one from September.

Habitat: At large and swiftly flowing rivers, most common where woodland lines the banks.

Notes: Despite similar ecological conditions *M. singularis* is surprisingly rare in the Okavango Delta panhandle south of Mohembo, whereas at the Chobe River it is sometimes the most common zygopteran species.

PROTONEURIDAE

Elattoneura cellularis (GRÜNBERG, 1902)

(syn. *Elattoneura tropicalis* PINHEY, 1974)

Last record: 2007.

Number of records: 5

Rank: 92/127

Red List: Least Concern.

Botswana distribution: One historical record from Chobe Rapids in xi.1974 (PINHEY 1976).

Own records: CL10-iii.2005, 1 ♂, ii.2006 abun, i.2007; CL11-i.2007.

Flight period: Records from January, February, March and September.

Habitat: At large and swiftly flowing rivers with intact shady riverine woodland.

Notes: The confirmation of the historical locality by the finding of a single male in 2005 and many individuals in 2006 remains the only records from Botswana and the Caprivi (SUHLING & MARTENS 2007). It seems likely that, on Botswanan territory, the species is restricted to the Chobe Rapids with its turbulent water current.

Elattoneura glauca (SELYS, 1860)

Last record: 2007.

Number of records: 11

Rank: 76/127

Red List: Least Concern.

Botswana distribution: Okavango Delta and the south-eastern part of Botswana.

Other records: Matakota, Limpopo River, 25.iv.1957, B. I. Balinsky (TMSA); Shakawe, 2.iv.2007, W. Tarboton.

Own records: OP5-ii.2002; OP7- iii.2005, ii.2006; OS13-iv.2002, 1 ♂; OL5-ii.2006, abun, ovip.

Flight period: Records from February till April, more information needed.

Habitat: At swiftly flowing rivers and streams with shady sections.

Notes: So far not known from the Kwando (SUHLING & MARTENS 2007) and the Chobe Rivers, despite it was common at the Zambezi River around Katima Mulilo in February 2006. The species is probably more widespread in south-eastern Botswana in hilly areas with springs and streams.

ANISOPTERA

GOMPHIDAE

Ceratogomphus pictus SELYS, 1854

Last record: 1983.

Number of records: 2

Rank: 106/127

Red List: Least Concern.

Botswana distribution: Only two records from south-eastern Botswana. Gaborone in November 1976 (PINHEY 1976).

Other records: Nnywane Dam, 15 km N of Lobatse, 6.xi.1983, 1 ♂, 1 ♀, M. Parr.

Own records: None.

Flight period: Only November records, more data needed.

Habitat: As in Namibia, where this species was recorded only at large impoundments (MARTENS et al. 2003).

Crenigomphus cornutus PINHEY, 1956

Last record: 1974.

Number of records: 1

Rank: 76/127

Red List: Least Concern.

Botswana distribution: The single record comes from the Chobe Rapids near Kasane in September 1974 (PINHEY 1976).

Own records: None

Flight period: More information needed.

Habitat: Probably rocky river sections.

Notes: One historical record (the paratype) from the Okavango River near Andara (PINHEY 1984).

Other records from the Okavango cited by SUHLING & MARTENS (2007) belong to the new species *C. kavangoensis* (SUHLING & MARAIS 2010).

Gomphidia quarrei quarrei (SCHOUTEDEN, 1934)

Last record: 2009.

Number of records: 21

Rank: 62/127

Red List: Least Concern.

Botswana distribution: Large rivers in northern Botswana and Okavango Delta. PINHEY (1976) mentioned it from three Okavango Delta localities and from the Chobe Rapids.

Other records: Xugana Safari Camp, N of MGR, i.1991, J. Silsby.

Own records: OP7-i.2009; OP41-xii.2007, abun; CL10-i.2007.

Flight period: All records from December till March.

Habitat: At perennial and large rivers.

Notes: In December 2007 the most abundant Gomphidae along the Maunachira channel in Moremi Game Reserve, Okavango Delta. Recently recorded in abundance at the Kwando River in the Namibian Caprivi (SUHLING & MARTENS 2007) opposite the Botswanan river bank.

Ictinogomphus dundoensis PINHEY, 1961

(syn. *Gomphidia guyi* PINHEY, 1976)

Last record: 2010.

Number of records: 21

Rank: 63/127

Red List: Least Concern.

Botswana distribution: Okavango Delta and Linyanti area.

Other records: Xugana Safari Camp, N of MGR, i.1991, J. Silsby; Third Bridge, MGR, 10.iii.1993, E. Marais (NMNW); Shakawe, 2.iv.2007, W. Tarboton; Okavango Delta, Xhudum Lodge, 28.xi.2009, 1 ♂, E. Schuran.

Own records: OP29-i.2006; OP32-ii.2006; OP34-i.2009; OP35-xii.2007; OP38-ii.2007, ii.2010, abun; OP43-xii.2007; OP44-i.2009; OS11-iv.2000.

Flight period: Rainy season, records from December till April. Definitely absent from suitable habitats in September.

Habitat: At perennial swampy rivers and large lagoons with tall sedges.

Notes: Also recorded at the Kwando River and Popa Falls, Namibian Caprivi (SUHLING & MARTENS 2007).

Ictinogomphus ferox (RAMBUR, 1842)

Last record: 2010.

Number of records: 55

Rank: 35/127

Red List: Least Concern.

Botswana distribution: Northern and south-eastern Botswana. PINHEY (1976) recorded it from the Okavango Delta and from Lake Ngami.

Other records: Xugana Safari Camp, N of MGR, i.1991, J. Silsby; Duma Tau (Linyanti), iv.2002, M. Samways; Letsibogo Dam spillway, Mmadinare, 1.i.2002, 1 ♀, 26.i.2003, 2 ♂♂, both J. Goodwin (NMBZ); Chobe River, Kubu Lodge Kasane, xi.2003 (KAPPES & NEHLS 2004).

Own records: OP10-ii.2002; OP21-iii.2005; OP23-iii.2005; OP34-xii.2007, ex, i.2009; OP41-xii.2007; OP44-i.2009; OS2-xii.2007; OS3-xii.2007; OS11-iv.2000; OS13-iv.2002; OS14-iii.-iv.2002; OS17-iii.2001, iii.2002; OS18-i.2007; OS25-i.2007; OS29-ii.2010; OS32-i.2007; OS36-xii.2007; OS39-ii.2010; CL2-ii.2006; CL3-iii.2001, iii.2002, ii.2006; CL4-v.2000, copula, iii.2002, iii.2005, ii.2006; CL5-iii.2002, iii.2005; CL8-iii.2005; CL10-i.2007; CL11-i.2007; CL13-iii.2005; CL19-xii.2007, ex.

Flight period: Rainy season, records from December till May. Definitely absent from suitable habitats in September.

Habitat: At small or medium sized rivers with turbulent or calm current.

Lestinogomphus angustus MARTIN, 1911

Last record: 2010.

Number of records: 22

Rank: 60/127

Red List: Least Concern.

Botswana distribution: Northern Okavango Delta, Kwando/Linyanti area and Chobe River. Rare in the southern Okavango Delta.

Own records: OP8-ii.2006; OP35-xii.2007; CL3-iii.2002, iii.2005, ii.2010; CL5-iii.2002, abun; CL8-iii.2005; CL10-ii.2006, i.2007; CL11-iii.2005, i.2007; CL14-iii.2005.

Flight period: Records from January to March, one from September.

Habitat: Fast to slow flowing rivers, lined by riverine forest.

Notes: The genus is in urgent need of revision (DIJKSTRA 2003). Pinhey often confused this species with *L. africanus* (e. g. PINHEY 1961, Plate 4) and the damaged type specimen of *L. africanus*, lacking the last abdominal segments caused much confusion. One of Pinhey's illustrations (PINHEY 1981, p.578) is titled with *L. angustus* (Botswana), but shows probably another species. Dijkstra recently inspected the NMBZ collection and confirmed all specimens collected by Pinhey in Botswana belong to *L. angustus* (K.-D. B. Dijkstra pers. comm.). *L. angustus* has recently been redescribed by LEGRAND & LACHAISE (2001). SUHLING & MARTENS (2007) mention recent records from the Kwando River, opposite Botswana border, but so far there are no records from the Linyanti. Surprisingly this species was rare in the Okavango Delta panhandle in February to March, when it was very common at the Chobe River.

**Lestinogomphus silkeae* KIPPING, 2010

Last record: 2000.

Number of records: 2

Rank: 108/127

Red List: Data Deficient.

Africa distribution: So far known only from the type locality in the Okavango Delta panhandle, from Victoria Falls in Zimbabwe (in NMBZ) and from the middle Okavango River section near Rundu, Namibia.

Botswana distribution: New to Botswana. Okavango Delta panhandle only at one locality so far.

Own records: OP9-vi.2000, 2 ♂♂.

Flight period: The Botswana record from beginning of June, the NMBZ record is from May. In February only *L. angustus* has been found at the type locality.

Habitat: At a slow flowing river, lined by dense riverine forest. The males of this species were caught in dense forest close to the Okavango main channel. These and others (also females) were seen sun basking on broad-leaved trees and shrubs at the edge of small clearings (vide KIPPING 2010).

Notes: One male from Victoria Falls, Zimbabwe, collected by E. C. G. Pinhey in May 1961 (in NMBZ), belongs to this species. Another male was collected by R. Garrison and N. v. Ellenrieder at N'Kwazi Lodge near Rundu in northern Namibia in iv.2007. In the collection of NMBZ is a further male, which is poorly preserved and possibly this species, it was collected 5.iv.1991 at Musengezi River, Mzarabani, Zimbabwe (K.-D. B. Dijkstra, pers. comm.). Correction: the record mentioned in KIPPING (2003b) as *L. angustus* is in fact this species.

**Neurogomphus cocytius* CAMMAERTS, 2004

Last record: 2005.

Number of records: 3

Rank: 101/127

Red List: Least Concern.

Botswana distribution: New to Botswana. Chobe River.

Own records: CL4-iii.2005; CL8-iii.2005; CL13-iii.2005, mfl.

Flight period: Only records from March, often of freshly emerged individuals, more information needed.

Habitat: Large Rivers with riverine forest.

Notes: SUHLING & MARTENS (2007) provide recent records from the Okavango River in Namibia. The species was also recorded from several localities at the Zambezi River, close to the Chobe River (PINHEY 1984, CAMMAERTS 2004). PINHEY (1976) mentions the species as *Neurogomphus vicinus* SCHOUTEDEN, 1934 and expected it to occur at the Chobe River, what could be confirmed with the recent findings.

**Neurogomphus zambeziensis* CAMMAERTS, 2004

Last record: 2007.

Number of records: 3

Rank: 102/127

Red List: Least Concern.

Botswana distribution: New to Botswana.

Other records: Chobe River, Kubu Lodge Kasane, 7.xi.2003, 1 ♂, 1 ♀, photographic records (KAPPES & NEHLS 2004).

Own records: CL4-i.2007; CL11-i.2007.

Flight period: More information needed.

Habitat: Large Rivers with riverine forest.

Notes: Also recorded from several localities at the Zambezi River, close to the Chobe River (PINHEY 1984, CAMMAERTS 2004).

Paragomphus elpidius (RIS, 1921)

Last record: 2007.

Number of records: 8

Rank: 81/127

Red List: Least Concern.

Botswana distribution: Northern Botswana. Three December records from the Maunachira River system in the north-eastern Okavango Delta (PINHEY 1976).

Own records: CL4-iii.2002; CL10-ii.2006, i.2007; CL11-iii.2005, abun; CL14-iii.2005.

Flight period: Rainy season from December to March.

Habitat: Medium sized to large perennial rivers with fast current.

Paragomphus genei (SELYS, 1841)

Last record: 2010.

Number of records: 26

Rank: 58/127

Red List: Least Concern.

Botswana distribution: Both from northern and eastern parts of the country. Only three historical records from Botswana, north-eastern Okavango Delta, Chobe Rapids, and Nata (PINHEY 1976).

Other records: Kolobeng Dam, near Gaborone, 12.xi.1983, 1 ♂, M. Parr; Serowe, x.1986 (BNMG); Letsibogo Dam, Mmadinare, 16.ii.2001, 1 ♀, 1 ♂, 26.i.2003, 1 ♂; Motloutse River, Selebi-Phikwe, 16.vii.2001, 9.ix.2001, several adults, all J., V. & W. Goodwin (NMBZ).

Own records: OP1-vi.2000, larvae, mfl; OP16-ii.2002; OS18-iii.2005, i.2007; OS40-ii.2010; OL12-i.2006.

Flight period: Records from September to June, probably throughout the year. Some larvae were collected in June 2000, the adults emerged in August/ September.

Habitat: Small to large rivers in the north, in southern Botswana also at large reservoirs.

Paragomphus sabicus PINHEY, 1950

Last record: 2007.

Number of records: 1

Rank: 58/127

Red List: Least Concern.

Botswana distribution: New to Botswana.

Own records: Chobe Rapids, CL10-i.2007, 1 ♂.

Flight period: From the region only this record from January. Outside Botswana in neighbouring countries from August till April.

Habitat: Large rivers with riverine forest.

Notes: W. Tarboton (in litt.) provides a record from Mmabolela Estates, South Africa, at the Limpopo River on the border to Botswana (10.ii.2009) which is the first record of this species for South Africa.

Phyllogomphus selysi SCHOUTEDEN, 1933

(syn. *P. brunneus* PINHEY, 1976)

Last record: 1973.

Number of records: 3

Rank: 103/127

Red List: Least Concern.

Botswana distribution: Perennial rivers in northern Botswana. Four Rivers in the Maunachira system of the north-eastern Okavango Delta and Chobe River near Kasane (PINHEY 1976).

Own records: None.

Flight period: Only December records, more information needed.

Habitat: Perennial, medium sized to large rivers.

Notes: PINHEY (1976) described *Phyllogomphus brunneus* from the Okavango Delta (Four Rivers), DIJKSTRA et al. (2006) recently reviewed the taxonomic status of this species and synonymized *P. brunneus* with *P. selysi*. The species was recently recorded from several localities in the Namibian Caprivi, e. g. Okavango and Kwando Rivers (SUHLING & MARTENS 2007).

AESHNIDAE

Anax bangweuluensis KIMMINS, 1955

Last record: 2009.

Number of records: 19

Rank: 66/127

Red List: Near Threatened.

Africa distribution: Botswana, Namibia and Zambia.

Botswana distribution: Northern Okavango Delta and Kwando/Linyanti region. The only historical Botswanan records came from the Four Rivers area at the Maunachira channel system in the north-eastern Okavango Delta (PINHEY 1976).

Other records: DUMONT (2007) found it at the Boro River halfway of Chiefs Island – 22.vii.2007; Okavango Delta, Xhudum Lodge, 28.xi.2009, 1 ♂, E. Schuran.

Own records: OP32-ii.2006, 10 ♂♂; OP33-ii.2006, 1 ♀; OP35-xii.2007; OP40-xii.2007; OP41-xii.2007, abun.

Flight period: Most records from November till February. One finding end of July.

Habitat: Small channels through dense Papyrus swamps, close to riverine woodland.

Notes: The species is restricted to the Palaeo Chambeshi-Katanga swamp area. Probably a large part of the world population lives in the Okavango Delta. So far only known from the localities mentioned here and the Lake Bangweulu swamps in northern Zambia (PINHEY 1984). It might occur also at the Barotse Floodplains and Kafue Flats in western Zambia. SUHLING & MARTENS (2007) mention two sight records from the Okavango and the Kwando in the Namibian Caprivi from December 2004. The species seems to be local and rare in the Okavango Delta.

Anax ephippiger (BURMEISTER, 1839)

Last record: 2010.

Number of records: 50

Rank: 37/127

Red List: Least Concern.

Botswana distribution: All over Botswana. PINHEY (1976) listed findings from the surroundings of the Okavango Delta and from arid regions of northern Botswana.

Other records: Serowe, i.1986, 1 ♂, (BNMG); Letsibogo Dam, Mmadinare, 26.i.2003, J. Goodwin (NMBZ).

Own records: OP31-ii.2005; OS1-xii.2007; OS7-v.2000; OS14-v.2000, ovip, iv.2002; OS15-iv.-v.2000; OS17-iv.-v.2000, abun, ovip; OS20-i.2006; OS21-i.2006; OS30-xi.2007; OS32-i.2007; OS33-xi.2007; CL10-i.2007; CL18-xii.2007; OL1-ii.2006; OL7; OL8; OL9; OL11; OL12; OL13; OL16; OL18 ovip, all ii.2006; OL27-i.2009.

Flight period: Records from December to July, probably throughout the year.

Habitat: A wide variety of freshwater habitats, most common at temporary pools.

Notes: I observed remarkable annual fluctuations depending from length and intensity of rainy season. One can suppose that *A. ephippiger*, as a migrant, does occur widely distributed in Botswana, especially in years with exceptionally intense rain and large rainfilled pans.

Anax imperator LEACH, 1815

Last record: 2010.

Number of records: 119

Rank: 16/127

Red List: Least Concern.

Botswana distribution: All parts of Botswana except the driest parts of the Kalahari. Common in the Okavango Delta.

Other records: Nnywane Dam, 15 km N of Lobatse, 6.xi.1983, 1 ♂, M. Parr; Serowe, x.1984 (BNMG); Xugana Safari Camp, N of MGR, i.1991, J. Silsby; Letsibogo Dam, Mmadinare, 1.vii.2001, 26.i.2003, Motloutse River, Selebi-Phikwe, 16.vii.2001, 9.ix.2001, all J. Goodwin (NMBZ); Khwai floodplain east, 16.viii.2003, Kaziikini Camp, 18.x.2003, Stanley's Camp, 18.xi.2003, all Okavango Delta, all P. Hancock; Duma Tau (Linyanti) and Chitabe (Okavango Delta), iv.2002, M. Samways; Chobe River, Kubu Lodge Kasane, xi.2003 (KAPPES & NEHLS 2004).

Own records: OP2-vi.2000; OP7-vi.2000; OP13-vi.2000; OP15-vi.2000; OP16-ii.2002; OP24-iii.2005; OP25-iv.2005; OP28-iii.2005; OP32-ii.2006, abun; OP36-ii.2007; OP37-ii.2007; OP38-ii.2007, ii.2010; OP44-i.2009; OS3-iii.2001; OS5-ii.2002; OS6-iv.-vii.2000, ovip; OS8-v.2000; OS11-iv.2000; OS12-iv.2000, ix.2010; OS13- ii.-iv.2002, ovip, i.2006, exuviae; OS14- v.-vii.2000, ovip, ii.-iv.2002; OS15-iv.-vii.2000; OS16-iv.-vii.2000, ovip, exuviae, iii.2002; OS17-iv.-vii.2000, iii.2002; OS18-iii.2002; OS19-iii.2002; OS21-iii.2005, exuvia; OS28-i.2007; OS32-ix.2010; OS36-xii.2007; OS40-ii.2010; OS41-ix.2010; OS42-ix.2010; OS43-ix.2010; CL1-iii.2002; CL3-iii.2001; CL5-iii.2002; CL6-iii.2002; CL8-iii.2005; CL9-iii.2005; CL11-iii.2005; CL12-iii.2005; CL14-iii.2005; OL7-ii.2006, exuvia; OL9-ii.2006; OL13-ii.2006; OL16-ii.2006; OL20-ii.2006.

Flight period: Throughout the year. Emergence was observed from February to May.

Habitat: Breeds in perennial and seldom in temporary stagnant water bodies. I recorded one exuvia from a rain pool (OL7), which has been flooded only for about four months.

Anax tristis HAGEN, 1867

Last record: 2010.

Number of records: 48

Rank: 38/127

Red List: Least Concern.

Botswana distribution: The more humid northern and eastern parts of Botswana. Three historical records from the north-eastern Okavango Delta (PINHEY 1976).

Other records: Serowe, i.1992, 1 ♂, (BNMG); Duma Tau (Linyanti), xi.2002, M. Samways.

Own records: OP31-ii.2006; OP33-ii.2006; OP35-xii.2007; OP39-xii.2007; OS3-xii.2007; OS13-ii.-iii.2002; OS14-v.2000, ovip; OS15-v.2000; OS16-iv.2000, exuviae; OS18-i.2007; OS23-i.2006; OS29-xi.2007; OS30-xi.2007; OS31-xi.2007; OS32-i.2007; CL19-xii.2007; CL20-xii.2007; CL21-xii.2007; OL7-ii.2006; OL8-ii.2006; OL9-ii.2006; OL12-i.2006; OL17-ii.2006; OL26-i.2009; OL27-i.2009.

Flight period: Records from the rainy season, December to May.

Habitat: Both perennial and temporary water bodies, pools and river backswamps. In very wet years, like 2006, it expanded into the Kalahari with its scattered rainpools.

***Gynacantha manderica* GRÜNBERG, 1902

Last record: 2006.

Number of records: 1

Rank: 103/127

Red List: Least Concern.

Botswana distribution: New to Botswana, Linyanti area.

Other records: One record from Kwando/Linyanti River on Botswana border to Namibia on 7.ii.2006 (SUHLING & MARTENS 2007).

Own records: None.

Flight period: Data deficient, Namibian records from December and March (SUHLING & MARTENS 2007).

Habitat: Forested river margins.

