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Distribution maps and checklist of Namibian Odonata

Frank Suhling¹ and Andreas Martens²

¹ Institut für Geoökologie, Technische Universität Braunschweig, Langer Kamp 19c,
38106 Braunschweig, Germany, <f.suhling@tu-bs.de>

² Institut für Biologie und Schulgartenentwicklung, Pädagogische Hochschule Karlsruhe,
Bismarckstraße 10, 76133 Karlsruhe, Germany, <martens@ph-karlsruhe.de>

Abstract

This paper presents a checklist of the Odonata of Namibia and provides up-to-date distribution maps of 130 species. Compared with the checklist from 2007, five species have been added to the list, four of them were new for science. Two species were omitted.

Zusammenfassung

Verbreitungskarten und Checkliste der Libellen Namibias (Odonata). – Aus Namibia sind derzeit 130 Libellenarten bekannt. Im Vergleich zur Checkliste von 2007 werden fünf Arten hinzugefügt, vier davon waren neu für die Wissenschaft. Zwei Arten werden von der bisherigen Liste gestrichen. Für alle Arten werden aktualisierte Verbreitungskarten geliefert.

Introduction

Previously published species lists of the Odonata of Namibia are included in publications on other topics, by BRINCK (1955), CURTIS (1991), and PINHEY (1984, 1985). BRINCK's (1955) list of Namibian Odonata refers to 32 species, whereas Pinhey's South African Odonata checklist (PINHEY 1984, 1985) refers to 56 species for Namibia. CURTIS (1991) included 70 valid species of dragonflies in a checklist of freshwater macro-invertebrates of Namibia (plus some taxa marked as doubtful; cf. MARTENS et al. 2003). With the activities of the entomologists of the Museum für Naturkunde, Humboldt-Universität, Berlin (ZMHB) and finally the BIOTA research project the survey activity in Namibia increased (Fig. 1). The revised dragonfly fauna recorded 102 species (MARTENS et al. 2003). The next update listed additional 25 species raising the total species number to 127 and presented preliminary distribution maps for all species as of 2006 (SUHLING & MARTENS 2007).

The aim of this contribution is to deliver an updated checklist and up-to-date distribution maps for all species. We also critically examine the checklist of 2007 and suggest some few changes in the species list. We provide maps for a total of 130 species.

Data acquisition

The distribution maps and the checklist presented here, base on previously published checklists (see above) and on additional sources:

- Namibian National Collection of Insects, National Museum of Namibia, Windhoek (NMNW). This includes material collected by L. Coetzee, S.V. Green, J. Irish, A.H. Kirk-Spriggs, E. Marais, C.S. Roberts and H. & W. Rust. Virtually all the specimens dating from the period 1936-1963 lack a collector's name on the attached labels; most of these have likely been collected by F. Gaerdes. The collection also includes material collected by R. Jödicke in 1999. For this study, we re-identified the majority of Odonata material held in the NMNW.
- Odonata held in the Museum für Naturkunde, Humboldt-Universität, Berlin (ZMHB) collected by J. Deckert, U. Göllner, F. Koch, and G. Peters (cf. KOCH et al. 1995); F. Koch provided also more recently collected specimens.
- Odonata of the General Entomology Collection of the Transvaal Museum, Gauteng (TMSA), collected by B.I. Balinsky, F. Gaerdes, C. Koch, H. Strydom and others. W. Tarboton examined the specimens and provided a list.

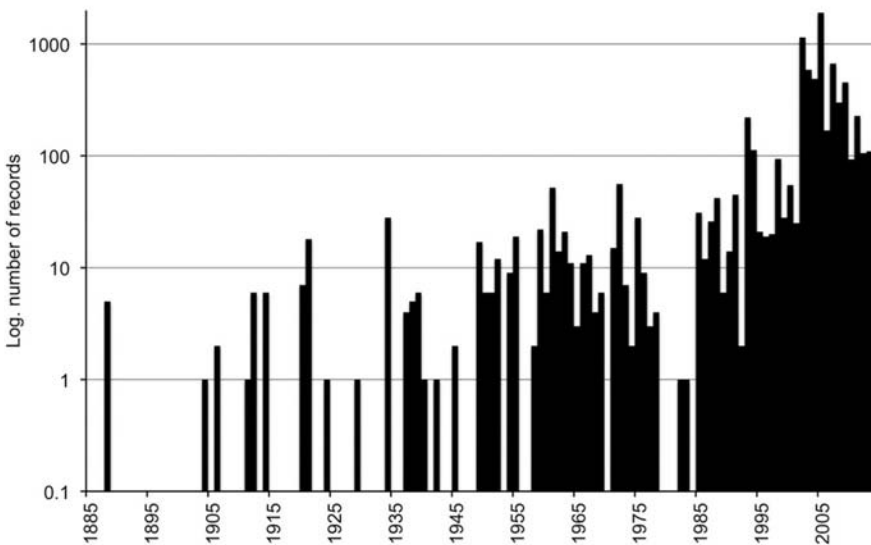


Figure 1. Temporal distribution of dragonfly records in Namibia. First records are from 1887. Note the logarithmic scale of records.

- Several photographic records by H.-M. Koch, H. Roland, and P. Reiner identified by the authors.
- Records of J. Kipping during several sampling trips since 2000. For some rare species we consider records made by him at the Chobe River near Kasane, Botswana, which is just opposite Impalila Island, Namibia (KIPPING 2010).
- Records generated from an extensive survey of the western ephemeral river catchments of Namibia and the upper Fish River catchment 2001 to 2003, and collecting trips to the Kunene in 2002 and the Okavango in 2003, by A. Martens and F. Suhling.
- Records generated from several excursions to different parts of the country, particularly the Caprivi, 2004 to 2013 by F. Suhling, accompanied by I. Suhling, K.G. Leipelt, E. Marais, A. Martens, E. Mosch, J. Ott, G. Sahlén, P. Schridde, C. Schütte, O. Richter and G. Rüppell, respectively, for some periods.

All collected specimens are deposited in NMNW. All data were compiled in a database maintained by FS (cf. Fig. 2).

Changes in the checklist since SUHLING & MARTENS (2007)

Five species are newly recorded. Among these, four are new to science, namely *Agriocnemis bumhilli* Kipping, Martens & Suhling, 2012, *Lestinigomphus silkae* Kipping, 2010, *Trithemis morrisoni* Damm & Hadrys, 2009, and *T. palustris* Damm & Hadrys, 2009. The fifth species new to Namibia is *Brachythemis wilsoni* Pinhey, 1952, which was found at the Kwando River in December 2010. *Agriocnemis bumhilli*, *T. morrisoni* as well as *Crenigomphus kavangoensis* Suhling & Marais, 2010 have their type localities in Namibia (DAMM & HADRYS 2009; SUHLING & MARAIS 2010; KIPPING et al. 2012). *Trithemis morrisoni* and *T. palustris* can not be distinguished in the field so far.

Two species have to be removed from the checklist:

- *Notogomphus praetorius* (Selys, 1878): the locality of the one single record from Namibia is unlikely to provide habitat for this species. The typical habitat is mountain streams in woodland, which does not exist near Hardap Dam. We suppose wrong locality assignment.
- *Trithemis pluvialis* Förster, 1906 is based on observation of one single male at the Kwando River (KAPPES & NEHLS 2004); no specimens have been collected nor photos have been taken. Since then no records of *T. pluvialis* were made. We infer that *T. monardi* was observed, which is known from the Kwando River.

Rhyothemis mariposa (Ris, 1913) is a special case: PINHEY (1984) assigned the type locality 'Otiembora' to Namibia. However, the locality cannot be localized with security since the collector, Axel W. Eriksson, did not leave notes. John Irish (in lit.) provided us with the best possible georeference, indicating that the locality is in Angola in close proximity to the Namibian border. The region is not well surveyed. Thus, although the species was not recorded it may occur in Namibia. We keep this species on the checklist.

In addition there are some taxonomic changes:

- Due to distinct larval characters *Mastigomphus* Cammaerts, 2004 formerly regarded as a subgenus of *Neurogomphus* by CAMMAERTS (2004) have been raised to genus level (SUHLING et al. 2014).
- PETERS & THEISCHINGER (2011) revised the former genus *Aeshna* in Africa and created the monotypic genus *Zosteraeschna*, including the former *Aeshna minuscula*.
- DIJKSTRA & PILGRIM (2007) created the genus *Trithetrum* which is represented by *T. navasi* (Lacroix, 1921), formerly *Sympetrum navasi*.
- *Aethiothemis discrepans* Lieftinck, 1969 is considered to be a junior synonym of *A. solitaria* Martin, 1908 (see KIPPING 2010).

The changes reported above bring the checklist to 130 species. Some more species may be expected, particularly *Pinheyagrion angolense*, which occurs in Angola as well as in Botswana. *Pseudagrion helenae*, *P. fisheri*, and *Trithemis brydeni* all occur in the Okavango Delta (KIPPING 2010). At the Orange River there may be two additional species, which have both been recorded at Augrabies Falls, 50 km upstream of the Namibian border, namely *Pseudagrion citricola* and *Trithemis dorsalis*. Finally, in streams in the lower Kunene catchment (e.g. Otjihipa Mts) one may expect *P. angolense*, which is found in S Angola.