Notes: I found one dead male at Victoria Falls National Park, Zimbabwe, in May 2000, only 80 km away from the Chobe River.

Gynacantha villosa GRÜNBERG, 1902

Last record: 1974.

Number of records: 1

Rank: 120/127

Red List: Least Concern.

Botswana distribution: A single record from Chobe Rapids near Kasane in September 1974 (PINHEY 1976) is the only record of the species so far.

Own records: None.

Flight period: One record from September, one own Zimbabwe record from May, more information needed.

Habitat: Rivers with dense forest.

Notes: I observed this species as very common at Victoria Falls National Park, Zimbabwe, in May 2000. Due to their crepuscular activity species of this genus are likely underrepresented in surveys.

CORDULIIDAE

Phyllomacromia contumax SELYS, 1879

(syn. *Phyllomacromia bifasciata* MARTIN, 1912)

Last record: 2010.

Number of records: 48

Rank: 39/127

Red List: Least Concern.

Botswana distribution: Okavango Delta, Savuti Channel and Chobe River (PINHEY 1976).

Other records: Kasane, ii.1994, 1 ♂, (BNMG); Duma Tau (Linyanti), iv.2002, M. Samways.

Own records: OP7-ii.2002, ii.2006; OP16-ii.2002, iii.2005; OP35-xii.2007; OS1-iii.2001, xii.2007; OS14-ii.-iv.2002; OS18-ii.2002, i.2007; OS29-i.2007, xi.2007; OS32-i.2007, ix.2010, ex; OS38-i.2010; OS39-ii.2010; OS40-ii.2010; OS43-ix.2010; CL2-ii.2006; CL3-iii.2002, ii.2006, ii.2010; CL4-iii.2005; CL5-iii.2002; CL10-iii.2005; CL11-iii.2005.

Flight period: Mainly rainy season, November to April, one record from June.

Habitat: Rivers with moderate current and nearby woodland.

Notes: PINHEY (1976) recorded it as *Macromia bifasciata* from the Boteti River at two localities in 1967. This is interesting, since in recent years this river was bone dry until 2007. In 2010 the species could be found again at the Boteti River at Meno-a-Kwena Camp. The species seems to disperse in some years as also revealed by a record in central Namibia far from larger perennial rivers (SUHLING & MARTENS 2007). DIJKSTRA (2005) recently revised this genus.

Phyllomacromia kimminsi (FRASER, 1954)

Last record: 1975.

Number of records: 5

Rank: 94/127

Red List: Least Concern.

Africa distribution: Sierra Leone, Uganda, Kenya, upper Zambezi catchment in Zambia and Botswana.

Botswana distribution: Five December records from the Maunachira River system in the north-eastern Okavango Delta (PINHEY 1976).

Own records: None.

Flight period: Only records from December.

Habitat: Probably like other members of the genus at rivers in woodland.

Notes: A poorly known species, on the southern subcontinent only recorded from the mentioned localities and from Ikelenge near the Zambezi River source (PINHEY 1984 and own records in iii.2010).

Phyllomacromia overlaeti (SCHOUTEDEN, 1934)

(syn. *Phyllomacromia paludosa* PINHEY, 1976)

Last record: 2007.

Number of records: 3

Rank: 104/127

Red List: Least Concern.

Botswana distribution: Northern Okavango Delta and Chobe River. PINHEY (1976) described *Macromia* (*Phyllomacromia*) *paludosa* from Shakawe, which is in fact this species (DIJKSTRA 2005).

Own records: CL11-iii.2005, 1 ♀, i.2007, 2 ♂♂.

Flight period: Not enough data, the available records are from January and March. Own records from neighbouring Zambia are from January and February.

Habitat: Rivers with moderate current and nearby woodland.

Notes: Next known records are from Victoria Falls, Zimbabwe and Maramba River, Zambia (PINHEY 1984) and other localities along the middle Zambezi (own findings). SUHLING & MARTENS (2007) mention it from Popa Falls, Kwando and Zambezi Rivers in the Namibian Caprivi. The own March record is from a dead female, drowned in a swimming pool.

Phyllomacromia picta (HAGEN in SELYS, 1871)

Last record: 2010.

Number of records: 23

Rank: 59/127

Red List: Least Concern.

Botswana distribution: Mainly northern Botswana, one record from Limpopo River. PINHEY (1976) recorded it from three localities in the Okavango Delta, from Savuti and the Chobe Rapids.

Other records: Matakota, Limpopo River, 25.iv.1957, B. I. Balinsky (TMSA).

Own records: OP7-ii.2006; OS18-i.2007; OS19-iii.2002; OS29-i.2007; OS42-ix.2010; CL3-iii.2001, iii.2002, iii.2005, ii.2006; CL5-iii.2002, iii.2005; CL11-iii.2005; CL13-iii.2005; CL14-iii.2005; Etsha 6, 40 km SSE of Sepopa, 20.ii.2002; OS25-i.2007.

Flight period: Mostly rainy season, records from January to May, one from September. In some regions like along the Chobe River probably throughout the whole year.

Habitat: Rivers with moderate current and nearby woodland.

Notes: With *P. contumax* the most abundant and widespread species of the genus in Botswana.

LIBELLULIDAE

Acisoma panorpoides ascalaphoides RAMBUR, 1842

Last record: 2010.

Number of records: 120

Rank: 15/127

Red List: Least Concern.

Botswana distribution: Northern and eastern Botswana. PINHEY (1976) recorded it from all parts of the Okavango Delta, further records from Linyanti Swamps and Chobe River.

Other records: Third Bridge Camp, MGR, 10.iii.1993; 1 ♀, J. Deckert, (ZMHB); Motloutse River, Selebi-Phikwe, 16.vii.2001, 7.x.2001, W. Goodwin (NMBZ); Duma Tau (Linyanti), Chitabe and Vumbura (Okavango Delta), iv.2002, M. Samways.

Own records: OP8-ii.2002, ii.2006; OP11-ii.2002; OP12-ii.2002; OP16-ii.2002; OP17-ii.2002,iii.2005; OP18-ii.2002; OP19-ii.2002; OP21-iii.2005; OP22-iii.2005; OP23-iii.2005; OP24-iii.2005; OP25-ii.2006, ii.2010; OP29-i.-ii.2006; OP30-ii.2006; OP32-i.-ii.2006; OP34-xii.2007, i.2009; OP35-xii.2007; OP36-ii.2007; OP37-ii.2007, i.2009; OP38-ii.2007, ii.2010; OP39-xii.2007; OP40-xii.2007, ii.2010; OP41-xii.2007; OP42-xii.2007; OP43-xii.2007; OP44-i.2009; OS1-xii.2007; OS2-xii.2007; OS3-iii.2001, xii.2007; OS6-iv.2002; OS7-iv.2002; OS9-iv.2003; OS13-ii.-iv.2002; OS14-ii.2006; OS16-iv.2000; OS17-ii.-iii.2002; OS18-iii.2002, iii.2005; OS19-iii.2002; OS24-xii.2007; OS29-ii.2010; OS30-xi.2007, ii.2010; OS31-xi.2007; OS36-xii.2007; OS39-ii.2010; OS43-ix.2010; CL5-iii.2002; CL7-iii.2005; CL8-iii.2005; CL10-iii.2005; CL17-xii.2007.

Flight period: Records from all months, except June and July. In some regions probably throughout the year.

Habitat: Quiet waterbodies, such as pools, backswamps and swampy river margins with floating-leaf plants.

Aethiothemis solitaria MARTIN, 1908
(syn. *Aethiothemis discrepans* LIEFTINCK, 1969)

Last record: 2006.

Number of records: 47

Rank: 41/127

Red List: Least Concern.

Botswana distribution: Only in the panhandle of the Okavango Delta from the Namibian border south to Sepopa. All historic finding also from that region (PINHEY 1976).

Own records: OP1-iv.2005; OP2-vi.2000; OP4-vi.2000; OP5-iv.2005; OP6-vi.2000, abun; OP7-vi.2000, abun, ovip, ii.2002, mfl, iii.2005, abun, mfl, ii.2006; OP8-ii.2006, mfl; OP9-vi.2000; OP15-vi.2000; OP26-iv.2005.

Flight period: Records from February to June. Emergence took place in February and March, oviposition in June.

Habitat: Rivers with moderate current, which have submerged grass at the bank and riverine forest.

Notes: *A. discrepans* is synonym to *A. solitaria* MARTIN, 1908 (K.-D. B. Dijkstra pers. comm.).

Aethriamanta rezia KIRBY, 1889

Last record: 2010.

Number of records: 35

Rank: 50/127

Red List: Least Concern.

Botswana distribution: Okavango Delta, Linyanti and Chobe Rivers.

Other records: Vumbura (Okavango Delta), iv.2002, M. Samways.

Own records: OP7-ii.2006; OP8-ii.2002, mfl, ii.2006; OP11-ii.2002, mfl; OP16-ii.2002; OP21-iii.2005, exuvia; OP24-iii.2005; OP29-i.ii.2006; OP30-ii.2006; OP34-i.2009; OP35-xii.2007; OP36-ii.2007; OP38-ii.2010; OP40-xii.2007; OP43-xii.2007; OP44-i.2009; OS1-xii.2007; OS2-xii.2007; OS3-xii.2007; OS36-xii.2007; CL3-ii.2006, abun; CL8-ii.2006.

Flight period: Rainy season, records from December to April. Teneral were only seen in January and February.

Habitat: Swampy rivers with dense vegetation and woodland.

Notes: The species probably suffered from habitat loss due to decline of floodwater in the southern Okavango Delta and habitat destruction in and around Maun, where it was found in the 1970s (PINHEY 1976) but is absent today. SUHLING & MARTENS (2007) list records from the Kwando River in the Namibian Caprivi.

Brachythemis lacustris (KIRBY, 1889)

Last record: 2010.

Number of records: 60

Rank: 33/127

Red List: Least Concern.

Botswana distribution: Common in the panhandle of the Okavango Delta south to Sepopa, and at the Chobe River. Rare and local in the permanent flooded Okavango Delta south of the panhandle.

Other records: Kasane, ii.1994 (BNMG); Drotzky's Cabins, Okavango Delta, 1 ♂, 8.ix.2002, W. Goodwin (NMBZ); Shakawe, 2.iv.2007, W. Tarboton.

Own records: OP5-ii.2002, iv.2005; OP7-ii.2002, iii.2005, i.2009; OP8-ii.2006, abun; OP9-ii.2006; OP11-ii.2002; OP20-iii.2005; OP23-iii.2005; OP25-iv.2005; OP26-iv.2005; OP29-ii.2006; OP34-xii.2007; OP38-ii.2007, abun, ii.2010; OP40-xii.2007, ii.2010; OP41-xii.2007; OP44-i.2009;

CL1-iii.2002; CL2-iii.2002; CL3-iii.2002, iii.2005, ii.2006; CL4-iii.2002, iii.2005, ii.2006, i.2007; CL5-iii.2002, iii.2005; CL8-iii.2005; CL10-iii.2005, ii.2006; CL11-iii.2005, i.2007; CL13-iii.2005; CL14-iii.2005.

Flight period: Rainy season, records from September to April. Definitely absent from the northern Okavango Delta localities in early June.

Habitat: Rivers with moderate current and submerged grass at the bank.

Brachythemis leucosticta (BURMEISTER, 1839)

Last record: 2010.

Number of records: 233

Rank: 4/127

Red List: Least Concern.

Botswana distribution: Widespread and common in northern and eastern Botswana. PINHEY (1976) has records from all parts of Botswana, most of them from the northern part, but also from Nata, Gaborone and its surroundings.

Other records: Nnywane Dam, 15 km N of Lobatse, 5.xi.1983, 1 ♀, M. Parr; Shashe Dam, iv.1983; Serowe v.1988, v.1990 (BNMG); Kasane, Chobe Safari Lodge (here loc. CL3), 12.iii.1993, 2 ♂♂, J. Deckert, (ZMHB); Okavango Delta, Guma Lagoon (here loc. OP16), 14.vi.2000, 3 ♂♂, 2 ♀♀, C. C. Appleton; Letsibogo Dam, Mmadinare, 26.viii.2001, 2 ♂♂, 1.x.2001, 1 ♂; Motloutse River, Selebi-Phikwe, 1.v.2002, 23.xi.2002, several adults, Selebi-Phikwe, mine dump, 6.x.2002, Khwai River, Chobe entrance, 3.ix.2002, all J., V. & W. Goodwin (NMBZ); Duma Tau (Linyanti), Vumbura and Chitabe (Okavango Delta), iv.2002, M. Samways; Boro River at HOORC Camp, 29.iii.2003, Modumo Lodge airstrip, 31.iii.2003, Qorokwe lagoon, Santandadibe, 18.iv.2003, Mbiroba, Seronga, 20.ix.2003, Txatxanika, MGR, 22.ix.2003, Dombo Lediba, MGR, 25.ix.2003, Khwai floodplain east, 25.ix.2003, 3.xii.2003, Stanley's Camp, 18.xi.2003, all Okavango Delta, all P. Hancock; Chobe River, Kubu Lodge Kasane, xi.2003 (KAPPES & NEHLS 2004).

Own records: OP1-vi.2000, iv.2005; OP2-vi.2000; OP11-ii.2002; OP12-ii.2002; OP17-iii.2005; OP18-ii.2002; OP19-ii.2002; OP22-iii.2005; OP25-ii.2010; OP31-i-ii.2006; OP34-xii.2007; OP35-xii.2007; OP36-ii.2007; OP37-ii.2007; OP38-ii.2007, ii.2010; OP39-xii.2007; OP40-xii.2007; OP41-xii.2007; OP44-i.2009; OS1-xii.2007; OS2-xii.2007; OS3-xii.2007; OS4-iv.2000; OS6-iv-v.2000, juv, ovip, iv.2002; OS7-iv-v.2000; OS8-iv.2002; OS9-v.2000; OS11-iv.2000, abun; OS12-ix.2010; OS13-ii-iv.2002, i.2006; OS14-ii-v.2000, abun, i.2006; OS15-iv-v.2000; OS16-iv-v.2000, juv, i.2007; OS17-ii-v.2000, abun; OS18-iii.2002, iii.2005, i.2006, i.2007, xi.2007; OS19-v.2000, iii.2002; OS21-iii.2005, abun, exuviae, i.2006; OS22-i.2006; OS23-i-ii.2006; OS24-xii.2007; OS25-i.2007; OS27-i.2007; OS29-i.2007, xi.2007, ii.2010; OS30-xi.2007, ii.2010; OS32-i.2007, ix.2010; OS35-xii.2007; OS39-ii.2010; OS40-ii.2010; OS41-ix.2010; OS42-ix.2010; OS43-ix.2010, abun; CL1-iii.2002; CL2-iii.2002, abun; CL3-iii.2002, iii.2005, ii.2006, abun; CL4-iii.2002, iii.2005, i.2007; CL6-iii.2002, abun; CL7-iii.2005; CL9-iii.2005; CL10-iii.2005; CL11-iii.2005; CL12-iii.2005; CL14-iii.2005; CL15-xii.2007; CL17-xii.2007; CL18-xii.2007; CL21-xii.2007; OL1-iii.2002, ii.2006; OL8-ii.2006; OL11-ii.2006; OL12-i.2006; OL13-ii.2006; OL14-ii.2006; OL15-ii.2006; OL16-ii.2006; OL17-ii.2006; OL18-ii.2006; OL19-ii.2006; OL21-ii.2006; OL22-i.2010; OL23-xii.2007; OL24-xii.2007; OL28-i.2010.

Flight period: Maybe throughout the year, records from August to mid June.

Habitat: A wide variety of freshwater habitats, from temporary pools to dams and rivers, even to brackish waters.



Fig. 3: Typical dragonfly species from Botswana. a: *Trithemis palustris*; b: *Diplacodes luminans*; c: *Aethriamanta rezia*; d: *Anax bangweuluensis*; e: *Pseudagrion rufostigma*; f: *Rhyothemis fenestrina*; g: *Ceriagrion katamborae*; h: *Pseudagrion helenae*. All males. All photographs: J. Kipping.



Fig. 4: Typical dragonfly habitats in Botswana. a: Maunachira channel in the Okavango Delta; b: Thamalakane River in Maun; c: river bank in the northern panhandle of the Okavango Delta; d: large lagoon in Moremi Game Reserve, Okavango Delta; e: temporary pools in the Kalahari; f: large rainfed pan in the Kalahari after heavy rainfall; g: Chobe rapids near Kasane; h: stream and waterfall at Tswapong Hills. All photographs: J. Kipping.

Notes: DIJKSTRA & MATUSHKINA (2009) splitted *B. leucosticta* in a more northern distributed *Brachythemis impartita*, which occurs in Central Africa, the Sahel and the Mediterranean and a southern species, *B. leucosticta*, which occurs from Central and Eastern Africa south to the Eastern Cape. An overlapping zone exist in Central and Eastern Africa. All the proofed specimens from Botswana and neighbouring countries belong to *B. leucosticta*.

Brachythemis wilsoni PINHEY, 1952

Last record: 2010.

Number of records: 20

Rank: 65/127

Red List: Least Concern.

Africa distribution: Sudan, Nigeria, Uganda, DR Congo and Botswana.

Botswana distribution: Only Okavango Delta. A tropical insect, in Botswana first recorded in 1967 around Maun and during the mid 1970s in the north-eastern Okavango Delta at Four Rivers and Xugana Lagoon (PINHEY 1967a, 1976).

Other records: Okavango Delta, 29.vi.1986, 1 ♀, M. Parr.

Own records: OP29-i.2006, 1 ♂; OP30-i.-ii.2006, 3 ♂♀; OP35-xii.2007; OP39-xii.2007; OS13-29.i.2006, 1 ♂; OS25-i.2007; OS30-ii.2010, abun; OS32-ix.2010; OS41-ix.2010.

Flight period: Rainy season, records from September to March.

Habitat: Swampy river margins and backswamps with diverse submerged and emerged vegetation.

Notes: Rare and localized in the Okavango Delta. I expect this species to occur also in similar large swamps like the Barotse Floodplain or Kafue Flats in Zambia, but so far there are no records from these areas.

**Bradinopyga cornuta* RIS, 1911

Last record: 2002.

Number of records: 3

Rank: 100/127

Red List: Least Concern.

Botswana distribution: New to Botswana, northern and south-eastern Botswana.

Other records: Selebi-Phikwe, 1.i.2003, 1 ♂, W. Goodwin (NMBZ).

Own records: CL4-v.2000, 1 ♂, iii.2002, 1 ♂, 1 ♀.

Flight period: Data deficient, more information needed.

Habitat: Rainfed temporary pools and puddles in rocky area.

notes: Maybe more widespread in hilly terrain in the south-eastern part of Botswana or at Tsodilo Hills in the north.

Chalcostephia flavifrons KIRBY, 1889

Last record: 2010.

Number of records: 32

Rank: 52/127

Red List: Least Concern.

Botswana distribution: Okavango Delta, Linyanti Swamps and Chobe River. PINHEY (1976) recorded it from the panhandle and the Maunachira system of the Delta.

Other records: Chitabe (Okavango Delta), iv.2002, M. Samways; Shakawe, 2.iv.2007, W. Tarboton.

Own records: OP5-ii.2002, iv.2005, abun; OP7-ii.2002, abun, ii.2006; OP8-ii.2002, abun, ii.2006; OP10-ii.2002; OP11-ii.2002; OP17-ii.2002, iii.2005; OP20-iii.2005; OP21-iii.2005, abun; OP22-iii.2005; OP36-ii.2007; OP44-i.2009, abun; OS43-ix.2010; CL3-iii.2005, 1 ♂.

Flight period: Rainy season, records from December to April, one from September.

Habitat: Swamps close to rivers, surrounded by dense riverine forest.

Notes: Noteworthy are the Chitabe and Tlhokatsebe records, which are the only findings from the seasonal flooded part of the Okavango Delta so far, the Chobe record is the first for this river.

SUHLING & MARTENS (2007) mention two records in xii.2004 from the Kwando River at the Botswanan border.

**Crocothemis divisa* BAUMANN, 1898

Last record: 2002.

Number of records: 1

Rank: 119/127

Red List: Least Concern.

Botswana distribution: New to Botswana.

Other records: Tswapong Hills, Moremi Gorge, 29.iii.2002, 1 ♂, N. Goodwin (NMBZ).

Own records: None.

Flight period: Data deficient, more information needed.

Habitat: Probably springbrooks and streams on rocky ground.

Crocothemis erythraea (BRULLÉ, 1832)

Last record: 2010.

Number of Records: 187

Rank: 5/127

Red List: Least Concern.

Botswana distribution: Northern and eastern Botswana. PINHEY (1976) lists records mainly from the Okavango Delta and adjacent areas, but also from drier regions. Common in the Okavango Delta and other swamps in the north.

Other records: Matakota, Limpopo River, 25.iv.1957, B. I. Balinsky (TMSA); Chiefs Island, Okavango Delta, 13.v.1984; Gaborone Game Reserve, on streams flowing from sewage ponds, 12.x.1985, M. Parr; Serowe, v.1988, v.1990 (BNMG); Letsibogo Dam, Mmadinare, 1.vii.2001, 3 ♂♂, Motloutse River, Selebi-Phikwe, 16.vii.2001, several adults, all J., V. & W. Goodwin (NMBZ); Duma Tau (Linyanti), Vumbura and Chitabe (Okavango Delta), iv.2002, M. Samways.