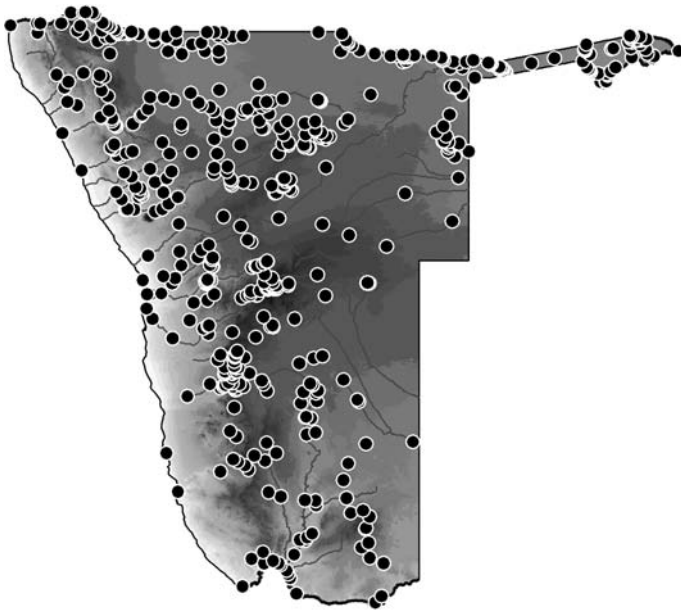
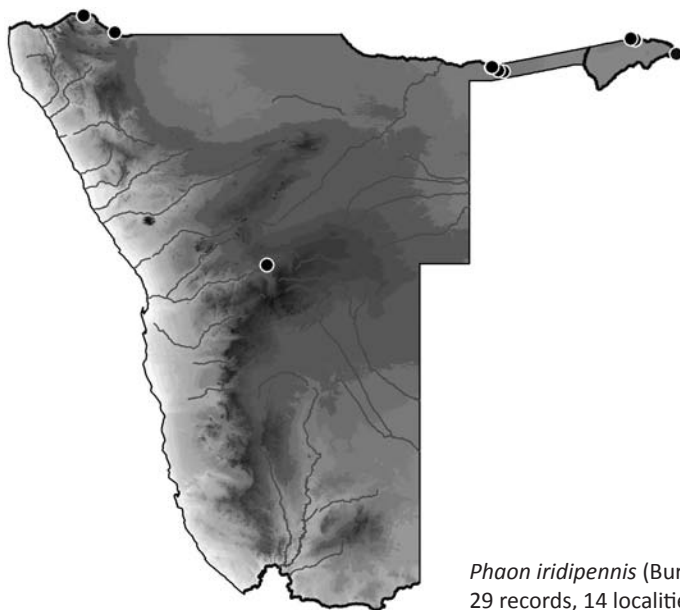
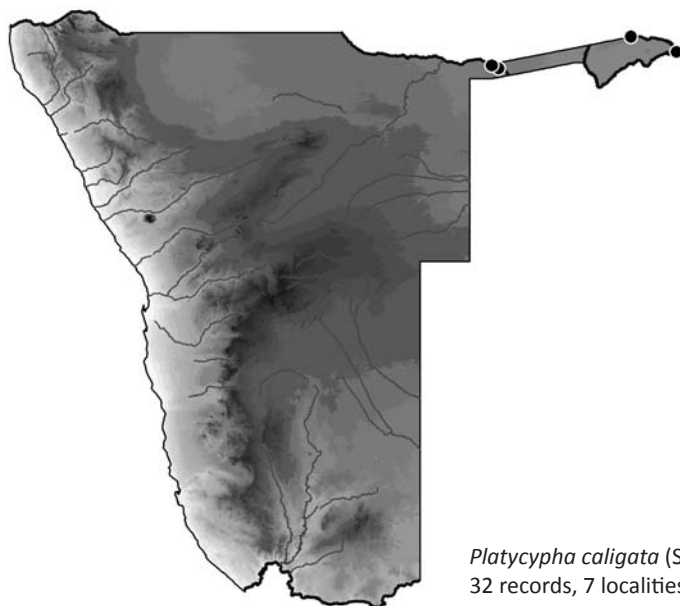


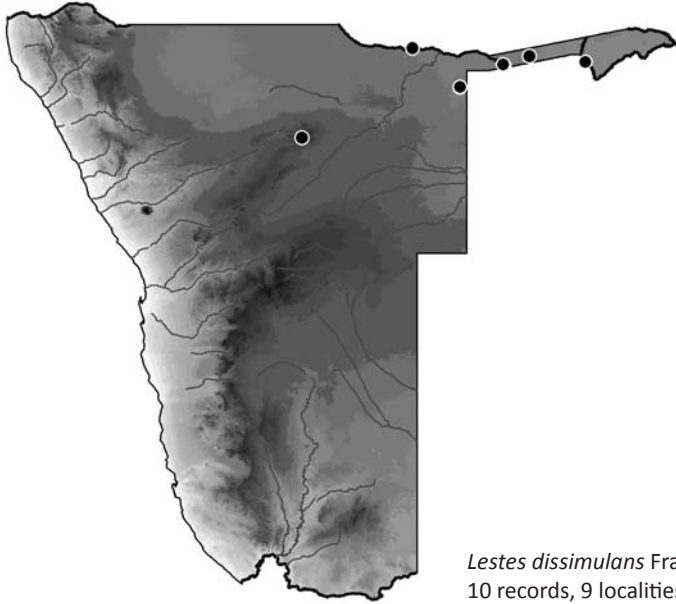
Figure 2. Distribution of all dragonfly records in Namibia (N = 7,488 records). The map indicates elevations from sea level (white) to highest summits (black, max. 2,573 m a.s.l.). Dark lines are ephemeral river courses, thick black lines perennial rivers.

Distribution maps: Calopterygidae

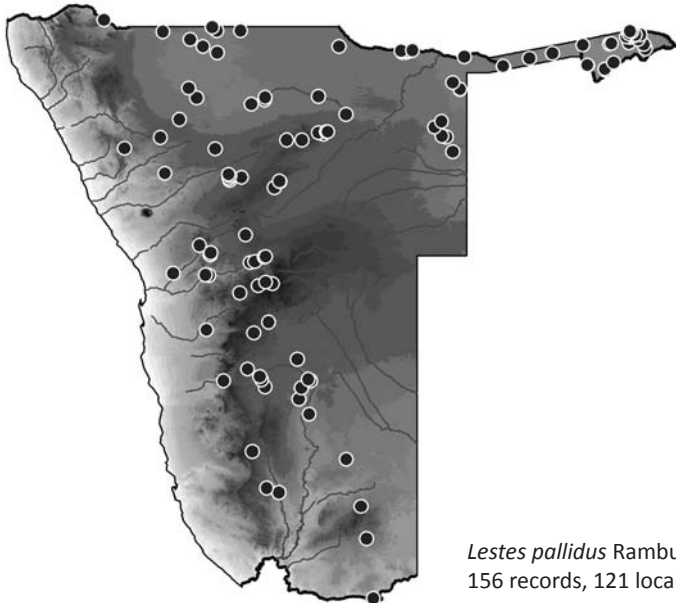
Phaon iridipennis (Burmeister, 1839)
29 records, 14 localities.

Distribution maps: Chlorocyphidae

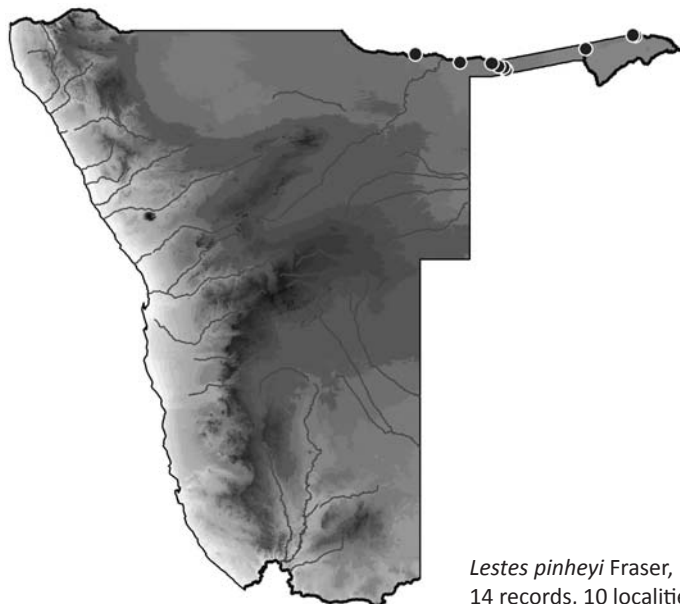
Platycypha caligata (Selys, 1853)
32 records, 7 localities.

Distribution maps: Lestidae

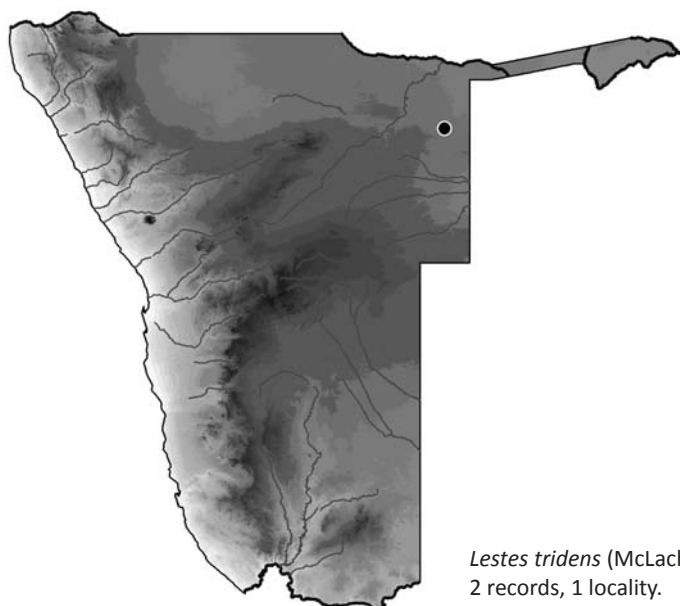
Lestes dissimulans Fraser, 1955
10 records, 9 localities.



Lestes pallidus Rambur, 1842
156 records, 121 localities.

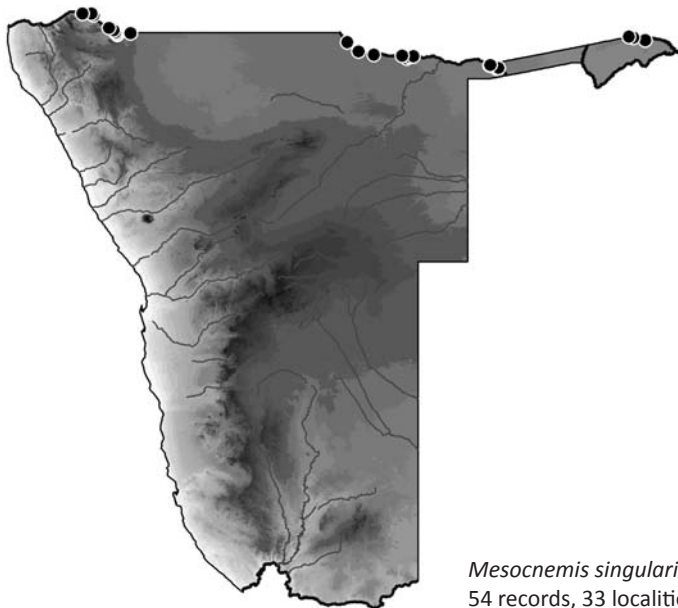


Lestes pinheyi Fraser, 1955
14 records, 10 localities.

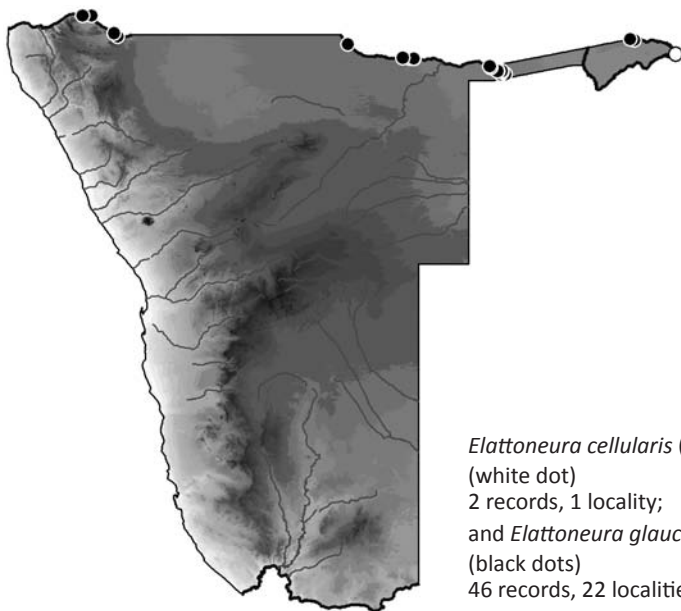


Lestes tridens (McLachlan, 1895)
2 records, 1 locality.

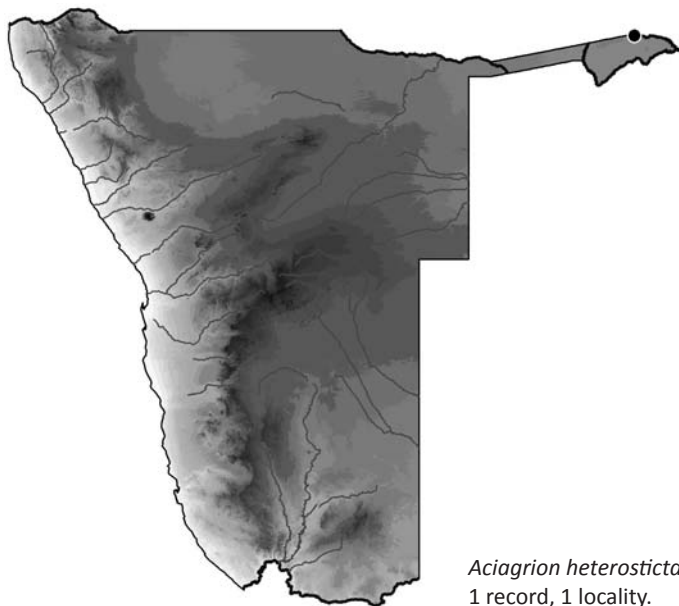
Distribution maps: Platycnemididae



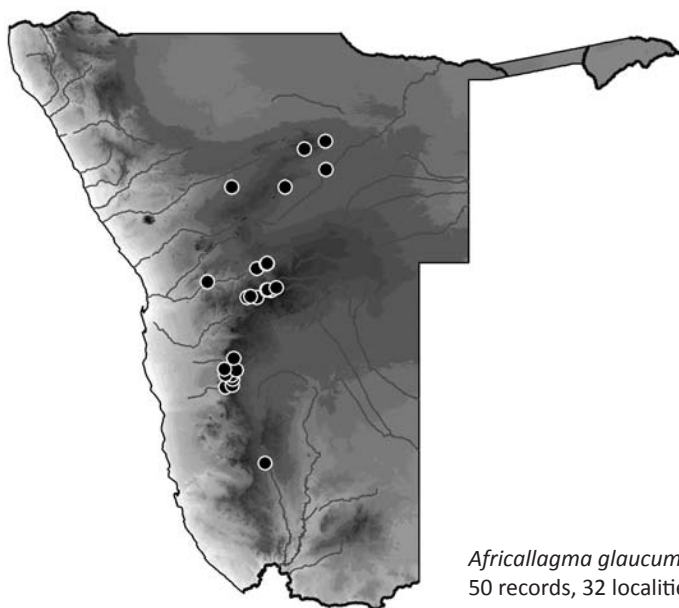
Mesocnemis singularis Karsch, 1891
54 records, 33 localities.



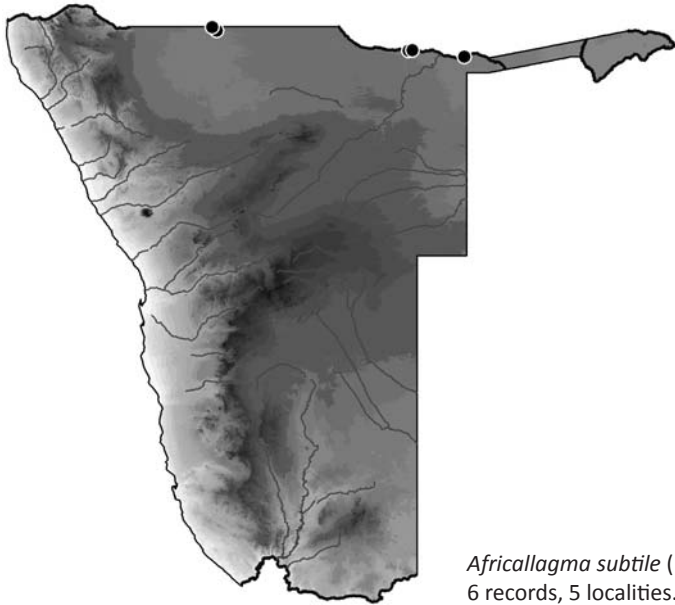
Elattonneura cellularis (Grünberg, 1902)
(white dot)
2 records, 1 locality;
and *Elattonneura glauca* (Selys, 1860)
(black dots)
46 records, 22 localities.

Distribution maps: Coenagrionidae

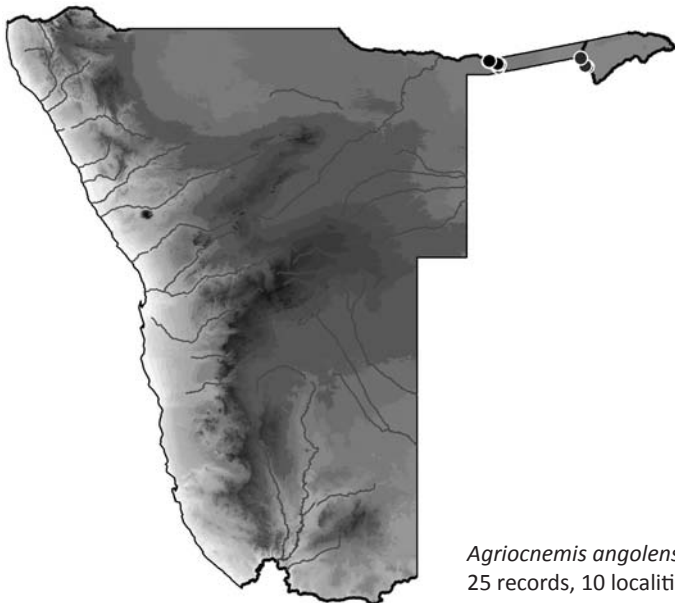
Aciagrion heterosticta Fraser, 1955
1 record, 1 locality.



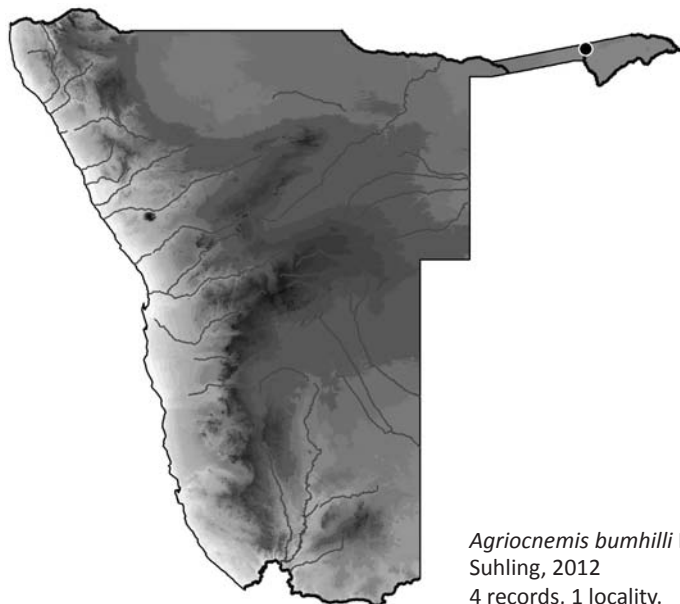
Africallagma glaucum (Burmeister, 1839)
50 records, 32 localities.



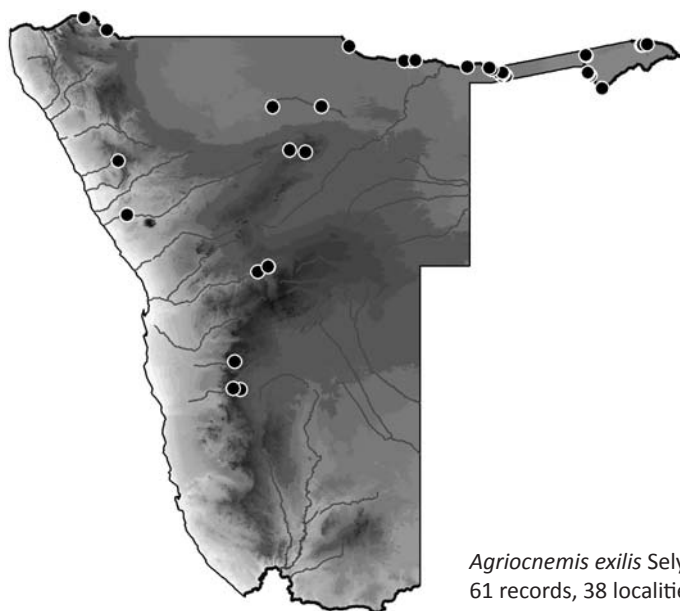
Africallagma subtile (Ris, 1921)
6 records, 5 localities.



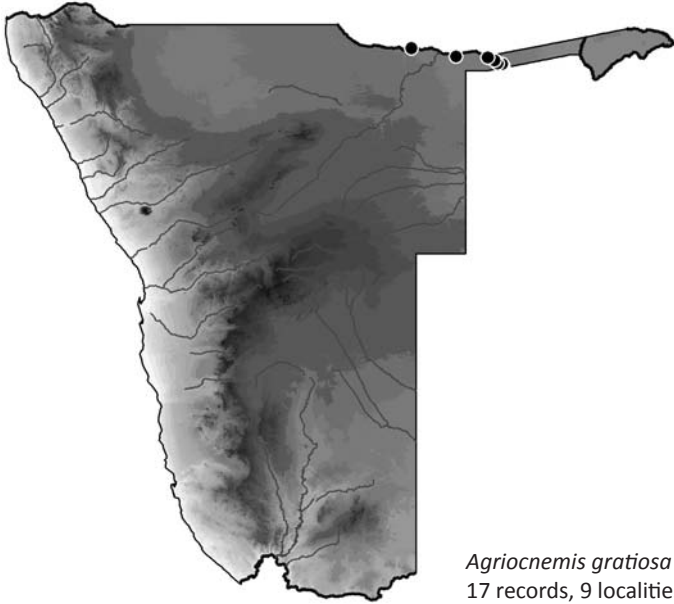
Agriocnemis angolensis Longfield, 1947
25 records, 10 localities.



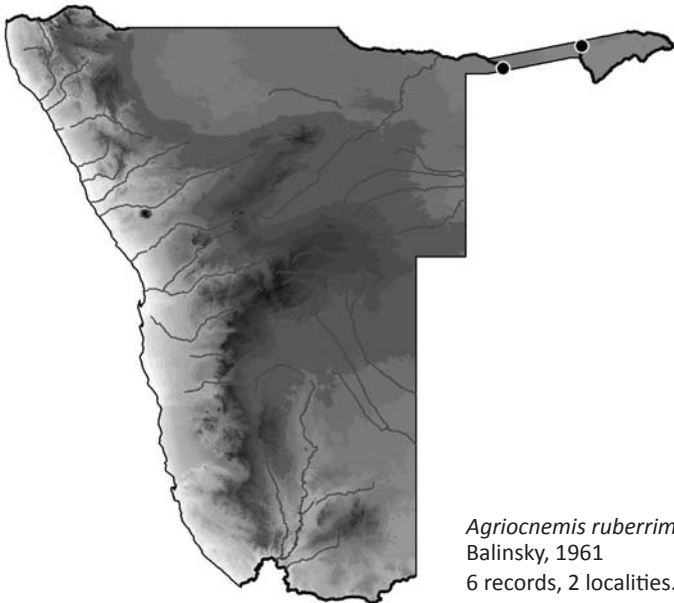
Agriocnemis bumhilli Kipping, Martens & Suhling, 2012
4 records, 1 locality.