Own records: OP1-vi.2000; OP2-vi.2000; OP3-vi.2000; OP4-vi.2000; OP7-vi.2000, i.2009; OP8-ii.2006; OP11-ii.2002; OP15-vi.2000; OP16-ii.2002; OP17-ii.2002, iii.2005; OP19-ii.2002; OP21-iii.2005; OP22-iii.2005; OP25-ii.2006, ii.2010; OP28-iii.2005; OP30-ii.2006; OP31-ii.2006; OP35-xii.2007; OP36-ii.2007; OP37-ii.2007; OP38-ii.2010; OP39-xii.2007; OP41-xii.2007; OP42-xii.2007; OS1-xii.2007; OS3-iii.2001, xii.2007; OS4-iv.2000; OS5-ii.2002; OS6-iv.-v.2000, iv.2002; OS7-iv.-vii.2000; OS8-iv.-vii.2000, abun; OS9-iv.-vii.2000, abun, ovip; OS11-iv.2000; OS12-ix.2010; OS13-ii.-iv.2002, ovip; OS14-iv.-vii.2000, iv.2002; OS15-iv.-vii.2000; OS16-iv.-vii.2000, abun, ovip; OS17-ii.-vi.2000; OS18-iii.2000, iii.2001, i.2006, i.2007; OS19-v.2000; OS20-iv.2000; OS21-iii.2005; OS29-ii.2010; OS30-xi.2007, ii.2010; OS31-xi.2007; OS32-i.2007; OS33-xi.2007; OS34-xi.2007; OS36-xii.2007; OS37-i.2010; OS38-i.2010; OS40-ii.2010; OS41-ix.2010; OS42-ix.2010; CL1-iii.2002; CL4-iii.2002, iii.2005, i.2007; CL5-iii.2002; CL6-iii.2002, abun; CL7-ii.2002; CL8-iii.2005; CL10-iii.2005; CL11-iii.2005, i.2007; CL15-xii.2007; CL17-xii.2007; OL1-iii.2002; OL2-iv.2000; OL4-vii.2005; OL7-ii.2006; OL8-ii.2006; OL11-ii.2006; OL32-ii.2010.

Flight period: Probably throughout the year, but no records from October and November so far.

Habitat: A wide variety of freshwater habitats, with a preference for stagnant water bodies.

Crocothemis sanguinolenta (BURMEISTER, 1839)

Last record: 2010.

Number of Records: 11

Rank: 75/127

Red List: Least Concern.

Botswana distribution: Northern and eastern Botswana.

Other records: Okavango River, Botswana, 18.iv.1962, 1 ♂, Khwai River, 22.xii.1963, 1 ♂, B. I. Balinsky (TMSA); Tswapong Hills, Moremi Gorge, 29.iii.2002, 3 ♂♂, V. & W. Goodwin (NMBZ).

Own records: CL4-iii.2002; OL5-ii.2006, abun.

Flight period: Records from December to June, and one from September.

Habitat: Streams and small rivers, preferably those with fast current and on rocky ground.

Notes: The status of the species in the Okavango Delta is unclear. In recent years I only found *C. erythraea* there, whereas *C. sanguinolenta* I only recorded under xeric conditions in rocky regions. Also in Namibia the species has only been found at springs in rocky areas (SUHLING & MARTENS 2007). The Okavango Delta records of PINHEY (1976) might be misidentifications.

Diplacodes deminuta LIEFTINCK, 1969

(syn. *Diplacodes okavangoensis* PINHEY, 1976)

Last record: 2010.

Number of Records: 58

Rank: 34/127

Red List: Least Concern.

Botswana distribution: Northern Botswana, Okavango Delta, Linyanti area and Chobe River.

Other records: Third Bridge, Moremi Game Reserve, 27.ii.1984, 1 ♀, R. Toms (TMSA); Okavango Delta, 29.vi.1986, 1 ♀, M. Parr; Vumbura and Chitabe (Okavango Delta), iv.2002, M. Samways; Chobe River, Kubu Lodge, Kasane, xi.2003 (sight record) (KAPPES & NEHLS 2004).

Own records: OP22-iii.2005; OP30-i.-ii.2006; OP34-xii.2007, i.2009; OP35-xii.2007; OP36-ii.2007; OP39-xii.2007; OP40-xii.2007; OP44-i.2009; OS7-v.2000, iv.2002; OS8-iv.2002; OS9-iv.2002; OS10-ii.2002; OS13-iv.2002; OS14-iv.2002; OS16-iv.2000; OS43-ix.2010.

Flight period: Records from November to May, and some from August, September.

Habitat: Swamps and extended floodplains with dense sedges.

Notes: The genus has recently been revised by DIJKSTRA (2006). *D. okavangoensis* is synonym to *D. deminuta* LIEFTINCK, 1969. The status of specimens from the Zambezi (and Chobe) is not clear. According to DIJKSTRA (2006) individuals from South Africa, Zimbabwe and parts of Zambia belong to *D. pumila*, whereas those from Okavango Delta are clearly *deminuta*. An overlapping zone exist at Lake Bangweulu and probably at the middle Zambezi River section.

Diplacodes lefebvrii (RAMBUR, 1842)

Last record: 2010.

Number of Records: 241

Rank: 3/127

Red List: Least Concern.

Botswana distribution: All over Botswana, except the driest parts of the Kalahari. Records from the humid north and the more arid south (PINHEY 1967a, 1976).

Other records: Okavango Delta, 13.v.1984, 29.vi.1986, 1 pair, M. Parr; Xugana Safari Camp, N of MGR, i.1991, J. Silsby; Letsibogo Dam, Mmadinare, 1.vii.2001, 1 ♂, 2 ♀♀, Motloutse River, Selebi-Phikwe,

1.v.2002, several adults, Selebi-Phikwe, mine dump, 6.x.2002, all J., N. & W. Goodwin (NMBZ); Duma Tau (Linyanti), Vumbura and Chitabe (Okavango Delta), iv.2002, M. Samways; Txatxanika, MGR, Okavango Delta, 22.ix.2003, P. Hancock; Shakawe, 2.iv.2007, W. Tarboton.

Own records: OP2-vi.2000; OP7-iii.2005, ii.2006; OP10-ii.2006; OP16-ii.2002; OP17-iii.2005; OP21-iii.2005; OP22-iii.2005; OP30-i.-ii.2006; OP31-ii.2006; OP35-xii.2007; OP36-ii.2007; OP37-ii.2007, i.2009; OP39-xii.2007; OP40-xii.2007; OP42-xii.2007; OS1-xii.2007; OS2-iii.2001; OS3-iii.2001, xii.2007; OS4-iv.2000; OS5-ii.2002; OS6-iv.-v.2000, abun, exuviae, iv.2002; OS7-iv.-vii.2000, abun, iv.2002; OS8-iv.-vii.2000, abun; OS9 iv.-vii.2000, abun, ovip; OS10-ii.2002; OS11-iv.2000; OS13-ii.-v.2002, ovip; OS14-ii.-v.2000; OS15- vii.2000, iv.2002; OS16-iv.-vi.2000, abun, ovip, i.2007; OS17-ii.-vi.2000; OS18- iii.2005, ii.2006, xi.2007; OS19-v.2000; OS20-i.2006; OS23-ii.2006; OS24-xii.2007; OS25-i.2007; OS26-i.2007; OS29-i.2007, ii.2010; OS30-xi.2007, ii.2010; OS31-xi.2007; OS32-i.2007, xi.2007; OS33-xi.2007; OS34-xi.2007; OS36-xii.2007; OS37-i.2010; OS38-i.2010; OS39-ii.2010; OS41-ix.2010; OS42-ix.2010; OS43-ix.2010; CL6-iii.2002, abun; CL10-i.2007; CL14-iii.2005; CL17-xii.2007; CL19-xii.2007; CL21-xii.2007; OL2-iv.2000; OL7-ii.2006; OL8-ii.2006; OL9-ii.2006; OL11-ii.2006; OL12-i.2006; OL14-ii.2006; OL16-ii.2006; OL17-ii.2006; OL18-ii.2006; OL19-ii.2006; OL21-ii.2006; OL22-i.2010; OL27-i.2009, abun, ovip; OL28-i.2010; OL29-ii.2010; OL31-ii.2010; OL32-ii.2010.

Flight period: Throughout the year, records from all months.

Habitat: All kind of stagnant waters, swamps, floodplains and artificial pools, preferably those with floating-leaf plants.

Diplacodes luminans (KARSCH, 1893)

(syn. *Philonomon luminans* KARSCH, 1893)

Last record: 2010.

Number of Records: 75

Rank: 30/127

Red List: Least Concern.

Botswana distribution: Mainly northern and eastern parts of the country. Historical records from the Okavango Delta and also drier parts of Botswana, as Gocha Hills, Gweta and Tsau River (PINHEY 1976).

Own records: OP31-ii.2006; OP35-xii.2007; OP36-ii.2007; OS1-iii.2001; OS13-iii.2002; OS14-ii.-iii.2002; OS15-v.2000; OS17-ii.-iii.2002; OS18-iii.2005; OS21-i.2006; OS23-ii.2006; OS29-xi.2007; OS30-xi.2007; OS36-xii.2007; CL18-xii.2007; CL19-xii.2007; CL20-xii.2007; CL21-xii.2007; OL7-ii.2006; OL8-ii.2006; OL9-ii.2006; OL11-ii.2006; OL12-i.2006; OL13-ii.2006; OL14-ii.2006; OL16-ii.2006; OL17-ii.2006; OL18-ii.2006; OL25-i.2009; OL26-i.2009; OL27-i.2009, abun, ovip; OL28-i.2010; OL31-ii.2010; OL32-ii.2010.

Flight period: Records from December to May. Most individuals till April.

Habitat: Mostly at stagnant waters. In dry years I observed it mainly at the fringe of the Okavango Delta, in wet years the species spreaded widely into the Kalahari and dwelled temporary pools and pans, where it was often the dominating libellulid species.

Notes: DIJKSTRA (2006) recently revised the genus *Diplacodes* and included *Philonomon*.

Hemistigma albipunctum (RAMBUR, 1842)

Last record: 2010.

Number of Records: 144

Rank: 11/127

Red List: Least Concern.

Botswana distribution: Northern Botswana with its large swamps and rivers, southwards to Maun. Very common and a typical species of the Okavango Delta swamps.

Other records: Ghanzi Camp, Okavango Delta, 13.v.1984, 1 ♀, M. Parr; Xugana Safari Camp, N of MGR, i.1991, J. Silsby; Kasane, ii.1994 (BNMG); Kasane, Chobe Safari Lodge (here loc. CL3), 12.iii.1993, 2 ♂♂, Shakawe Fishing Camp (here loc. OP5), 7.iv.1998, 1 ♂, J. Deckert (ZMHB); Drotzky's Cabins, Okavango Delta, several adults, 8.ix.2002, V. & W. Goodwin (NMBZ); Duma Tau (Linyanti), Vumbura and Chitabe (Okavango Delta), iv.2002, M. Samways; Chobe River, Kubu Lodge Kasane, xi.2003 (KAPPES & NEHLS 2004); Shakawe, 2.iv.2007, W. Tarboton.

Own records: OP5-iv.2005; OP8-ii.2006; OP9-ii.2006; OP11-ii.2002; OP12-ii.2002; OP16-ii.2002; OP17-ii.2002; OP18-ii.2002; OP19-2002; OP21-iii.2005; OP22-iii.2005; OP23-iii.2005; OP24-iii.2005; OP25-ii.2006, ii.2010; OP29-ii.2006; OP30-i.2006; OP32-ii.2006; OP33-ii.2006; OP34-xii.2007, i.2009; OP35-xii.2007; OP36-ii.2007; OP37-ii.2007, i.2009; OP38-ii.2007; OP39-xii.2007; OP40-xii.2007; OP41-xii.2007; OP42-xii.2007; OP43-xii.2007; OP44-i.2009; OS1-iii.2001, xii.2007; OS2-iii.2001, xii.2007; OS3-iii.2001, xii.2007; OS6-iv.-vi.2000, abun, mfl; OS7-iv.-vi.2000, ovip; OS8-iv.2000; OS9-iv.-vi.2000; OS10-ii.2002; OS12-ix.2010; OS13-ii.2002; OS14-iv.-v.2000; OS16-iv.-v.2000; OS17-ii.2002; OS24-xii.2007; OS34-xi.2007; OS39-ii.2010; OS41-ix.2010; CL3-iii.2002, iii.2005; CL4-v.2000; CL7-ii.2006; CL17-xii.2007.

Flight period: Maybe throughout the year with a winter break from mid June to August.

Habitat: Swampy river margins with dense and diverse vegetation.

Nesciothemis farinosa (FÖRSTER, 1898)

Last record: 2010.

Number of Records: 73

Rank: 31/127

Red List: Least Concern.

Botswana distribution: Northern and eastern Botswana. Historical records from the Okavango Delta, Savuti/ Linyanti area, Chobe and Notwane Rivers (PINHEY 1976).

Other records: Matakota, Limpopo River, 24.iv.1957, 2 ♂♂, B. I. Balinsky (TMSA); Kolobeng Dam, near Gaborone, 12.xi.1983, 1 ♂, M. Parr; Serowe, v.1988 (BNMG); Motloutse River, Selebi-Phikwe, 23.xi.2002, Tswapong Hills, Moremi Gorge, 29.iii.2002, 15.xii.2002, V. & W. Goodwin (NMBZ).

Own records: OP7-iii.2005, i.2009; OP29-i.-ii.2006, copula; OP30-i.-ii.2006; OP34-xii.2007, i.2009; OP38-ii.2007, ii.2010; OP39-xii.2007; OP40-xii.2007; OP41-xii.2007; OP44-i.2009; OS1-iii.2001, xii.2007; OS14-iii.2002; OS18-i.2007; OS25-i.2007; OS26-i.2007; OS29-ii.2010; OS36-xii.2007; OS38-i.2010; OS39-ii.2010; CL2-ii.2006; CL3-iii.2001, ii.2006; CL4-i.2007; CL5-iii.2005; CL7-iii.2005; CL8-iii.2005; CL10-iii.2005, ii.2006; CL11-iii.2005, i.2007; CL13-iii.2005; CL14-iii.2005; CL19-xii.2007.

Flight period: Rainy season, records from November to May.

Habitat: Large or medium sized permanent rivers and streams.

Nesciothemis minor GAMBLES, 1966

Last record: 1975.

Number of Records: 1

Rank: 122/127

Red List: Least Concern.

Africa distribution: West Africa, Ghana, Guinea, Ivory Coast, Liberia, Nigeria and Sierra Leone.

Botswana distribution: Only one single historical record: Four Rivers, north-eastern Okavango Delta, in December 1975 (PINHEY 1976).

Own records: None.

Flight period: Only this December record.

Habitat: Swamps.

Notes: The status of this species in Botswana is absolutely unclear. The Botswana record is a remarkable outlier of the range of this species. Dijkstra (pers. comm.) confirmed the identification of the specimen.

Olpogastra lugubris KARSCH, 1895

Last record: 2010.

Number of Records: 80

Rank: 29/127

Red List: Least Concern.

Botswana distribution: Northern Botswana, Okavango Delta and Chobe River.

Other records: Khwai River, Okavango Delta, xii.1963, several adults, B. I. Balinsky (TMSA); Xugana Safari Camp, N of MGR, i.1991, J. Silsby; Shakawe, 2.iv.2007, W. Tarboton.

Own records: OP5-ii.2002; OP7-ii.2002, iii.2005, ii.2006, i.2009; OP8-ii.2006; OP9-ii.2002; OP10-ii.2002; OP20-iii.2005; OP21-iii.2005; OP22-iii.2005; OP32-ii.2006, abun, copula; OP34-xii.2007; OP38-ii.2007, ii.2010; OP40-xii.2007, ii.2010; OP41-xii.2007; OP44-i.2009; OS1-iii.2001, xii.2007; OS13-iii.2002; OS14- iii.2002, i.2006; OS18-iii.2002; OS19-iii.2002; OS22-28.i.2006, 1 ♂; OS26-i.2007; OS29-xi.2007; OS32-i.2007, xi.2007; OS37-i.2010; CL1-iii.2002; CL4-iii.2002, iii.2005, ii.2006, i.2007; CL9-iii.2005, copula; CL10-iii.2005, ii.2006; CL11-iii.2005.

Flight period: Rainy season, without exceptions records from December to April.

Habitat: Swiftly flowing streams and rivers. In the Okavango Delta typical at small and fast flowing channels through the Papyrus swamps. In copula at an artificial stream on a golf course in Kasane.

Notes: Also recently recorded from the Kwando River in Namibian Caprivi (SUHLING & MARTENS 2007). Remarkable is a male individual, which I found perching at a swimming pool of Leroo la Tau Lodge (OS22) far from any suitable habitat; long-distance dispersal is also recorded from Namibia (SUHLING & MARTENS 2007).

**Orthetrum abbotti abbotti* CALVERT, 1892

Last record: 2002.

Number of Records: 1

Rank: 123/127

Red List: Least Concern.

Botswana distribution: New to Botswana.

Other records: Tswapong Hills, Moremi Gorge (here loc. OL5), 15.xii.2002, 1 ♂, W. Goodwin (NMBZ).

Own records: None.

Flight period: Data deficient, only this December record.

Habitat: Data deficient, in Namibia at well-vegetated springs (SUHLING & MARTENS 2007). In adjacent Zambia the species is common in a wide variety of freshwater habitats (own observations).

Notes: Probably more widespread at Tswapong Hills and other rocky areas in south-eastern Botswana.

Orthetrum brachiale (PALISOT DE BEAUVOIS, 1817)

Last record: 2010.

Number of records: 90

Rank: 23/127

Red List: Least Concern.

Botswana distribution: Northern and eastern Botswana.

Other records: Mababe Flats, 8.vi.1930, 1 ♂, Vernay-Lang Expedition; Khwai River, Okavango Delta, xii.1962, xii.1963, several adults, B. I. Balinsky (all in TMSA).

Own records: OP7-ii.2002, i.2009; OP34-i.2009; OS6-iv.2002; OS13-ii.; OS14-iii.-v.2000, 2005; OS16-iv.; OS18-i.2007; OS25-i.2007; OS26-i.2007; OS29-i.2007, ii.2010; OS31-xi.2007; OS35-xii.2007; OS39-ii.2010; OS40-ii.2010; CL4-iii.2005, ii.2006; CL10-ii.; CL17-xii.2007; CL18-xii.2007; CL19-xii.2007; CL20-xii.2007; CL21-xii.2007; OL11; OL12; OL19; OL26-i.2009; OL27-i.2009; OL28-i.2010.

Flight period: Records from November to June.

Habitat: Rivers, streams and pools, mostly in open savannah situations.

Notes: During dry years only to be found close to the Okavango Delta and perennial waters, in wet years with extended rainy seasons it was able to spread into the Kalahari and settle temporary pools, where it was the dominating *Orthetrum* species.

Orthetrum chrysostigma chrysostigma (BURMEISTER, 1839)

Last record: 2010.

Number of Records: 52

Rank: 36/127

Red List: Least Concern.

Botswana distribution: Mainly in arid parts of the country. Not in the central Okavango Delta.

Other records: Nnywane Dam, 15 km N of Lobatse, 5.xi.1983; Kolobeng Dam, near Gaborone, 12.xi.1983; Gaborone Game Reserve, on sewage ponds stream, 13.xi.1983, all ♂♂, all M. Parr; Serowe, v.1988; Moeng College, Tswapong Hills, i.1992 (BNMG); Duma Tau (Linyanti), iv.2002, M. Samways; Tuli Hill Farm, 27.iv.2001, copula, Letsibogo Dam, Mmadinare, 1.vii.2001, copula, Motloutse River, Selebi-Phikwe, 16.vii.2001, 9.ix.2001, 1.v.2002, 6.x.2002, several adults, Tswapong Hills, Moremi Gorge, 15.xii.2002, V. & W. Goodwin (NMBZ).

Own records: OS7-iv.2000 ; OS8-iv.2002; OS13-iv.2002; OS15-iv.-v.2000; OS16-iv.2000; OS17-iv.2000; OS21-iii.2005; CL4-v.2000, abun, iii.2005; CL9-iii.2005; CL10-iii.2005; OL12-i.2006, abun; OL28-i.2010.

Flight period: Probably throughout the year, records from all months except June.

Habitat: All kind of freshwater habitats, but most common at temporary waters in xeric and rocky surroundings.

Notes: More southerly distributed; I found it very seldom in the humid north of the country. Obviously not able to colonise permanent water bodies, like *O. brachiale* or *O. machadoi* do. *O. chrysostigma* is independent from perennial water due to rapid larval development (SUHLING et al. 2004, JOHANSSON & SUHLING 2004).

**Orthetrum guineense* RIS, 1910

Last record: 2005.

Number of records: 2

Rank: 109/127

Red List: Least Concern.

Botswana distribution: New to Botswana.

Other records: Only at Tswapong Hills. OL4-13.vii.2005, 2 ♂♂, 3 ♀♀, E. Schuran.

Own records: None.

Flight period: More information needed.

Habitat: At a small stream in rocky terrain with shady sections.

Orthetrum icteromelas cinctifrons PINHEY, 1970

Last record: 2010.

Number of records: 84

Rank: 27/127

Red List: Least Concern.

Botswana distribution: Okavango Delta, Savuti Marsh, Linyanti Swamps and Chobe River.

Other records: Xugana Safari Camp, N of MGR, i.1991, J. Silsby; Vumbura and Chitabe (Okavango Delta), iv.2002, M. Samways; Txatxanika, MGR, Okavango Delta, 22.ix.2003, P. Hancock; Okavango Delta, Xhudum Lodge, 28.xi.2009, 1 ♂, E. Schuran.

Own records: OP17-ii.2002; OP22-iii.2005; OP29-iii.2005; OP30-ii.2006; OP32-ii.2006; OP34-i.2009; OP35-xii.2007; OP36-ii.2007; OP37-ii.2007, i.2009; OP38-ii.2007; OP39-xii.2007; OP40-xii.2007; OP43-xii.2007; OP44-i.2009; OS1-iii.2001, xii.2007; OS2-xii.2007; OS3-iii.2001; OS6-v.-vi.2000, iv.2002; OS7-iv.2002; OS9-v.2000; OS10-ii.2002; OS13-ii., iv.2002; OS14-v.2000; OS17-v.2000; OS26-i.2007; OS30-xi.2007, ii.2010; OS32-i.2007; OS39-ii.2010; OS42-ix.2010; OS43-ix.2010; CL17-xii.2007.

Flight period: Mostly rainy season, records from December to early June, and one record from September.

Habitat: Extended swamps, swampy rivers and floodplains with rich vegetation.

Notes: It is the most common *Orthetrum* species in large parts of the Okavango Delta. It is able to colonize shortly flooded swamps very quickly. In Maun it appeared in 2010 at the Boronyana River a few weeks after it was flooded the first time since 45 years.

**Orthetrum julia falsum* LONGFIELD, 1955

Last record: 2006.

Number of records: 6

Rank: 87/127

Red List: Least Concern.

Botswana distribution: New to Botswana, Chobe River and Tswapong Hills.

Own records: CL5-iii.2002; OL5-ii.2006, abun.

Flight period: Records from February and March, more information needed.

Habitat: Perennial rivers and streams with shady forest.

Orthetrum machadoi LONGFIELD, 1955

Last record: 2010.

Number of records: 37

Rank: 48/127

Red List: Least Concern.

Botswana distribution: Northern Botswana, Okavango Delta and Linyanti swamps. Historical records from the northern Okavango Delta and panhandle (BALINSKY 1967, PINHEY 1976).

Own records: OP7-ii.2002, ii.2006, i.2009, abun; OP8-ii.2002; OP10-ii.2002; OP17-ii.2002, iii.2005; OP21-iii.2005; OP30-ii.2006; OP34-xii.2007; OP35-xii.2007; OP36-ii.2007; OP40-xii.2007; OP43-xii.2007; OP44-i.2009; OS1-xii.2007.

Flight period: Rainy season, records from December to March.

Habitat: Well vegetated swampy rivers or lagoons with dense riverine forest.

Notes: Since SUHLING & MARTENS (2007) listed some records from Kwando and Zambezi Rivers in Namibian Caprivi I expect this species to occur also at Linyanti and Chobe Rivers.

Orthetrum robustum BALINSKY, 1965

Last record: 2009.

Number of records: 45

Rank: 43/127

Red List: Least Concern.

Botswana distribution: Northern Botswana. Historical records from the Okavango Delta and surroundings (PINHEY 1976).

Other records: Khwai River, xii.1963, Ngamiland Game Reserve, Maxwee, Okavango Delta, xii.1963, xii.1964, B. I. Balinsky (TMSA).

Own records: OP7-ii.2006; OP8-ii.2002; OP17-ii.2002; OP34-xii.2007, i.2009; OP35-xii.2007; OP36-ii.2007; OP39-xii.2007; OP41-xii.2007; OP43-xii.2007; OP44-i.2009; OS3-xii.2007; OS9-vi.2000; OS14-v.2000; OS16-iv.2000; OS32-i.2007; OS36-xii.2007; CL15-xii.2007; CL19-xii.2007.

Flight period: Records from December to early June.

Habitat: Swampy rivers and floodplains with rich vegetation and open woodland.

Notes: Also recorded from the Kwando and Okavango Rivers in Namibian Caprivi (SUHLING & MARTENS 2007).

**Orthetrum stemmale stemmale* (BURMEISTER, 1839)

Last record: 2007.

Number of records: 7

Rank: 84/127

Red List: Least Concern.

Botswana distribution: New to Botswana, only Chobe River in northern Botswana.

Own records: CL4-i.2007; CL5-iii.2002; CL7-iii.2005; CL10-iii.2005, ii.2006; CL11-iii.2005.

Flight period: Data deficient, records only from February and March.

Habitat: I found it in dense riverine forest with small clearings along the Chobe River.

Notes: Next known localities of this species are also eastern Caprivi on Namibian side of the Chobe River and at the Zambezi River (SUHLING & MARTENS 2007) and Victoria Falls in neighbouring Zimbabwe (LEHMANN & WENDLER 1996).

Orthetrum trinacria trinacria (SELYS, 1841)

Last record: 2010.

Number of records: 96

Rank: 22/127

Red List: Least Concern.

Botswana distribution: Mainly Okavango Delta and Linyanti/Chobe region, few records from more arid regions.

Other records: Serowe, v.1988, v.1990 (BNMG); Motloutse River, Selebi-Phikwe, 9.ix.2001, 1 ♂, 13.x.2002, J. & N. Goodwin (NMBZ); Duma Tau (Linyanti) and Chitabe (Okavango Delta), iv.2002, M. Samways.

Own records: OP31-ii.2006; OP36-ii.2007; OP37-ii.2007; OS2-xii.2007; OS3-xii.2007; OS7-iv.-v.2000; OS13-ii.,iv.2002; OS14-v.2000, ii.,iv.2002, i.2006; OS15-iv.-v.2000; OS16-iv.-vii.2000, abun, ovip; OS17-iv.-v.2000, abun, ovip, ii.-iii.2002; OS18-iii.2005, i.2006; OS19-v.2000; OS21-iii.2005, i.2006; OS25-i.2007; OS26-i.2007; OS30-xi.2007, ii.2010; OS32-i.2007, xi.2007; OS33-xi.2007; OS36-xii.2007; OS37-i.2010; OS39-ii.2010; OS40-ii.2010; OS42-ix.2010; OS43-ix.2010; CL12-iii.2005; CL17-xii.2007; OL12-i.2006; OL19-ii.2006; OL28-ii.2009.

Flight period: Probably throughout the year, records from all months except August.

Habitat: Mainly at temporary water bodies, also brackish pools. Rare or absent in the northern Okavango Delta at perennial water courses.

Notes: During extended rainy seasons as in 2000 it was able to disperse into arid biomes and bred in rainfed waters.

Palpopleura deceptor (CALVERT, 1899)

Last record: 2010.

Number of records: 7

Rank: 93/127

Red List: Least Concern.

Botswana distribution: Northern and eastern Botswana. Only two historical records from drier parts of Botswana, Goha Hills and near Gaborone (PINHEY 1976).

Own records: OS23-ii.2010; CL10-iii.2005; CL14-iii.2005.

Flight period: Records only from February and March, more information needed.

Habitat: I observed it at small shallow pools along the river courses of the Chobe River. Also at temporary pools in Mopane woodland near Maun.

Palpopleura jucunda jucunda RAMBUR, 1842

Last record: 2010.

Number of records: 96

Rank: 22/127

Red List: Least Concern.

Botswana distribution: Chobe River and arid eastern parts of Botswana. Only two historical records from the Chobe Rapids and Notwane River near Gaborone (PINHEY 1976).

Other records: Tuli Hill Farm, 27.iv.2001, 3 ♂♂, Motloutse River, Selebi-Phikwe, 16.vii.2001, 3 ♂♀, J. & W. Goodwin (NMBZ).

Own records: None.

Flight period: Data deficient, records from dry season in April, May, July and September.

Habitat: Probably also at well-vegetated springbrooks as in Namibia (SUHLING & MARTENS 2007), more data needed.

Palpopleura lucia (DRURY, 1773)

Last record: 2007.

Number of records: 7

Rank: 85/127

Red List: Least Concern.

Botswana distribution: Mainly northern Botswana, one record from Gaborone.

Other records: Txatxanika, Moremi Game Reserve, Okavango Delta, 23.ix.2003, P. Hancock.

Own records: OS7-iv.2000; OS15-iv.,v.2000; OS31-xi.2007.

Flight period: Records from dry season, April, May and September, November.

Habitat: Data deficient, probably at shallow pools.

Notes: This and the following species only recently separated by DNA-analysis (MITCHELL & SAMWAYS 2005). All the historical Botswana records of PINHEY (1976) definitely belong to *P. lucia*.

**Palpopleura portia* (DRURY, 1773)

Last record: 1992.

Number of records: 1

Rank: 124/127

Red List: Least Concern.

Botswana distribution: New to Botswana.

Other records: Moeng College, north-eastern Tswapong Hills, i.1992, 2 ♂♂, (BNMG).

Own records: None.

Flight period: Data deficient, only the one record from January.

Habitat: At the locality Moeng College I recently found springbrooks and shallow pools.

Notes: Vide supra. PINHEY (1976) mentioned only *P. lucia* from Botswana, so the new species *P. portia* is a real addition to the Botswana checklist.

Pantala flavescens (FABRICIUS, 1798)

Last record: 2010.

Number of records: 165

Rank: 7/127

Red List: Least Concern.

Botswana distribution: As a migrant to be found in all parts of Botswana, but rare in the central Okavango Delta.

Other records: Serowe, vi.1983, xi.1983, xi.1988 (BNMG); Letsibogo Dam, Mmadinare, 1.i.2002, 1 ♂, Selebi-Phikwe, 23.x.2001, 1 ♂, W. Goodwin (NMBZ); Duma Tau (Linyanti) and Vumbura (Okavango Delta), iv.2002, M. Samways; Shakawe, 2.iv.2007, W. Tarboton.

Own records: OP17-iii.2005, i.2009; OP20-iii.2005; OP30-i.-ii.2006; OP31-ii.2006; OP35-xii.2007; OS1-iii.2001; OS2-xii.2007; OS3-xii.2007; OS5-ii.2002; OS11-iv.2000; OS13-ii.,iv.2002; OS14-iii.2002; OS15-iv.2000, abun; OS16-iv.-v.2000, abun; OS17-iv.-v.2000, abun, i.2006; OS18-iii.2005, i.2006; OS19-v.2000, iii.2002; OS20-iv.2000, abun; OS21-iii.2005; OS22-i.2006; OS23-i.2006, exuvia; OS25-i.2007; OS27-i.2007; OS30-xi.2007; OS31-xi.2007; OS32-i.2007; OS33-xi.2007; OS35-xii.2007; OS40-ii.2010; CL4-iii.2002; CL10-i.2007; CL11-iii.2005, i.2007; CL15-xii.2007; CL16-xii.2007; CL17-xii.2007; CL18-xii.2007; CL19-xii.2007; CL20-xii.2007; CL21-xii.2007; OL2-v.2000, abun, iii.2001; OL1-ii.2006, abun; OL3-iv.2005; OL7; OL8; OL9; OL10; OL11; OL12; OL13; OL14; OL15; OL16; OL17; OL18; OL19; OL20; OL21-all ii.2006; OL22-i.2010; OL23-xii.2007; OL24-xii.2007; OL26-i.2009; OL27-i.2009; OL28-i.2010; OL29-ii.2010; OL30-ii.2010; OL31-ii.2010. Also in between the listed localities.

Flight period: Most common during rainy season, records from September to June.

Habitat: A wide variety of temporary freshwater habitats, also brackish water. Obviously weak in competition at permanent water, since it was absent from large parts of the permanent rivers and swamps. Very common during extended rainy seasons like in 2006, when it dispersed deep into the Kalahari and bred in all kinds of rainfed pans and pools.

Notes: Despite it is not reflected by the ranking above, *P. flavescens* is probably the Odonata species with the widest distribution in Botswana, I often found it en masse dead in radiator grills of cars after long overland tours without local specification.

Parazyxomma flavicans (MARTIN, 1908)

Last record: 2010.

Number of records: 28

Rank: 56/127

Red List: Least Concern.

Botswana distribution: Okavango Delta, Linyanti Swamps and Chobe River.

Other records: Shakawe, 2.iv.2007, W. Tarboton.

Own records: OP7-ii.2002, ii.2006; OP8-ii.2002, ii.2006; OP9-ii.2006; OP29-ii.2006; OP35-xii.2007; OS1-xii.2007; OS6-v.2000, exuvia; OS41-ix.2010; OS43-ix.2010, abun; CL3-iii.2002, ii.2002; CL10-iii.2005; CL11-i.2007.

Flight period: Dry and rainy season, all available records from September to April. It was very common in the southern Okavango Delta in early September 2010.

Habitat: At medium sized to large well-vegetated rivers with dense woodland. During the day the crepuscular species has only been seen hidden in the shade of trees. I collected several individuals at light at dawn.

Notes: For taxonomic discussion and Kwando River records vide SUHLING & MARTENS (2007).

Rhyothemis fenestrina (RAMBUR, 1842)

Last record: 2010.

Number of records: 87

Rank: 84/127

Red List: Least Concern.

Botswana distribution: Okavango Delta, Savuti Marsh, Linyanti Swamps and Chobe River.

Other records: Xugana Safari Camp, N of MGR, i.1991, J. Silsby; Kasane, ii.1994 (BNMG); Vumbura (Okavango Delta), iv.2002, M. Samways; Mbiroba, Seronga, Okavango Delta, 20.ix.2003, abun, P. Hancock; Chobe River, Kubu Lodge Kasane, xi.2003, abun (KAPPES & NEHLS 2004); Ikogha – Sepopa, xii.2004-i.2005, abun (S. Bourquin pers. comm.).

Own records: OP7-ii.2002, i.2009; OP8-ii.2002; ii.2006; OP10-ii.2002; OP11-ii.2002; OP16-ii.2002; OP17-ii.2002, abun, iii.2005; OP18-ii.2002; OP19-ii.2002; OP29-i.-ii.2006; OP30-i.-ii.2006; OP33-ii.2006; OP34-xii.2007; OP35-xii.2007; OP36-ii.2007; OP38-ii.2010; OP39-xii.2007; OP40-xii.2007, ii.2010; OP41-xii.2007; OP43-xii.2007; OP44-i.2009; OS1-xii.2007; OS3-xii.2007; OS31-xi.2007; OS32-i.2007, xi.2007; OS34-xi.2007; OS35-xii.2007; OS36-xii.2007; OS43-ix.2010; CL3-iii.2001, abun, iii.2002, ii.2006, ii.2010; CL8-iii.2005; CL10-i.2007; CL11-iii.2005.

Flight period: Rainy season from September to March, it was rare from February onwards and definitely absent from suitable habitats in early June.

Habitat: Swampy perennial rivers and adjacent floodplains.

Notes: Despite intense search I was not able to confirm the historical record from Maun until 2006, probably due to habitat degradation and the shortage of flooding it was absent in this area. With the increase of flood water after 2005 it became common again during the rainy season. The species is more common in the permanent flooded part of the Okavango Delta and panhandle.

Rhyothemis semihyalina (DESJARDINS, 1832)

Last record: 2010.

Number of records: 107

Rank: 18/127

Red List: Least Concern.

Botswana distribution: Northern and eastern Botswana.

Other records: Xugana Safari Camp, N of MGR, i.1991, J. Silsby; Letsibogo Dam spillway, Mmadinare, 26.i.2003, Motloutse River, Selebi-Phikwe, 7.x.2001, W. Goodwin (NMBZ); Duma Tau (Linyanti), Vumbura and Chitabe (Okavango Delta), iv.2002, M. Samways; Chobe River, Kubu Lodge Kasane, xi.2003 abun (KAPPES & NEHLS 2004).

Own records: OP16-ii.2002; OP17-ii.2002; OP31-ii.2006; OP33-ii.2006; OP35-xii.2007; OP36-ii.2007; OP41-xii.2007; OP43-xii.2007; OP44-i.2009; OS1-iii.2001, xii.2007; OS2-xii.2007; OS3-xii.2007; OS5-ii.2002; OS6-iv.-v.2000, iv.2002; OS7-iv.2002; OS11-iv.2000; OS13-ii.2002; OS14-ii.-iii.2002;

OS15-iv.-v.2000; OS16-iv.2000; OS17-iv.2000, ii.-iii.2002; OS18-iii.2002, i.2006; OS19-iii.2002; OS21-i.2006; OS24-xii.2007; OS25-i.2007; OS28-i.2007; OS29-i.2007; OS30-xi.2007, ii.2010; OS31-xi.2007; OS32-xi.2007; OS33-xi.2007; OS36-xii.2007; OS37-i.2010; OS38-i.2010; OS43-ix.2010; CL3-iii.2002, iii.2005, ii.2006, ii.2010; CL4-i.2007; OL7-ii.2006; OL8-ii.2006; OL11-ii.2006, i.2007; OL22-i.2010.

Flight period: Rainy season from October to May.

Habitat: River backswamps, temporary pools and well-vegetated pans, in southern Botswana also at dams. I found it as typical in the southern temporary flooded part of the Okavango Delta, it was less common in the panhandle.

Sympetrum fonscolombii (SELYS, 1840)

Last record: 2010.

Number of records: 85

Rank: 26/127

Red List: Least Concern.

Botswana distribution: In all biomes of Botswana, but not many localities. Migrates even to remote parts of the Kalahari in wet years.

Other records: Chiefs Island, Okavango Delta, 13.v.1984, 1 ♂, M. Parr; Serowe, xii.1981 (BNMG); Letsibogo Dam, Mmadinare, 15.ii.2001, 15.vii.2001, V. & J. Goodwin (NMBZ); Shakawe, 2.iv.2007, W. Tarboton.

Own records: OS7-v.2000; OS13-iv.2002; OS14-v.2000, ovip, vii.2000, abun, iv.2002; OS15-v.2000; OS16-iv.-vii.2000, abun, ovip; OS17-iv.-vii.2000, abun, ovip; OS19-v.2000; OS21-iii.2005; OS30-xi.2007; OS39-ii.2010; OS42-ix.2010; OS43-ix.2010; OL8-ii.2006; OL11-ii.2006; OL12-i.2006; OL26-i.2009; OL29-ii.2010; OL30-ii.2010; OL31-ii.2010; OL32-ii.2010.

Flight period: Throughout the year, records from all months.

Habitat: Mostly temporary water bodies, like pools and pans, also brackish waters.

Notes: A species which depends on rainfall and obviously follows the floodwater in the Okavango Delta. In May 2000 I have seen thousands of mating pairs appearing with the incoming flood of the Boro and Thamalakane Rivers in Maun to oviposit there.

Tholymis tillarga (FABRICIUS, 1798)

Last record: 2010.

Number of records: 84

Rank: 28/127

Red List: Least Concern.

Botswana distribution: Very abundant at swamps and rivers of northern Botswana, especially common in the Okavango Delta panhandle. Rare in rocky and dry areas of Tsodilo and Tswapong Hills or Nxai Pan.

Own records: OP7-iii.2005, mfl, ii.2006, abun, i.2009, abun; OP8-ii.2002, ii.2006; OP10-ii.2002, abun; OP17-ii.2002; OP21-iii.2005; OP22-iii.2005, abun, exuviae; OP35-xii.2007; OP41-xii.2007; OP44-i.2009; OS1-iii.2001, xii.2007; OS2-ii.2001, xii.2007; OS5-ii.2002; OS6-iv.2000, iv.2002; OS7-iv.-v.2000, mfl, abun; OS13-i.2006; OP30-i.2006; OS14-i.2006; OS15-v.2000; OS18-xi.2007; OS25-i.2007; OS26-i.2007; OS28-i.2007; OS29-i.2007, xi.2007; OS32-i.2007; OS34-xi.2007; OS36-xii.2007; OS40-ii.2010; CL3-iii.2002, iii.2005, ii.2006, abun, ii.2010; CL5-iii.2002; CL11-iii.2005, i.2007; CL15-xii.2007; OL3-iv.2005; OL5-ii.2006; OL30-ii.2010.

Flight period: Rainy season, records between December and May, teneral throughout the year, exuviae in March.

Habitat: Swampy rivers with diverse vegetation and dense intact riverine forest. Exuviae were found in backswamps of a large river.

Notes: I found sometimes huge aggregations hunting at dusk in the riverine forests of the Okavango Delta panhandle, during the day they rested in dense shrubs and trees.

Tramea basilaris (PALISOT DE BEAUVOIS, 1807)

Last record: 2010.

Number of records: 117

Rank: 17/127

Red List: Least Concern.

Botswana distribution: Northern and eastern parts of Botswana. After good rain also deep in the Kalahari.

Other records: Palapye, 4.i.1985, 1 ♀, M. Parr; Serowe, iv.1988 (BNMG); Xugana Safari Camp, N of MGR, i.1991, J. Silsby; Letsibogo Dam, Mmadinare, 1.i.2002, 26.1.2003, J. & N. Goodwin (NMBZ).