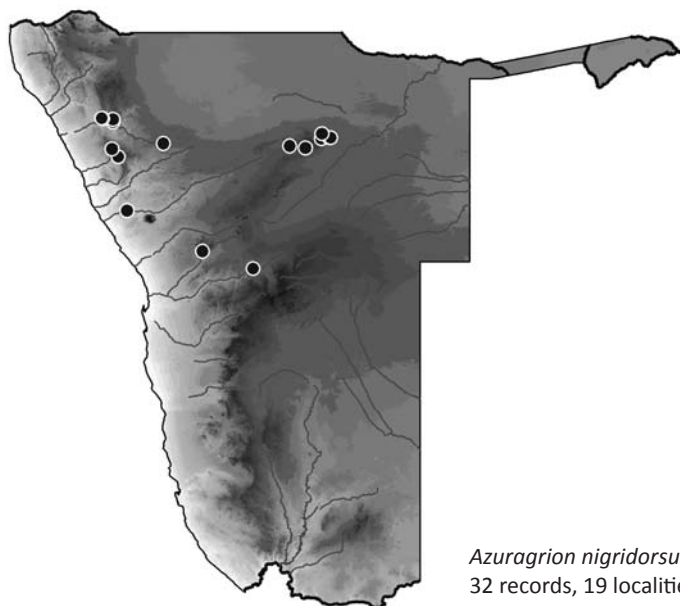
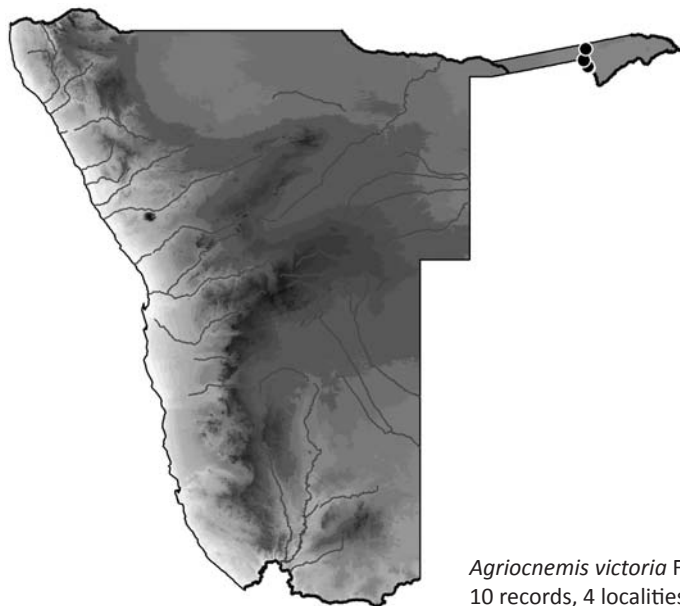
Agriocnemis exilis Selys, 1872
61 records, 38 localities.

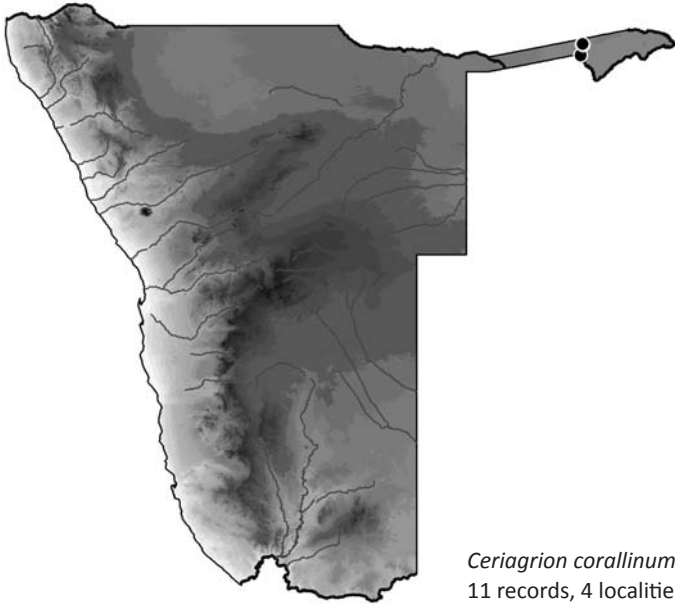


Agriocnemis gratiosa Gerstäcker, 1891
17 records, 9 localities.

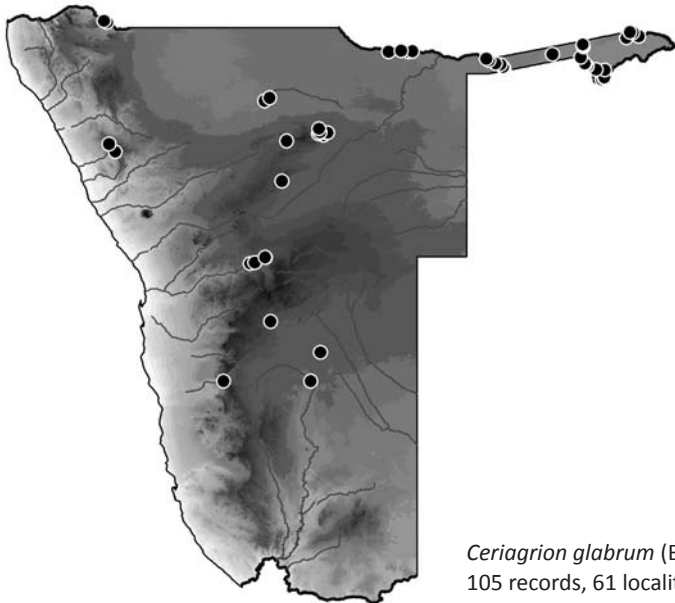


Agriocnemis ruberrima albifrons
Balinsky, 1961
6 records, 2 localities.

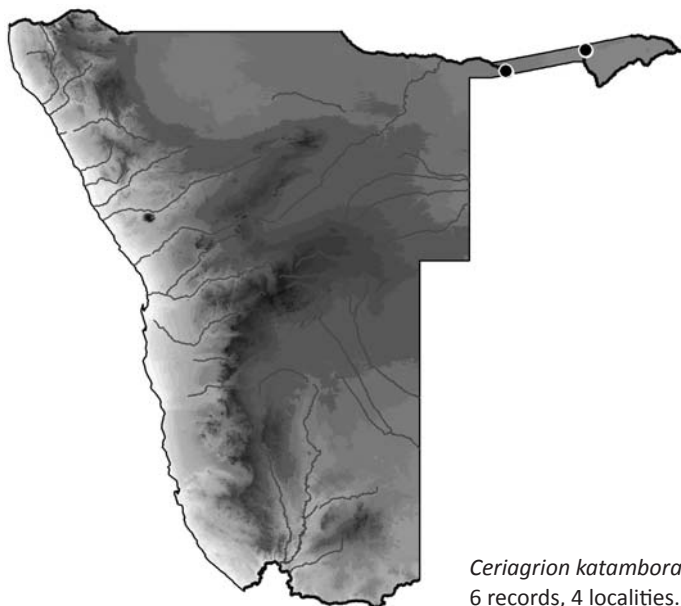




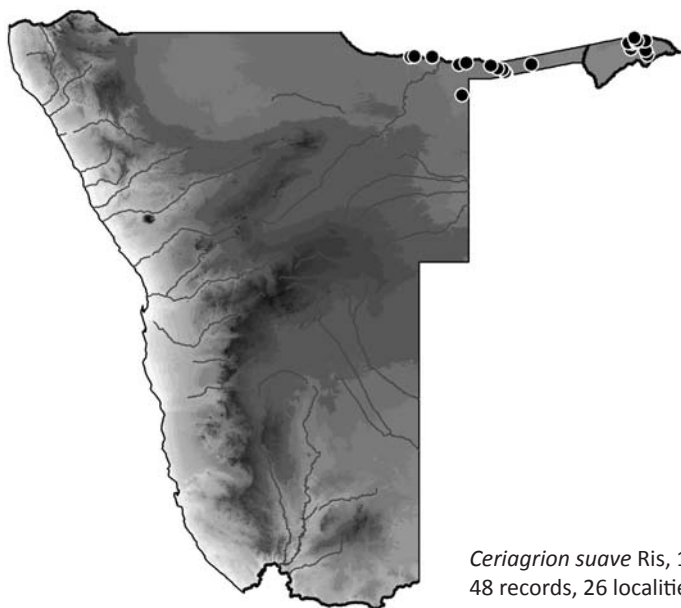
Ceriagrion corallinum Campion, 1914
11 records, 4 localities.



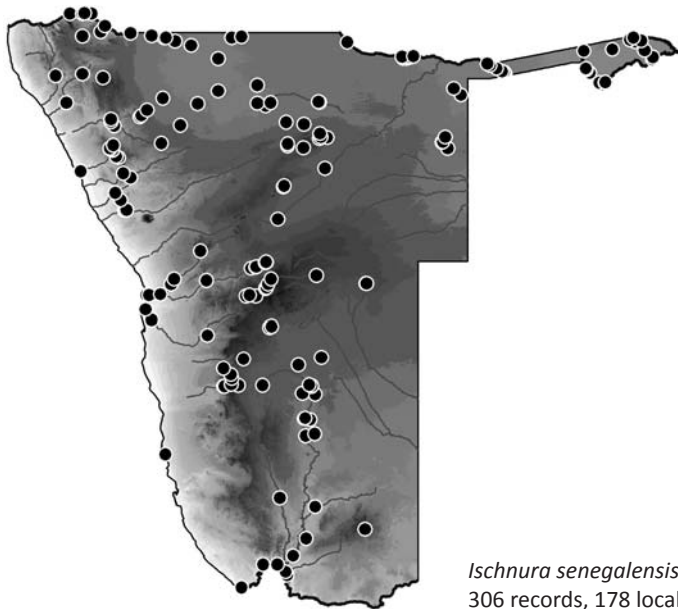
Ceriagrion glabrum (Burmeister, 1839)
105 records, 61 localities.



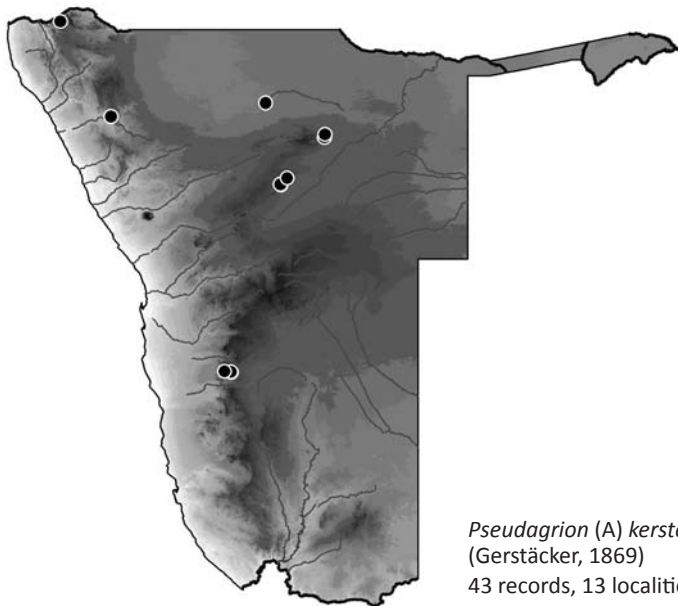
Ceriagrion katamborae Pinhey, 1961
6 records, 4 localities.