Own records: OP34-i.2009; OP36-ii.2007; OP39-xii.2007; OP42-xii.2007; OS3-xii.2007; OS5-ii.2002; OS14-v.2000, ii.2002, i.2006; OS15-iv.-v.2000, abun; OS16-iv.2000; OS17-iv.-v.2000, abun; OS18-i.2006; OS19-v.2000; OS20-iv.2000, abun; OS22-i.2006; OS23-i.2006; OS27-i.2007; OS28-i.2007; OS29-i.2007, xi.2007; OS30-xi.2007; OS31-xi.2007; OS33-xi.2007; OS40-ii.2010; CL15-xii.2007; CL16-xii.2007; CL18-xii.2007; CL19-xii.2007; CL20-xii.2007; CL21-xii.2007; OL1-ii.2006; OL7-ii.2006; OL8-ii.2006; OL9-ii.2006; OL11-ii.2006; OL12-i.2006; OL13-ii.2006; OL14-ii.2006; OL15-ii.2006; OL16-ii.2006; OL18-ii.2006; OL20-ii.2006; OL25-i.2009; OL26-i.2009; OL27-i.2009, abun, ovip; OL29-ii.2010; OL30-ii.2010; OL31-ii.2010; OL32-ii.2010.

Flight period: Mainly rainy season, records from November to May.

Habitat: At many types of freshwater habitats, mainly temporary pools and pans with grassy vegetation.

Notes: In wet years like 2000 and 2006 it was extremely common together with *Pantala flavescens* in mixed swarms around Maun and Lake Ngami and dispersed far into the Kalahari.

Tramea limbata (DESJARDINS, 1832)

(syn. *Tramea continentalis* SELYS, 1878)

Last record: 1974.

Number of records: 1

Rank: 126/127

Red List: Least Concern.

Botswana distribution: As *T. continentalis* recorded from a single locality: Mosu (Nathane), S of Makgadikgadi Pans, i.1974 (PINHEY 1976).

Own records: None.

Flight period: More information needed, only this record from January.

Habitat: Ponds and dams probably in often more arid conditions.

Notes: A new record from Namibia comes from Katima Mulilo at sewage ponds (SUHLING & MARTENS 2007). Probably often just overlooked due to the similarity with the very common *T. basilaris*.

**Trithemis aconita* LIEFTINCK, 1969

Last record: 2007.

Number of records: 5

Rank: 97/127

Red List: Least Concern.

Botswana distribution: New to Botswana, northern panhandle of the Okavango Delta and Chobe River.

Other records: Shakawe, 2.iv.2007, W. Tarboton.

Own records: OP9-vi.2000, iv.2007; CL3-ii.2006; CL10-iii.2005, ii.2006.

Flight period: Records from February to early June, more information needed.

Habitat: Large rivers with moderate to turbulent current and dense riverine forest.

Trithemis aequalis LIEFTINCK, 1969

Last record: 2009.

Number of records: 85

Rank: 26/127

Red List: Near Threatened.

Botswana distribution: Only Okavango Delta. Recorded as »*T. ? aequalis falconis*« from Khwai River and Four Rivers area in north-eastern Okavango Delta (PINHEY 1976).

Other records: Okavango Delta, Xhudum Lodge, 28.xi.2009, 1 ♀, E. Schuran.

Own records: OP34-xii.2007; OP35-xii.2007, abun; OP40-xii.2007; OP41-xii.2007; OP43-xii.2007.

Flight period: Only November and December records, more information needed.

Habitat: Probably swampy rivers and larger lagoons, more information needed.

Notes: A record from Popa Falls, Okavango River, Namibia (SUHLING & MARTENS 2007) makes the occurrence in the northern panhandle likely. The species is known from Okavango River and from Lake Bangweulu in Zambia (PINHEY 1984). I found some individuals at the Kwando River near Kongola in eastern Caprivi (Bum Hill campsite, 12.i.2009). *T. aequalis* is strictly restricted to the Palaeo Chambeshi-Katanga swamp area. Probably a large part of its population lives in the Okavango Delta. More research necessary.

Trithemis annulata annulata (PALISOT DE BEAUVOIS, 1807)

Last record: 2010.

Number of records: 146

Rank: 10/127

Red List: Least Concern.

Botswana distribution: Northern and eastern Botswana, probably all over the country, except the driest parts.

Other records: Chiefs Island, Okavango Delta, 13.v.1984, 1 ♂, M. Parr; Serowe, v.1988 (BNMG); Letsibogo Dam, Mmadinare, 15.vii.2001, 26.i.2003, Motloutse River, Selebi-Phikwe, 7.x.2001, 9.ix.2001, V., N., J. & W. Goodwin (NMBZ); Duma Tau (Linyanti), iv.2002, M. Samways; Maun-Disaneng, 5.iv.2003, 1 ♂, P. Hancock; Chobe River, Kubu Lodge Kasane, xi.2003, abun (KAPPES & NEHLS 2004).

Own records: OP2-vi.2000; OP5-iv.2005; OP7-ii.2006; OP16-ii.2002; OP17-iii.2005; OP18-ii.2002; OP21-iii.2005; OP22-iii.2005; OP25-ii.2010; OP28-iii.2005; OP44-i.2009; OS1-iii.2001, xii.2007; OS2-iii.2001; OS6-iv.-vi.2000; OS7-v.2000; OS13-iii.-iv.2002; OS14-v.-vii.2000, ii.-v.2002, abun, iii.2005, i.2006; OS15-iv.2000; OS17-iii.-vi.2000; OS18-ii.2002, iii.2005, i.2007; OS19-iii.2002; OS22-i.2006; OS25-i.2007; OS26-i.2007; OS29-i.2007, xi.2007, ii.2010; OS32-i.2007, xi.2007, ix.2010; OS36-xii.2007; OS37-i.2010; OS38-i.2010; OS39-ii.2010; OS40-ii.2010; OS41-ix.2010; OS42-ix.2010; OS43-ix.2010; CL1-iii.2002; CL3-iii.2002; CL4-iii.2002, i.2007; CL5-iii.2005; CL9-iii.2005; CL10-iii.2005; CL11-iii.2005, i.2007; CL12-iii.2005; CL13-iii.2005; CL14-iii.2005; CL15-xii.2007; OL16-ii.2006; OL18-ii.2006; CL19-xii.2007; OL19-ii.2006; OL28-ii.2009, i.2010.

Flight period: Records between September and July, probably throughout the year.

Habitat: Locally abundant at perennial rivers and their backswamps, in wet years it was also seen at temporary waters.

Trithemis arteriosa arteriosa (BURMEISTER, 1839)

Last record: 2010.

Number of records: 45

Rank: 44/127

Red List: Least Concern.

Botswana distribution: Northern and eastern parts of the country.

Other records: Lobatse, October 1904, 2 ♂♂, L. Schultze (RIS 1908); Matakota, Limpopo River, 25.iv.1957, 3 ♂♂, Khwai River, 20.ix.1964, 1 ♀, B. I. Balinsky (TMSA); Motloutse River, Selebi-Phikwe, 16.vii.2001, 2 ♀♀, 7.x.2001, 2 ♂♂, W. Goodwin (NMBZ).

Own records: OP7-vi.2000; OS1-xii.2007; OS14-iv.2002, iii.2005; OS28-i.2007; OS29-i.2007; OS31-xi.2007; CL4-iii.2005, ii.2006, i.2007; CL9-iii.2005; CL10-iii.2005, ii.2006; CL11-iii.2005, i.2007; CL13-iii.2005; CL19-xii.2007.

Flight period: Maybe throughout the year in variable numbers, records from September to July, most common in January to March.

Habitat: At perennial waters, like streams to large rivers, their backswamps and floodplains. Not at temporary pans. The record in PINHEY (1976) from pans in S. Botswana has to be corrected: RIS (1908) cites L. Schultze's two males from Lobatse and not from the mentioned pans.

Trithemis brydeni PINHEY, 1970

Last record: 2007.

Number of records: 5

Rank: 98/127

Red List: Near Threatened.

Africa distribution: Known from Kasama in northern Zambia, where the species was originally described (PINHEY 1970a), and from the Okavango Delta with the allotypes. Furthermore, an additional sight-record from Lake Bangweulu, Zambia exist (PINHEY 1984).

Botswana distribution: Okavango Delta. Historical records from Four Rivers area in December 1973 and 1975 (PINHEY 1976).

Own records: OP35-8.xii.2007, 1 ♂.

Flight period: From Botswana only December records, Zambia in March (PINHEY 1970a, 1984).

Habitat: Probably swamps or swampy rivers.

Notes: The species is only known from six records with few individuals. With *T. aequalis* this species is strictly restricted to the Palaeo Chambeshi-Katanga swamp area. Probably a large part of its population lives in the Okavango Delta.

**Trithemis donaldsoni* (CALVERT, 1899)

Last record: 2003.

Number of records: 5

Rank: 99/127

Red List: Least Concern.

Botswana distribution: New to Botswana, Chobe River and south-eastern Botswana.

Other records: Nnywane Dam, 15 km N of Lobatse, 5.xi.1983, 1 ♂, M. Parr; Letsibogo Dam, Mmadinare, 1.i.2002, 1 ♀, Letsibogo Dam spillway, Mmadinare, 26.i.2003, 2 ♂♂, V., J. & W. Goodwin (NMBZ).

Own records: CL4-iii.2002.

Flight period: Records from November, January and March.

Habitat: Large swiftly flowing rivers on rocky ground, dams and streams in the south.

Notes: SUHLING & MARTENS (2007) recorded it from the Okavango in western Caprivi, where the Okavango cuts through some rocky formations, but also known from dams in central Namibia.

**Trithemis furva* KARSCH, 1899

Last record: 2006.

Number of records: 2

Rank: 110/127

Red List: Least Concern.

Botswana distribution: New to Botswana, hills in south-eastern Botswana.

Other records: Tswapong Hills, Moremi Gorge, 15.xii.2002, 1 ♂, W. Goodwin (NMBZ).

Own records: OL5-13.ii.2006, 1 ♂.

Flight period: Not adequately known.

Habitat: Only known from a stream in a deep cutted and shady gorge.

Notes: Likely to be more widespread at Tswapong and other neighbouring hills.

Trithemis hecate RIS, 1912

Last record: 2010.

Number of records: 161

Rank: 8/127

Red List: Least Concern.

Botswana distribution: Common and widespread in the Okavango Delta, Savuti Marsh, Linyanti Swamps but rare at the Chobe River.

Other records: Chiefs Island, Okavango Delta, 13.v.1984, 26-29.vi.1986, M. Parr; Duma Tau (Linyanti), Vumbura and Chitabe (Okavango Delta), iv.2002, M. Samways; Txatxanika, MGR, 22.ix.2003, Boro River at HOORC camp, 26.ix.2003, all Okavango Delta, P. Hancock.

Own records: OP7-vi.2000; OP8-vi.2000; OP9-vi.2000; OP15-vi.2000; OP16-ii.2002; OP17-ii.2002; OP22-iii.2005; OP30-i.-ii.2006, abun; OP34-xii.2007; OP35-xii.2007; OP36-ii.2007; OP38-ii.2010; OP39-xii.2007; OP41-xii.2007; OP42-xii.2007; OS1-iii.2001, xii.2007; OS2-xii.2007; OS3-iii.2001, xii.2007; OS6-iv.-v.2000; OS7-iv.-v.2000; OS12-iv.2000, ix.2010; OS13-ii.-iv.2002, i.2006; OS14-v.2000 abun, vii.2000, iv.2002; OS15- iv.-v.2000; OS16-iv.-vii.2000, ovip, i.2007; OS17- v.2000, ii.-iii.2002; OS18-iii.2005, i.2006, i.2007, xi.2007; OS19-iii.2002; OS24-xii.2007; OS25-i.2007; OS26-i.2007; OS29-xi.2007, ii.2010; OS30-xi.2007; OS31-xi.2007; OS32-i.2007, xi.2007, ix.2010; OS33-xi.2007; OS34-xi.2007; OS36-xii.2007; OS41-ix.2010; OS43-ix.2010, abun.

Flight period: In the Okavango Delta throughout the year, records from all months except August.

Habitat: Swampy rivers and their adjacent floodplains. I found it as one of the most common *Trithemis* in the central and southern Okavango Delta. Teneral were often seen resting in scrubland.

Trithemis kirby ardens (GERSTÄCKER, 1891)

Last record: 2010.

Number of records: 30

Rank: 55/127

Red List: Least Concern.

Botswana distribution: Mainly the arid parts of Botswana, few records from Chobe River and the outer Okavango Delta.

Other records: Matakota, Limpopo River, 25.iv.1957, several adults, B. I. Balinsky (TMSA); Serowe, v.1988, v.1990 (BNMG); Letsibogo Dam, Mmadinare, 1.vii.2001, 1 ♂, 15.vii.2001, 1 ♂, Motloutse River, Selebi-Phikwe, 16.vii.2001, 9.ix.2001, several adults, Selebi-Phikwe, mine dump, 6.x.2002, 1 ♂, J. & W. Goodwin (NMBZ).

Own records: OS14-v.2000; OS18-iii.2002; OS21-iii.2005; CL4-iii.2005, i.2007; CL6-iii.2002, abun; OL1-ii.2006; OL10-ii.2006, abun; OL11-ii.2006; OL12-i.2006; OL16-ii.2006; OL19-ii.2006; OL28-i.2010.

Flight period: In some regions probably throughout the year.

Habitat: Mainly temporary rivers and pools in arid country.

Trithemis monardi monardi RIS, 1931

Last record: 2010.

Number of records: 97

Rank: 20/127

Red List: Least Concern.

Botswana distribution: Widespread and locally abundant in the Okavango Delta, also Savuti Marsh and Linyanti Swamps. So far not found at the Chobe River.

Other records: Xugana Safari Camp, N of MGR, i.1991, J. Silsby; Txatxanika, MGR, Okavango Delta, 23.ix.2003, 1 ♂, P. Hancock; Okavango Delta, Xhudum Lodge, 28.xi.2009, E. Schuran.

Own records: OP29-i.-ii.2006, abun; OP30-ii.2006; OP32-ii.2006; OP34-xii.2007, i.2009; OP35-xii.2007; OP36-ii.2007; OP38-ii.2007, ii.2010; OP40-xii.2007, ii.2010; OP41-xii.2007; OP42-xii.2007; OP43-xii.2007; OP44-i.2009; OS2-iii.2001; OS6-iv.-v.2000; OS7-iv.-vi.2000, ovip, mfl; OS10-ii.2002; OS12-ix.2010; OS13-ii.2002; OS14-v.2000; OS16-iv.-v.2000; OS26-i.2007; OS30-ii.2010; OS32-i.2007; OS37-i.2010; OS43-ix.2010, abun, juv.

Flight period: Mainly rainy season with large numbers, but records from all months except July. A second generation in the Okavango Delta during the dry season is remarkable. I found large numbers of freshly emerged and adult individuals in early September in large swamps south of Chiefs Island.

Habitat: Well-vegetated rivers and channels with extended swampy margins.

Notes: The subspecies *T. m. insuffusa* PINHEY, 1970, occurs in eastern Angola, Zambia, Malawi, Zimbabwe and Mozambique and might occur at the Chobe River (PINHEY 1984). The occurrence of several generations and the high abundance shows that *T. monardi* is perfectly adapted to the unusual flood regime of the Okavango Delta.

**Trithemis palustris* DAMM & HADRY, 2009

Last record: 2010.

Number of records: 126

Rank: 14/127

Red List: Least Concern.

Africa distribution: Not known, due to the mix up with *T. stictica* and *T. morrisoni*.

Botswana distribution: Abundant in the Okavango Delta, Savuti Channel, Linyanti Swamps and less common at the Chobe River. Historical records as *Trithemis stictica* (BURMEISTER, 1839) in PINHEY (1976). Described from Moremi Game Reserve, Third Bridge by DAMM & HADRY (2009).

Other records: Vumbura and Chitabe (Okavango Delta), iv.2002, M. Samways; Drotzky's Cabins, Okavango Delta, 8.ix.2002, several adults, W. Goodwin (NMBZ); Chobe River at Kubu Lodge, 10.xi.2003 (KAPPES & NEHLS 2004); Shakawe, 2.iv.2007, W. Tarboton.

Own records: OP5-iv.2005; OP7- vi.2000, ii.2002, iii.2005, mfl, abun, ii.2006, abun; OP8-ii.2002, ii.2006; OP10-ii.2002, mfl; OP11-ii.2002; OP12-ii.2002; OP15-vi.2000; OP21-iii.2005;

OP22-iii.-vi.2005, abun, exuviae; OP23-iii.2005; OP24-iii.2005; OP25-iv.2005, ii.2010; OP26-iv.2005; OP28-iii.2005; OP29-i.-ii.2006, abun; OP30-i.ii.2006, abun; OP32-ii.2006; OP33-ii.2006; OP34-i.2009; OP35-xii.2007; OP36-ii.2007 (type locality); OP38-ii.2007, ii.2010; OP40-xii.2007, ii.2010; OP41-xii.2007; OP43-xii.2007; OP44-i.2009; OS1-iii.2001, xii.2007; OS3-xii.2007; OS6-iv.-v.2000; OS7-iv.-v.2000, iv.2002; OS30-ii.2010; OS32-i.2007, ix.2010, juv; OS36-xii.2007; OS39-ii.2010; OS41-ix.2010; OS43-ix.2010; CL5-iii.2002, abun; CL10-iii.2005; CL14-iii.2005.

Flight period: Most common during the rainy season, but records available between August and June. Many teneral in January to March.

Habitat: Swampy margins of medium sized to large rivers with adjacent woodland. Not found at ephemeral habitats. At several places this was the dominating libellulid species in the Okavango Delta. Teneral were often found in woodland.

Notes: According to DNA sequencing recently undertaken by GIERE (2004) the Okavango and Caprivi population belong to a new species, close to *T. stictica*. Real *T. stictica* is known e. g. from Naukluft region, Namibia (MARTENS et al. 2003, SUHLING & MARTENS 2007) and other arid regions in southern Africa. As I only have Botswanan records from the northern rivers, these likely all belong to this new taxon. There might be an overlapping zone between the both species at the Chobe River, but all individuals I have seen there belong to this new species. I expect the true *T. stictica* to occur at streams in the arid south-eastern part of the country in the Limpopo River basin, but so far we don't have any records from Botswanan territory. Next known localities of *T. stictica* are in South Africa opposite Martins Drift close to the Limpopo River. A useful distinguishing feature in the field is the eye coloration. In the new species the adult eyes show a maroon-brown cap, eyes of adult *T. stictica* are petrol-green-blue above. The very closely related *T. morrisoni* DAMM & HADRY 2009 can not be separated from *T. palustris* in the field. DNA sequencing is always necessary for veritable records.

Trithetrum navasi (LACROIX, 1921)

(syn. *Sympetrum navasi* LACROIX, 1921)

Last record: 2007.

Number of records: 22

Rank: 61/127

Red List: Least Concern.

Botswana distribution: Okavango Delta and adjacent areas. Historical records only between Maun and Makgadikgadi Pan (PINHEY 1976).

Own records: OP7-ii.2002; OP35-xii.2007; OP40-xii.2007; OP41-xii.2007; OP44-i.2009; OS3-xii.2007; OS36-xii.2007.

Flight period: Records between December and February, one from August.

Habitat: Probably rivers and their floodplains and oxbows. One male perching on submerged grass along a river.

Notes: DIJKSTRA & PILGRIM (2007) erected the new genus *Trithetrum* for this species and the central African *T. congoense*. Formerly *T. navasi* was placed in *Sympetrum*. Also recorded in the Caprivi from Kwando and Zambezi Rivers (SUHLING & MARTENS 2007 and own records), and therefore the species might also occur in the Linyanti Swamps and at the Chobe River.

Urothemis assignata (SELYS, 1872)

Last record: 2010.

Number of records: 12

Rank: 74/127

Red List: Least Concern.

Botswana distribution: Northern and south-eastern Botswana. One historical record from Notwane River in southern Botswana (PINHEY 1976).

Other records: Okavango River, Botswana, 20.iv.1962, 1 ♀, B. I. Balinsky (TMSA).

Own records: OS1-xii.2007; OP18-ii.2002; OS3-xii.2007; OS14-iii.2002; OS15-v.2000, juv; OS26-i.2007; CL15-xii.2007; CL17-xii.2007; OL32-ii.2010.

Flight period: Records between January and May, more information needed.

Habitat: Slow flowing rivers with rich vegetation, sometimes also at temporary pools.

Urothemis edwardsii (SELYS, 1849)

Last record: 2010.

Number of records: 179

Rank: 6/127

Red List: Least Concern.

Botswana distribution: Okavango Delta, Linyanti Swamps and Chobe River. A single historical record from Tsodilo Hills. Southernmost record from Selebi-Phikwe.

Other records: Chiefs Island, Okavango Delta, 13.v.1984, 1 ♂, M. Parr; Xugana Safari Camp, N of MGR, i.1991, J. Silsby; Motloutse River, Selebi-Phikwe, 7.x.2001, 2 ♂♂, W. Goodwin (NMBZ); Duma Tau (Linyanti) and Vumbura (Okavango Delta), iv.2002, M. Samways; Boro River at HOORC camp, Okavango Delta, 23.ix.2003, 1 ♂, P. Hancock; Chobe River at Kubu Lodge, 10.xi.2003 (KAPPES & NEHLS 2004); Okavango Delta, Xhudum Lodge, 28.xi.2009, 1 ♂, E. Schuran.