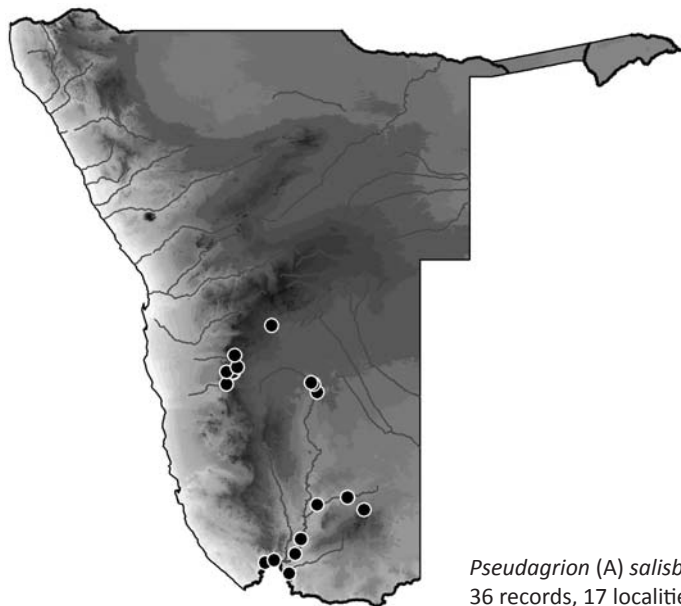
Ceriagrion suave Ris, 1921
48 records, 26 localities.



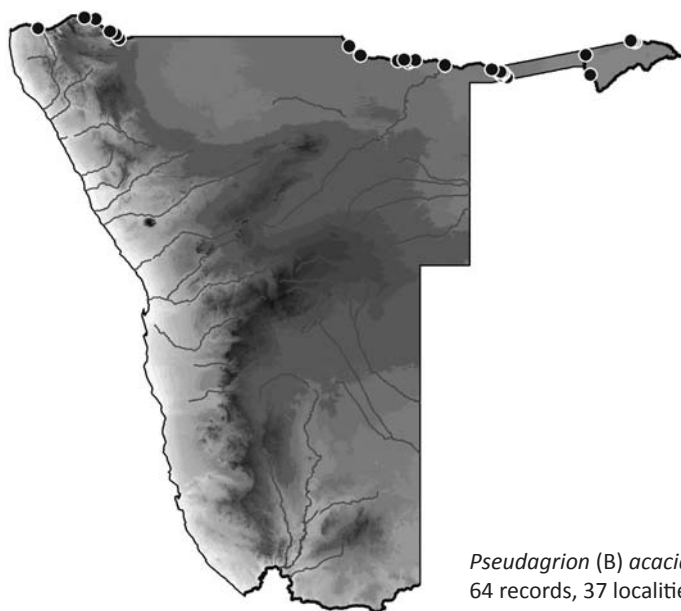
Ischnura senegalensis (Rambur, 1842)
306 records, 178 localities.



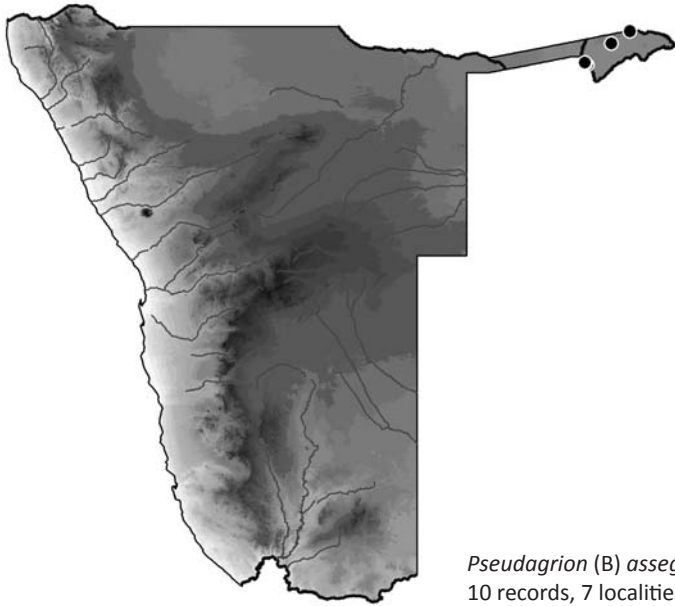
Pseudagrion (A) *kersteni*
(Gerstäcker, 1869)
43 records, 13 localities.



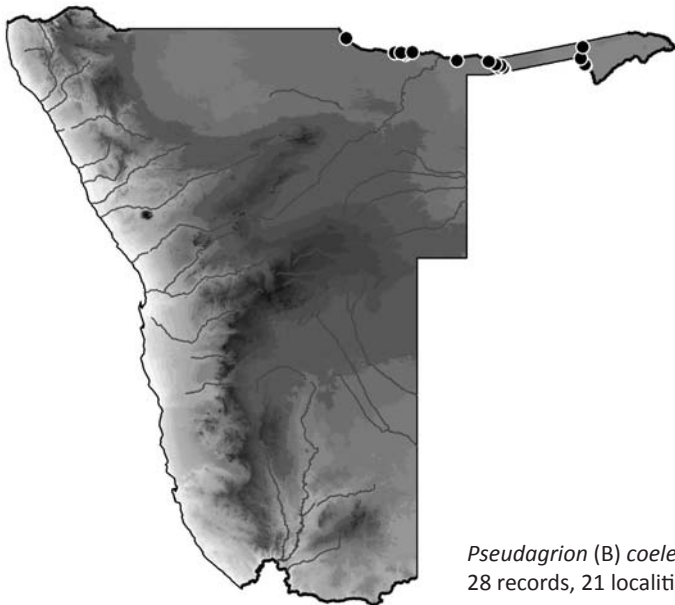
Pseudagrion (A) salisburyense Ris, 1921
36 records, 17 localities.



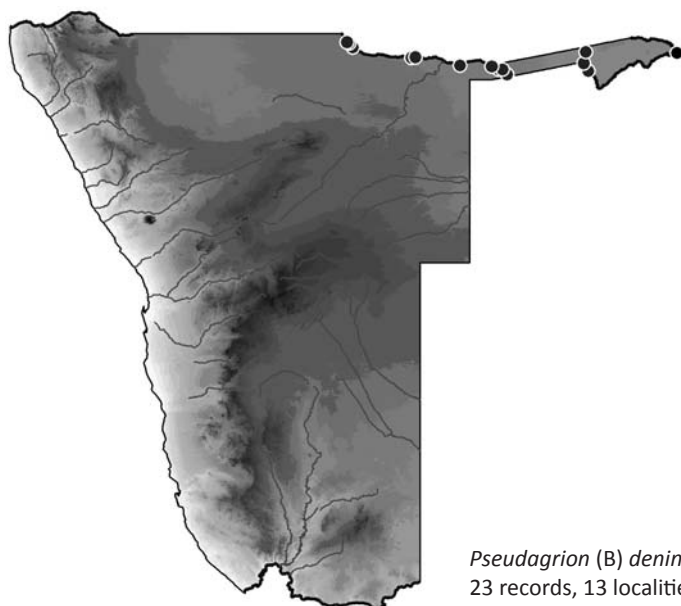
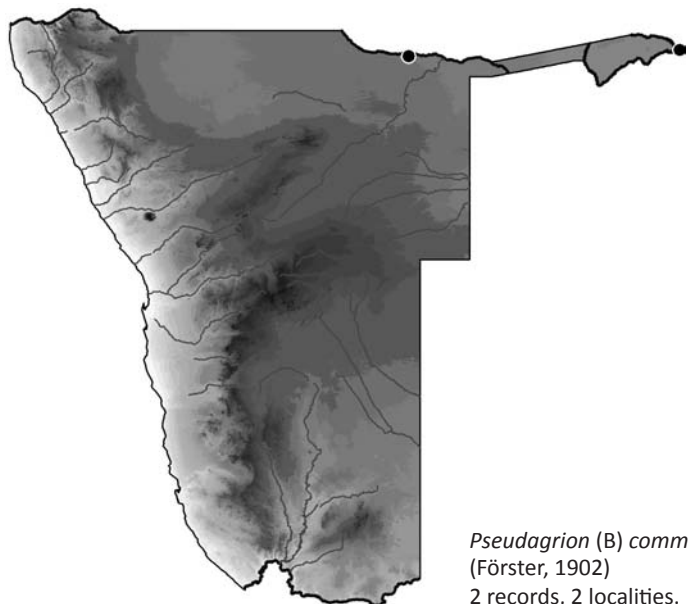
Pseudagrion (B) acaciae Förster, 1906
64 records, 37 localities.

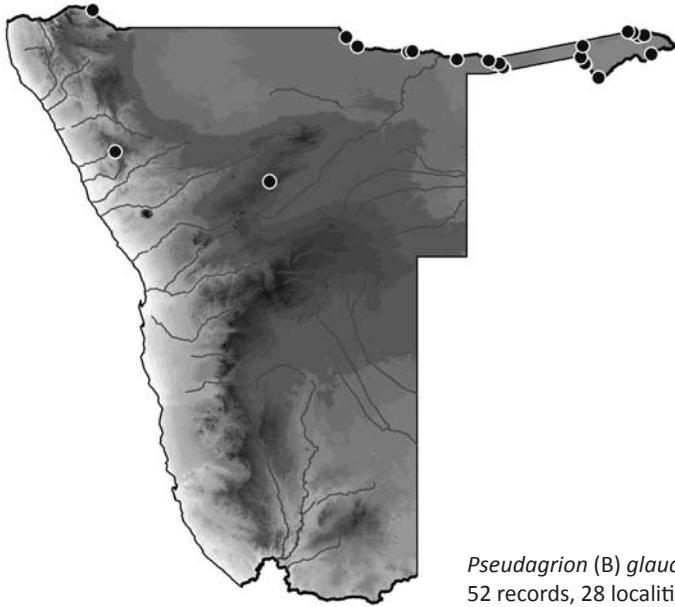


Pseudagrion (B) *assegaii* Pinhey, 1950
10 records, 7 localities.