Own records: OP2-vi.2000; OP4-vi.2000; OP5-ii.2002, iv.2005; OP7-iii.2005; OP8-ii.2002, ii.2006; OP16-ii.2002; OP17-ii.2002, abund, iii.2005; OP18-ii.2002; OP19-ii.2002; OP22-iii.2005; OP25-iv.2005; OP29-iii.2005; OP30-i.-ii.2006; OP32-ii.2006; OP34-xii.2007, i.2009; OP35-xii.2007; OP36-ii.2007; OP37-ii.2007; OP38-ii.2007, ii.2010; OP39-xii.2007; OP40-xii.2007; OP41-xii.2007; OP42-xii.2007; OP43-xii.2007; OS1-iii.2001, xii.2007; OS2-xii.2007; OS3-xii.2007; OS4-iv.2000; OS5-ii.2002; OS6-iv.-v.2000, abund, ovip, iv.2002; OS7-iv.2000, ovip, iv.2002; OS8-v.2000; OS11-iv.2000; OS12-iv.2000, ix.2010; OS13-ii.-iv.2002; OS14-v.2000; OS15-v.2000; OS16-iv.2000, ovip, iii.2005, i.2007; OS17-iv.2000, ovip, ii.-iii.2002; OS18-iii.2002, iii.2005, i.2006, i.2007, xi.2007; OS19-iii.2002; OS21-iii.2005, i.2006; OS24-xii.2007; OS26-i.2007; OS28-i.2007; OS29-i.2007, xi.2007; OS30-xi.2007, ii.2010; OS31-xi.2007; OS32-i.2007, xi.2007; OS33-xi.2007; OS36-xii.2007; OS37-i.2010; OS38-i.2010; OS39-ii.2010; OS41-ix.2010; OS42-ix.2010; OS43-ix.2010; CL8-iii.2005; CL11-iii.2005; CL14-iii.2005; CL15-xii.2007; CL17-xii.2007; OL26-i.2009.

Flight period: Mainly rainy season, records between September and May.

Habitat: Mainly at swampy rivers and their floodplains. It was one of the most common libellulid species in the southern Okavango Delta.

Zygonoidea fueleborni (GRÜNBERG, 1902)

(syn. *Olpogastra fueleborni* GRÜNBERG, 1902)

Last record: 2009.

Number of records: 11

Rank: 77/127

Red List: Least Concern.

Botswana distribution: Mainly northern Botswana at the Chobe River and the Okavango Delta panhandle. One historical record from Chobe Rapids, Kasane, in February 1974 (PINHEY 1976).

Other records: Matakota, Limpopo River, 1 ♂, 25.iv.1957, B. I. Balinsky (TMSA); Shakawe, 2.iv.2007, W. Tarboton.

Own records: OP7-ii.2002, ii.2006; OP8-ii.2002, 2 exuviae; OP20-iii.2005; OP21-iii.2005; CL4-iii.2002, i.2007; CL10-ii.2006; CL11-iii.2005.

Flight period: Recorded from February till April, but more information needed.

Habitat: Fast flowing stretches of large rivers or at rapids and waterfalls.

Notes: These are the first records for the Okavango Delta. Until the revision (DIJKSTRA et al. 2006) this species has been placed in the genus *Olpogastra*.

Zygonyx natalensis (MARTIN, 1900)

Last record: 2002.

Number of records: 2

Rank: 111/127

Red List: Least Concern.

Botswana distribution: Chobe River. One historical record from Chobe Rapids near Kasane (PINHEY 1976).

Own records: CL4-iii.2002.

Flight period: More information needed.

Habitat: Restricted to waterfalls and rapids with turbulent water.

Zygonyx torridus (KIRBY, 1899)

Last record: 2010.

Number of records: 11

Rank: 78/127

Red List: Least Concern.

Botswana distribution: Northern and eastern Botswana. One historical record from Savuti Channel, one from Chobe Rapids (PINHEY 1976).

Other records: Moeng College, Tswapong Hills, i.1992 (BNMG).

Own records: OS40-ii.2010; CL4-v.2000, ovip, iii.2002, iii.2005, i.2007; OL5-ii.2006.

Flight period: Records from December till May, but not enough data.

Habitat: Perennial rocky streams or rivers with turbulent current and waterfalls.

Notes: Since fast-flowing and perennial water is a rare habitat type in Botswana, both species of *Zygonyx* seems to be very local here. *Zygonyx torridus* obviously likes to disperse, in 2010 one male was found at the recently flooded Boteti River far from the next known suitable habitats.

5 Discussion

The updated checklist of the Odonata of Botswana currently contains 127 species. This is a result of the addition of 21 species, which are new for the national fauna and the subtraction of species from the previous checklist. The addition of the new species is an increase of 20 % to the national Odonata biodiversity. The previous list (PINHEY 1976) included 104 species which were actually recorded and 10 species which Pinhey expected to occur in Botswana. Half of Pinhey's expectations could be confirmed, viz. *Africallagma subtile*, *Agriocnemis angolensis*, *Neurogomphus cocytius*, *Bradinopyga cornuta* and *Trithemis aconita*. One species has to be deleted from the checklist: as stressed above *Trithemis stictica* is not so far known to be part of the Botswanan fauna. All the records listed in PINHEY (1976) under this name belong either to *Trithemis palustris* or *T. morrisoni* (vide DAMM & HADRY 2009). There are no endemic species in Botswana, the new *Lestinogomphus silkeae* (KIPPING, 2010) has also been found at the Zambezi River and at the middle Okavango River section in Namibia.

Tab. 1: Checklist of the Odonata species recorded from Botswana with special reference to their known occurrence in the different freshwater ecoregions within the border of Botswana: UZF – Upper Zambezi Floodplains; OF – Okavango Floodplains; K – Kalahari; SK – Southern Kalahari; STH – Southern Temperate Highveld; ZL – Zambezi Lowveld (according to THIEME et al. 2005), vide supra, + = presence; * = new to the odonate fauna of Botswana; ** = recorded from rivers bordering the country; see also map in figure 2.

no.	species	UZF	OF	K	SK	STH	ZL
1	<i>Phaon iridipennis</i> (BURMEISTER, 1839)	+	+			+	+
2	<i>Platycypha caligata</i> (SELYS, 1853)	+					+
3	<i>Lestes dissimulans</i> FRASER, 1955		+			+	+
4	<i>Lestes pallidus</i> RAMBUR, 1842	+	+	+	+	+	+
5	<i>Lestes pinheyi</i> FRASER, 1955	+	+	+			
6	<i>Lestes plagiatus</i> (BURMEISTER, 1839)		+			+	+
7	<i>Lestes tridens</i> MCLACHLAN, 1895*		+				
8	<i>Lestes virgatus</i> (BURMEISTER, 1893)*		+				
9	<i>Aciagrion gracile</i> (SJOESTEDT, 1910)						+
10	<i>Aciagrion steeleae</i> KIMMINS, 1955		+				
11	<i>Africallagma glaucum</i> (BURMEISTER, 1839)		+		+	+	+
12	<i>Africallagma subtile</i> (RIS, 1921)*		+				
13	<i>Agriocnemis angolensis</i> LONGFIELD, 1947*		+				
14	<i>Agriocnemis exilis</i> SELYS, 1872	+	+	+			
16	<i>Agriocnemis gratiosa</i> GERSTÄCKER, 1891	+	+				
17	<i>Agriocnemis ruberrima albifrons</i> BALINSKY, 1963	+	+				
18	<i>Agriocnemis victoria</i> FRASER, 1928	+	+				
19	<i>Agriocnemis</i> sp. nov.**	+					
20	<i>Azuragrion nigradorsum</i> (SELYS, 1876)		+	+			+
21	<i>Ceriagrion corallinum</i> CAMPION, 1914	+					
22	<i>Ceriagrion glabrum</i> (BURMEISTER, 1839)	+	+	+		+	+
23	<i>Ceriagrion katamborae</i> PINHEY, 1961	+	+				
24	<i>Ceriagrion suave</i> RIS, 1921	+	+	+			+
25	<i>Ischnura senegalensis</i> (RAMBUR, 1842)	+	+	+	+	+	+
26	<i>Pinheyagrion angolicum</i> (PINHEY, 1966)	+	+				
27	<i>Pseudagrion acaciae</i> FORSTER, 1906	+	+				+
28	<i>Pseudagrion assegaai</i> PINHEY, 1950	+	+				
29	<i>Pseudagrion coeleste</i> LONGFIELD, 1947	+	+	+			
30	<i>Pseudagrion commoniae nigerrimum</i> PINHEY, 1950	+				+	+
31	<i>Pseudagrion deningi</i> PINHEY, 1961	+	+	+			
32	<i>Pseudagrion fisheri</i> PINHEY, 1961		+				
33	<i>Pseudagrion glaucescens</i> SELYS, 1876	+	+				

Tab. 1: continued

no.	species	UZF	OF	K	SK	STH	ZL
34	<i>Pseudagrion hageni tropicanum</i> KARSCH, 1893*						+
35	<i>Pseudagrion hamoni</i> FRASER, 1955	+	+	+			+
36	<i>Pseudagrion helenae</i> BALINSKY, 1964		+				
37	<i>Pseudagrion kersteni</i> (GERSTÄCKER, 1869)*					+	+
38	<i>Pseudagrion massaicum</i> SIÖSTEDT, 1909	+	+	+	+	+	+
39	<i>Pseudagrion nubicum</i> SELYS, 1876		+	+			
40	<i>Pseudagrion rufostigma</i> LONGFIELD, 1947	+	+				
41	<i>Pseudagrion salisburyense</i> RIS, 1921					+	+
42	<i>Pseudagrion sjoestedti jacksoni</i> PINHEY, 1961	+	+				
43	<i>Pseudagrion sublacteum</i> (KARSCH, 1893)	+	+				+
44	<i>Pseudagrion sudanicum rubroviride</i> PINHEY, 1955	+	+				+
45	<i>Mesocnemis singularis</i> KARSCH, 1891	+	+				+
46	<i>Elatoneura cellularis</i> (GRÜNBERG, 1902)	+					
47	<i>Elatoneura glauca</i> (SELYS, 1860)	+	+				+
48	<i>Ceratogomphus pictus</i> SELYS, 1854					+	+
49	<i>Crenigomphus cornutus</i> PINHEY, 1956	+					
50	<i>Gomphidia quarrei</i> (SCHOUTEDEN, 1934)	+	+				
51	<i>Ictinogomphus dundoensis</i> PINHEY, 1961	+	+				
52	<i>Ictinogomphus ferox</i> (RAMBUR, 1842)	+	+		+		+
53	<i>Lestinogomphus angustus</i> MARTIN, 1911	+	+				
54	<i>Lestinogomphus silkeae</i> KIPPING, 2010*		+				
55	<i>Neurogomphus cocytius</i> CAMMAERTS, 2004*	+					
56	<i>Neurogomphus zambeziensis</i> CAMMAERTS, 2004*	+					
57	<i>Paragomphus elpidius</i> (RIS, 1921)	+	+				
58	<i>Paragomphus genei</i> (SELYS, 1841)	+	+	+		+	+
59	<i>Paragomphus sabicus</i> PINHEY, 1950	+					+
60	<i>Phyllogomphus selysi</i> SCHOUTEDEN, 1933	+	+				
61	<i>Anax bangweuluensis</i> KIMMINS, 1955	+	+				
62	<i>Anax ephippiger</i> (BURMEISTER, 1839)	+	+	+	+	+	+
63	<i>Anax imperator</i> LEACH, 1815	+	+	+	+	+	+
64	<i>Anax tristis</i> HAGEN, 1867	+	+	+			+
65	<i>Gynacantha manderica</i> GRÜNBERG, 1902**	+					
66	<i>Gynacantha villosa</i> GRÜNBERG, 1902	+					
67	<i>Phyllomacromia contumax</i> SELYS, 1879	+	+				+
68	<i>Phyllomacromia kimminsi</i> (FRASER, 1954)		+				

Tab. 1: continued

no.	species	UZF	OF	K	SK	STH	ZL
69	<i>Phyllomacromia overlaeti</i> (SCHOUTEDEN, 1934)	+	+				
70	<i>Phyllomacromia picta</i> (HAGEN in SELYS, 1871)	+	+				+
71	<i>Acisoma panorpoides ascalaphoides</i> RAMBUR, 1842	+	+				+
72	<i>Aethiothemis solitaria</i> MARTIN, 1908		+				
73	<i>Aethriamanta rezia</i> KIRBY, 1889	+	+				
74	<i>Brachythemis lacustris</i> (KIRBY, 1889)	+	+				
75	<i>Brachythemis leucosticta</i> (BURMEISTER, 1839)	+	+	+	+	+	+
76	<i>Brachythemis wilsoni</i> PINHEY, 1952		+				
77	<i>Bradinygyga cornuta</i> RIS, 1911*	+					+
78	<i>Chalcostephia flavifrons</i> KIRBY, 1889	+	+				
79	<i>Crocothemis divisa</i> BAUMANN, 1898*						+
80	<i>Crocothemis erythraea</i> (BRULLÉ, 1832)	+	+	+	+	+	+
81	<i>Crocothemis sanguinolenta</i> (BURMEISTER, 1839)	+	+			+	+
82	<i>Diplacodes deminuta</i> LIEFTINCK, 1969	+	+				
83	<i>Diplacodes lefebvreii</i> (RAMBUR, 1842)	+	+	+	+	+	+
84	<i>Diplacodes luminans</i> (KARSCH, 1893)	+	+	+	+	+	+
85	<i>Hemistigma albipunctum</i> (RAMBUR, 1842)	+	+				
86	<i>Nesciothemis farinosa</i> (FÖRSTER, 1898)	+	+			+	+
87	<i>Nesciothemis minor</i> GAMBLES, 1966		+				
88	<i>Olpogastra lugubris</i> KARSCH, 1895	+	+	+			+
89	<i>Orthetrum abbotti</i> CALVERT, 1892*						+
90	<i>Orthetrum brachiale</i> (PALISOT DE BEAUVOIS, 1817)	+	+	+		+	+
91	<i>Orthetrum chrysostigma</i> (BURMEISTER, 1839)	+	+	+		+	+
92	<i>Orthetrum guineense</i> RIS, 1910						+
93	<i>Orthetrum icteromelas cinctifrons</i> PINHEY, 1970	+	+				
94	<i>Orthetrum julia falsum</i> LONGFIELD, 1955*	+					+
95	<i>Orthetrum machadoi</i> LONGFIELD, 1955		+				
96	<i>Orthetrum robustum</i> BALINSKY, 1965	+	+	+			
97	<i>Orthetrum stemmale</i> (BURMEISTER, 1839)*	+					+
98	<i>Orthetrum trinacria</i> (SELYS, 1841)	+	+	+			+
99	<i>Palpopleura deceptor</i> (CALVERT, 1899)	+	+				+
100	<i>Palpopleura jucunda</i> RAMBUR, 1842	+					+
101	<i>Palpopleura lucia</i> (DRURY, 1773)	+	+			+	+
102	<i>Palpopleura portia</i> (DRURY, 1773)*						+

Tab. 1: continued

no.	species	UZF	OF	K	SK	STH	ZL
103	<i>Pantala flavescens</i> (FABRICIUS, 1798)	+	+	+	+	+	+
104	<i>Parazyxomma flavicans</i> (MARTIN, 1908)	+	+				
105	<i>Rhyothemis fenestrina</i> (RAMBUR, 1842)	+	+				
106	<i>Rhyothemis semihyalina</i> (DESJARDINS, 1832)	+	+	+		+	+
107	<i>Sympetrum fonscolombii</i> (SELYS, 1840)	+	+	+	+	+	+
108	<i>Tholymis tillarga</i> (FABRICIUS, 1798)	+	+	+			+
109	<i>Tramea basilaris</i> (PALISOT DE BEAUVOIS, 1807)	+	+	+	+	+	+
110	<i>Tramea limbata</i> (DESJARDINS, 1832)			+			
111	<i>Trihemis aconita</i> LIEFTINCK, 1969*	+	+				
112	<i>Trithemis aequalis</i> LIEFTINCK, 1969	+	+				
113	<i>Trithemis annulata</i> (PALISOT DE BEAUVOIS, 1807)	+	+	+		+	+
114	<i>Trithemis arteriosa</i> (BURMEISTER, 1839)	+	+	+		+	+
115	<i>Trithemis brydeni</i> PINHEY, 1970		+				
116	<i>Trithemis donaldsoni</i> (CALVERT, 1899)*	+					+
117	<i>Trithemis furva</i> KARSCH, 1899*						+
118	<i>Trithemis hecate</i> RIS, 1912	+	+				
119	<i>Trithemis kirby ardens</i> (GERSTÄCKER, 1891)	+	+	+		+	+
120	<i>Trithemis monardi</i> RIS, 1931	+	+				
121	<i>Trithemis palustris</i> DAMM & HADRY, 2009*	+	+				
122	<i>Trithetrum navasi</i> (LACROIX, 1921)	+	+	+			
123	<i>Urothemis assignata</i> (SELYS, 1872)	+	+	+			+
124	<i>Urothemis edwardsii</i> (SELYS, 1849)	+	+				+
125	<i>Zygonoides fuelleborni</i> (GRÜNBERG, 1902)	+	+				+
126	<i>Zygonyx natalensis</i> (MARTIN, 1900)	+					
127	<i>Zygonyx torridus</i> (KIRBY, 1889)	+	+	+			+
	recorded species per ecoregion:	96	98	37	14	31	66

Several species have not been re-recorded in Botswana since 1975. This applies to *Aciagrion gracile*, *Ceriagrion corallinum*, *Pseudagrion fisheri*, *P. nubicum*, *Gynacantha villosa*, *Crenigomphus cornutus*, *Phyllogomphus selysi*, *Phyllomacromia kimminsi*, *Nesciothemis minor* and *Tramea limbata* (vide PINHEY 1976), which are only less than 10 % of the national fauna. Although many of these species have been recently recorded in neighbouring countries (vide TARBOTON & TARBOTON 2002, 2005; SUHLING & MARTENS 2007; SAMWAYS 2008), there are no new records for e. g. *Pseudagrion fisheri*, *Phyllomacromia kimminsi* or *Nesciothemis minor* and their current status in southern Africa remains unclear. *Aciagrion steeleae*, *Pseudagrion helenae*, *Anax bangweuluensis*, *Trithemis aequalis* and *T. brydeni* could only been confirmed recently by few records, of *T. brydeni* only of a single male from the Okavango Delta (KIPPING 2007). All of these species show a disjunct distribution pattern, they occur further north e. g. around Lake Bangweulu and having their southernmost occurrence in the

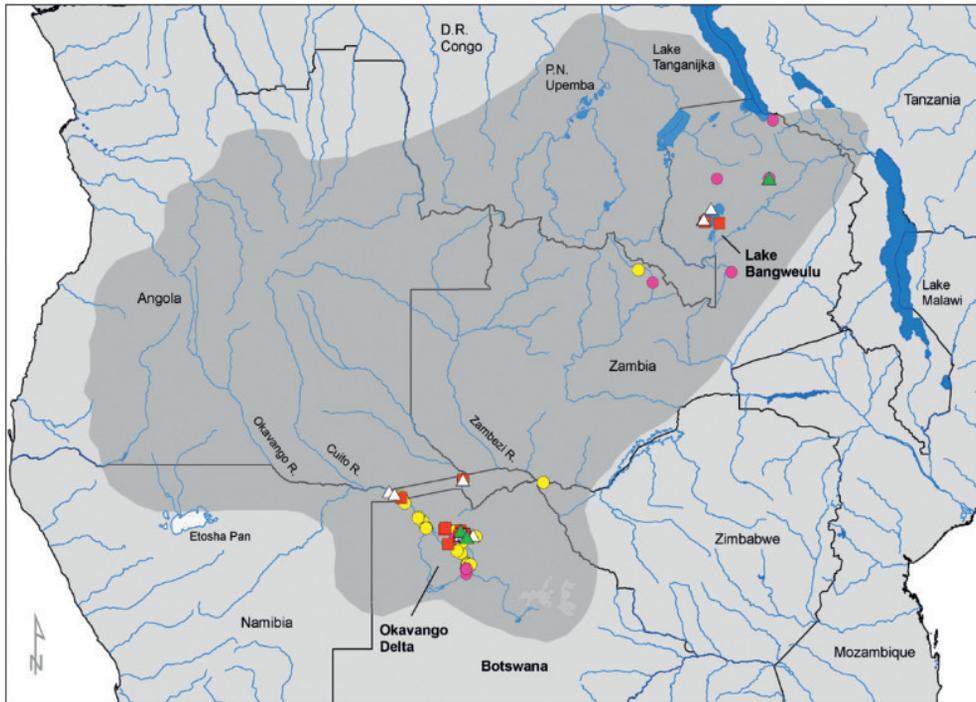


Fig. 5: Map of south-central Africa showing the Palaeo Chambeshi-Katanga region (shaded) and the distribution of some selected species endemic to it: *Ceriagrion katamborae* (yellow circles); *Pseudagrion helenae* (pink circles); *Anax bangweuluensis* (red squares); *Trithemis aequalis* (white triangles) and *Trithemis brydeni* (green triangles).

Okavango Delta. Probably most of them have a very local distribution within the Okavango Delta and/or a very restricted flying period. PINHEY (1976) recorded most of the mentioned species only in December 1973 and 1975 very locally at Four Rivers and Xugana Lagoon in the north-eastern Okavango Delta. Not much is known about their large scale distribution e. g. in Zambia. Of some species recent records from Zambia appeared – *Pseudagrion fisheri* from Ikelenge (own records) or *P. helenae* from Kasanka National Park (GESCHKE 2003) but this does not change the known general distribution pattern.

Also belonging to the group of more tropical swamp and river species are *Agriocnemis ruberrima albifrons*, *Ceriagrion katamborae*, *Pinheyagrion angolicum*, *Pseudagrion assegaii*, *P. deningi*, *P. helenae* and *P. rufostigma*, which show a strong similarity between the swamps of the Okavango Floodplain ecoregion and those of the Zambezian Headwaters and Bangweulu-Mweru region. Large parts of the Upper Zambezi Floodplain ecoregion with the Barotse Floodplains or the Kafue ecoregion in Zambia are underresearched with an almost complete lack of Odonata records but I assume a very similar Odonata fauna in these areas between Lake Bangweulu and the Okavango Delta, indicated by a recent record of *Agriocnemis ruberrima albifrons* from Mongu, Barotse Floodplain (vide supra) and a few records collected by a first fieldtrip to Barotse in 2007. In terms of terrestrial habitat classification they all together are combined in the Zambezian Flooded Grassland and the dry Kalahari forms a natural barrier in the south.

The remarkable distribution pattern with a disjunct occurrence of the above mentioned species was already recognised by PINHEY (1978) and can be explained by the complex history of the larger rivers in the whole region. The Okavango Delta was not as isolated as it seems nowadays, but connected by a river corridor to an area which is called the Palaeo Chambeshi-Katanga region, a much larger swamp area stretching from Makgadikgadi pans in the south up to Upemba National Park in Congo Kinshasa (see figure 5). The history of this region is described by MOORE & LARKIN (2001) and COTTERILL (2005, 2006) emphasizes its biogeographic relevance on the distribution patterns and speciation of *Kobus* antelopes. DIJKSTRA (2007) postulated a distinctive 'Zambezi' fauna for the region which forms the only swamp-speciation hotspot in continental Africa. A recent analysis showed that 57 odonate species are endemic to the Palaeo Chambeshi-Katanga region (KIPPING in prep.) and many of them have a stronghold of their occurrence in the Okavango Delta of Botswana.

So whereas the northern part of Botswana is highly influenced by the tropical Zambezi River basin and its history, in subtropical south-eastern Botswana this rule is probably taken by the Limpopo River system as a colonisation corridor from the south. Species like *Pseudagrion commoniae*, *P. salisburyense* or *Ceratogomphus pictus* are exclusively to be found here.

The largest number of Botswanan Odonata species are widespread African savannah species, which occur in all or most of the freshwater ecoregions of Botswana. Such species, like *Lestes pallidus*, *Anax imperator*, *Brachythemis leucosticta*, *Diplacodes lefebvreii* or members of the genus *Palpopleura* are able to disperse over wide distances and breed in temporary water bodies under xeric conditions as well as in more stable and open savannah environments. Thus, I observed a preference for more or less perennial habitats, where those species can be very common. Another distinguishable group are migrants, like *Anax ephippiger*, *Pantala flavescens*, *Sympetrum fonscolombii*, *Crocothemis erythraea* or *Diplacodes luminans*. These were the first species which appeared and successfully reproduced at the newly filled rainpools in the Kalahari Desert near Ghanzi. Often these species were seen flying in front of rainstorms far from any permanent water.

Botswana is a flat country with only some isolated hills, Tsodilo Hills are the highest in the north-west, Goha Hills in the north and a concentration of hills in the south-east with Tswapong Hills being the most famous. These are mainly dry rock formations, which rise a few hundred metres above the ground and are not comparable with e. g. the mountains in eastern Zimbabwe. Only few mountain groups in the south-east have permanent springs and streams in deep-cut and shady gorges. Therefore mountain species are mostly absent from the country. Only few widespread stream species, which are known from lower elevations, were found in the hills in the south-east. These are *Pseudagrion hageni*, *P. kersteni* or *Trithemis furva*.

Odonata species of dense riverine forest are naturally restricted to northern parts of the Okavango Delta and the Chobe River. Mostly here only fragments of those forests exist. From the conservation point of view, land use change and habitat degradation or even habitat loss are the most important threats for Odonata (CLAUSNITZER & JÖDICKE 2004). In Botswana these threats are cutting of pristine riverine forest for cattle grazing, firewood and human settlements, water extraction in settlements for human needs, growing tourism in parts of the Okavango Delta and pollution by chemicals in order to control tsetse flies. To get an impression of what habitat degradation and habitat loss means, a look on the current situation in and around Maun and a comparison with the past some few decades ago is most helpful. Local people from Maun remember the ever-flowing Thamalakane River in the mid 70s

with dense riverine forest, hippopotamuses in the river and even lions straying around the huts. Today lions are only fairy tales, most of the forest is cutted to satisfy the demand for firewood or timber and the Thamalakane River for many years was most of the year dry or only a chain of muddy pools. These results of an increasing human population affect Odonata. PINHEY (1967a, 1976) found some species of rivers or permanent swamps in Maun, which are absent from this area today. These are for instance *Pseudagrion glaucescens*, *P. helenae*, *Ictinogomphus dundoensis* and *Aethriamanta rezia*. The dragonfly diversity of one of the best known areas of Africa, the surrounding of Maun (KIPPING et al. 2009), can also show how quick dragonflies are able to respond to changing environments and to better ecological conditions. When I started to observe dragonflies in Botswana, this was in Maun in 2000, many of Pinhey's findings from the 1960s and 1970s were not occurring in and around Maun anymore. A remarkable example is *Rhyothemis fenestrina*, a very distinctive small libellulid species, which can hardly been overlooked due to the black wings and the fluttering flight sometimes, even in large groups. In the early years just after 2000 I learned this is a species which is common in the Delta panhandle where permanent water and Papyrus is. I never saw it in and near Maun, the Boro and Thamalakane were bone dry for some months every year. This lasted till 2005 when a first large flood came in and made the Boro and Thamalakane to permanent rivers, a situation that last up to now. For example this year 2010 the Okavango Delta and Maun faced the largest flood since 45 years. The Thamalakane is flowing the whole year and even the Boteti River is carrying water into Makgadikgadi pans. The change of the Odonata assemblage in Maun was remarkable. Species like *R. fenestrina*, *Ceriagrion katamborae* or *Pseudagrion deningi*, which were definitely missing before are common now. Whereas I only found 41 species between 2000 and 2005 now 56 species live in Maun again which is even more than the 52 odonate species found by PINHEY (1967a, 1976).

The 'Maunisation' of the Okavango Delta margin in terms of land use change and degradation can also be observed where roads and settlements are very close to it, e. g. around the panhandle and along the Shakawe-Sehitwa-Maun road. Another possible threat of the Okavango Delta ecosystem is the construction of a dam for an electric power plant in the Namibian Caprivi near Popa Falls.

A serious and often discussed issue is the spraying of the Delta against tsetse fly with deltamethrin or endosulphan. A campaign of aerial spraying with deltamethrin was undertaken in 2001 and 2002 covering most parts of the Okavango Delta and will be continued in current years. An environmental recovery monitoring was undertaken by the Okavango Research Institute (ORI) in 2002 and 2003, which showed good recovery, particularly of aquatic invertebrates (PERKINS & RAMBERG 2004). A study by SCHURAN (2008), carried out in 2007 focussed on the direct impact of deltamethrin on dragonfly larvae and other invertebrates. The results showed a serious impact of spraying on the mortality of dragonfly larvae under semi-artificial conditions.

From the current knowledge of Odonata distribution it became clear that Botswana has a strong responsibility for the protection of the following species, which have large parts of their known distribution in the country. These are: *Aciagrion steeleae*, *Ceriagrion katamborae*, *Pinheyagrion angolicum*, *Pseudagrion coeleste*, *P. deningi*, *P. fisheri*, *P. helenae*, *P. rufostigma*, *Lestinogomphus silkeae*, *Ictinogomphus dundoensis*, *Anax bangweuluensis*, *Brachythemis wilsoni*, *Nesciothemis minor*, *Trithemis aequalis*, *T. brydeni* and *T. palustris*.

The new checklist of the Odonata of Botswana is only preliminary. Some of the regions have been surveyed only few times and many more species are to be expect. Gathering of distribution data e. g. from the southern Kalahari and from the Tuli Block in the south-east

Tab.2: Odonata species expected to occur in Botswana due to their regional distribution in neighbouring countries.

Species	Distribution	where to expect in Botswana, and preferred habitat	References
<i>Lestes amicus</i> MARTIN, 1910	Zimbabwe, Zambia to Tanzania, next record from Victoria Falls	Chobe River	PINHEY (1980, 1984)
<i>Lestes ictericus</i> GERSTÄCKER, 1869	South Africa, Zimbabwe north to Sudan and Nigeria	Chobe River	PINHEY (1980, 1984), TARBOTON & TARBOTON (2005)
<i>Lestes uncifer</i> KARSCH, 1899	South Africa, Zimbabwe, Zambia to Somalia, next record from Victoria Falls	Chobe River	PINHEY (1980, 1984), TARBOTON & TARBOTON (2005), own records
<i>Pseudagrion makabusiense</i> PINHEY, 1950	South Africa, Zimbabwe, Mozambique, Zambia to northern Angola	hills in the south-east, fast flowing streams in mountainous areas	PINHEY (1964b, 1984), TARBOTON & TARBOTON (2005)
<i>Anax speratus</i> HAGEN, 1867	South Africa, Zimbabwe, Namibia to Sudan	south-east, streams in mountainous area	PINHEY (1984), SUHLING & MARTENS (2007)
<i>Aeshna minuscula</i> McLACHLAN, 1896	Namibia, South Africa	south-east, streams in mountainous area	TARBOTON & TARBOTON (2002), SUHLING & MARTENS (2007)
<i>Anaciaeschna trian-gulifera</i> McLACHLAN, 1896	Zambia, Zimbabwe, next record from Victoria Falls	Chobe River	PINHEY (1984), own records
<i>Crenigomphus kavangoensis</i> SUHLING & MARAIS 2010	middle Okavango River section, Namibia	Okavango Delta panhandle, large rivers	SUHLING & MARAIS (2010)
<i>Paragomphus cognatus</i> (RAMBUR, 1842)	South Africa to Equatorial Africa, next records from Limpopo valley and middle Okavango River, Namibia	Limpopo River, northern Okavango Delta, rivers	TARBOTON & TARBOTON (2002), SUHLING & MARTENS (2007)
<i>Diplacodes pumila</i> DIJKSTRA 2006	South Africa, Zimbabwe, Zambia, DR Congo to Tanzania	south-east, mountainous area at higher elevations	PINHEY (1984), DIJKSTRA (2006)
<i>Orthetrum cafferum cafferum</i> (BURMEISTER, 1839)	South Africa, Zimbabwe, Namibia to Sudan	eastern Botswana, temporary ponds	PINHEY (1970b), SUHLING & MARTENS (2007)
<i>Orthetrum hintzi</i> SCHMIDT, 1951	South Africa (Natal), Zimbabwe, Namibia to Kenya and Senegal	south-east, grassy margins of streams and rivers	PINHEY (1970b), TARBOTON & TARBOTON (2002), SUHLING & MARTENS (2007)
<i>Tetrathemis polleni</i> (SELYS, 1869)	Zimbabwe (Victoria Falls), Natal and N Angola to Uganda	Chobe River, large rivers with dense woodland	PINHEY (1984), TARBOTON & TARBOTON (2002)
<i>Trithemis dorsalis</i> (RAMBUR, 1842)	S Angola, Zimbabwe and South Africa (Cape Province and Natal) to Kenya	south-east, rivers and streams	RIS (1931), PINHEY (1970a, 1984), TARBOTON & TARBOTON (2002)
<i>Trithemis morrisoni</i> DAMM & HADRYIS, 2009	Popa Falls, Namibia and Bovu Island, Zambezi, Zambia	Chobe River, Okavango Delta – upper panhandle	DAMM & HADRYIS 2009, own records

Tab. 2: continued

Species	Distribution	where to expect in Botswana, and preferred habitat	References
<i>Trithemis pluvialis</i> FÖRSTER, 1906	South Africa, Zimbabwe, Namibia to DR Congo and Kenya	Okavango Delta, Linyanti swamps, Limpopo River	PINHEY (1970a, 1984), TARBOTON & TARBOTON (2002), SUHLING & MARTENS (2007)
<i>Trithemis stictica</i> (BURMEISTER, 1839)	Namibia, South Africa to Somalia	south-east, small springbrooks and streams	PINHEY (1970a), SUHLING & MARTENS (2007)
<i>Trithemis wernerii</i> RIS, 1912	Namibia, South Africa to Uganda and Nigeria	south-east, Limpopo River, rivers in arid areas	PINHEY (1970a, 1984), TARBOTON & TARBOTON (2002), SUHLING & MARTENS (2007)

has only just started. Whereas the first will probably not bring new species to the national list the latter is very promising. Table 2 gives an overview about Odonata species which I expect to occur in Botswana, due to their distribution in neighbouring countries.

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8 Appendix

List of localities sampled by the author

Okavango Delta North, panhandle and ± permanently flooded part (OP)

- OP1. Left Okavango River bank at Mohembo road ferry. Moderate current and sandy ground, surrounded by bushland (18° 15' 04" S, 21° 47' 57" E): 8.vi.2000, 1.iv.2005.
- OP2. Okavango backwater near Mohembo (18° 18' 03" S, 21° 50' 01" E): 8.vi.2000.
- OP3. Small sandy island in Okavango River near Mohembo (18° 16' 20" S, 21° 48' 35" E): 8.vi.2000.
- OP4. Okavango near Shakawe, moderate current, surrounded by woodland (18° 20' 46" S, 21° 51' 18" E): 8.vi.2000, 1.iv.2005.
- OP5. Backswamp and Okavango main channel at Shakawe Fishing Lodge (18° 57' 44" S, 21° 54' 59" E): 17.ii.2002, 1.iv.2005.
- OP6. Floodplain, left river bank near Drotzky's Cabins, 0.6 m deep, with fast current and dense stands of flooded grass *Vossia cuspidata* (18° 24' 27" S, 21° 53' 08" E): 8.vi.2000.

- OP7. Okavango at Drotzky's Cabins (18° 24' 50" S, 21° 53' 07" E): 7.vi.2000, 16.ii.2002, 21.iii.2005, 19.ii.2006, 14.i.2009.
- OP8. Okavango main channel at Xaro Lodge (18° 24' 52" S, 21° 57' 44" E): 9.vi.2000, 14.-15.ii.2002, 21.ii.2006.
- OP9. Right Okavango bank at Xaro Lodge (18° 25' 49" S, 21° 55' 38" E): 9.vi.2000, 21.ii.2006.
- OP10. Open woodland S of Xaro Lodge (18° 27' 11" S, 21° 57' 41" E): 14.-15.ii.2002.
- OP11. Backswamp at Fieldcamp 1, shallow water between Papyrus swamp and riverine forest, overgrown with flooded grass (18° 25' 12" S, 21° 58' 22" E): 14.ii.2002.
- OP12. Large lagoon near Fieldcamp 1, deep stagnant water fringed by *Cyperus papyrus*, surrounded by open woodland (18° 27' 01" S, 21° 58' 21" E): 15.ii.2002.
- OP13. Large lagoon 5 km NE of Xaro Lodge, deep stagnant water covered by *Nymphaea lotus*, rich in submerged plants, fringed by grasses and dense *Cyperus papyrus* (18° 24' 18" S, 21° 58' 19" E): 9.vi.2000.
- OP14. Small lagoon close to Okavango, partly covered by *Trapa natans*, fringed by *Cyperus papyrus* (18° 26' 22" S, 21° 53' 30" E): 9.vi.2000.
- OP15. Okavango back swamp at Irrigation Project, stagnant water, well vegetated, surrounded by woodland (18° 26' 29" S, 21° 54' 41" E): 9.vi.2000.
- OP16. Ngquma Lediba (Guma Lagoon), partly covered by *Trapa natans*, rich in submerged plants, fringed by flooded grass, *Phragmites australis* and dense *Cyperus papyrus* (18° 56' 09" S, 22° 22' 09" E): 19.ii.2002, 27.iii.2005.
- OP17. Western bank of Ngquma Lediba, well vegetated, sandy ground (18° 56' 45" S, 22° 22' 46" E): 17.-19.ii.2002, 27.iii.2005.
- OP18. Main channel to Ngquma Lediba (3 m deep, 15 m wide), lined by flooded grass, *Cyperus papyrus* and partly woodland (18° 57' 02" S, 22° 23' 07" E): 19.ii.2002.
- OP19. Narrow channel to Ngquma Lediba (2 m deep, 10 m wide), lined by flooded grass and dense *Cyperus papyrus* (18° 57' 43" S, 22° 23' 38" E): 19.ii.2002.
- OP20. Okavango main channel at Sepopa Swamp Stop, with moderate current, 30 m wide, surrounded by Papyrus and riverine forest (18° 45' 01" S, 22° 11' 58" E): 25.-31.iii.2005.
- OP21. Okavango main channel at Crocodile Research Camp near Ikogha, with moderate current, 50 m wide surrounded by Papyrus and floodplains (18° 49' 05" S, 22° 17' 21" E): 25.-31.iii.2005.
- OP22. Floodplains around OP21, just flooded by the Okavango (18° 49' 05" S, 22° 19' 56" E): 25.-31.iii., 17.iv.2005.
- OP23. Philippa Channel, 6 km N to 7 km E Sepopa, 20 m wide channel with fast current, lined by Papyrus or *Phragmites australis*, surrounded by floodplains and small islands (18° 42' 08" S, 22° 11' 42" E): 28.-30.iii.2005.
- OP24. Backswamps of Philippa Channel, 6 km N to 7 km E Sepopa, extensive floodplains just flooded, covered by Papyrus, flooded grass and partly with floating-leaf vegetation (18° 41' 30" S, 22° 11' 30" E): 28.-30.iii.2005.
- OP25. Okavango backswamp at Shakawe centre, large floodplain mainly covered by flooded grass (18° 21' 46" S, 21° 50' 30" E): 1.iv.2005, 20.ii.2006, 19.ii.2010.
- OP26. Right Okavango River bank at Mohembo road ferry with moderate current and small swamps, surrounded by riverine forest (18° 16' 51" S, 21° 47' 24" E): 1.iv.2005.
- OP27. Okavango oxbow south of OP26, sparse vegetation, used as gravel pit (18° 16' 50" S, 21° 47' 22" E): 1.iv.2005.
- OP28. Crocodile farm »Krokovango«, 15 km SE Shakawe, artificial pools with sparse vegetation, packed with *Crocodilus niloticus*, surrounded by dense Acacia woodland (18° 25' 54" S, 21° 53' 54" E): 31.iii.2005.

- OP29. Kaparota Camp, Kaparota channel, slow flowing permanent river with swampy margins and rich vegetation, close to dense woodland (19° 00' 23" S, 22° 55' 36" E): 30.i.-5.ii.2006.
- OP30. Kaparota Camp, seasonal floodplains with dense sedges, floating-leaf plants, surrounded by grassland (19° 00' 14" S, 22° 55' 36" E): 30.i.-5.ii.2006.
- OP31. Vumbura Plains, seasonal rainfed pans, surrounded by grass- and woodland (18° 57' 48" S, 22° 54' 26" E): 30.i.-5.ii.2006.
- OP32. Maunachira channel near Little Vumbura Camp, system of narrow channels and lagoons, fringed by dense Papyrus and *Phragmites australis* (19° 01' 19" S, 22° 51' 46" E): 3.ii.2006.
- OP33. Vumbura Camp, dense riverine woodland along a mosaic of rivers, swamps and lagoons (18° 58' 44" S, 22° 53' 22" E): 30.i.-5.ii.2006.
- OP34. Moremi Game Reserve, Xakanaxa, public campsite and boat station, large lagoons, swamps and channels in MGR (19° 10' 49" S, 23° 24' 43" E): 4.-8.xii.2007, 18.i.2009, 9.ii.2010.
- OP35. Moremi Game Reserve, Xakanaxa, DWNP camp north of Xakanaxa airstrip, large lagoons, small pools, swamps and channels (19° 11' 42" S, 23° 25' 58" E): 4.-8.xii.2007.
- OP36. Moremi Game Reserve, Third Bridge camp site, large swamps and a permanent medium sized river (19° 14' 17" S, 23° 21' 18" E): 25.ii.2007.
- OP37. Moremi Game Reserve, Large and almost permanent lagoon between Third Bridge and Fourth Bridge, deep lagoon, 50 ha size, with extended reeds and swamps (19° 15' 19" S, 23° 23' 59" E): 25.ii.2007, 18.i.2009.
- OP38. Moremi Game Reserve, around Mboma boat station, 10 km NW Third Bridge, permanent channels and small lagoons, islands (19° 11' 34" S, 23° 16' 13" E): 26.ii.2007; 9.ii.2010.
- OP39. Moremi Game Reserve, seasonal pool near larger swamp near Xakanaxa airstrip (19° 11' 46" S, 23° 26' 12" E): 4.-8.xii.2007.
- OP40. Moremi Game Reserve, swamp complex of large lagoons, permanent flowing channels, swamps and islands north-west of Xakanaxa public campsite, between Xakanaxa and Maunachira channel (19° 10' 09" S, 23° 23' 39" E): 4.-8.xii.2007, 10.ii.2010.
- OP41. Moremi Game Reserve, 20 km section of Maunachira channel between Lechwe Island, N of Xakanaxa and Gadigkwe lagoon (19° 07' 07" S, 23° 19' 33" E): 4.-8.xii.2007.
- OP42. Moremi Game Reserve, Paradise Pools, east of Xakanaxa (19° 12' 07" S, 23° 29' 59" E): 4.-8.xii.2007.
- OP43. Moremi Game Reserve, boat station of Water Affairs between Xakanaxa public campsite and airstrip, permanent lagoon and channels with swamp next to riverine forest (19° 11' 20" S, 23° 25' 42" E): 8.xii.2007.
- OP44. Okavango Delta panhandle, Nxsamasere Lodge, medium sized river (side stream of Okavango mainchannel) with large swamps, islands and dense riverine forest (18° 36' 25" S, 22° 05' 16" E): 22.i.2009.