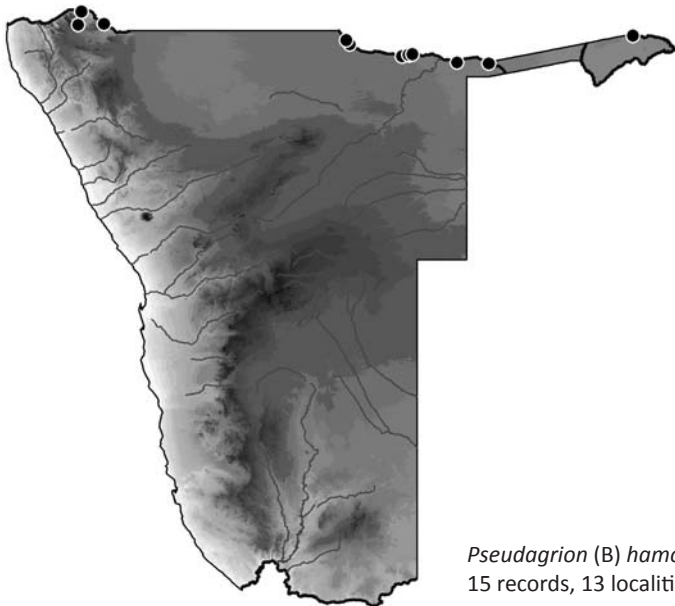


Pseudagrion (B) *coeleste* Longfield, 1947
28 records, 21 localities.

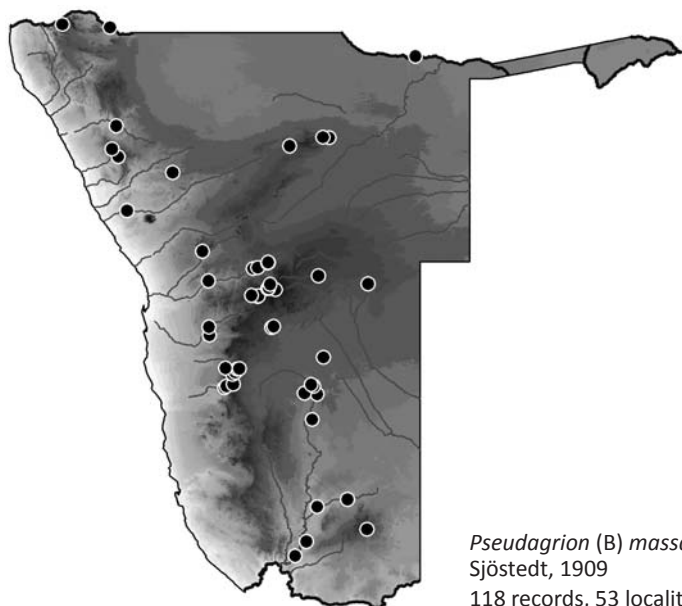




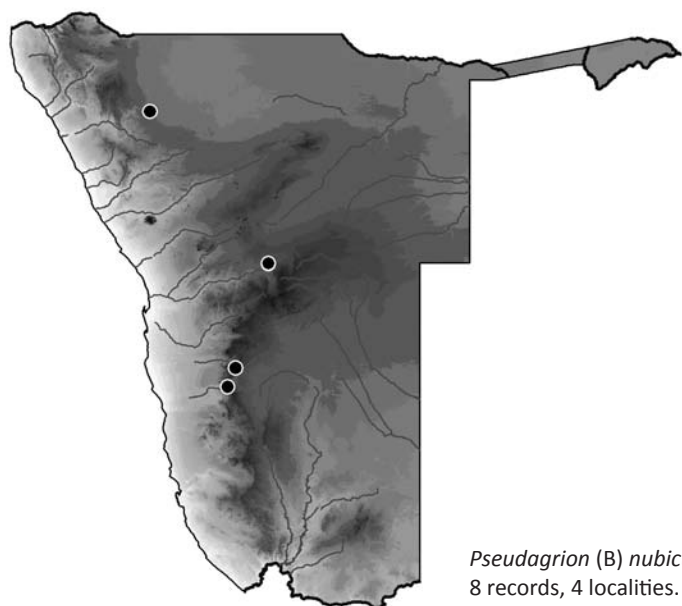
Pseudagrion (B) *glaucescens* Selys, 1876
52 records, 28 localities.



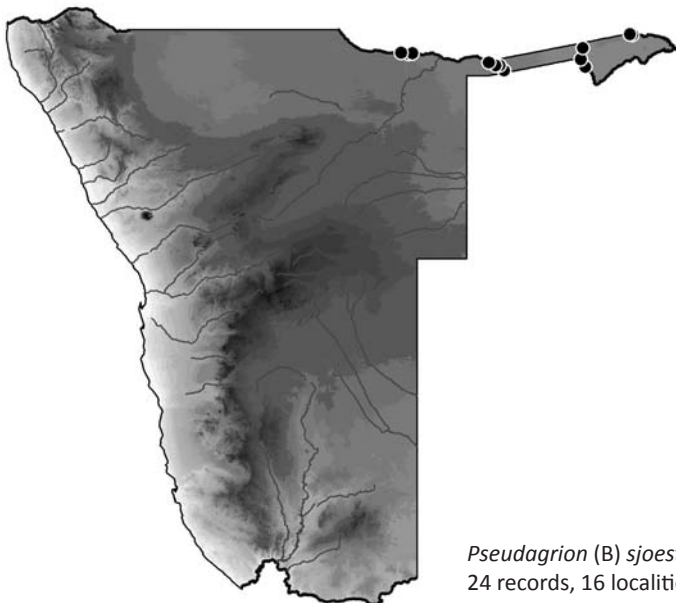
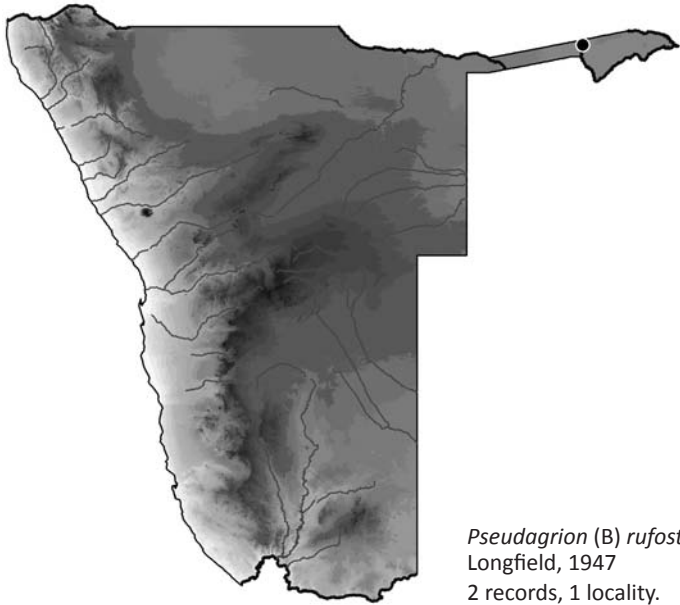
Pseudagrion (B) *hamoni* Fraser, 1955
15 records, 13 localities.

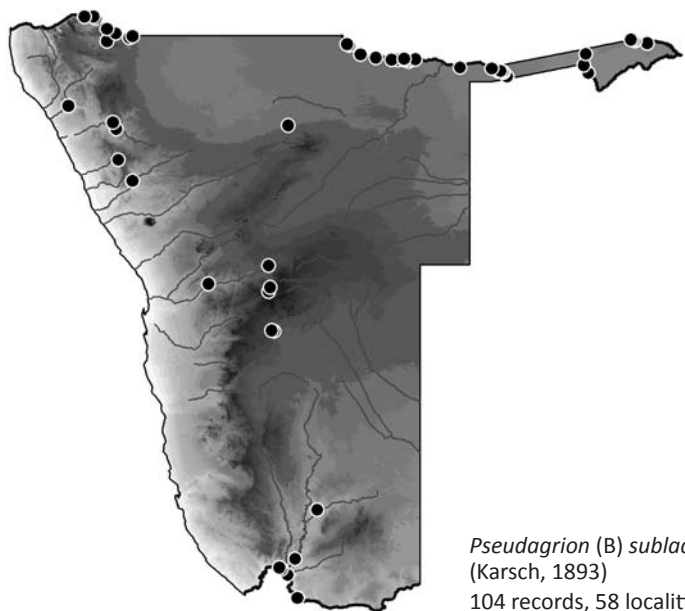


Pseudagrion (B) *massaicum*
Sjöstedt, 1909
118 records, 53 localities.

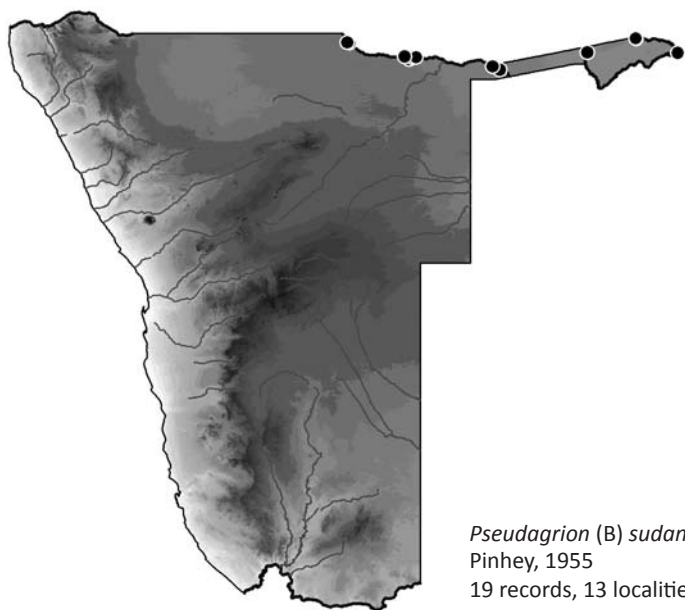


Pseudagrion (B) *nubicum* Selys, 1876
8 records, 4 localities.

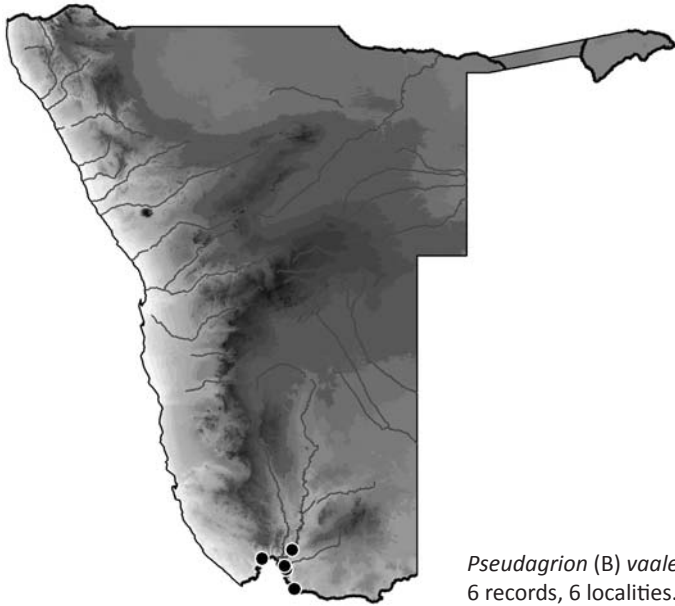




Pseudagrion (B) *sublacteum*
(Karsch, 1893)
104 records, 58 localities.