Okavango Delta South, seasonally flooded part (OS)

- OS1. Khwai River at North Gate, Moremi Game Reserve (MGR), small river (1.5 m deep, 10 m wide) with moderate current and sandy ground, lined by flooded grass and surrounded by woodland (19° 09' 31" S, 23° 45' 00" E): 11.-12.iii.2001; 15.-16.xii.2007.
- OS2. Khwai River 5 km W of North Gate, MGR, small river, surrounded by grassland and floodplains, larger lagoons (19° 09' 49" S, 23° 41' 51" E): 12.iii.2001; 16.xii.2007.
- OS3. Dombo Lediba, large and deep lagoon, 13 km SW of North Gate, MGR, partly covered by *Nymphaea* spec. and fringed by *Phragmites australis*, grassy floodplains and woodland (19° 11' 32" S, 23° 38' 17" E): 12.iii.2001; 16.xii.2007.

- OS4. Xaxaba Flats W of Chiefs Island, extensive primary floodplains with shallow water, dense stands of sedges and rich submerged vegetation (19° 29' 12" S, 22° 55' 23" E): 22.iv.2000.
- OS5. Thaoge River, almost dry river bed, 6 km E of Gumare, small rest pools with sparse stands of *Cyperus papyrus* and *Phragmites australis* (19° 22' 13" S, 22° 12' 64" E): 22.ii.2002.
- OS6. Stretch of Boro River on West Chiefs Island (WCI), medium sized river (3 m deep, 20 m wide), moderate current and sandy ground, partly covered by *Nymphaea nouchali*, lined by backwaters, primary floodplains and woodland (19° 32' 55" S, 23° 10' 35" E): 18.iv.-27.vii.2000, 8.-11.iv.2002.
- OS7. Boro River backswamp on WCI, sparse stands of *Cyperus articulatus*, water covered with *Potamogeton*, rich submerged vegetation (19° 32' 53" S, 23° 10' 37" E) 18.iv.-27.vii.2000, 8.-11.iv.2002.
- OS8. Large secondary floodplain on WCI, dense stands of *Cyperus articulatus* and flooded grass, shallow water (19° 32' 03" S, 23° 10' 54" E): 18.iv.-27.vii.2000, 8.-11.iv.2002.
- OS9. Small floodplain on WCI with Hippo Pool, deep pool partly covered by floating leaves, fringed by *Phragmites*, sedges and flooded grass (19° 32' 25" S, 23° 11' 01" E): 18.iv.-27.vii.2000, 8.-11.iv.2002.
- OS10. Large floodplain S of Chiefs Island, dense stands of sedges and grass in shallow water (19° 35' 51" S, 23° 17' 33" E): 7.ii.2002.
- OS11. Boro River 20 km S of Chiefs Island, moderate current, fringed by sedges and submerged grass (19° 42' 55" S, 23° 14' 43" E): 18./20.iv.2000.
- OS12. Xaraxau flats, small channels among grassy floodplains (19° 50' 17" S, 23° 21' 09" E): 18.iv.2000, 12.ix.2010.
- OS13. Stretch of Boro River 15 km N of Maun, small river (1.5 m deep, 10 m wide), with moderate current, lined with grass and open bush (19° 50' 53" S, 23° 25' 22" E): 10.ii./3.iii./3.iv.2002, 29.i.2006.
- OS14. Boro River nearby Maun, 4 km NW of confluence with Thamalakane River, small river surrounded by open bush and woodland, it dried up in some years till 2005, later permanently flowing (19° 53' 28" S, 23° 29' 00" E): 21.iv./14.v./21.v./23.vii.2000, 10.ii./3.iii./3.iv.2002, 5.iii.2005, i.2006.
- OS15. Dense riverine forest along Thamalakane River at Maun Wildlife Sanctuary (MWS), scattered with small clearings and surrounded by broad-leafed *Mopane colophospermum* woodland (19° 58' 20" S, 23° 26' 15" E): 13.-17.iv./23.-29.iv./5.-8.v./13.vii.2000, 10.iii.2001, 10.ii./26.iii.2002, 5.iii.2005.
- OS16. Rest pools of Thamalakane River at new bridge Maun, several small to medium sized pools with rich vegetation, from 2005 slowly flowing river with permanent water (20° 00' 04" S, 23° 30' 25" E): 16.iv./24.iv./ 26.iv./30.v./6.v./21.v./12.vii./23.vii.2000, 26.iii.2002, 5.iii.2005, i.2007.
- OS17. Thamalakane River at MWS, broad river-course with almost stagnant water, covered by floating leaves of *Nymphaea nouchali* and *Potamogeton*, fringed by grass and sedges (19° 57' 31" S, 23° 27' 28" E): 16.iv./22.iv./30.iv./6.v./8.v./17.vi./12.vii./23.vii.2000, 9.iii.2001, 8.ii./12.ii./26.iii.2002.
- OS18. Thamalakane River at Island Safari Lodge, Maun (19° 55' 41" , 23° 30' 16"): 9.iii.2001, 24.ii./26.iii.2002, iii.2005, i.2006, 8.-13.i.2007, 23.xi.2007.
- OS19. Thamalakane River at Sitatunga Croc Farm, 12 km SW of Maun, stagnant water, rich vegetation (20° 04' 31" S, 23° 21' 20" E): 15.v.2000, 26.iii.2002.
- OS20. Rain pools along road Sehitwa - Toteng (20° 21' 18" S, 22° 51' 13" E): 12.iv.2000, i.2006.
- OS21. Boteti River at Drifters Lodge, 33 km SE Maun, large stagnant water body, filled by flood and heavy rain in xi.2004, with sparse vegetation (20° 10' S, 23° 40' E): 8.iii.2005, 27.i.2006.
- OS22. Boteti River at Leroo la Tau Lodge and campsite, dry riverbed with small pools and permanent waterholes (20° 25' 34" S, 24° 31' 17" E): 28.i.2006.
- OS23. Maun, rainpools between Maun and Okavango Delta buffalo fence, medium sized to large shallow pools with rich vegetation like sedges and floating-leaf plants (19° 52' 39" S, 23° 26' 10" E): i.-ii.2006.

- OS24. Boro River at Boro village near veterinary fence, north of Maun, medium sized temporary river with swampy river bank and sparse gallery forest (19° 50' 45" S, 23° 24' 16" E): 2.xii.2007.
- OS25. Maun, Thamalakane River at Okavango River Lodge (19° 55' 42" S, 23° 30' 42" E): 5.-9.i.2007.
- OS26. Maun, Thamalakane River opposite Crocodile Safari Camp (19° 55' 51" S, 23° 30' 37" E): 5.-9.i.2007.
- OS27. Maun, sewage ponds at water treatment plant (19° 57' 34" S, 23° 24' 49" E): 6.i.2007.
- OS28. Maun, Boro River north of Maun, near old Ostrich farm (19° 52' 59" S, 23° 26' 49" E): 13.i.2007; 19.-22-xi.2007.
- OS29. Maun, Boro River, 5 km north of Maun (19° 53' 56" S, 23° 28' 56" E): 6.-13.i.2007, 19.-25.xi.2007, 5.ii.2010.
- OS30. Maun, floodplains of Boro River north of Maun, shallow temporary swamps with dense stands of *Schoenoplectus* reeds, *Nymphaea nouchali* and other rich vegetation (19° 53' 41" S, 23° 28' 14" E): 25.xi.2007; 5.ii.2010.
- OS31. Maun, temporary and artificial ponds at Okavango Research Institute (ORI, former HOORC) near Thamalakane River in Mopane woodland (19° 55' 05" S, 23° 31' 44" E): v. - xii.2007.
- OS32. Maun, Thamalakane River at Matlapaneng Old Bridge, broad river with swamp and remainings of gallery forest (19° 56' 37" S, 23° 29' 21" E): 7.-10.i.2007; 28.xi.2007; 4.-10.ix.2010.
- OS33. Lake Ngami, northern bank between Toteng and Sehitwa, temporary filled lake (20° 25' 13" S, 22° 50' 09" E): 24.xi.2007.
- OS34. Maun, Thamalakane River 15 km NE of Maun (19° 54' 36" S, 23° 31' 13" E): 25.-30.xi.2007.
- OS35. Moremi Game Reserve, South Gate entrance, Mopane woodland with some temporary pools and a river nearby (19° 25' 31" S, 23° 38' 44" E): 3.xii.2007.
- OS36. Khwai River, 5 km north-east of North Gate (19° 08' 52" S, 23° 48' 10" E): 15.xii.2007.
- OS37. Toteng, road bridge over river flowing from Okavango Delta into Lake Ngami, west of Toteng (20° 21' 30" S, 22° 56' 45" E): 30.i.2010.
- OS38. Maun, Thamalakane River at Audi Camp, broad river with swamps with permanent flow since 2005 (19° 55' 59" S, 23° 30' 28" E): 31.i.2010.
- OS39. Maun, Thamalakane River near Sedia Hotel, broad and swampy river, with permanent flow since 2005 (19° 57' 02" S, 23° 28' 58" E): 3.ii.2010.
- OS40. Boteti River at Meno-a-Kwena tented Camp, seasonal river, outflow of the Okavango Delta to Makgadikgadi pans, dry for many decades but now flowing since 2007 (20° 19' 21" S, 24° 19' 02" E): 11.ii.2010.
- OS41. Maun, Thamalakane River at Maun Lodge, broad river with swamp and reeds (20° 00' 15" S, 23° 25' 36" E): 4.-10.ix.2010.
- OS42. Maun, Boronyana River, small temporary river, started flowing in March 2010 the first time since 45 years (19° 56' 34" S, 23° 28' 56" E): 4.-10.ix.2010.
- OS43. Tlhokatsebe, swamps near Boro River in NG 32 area, 22 km NNE of Maun (19° 47' 47" S, 23° 22' 21" E): 11.-12.ix.2010.

Chobe-/Linyanti River system (CL)

- CL1. Chobe River close to Ngoma Bridge border post, slow current, surrounded by grassy floodplains (17° 55' S, 24° 44' E): 19.iii.2002.
- CL2. Chobe River in Chobe National Park, 15 km W of Kasane, slow current among swamps and floodplains (17° 51' S, 25° 04' E): 21.iii.2002, 17.ii.2006.
- CL3. Chobe River at Chobe Safari Lodge, Kasane, almost stagnant water fringed by woodland (17° 49' S, 25° 07' E): 07.iii.2001, 21.iii.2002, 17.-18.iii.2005, 16.-19.ii.2006, 13./17.ii.2010.

- CL4. Chobe Rapids, 3 km NE of Kasane, river with fast current and rocky ground among bushland (17° 48' S, 25° 11' E): 27.v.2000, 20.iii.2002, 14.-20.iii.2005, 16.-19.ii.2006, 17.-18.i.2007.
- CL5. Chobe River at Kubu Lodge, moderate current, fringed by dense riverine forest (17° 48' S, 25° 11' E): 21.-24.iii.2002, 16.iii.2005.
- CL6. Artificial pool near Kazungula, sparse vegetation (17° 50' S, 25° 15' E): 21.iii.2002.
- CL7. Chobe River at The Garden Lodge, Kasane, broad river, slow current, grassy margins (17° 47' 40" S, 25° 09' 29" E): 14.-15.iii.2005, 17.ii.2006.
- CL8. Chobe River at Mowana Lodge, Kasane, broad river fringed by dense forest, river starts spreading to the Chobe rapids and forms several small channels (17° 47' S, 25° 09' E): 14.-15.iii.2005, 17.ii.2006.
- CL9. Small artificial streams and ponds at Mowana Lodge golf course, Acacia woodland (17° 47' 29" S, 25° 09' 35" E): 15.iii.2005.
- CL10. Chobe River 1 km E of CL4, Chobe rapids, fast flowing river, constricted by rocky outcrops, fringed by shady forest (17° 48' S, 25° 11' E): 20.iii.2005, 17.ii.2006, 18.i.2007.
- CL11. Chobe River at Thebe River Safaris, Kasane, broad river fringed by narrow broad-leaved forest and Acacia woodland (17° 47' 22" S, 25° 11' 07" E): 14.-21.iii.2005, 17.i.2007.
- CL12. Hot Seep Springs at right Chobe River bank, 10 km E of Kasane, helocrenes, surrounded by grassy swamps, heavily disturbed by human livestock and wildlife. (17° 47' 44" S, 25° 12' 00" E): 16.iii.2005.
- CL13. Chobe River between CL12 and Kazungula settlement, broad river, fringed by dense broad-leaved forest and Acacia woodland (17° 47' S, 25° 13' E): 16.iii.2005.
- CL14. Confluence of Chobe and Zambezi Rivers near Kazungula road ferry, broad mighty rivers fringed by grassy swamps and surrounded by Acacia woodland (17° 47' 53" S, 25° 15' 52" E): 17.iii.2005.
- CL15. Chobe National Park, Linyanti Gate, DWNP camp, woodland and little swamps (18° 16' 14" S, 23° 56' 04" E): 13.xii.2007.
- CL16. Chobe National Park, Goha Gate, temporary rainpools in arid scrubland (18° 23' 15" S, 24° 14' 45" E): 14.xii.2007.
- CL17. Chobe National Park, large lagoon at Linyanti public campsite (18° 17' 41" S, 23° 54' 29" E): 13.xii.2007.
- CL18. Chobe National Park, several temporary water bodies between Mababe Gate and Linyanti public campsite (18° 52' 10" S, 23° 58' 31" E): 12.xii.2007.
- CL19. Mababe depression, Mababe village near Khwai River, road crossing of temporary river, outflow of the Okavango Delta (19° 14' 23" S, 23° 57' 14" E): 12.xii.2007.
- CL20. Goha Hills, sand pit with temporary pools near the hills at road Chobe NP Goha Gate towards Savuti (18° 24' 56" S, 24° 13' 34" E): 14.xii.2007.
- CL21. Savuti Marsh, several temporary water bodies around Savuti Camp (18° 33' 47" S, 24° 03' 31" E): 14.xii.2007.

Other Localities outside the northern catchments (OL)

- OL1. Nata River S of Nata, small rest pools without vegetation in 2002, fast flowing river in 2006 (20° 12' 50" S, 26° 11' 12" E): 25.iii.2002, 15.ii.2006.
- OL2. Rain pools along road Nata-Gweta-Maun, close to Nxai Pan (20° 09' S, 25° 32' E): 11.iv.2000.
- OL3. Tsodilo Hills, rocky hills, surrounded by dry Mopane woodland, several rain filled pools (18° 45' S, 21° 44' E): 2.-3.iv.2005.
- OL4. Tswapong Hills, Matlokhane, rocky hills with a variety of small springs and streams, (22° 41' S, 27° 24' E): 13.vii.2005. (E. Schuran).

- OL5. Tswapong Hills, Moremi Gorge, deep cutted gorge with shady stream, small waterfalls and pools (22° 35' 42" E, 27° 26' 23" S): 13.ii.2006.
- OL6. Deception Valley, Central Kalahari Game Reserve, waterhole at dry Letiahau river bed (22° 14' S, 23° 57' E): 10.viii.2005 (E. Schuran).
- OL7. Moseitse, large seasonal pool at Nata-Francistown road, rich vegetation, surrounded by dry woodland (20° 44' 18" S, 26° 52' 59" E): 14.ii.2006.
- OL8. Nata, seasonal pool, north of Nata, surrounded by Mopane woodland (19° 46' 08" S, 26° 05' 44" E): 15.ii.2006.
- OL9. Pandamatenga, small (0.5 ha) seasonal pool at the Nata-Kasane road (18° 42' 37" S, 25° 36' 23" E): 15.ii.2006.
- OL10. Shashe River north of Francistown, seasonal shallow and broad river with sandy riverbed, without any vegetation (20° 59' 54" S, 27° 20' 46" E): 14.ii.2006.
- OL11. Moremi village, north of Tswapong Hills, large seasonal pool, rich vegetation, surrounded by Mopane woodland (22° 26' 21" S, 27° 20' 38" E): 13.ii.2006.
- OL12. Ghanzi, Dqâe Quare Game Farm, two permanent waterholes and two seasonal pools, surrounded by Acacia and Terminalia woodland (21° 38' 45" S, 21° 51' 05" E): 16.-19.i.2006.
- OL13. Serowe, Khama Rhino Sanctuary, temporary waterholes and pools, surrounded by Acacia woodland (22° 14' 58" S, 26° 44' 46" E): 12.ii.2006.
- OL14. Mopipi Dam, nr. Mopipi, large and shallow reservoir of variable extension (21° 12' 59" S, 24° 52' 05" E): 11.ii.2006.
- OL15. Rakops, seasonal pan W of R., surrounded by dry Acacia woodland (20° 49' 32" S, 24° 21' 08" E): 11.ii.2006.
- OL16. Tshootsha, seasonal pan at road Mamuno-Ghanzi (22° 08' 20" S, 20° 53' 05" E): 8.ii.2006.
- OL17. Bodibeng, small shallow temporary pool (20° 46' 14" E, 22° 29' 06" E): 6.ii.2006.
- OL18. Mamuno border post, large temporary pan, surrounded by Acacia woodland (22° 16' 40" S, 20° 01' 34" E): 8.ii.2006.
- OL19. Schitwa, small artificial pond without vegetation in Acacia woodland (20° 32' 43" S, 22° 32' 53" E): 9.ii.2006.
- OL20. Serowe, artificial fish ponds with little vegetation (22° 24' 36" S, 26° 45' 16" E): 12.ii.2006.
- OL21. Sowa Pan, south-west of Nata, shallow pan with sparse vegetation and brackish water (20° 38' S, 26° 05' E): 14.ii.2006.
- OL22. Bodibeng, temporary pools and gravel pit at road Ghanzi-Maun (20° 40' 32" S, 22° 32' 04" E): 30.i.2010.
- OL23. Central Kalahari Game Reserve, sampling area 1, Matswere gate, temporary pools (21° 09' 25" S, 24° 00' 25" E): 14.xii.2007.
- OL24. Central Kalahari Game Reserve, sampling area 2, Deception Valley, temporary pools (21° 25' 02" S, 23° 47' 49" E): 14.xii.2007.
- OL25. Nokaneng, shallow seasonal pan in Kalahari thornbush, 17 km north of Nokaneng at road Shakawe-Schitwa (19° 30' 39" S, 22° 07' 26" E): 15.i.2009.
- OL26. Gumare, temporary rainfed pools in Kalahari thornbush, 6 km south of Gumare at road Shakawe-Schitwa (19° 25' 33" S, 22° 08' 20" E): 15.i.2009.
- OL27. Tsau, temporary rainfed pools in Kalahari thornbush, 10 km south of Tsau at road Shakawe-Schitwa (20° 15' 00" S, 22° 33' 05" E): 15.i.2009.
- OL28. Ghanzi, Thakadu Rest Camp, waterholes and pools filled by borehole water, surrounded by Kalahari thornbush and Terminalia woodland (21° 44' 22" S, 21° 40' 43" E): 3.ii.2009; 30.i.2010.
- OL29. Nata Bird Sanctuary, at the entrance, large salt pans, water filled after heavy rain (20° 17' 21" S, 26° 17' 53" E): 13.ii.2010.

- OL30. Nxai Pan National Park, Baines Baobabs, campsite No. 2 near Baines Baobabs, rainfed salt pan (20° 08' 22" S, 24° 46' 12" E): 13.ii.2010.
- OL31. Ntwetwe Pan at road Maun-Nata, 45 km east of Gweta, temporary filled pools and salt pans (20° 08' 30" S, 25° 40' 43" E): 18.ii.2010.
- OL32. Sibuyu Forest Reserve, little temporary pool at road Nata-Kasane (18° 50' 12" S, 25° 36' 09" E): 17.ii.2010.