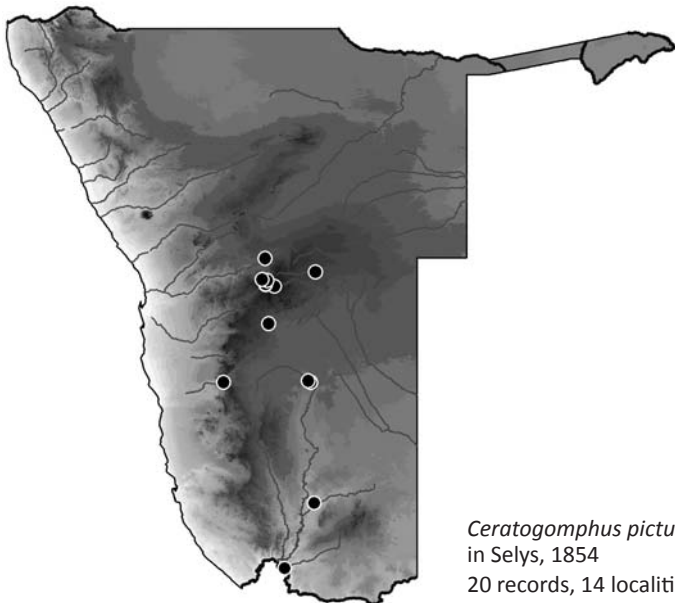


Pseudagrion (B) *sudanicum rubroviride*
Pinhey, 1955
19 records, 13 localities.

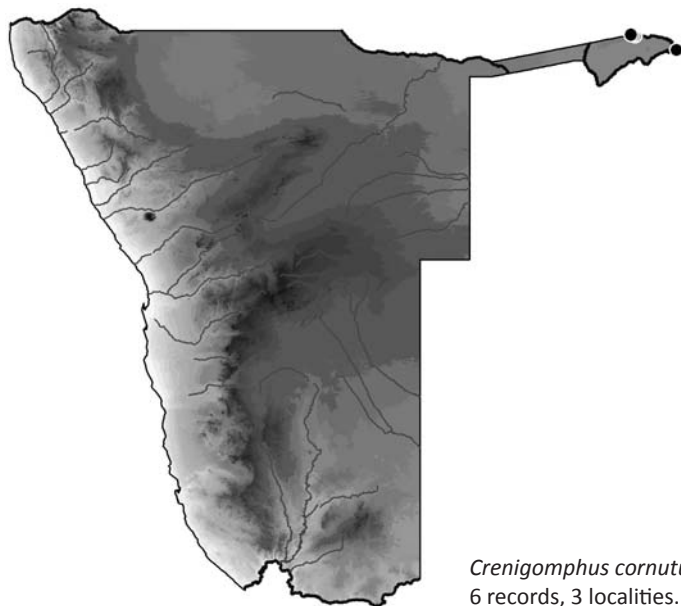


Pseudagrion (B) vaalense Chutter, 1962
6 records, 6 localities.

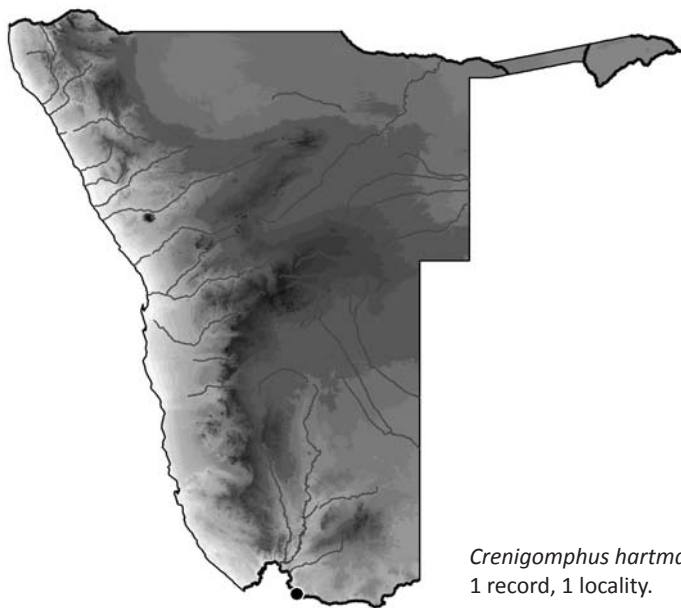
Distribution maps: Gomphidae



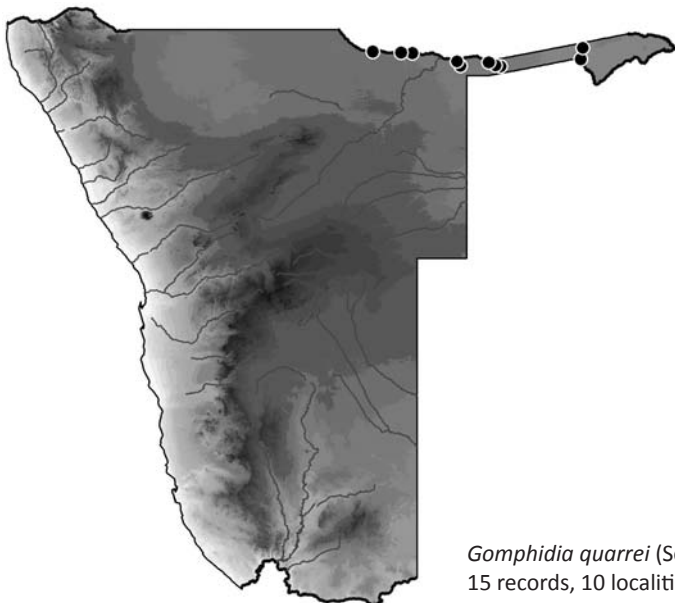
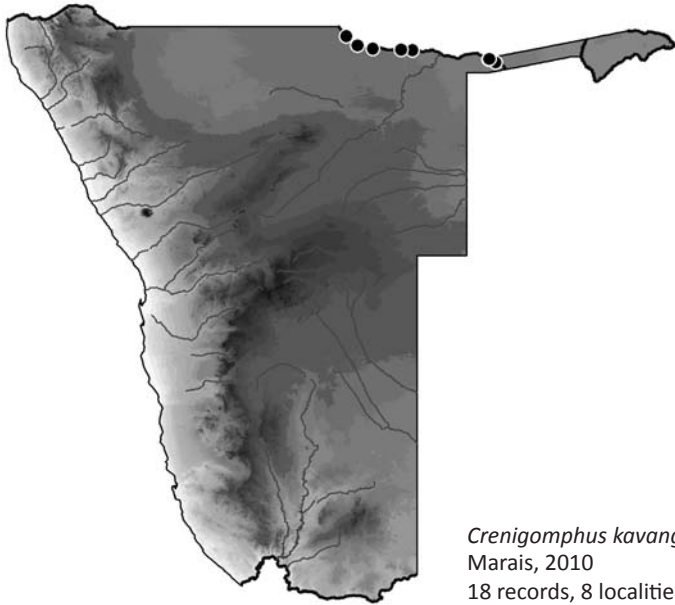
Ceratogomphus pictus Hagen
in Selys, 1854
20 records, 14 localities.

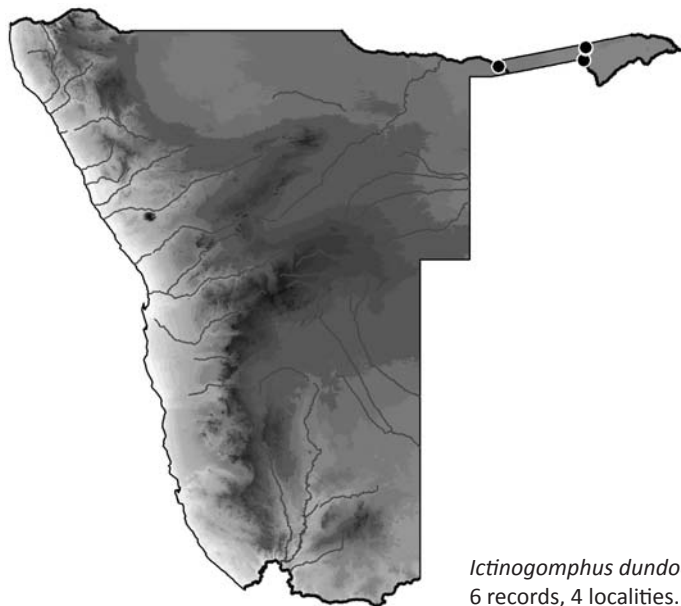


Crenigomphus cornutus Pinhey, 1956
6 records, 3 localities.

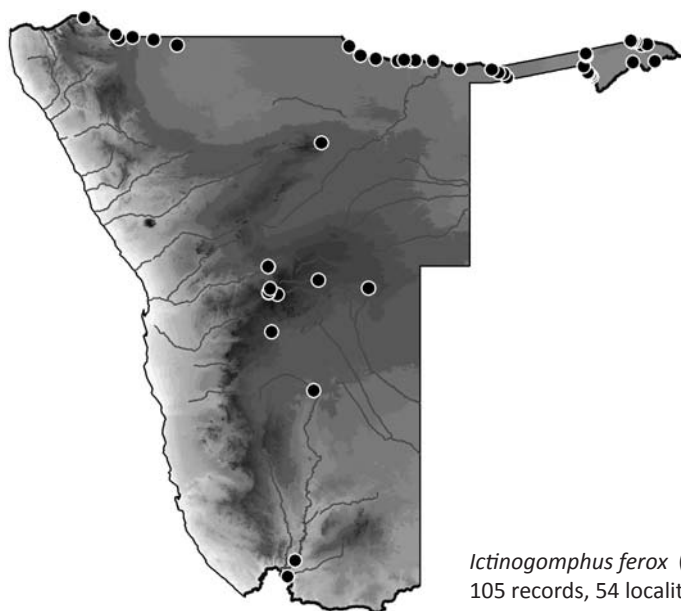


Crenigomphus hartmanni (Förster, 1898)
1 record, 1 locality.

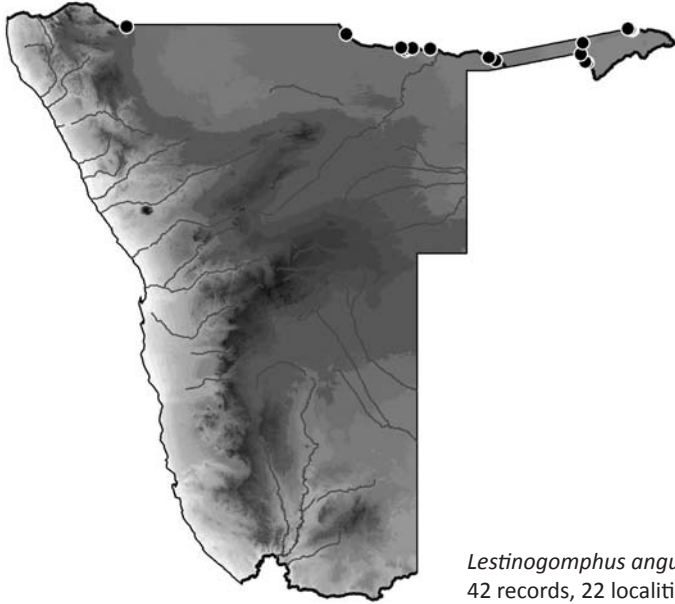




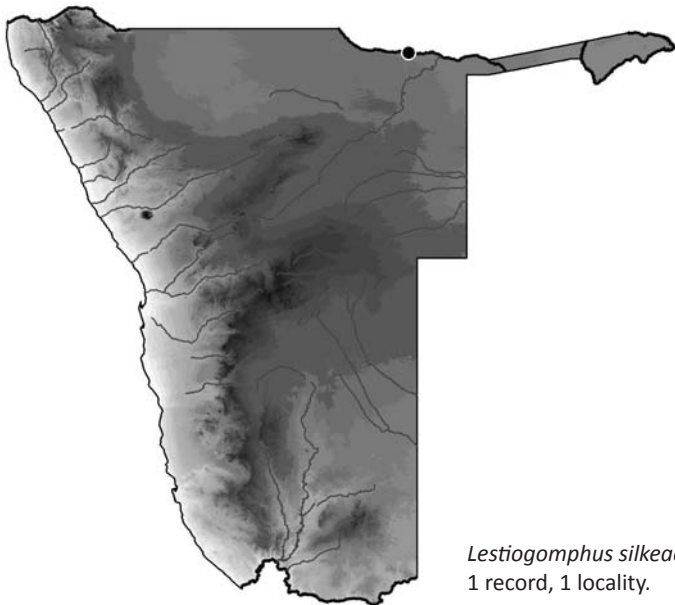
Ictinogomphus dundoensis (Pinhey, 1961)
6 records, 4 localities.



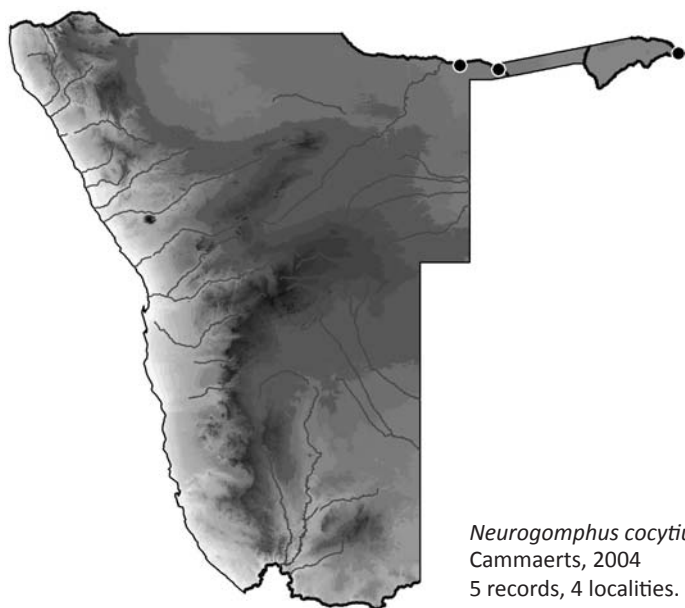
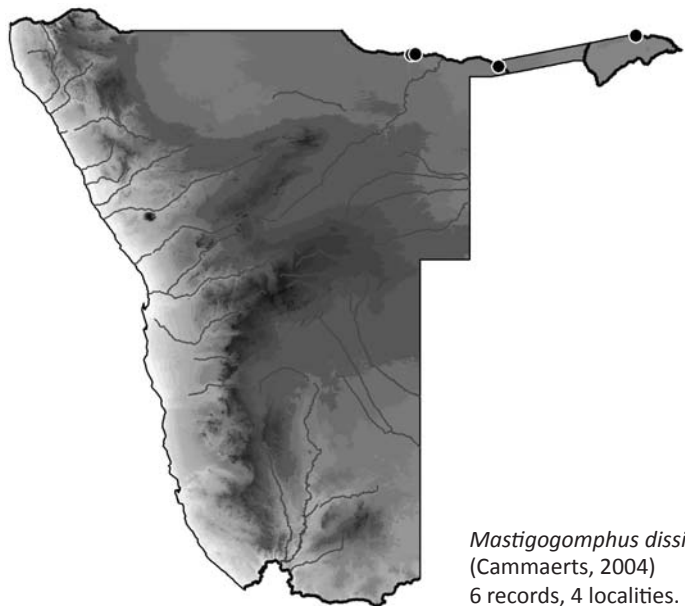
Ictinogomphus ferox (Rambur, 1842)
105 records, 54 localities.

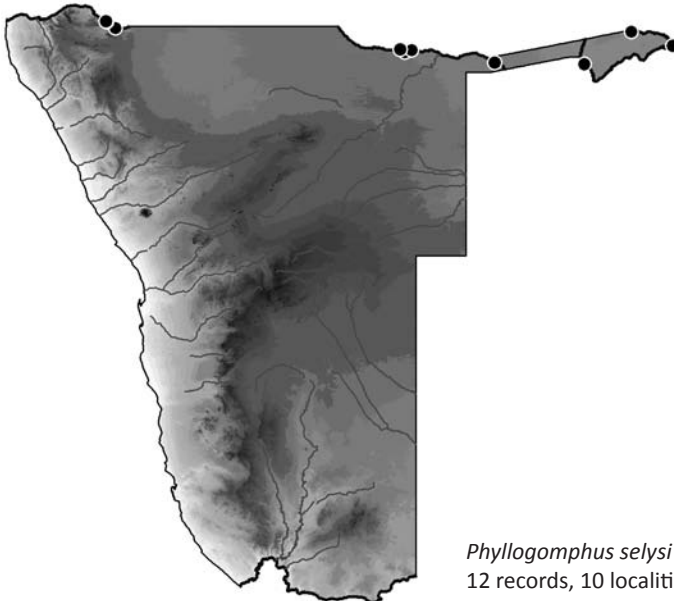
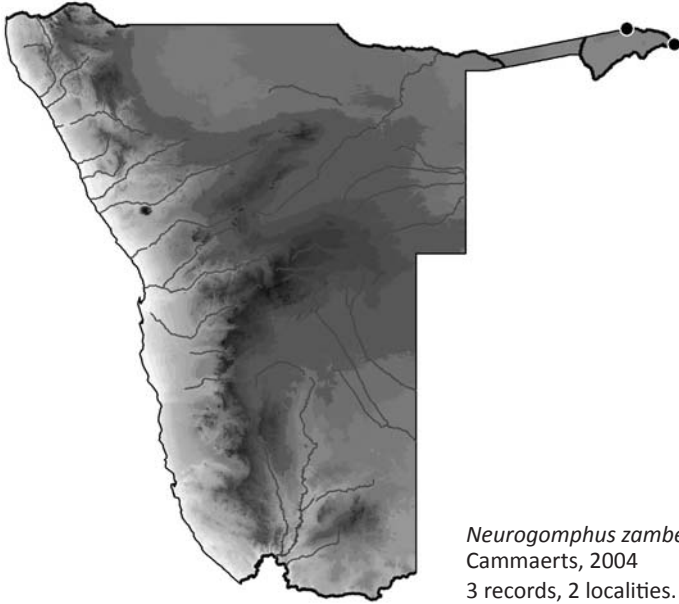


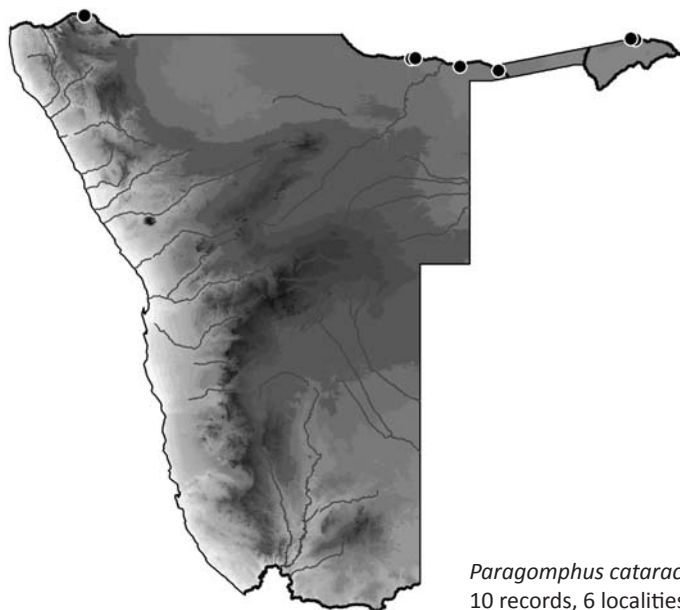
Lestinogomphus angustus Martin, 1911
42 records, 22 localities.



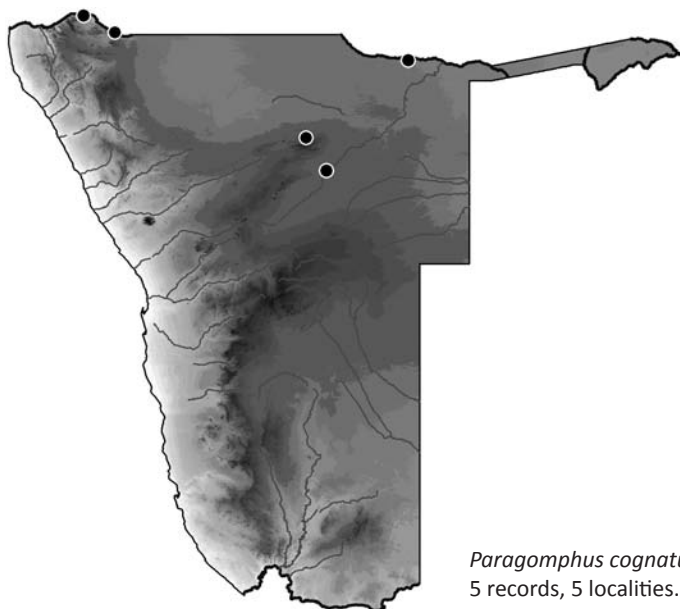
Lestiogomphus silkeae Kipping, 2010
1 record, 1 locality.



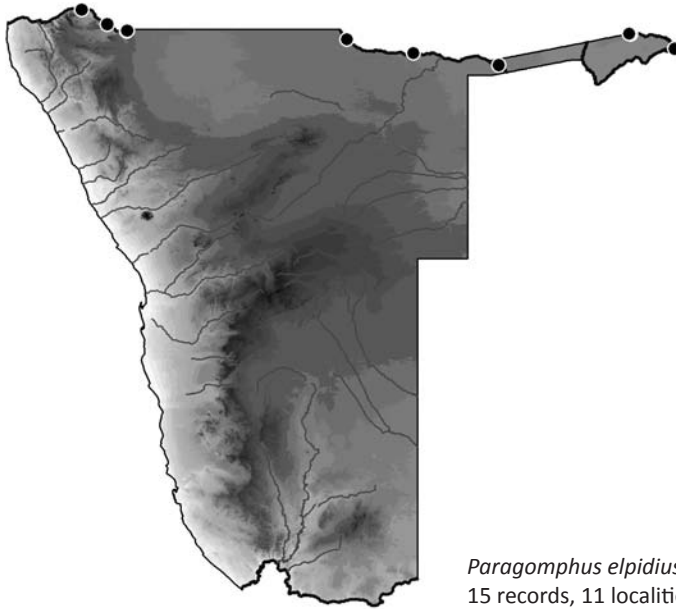




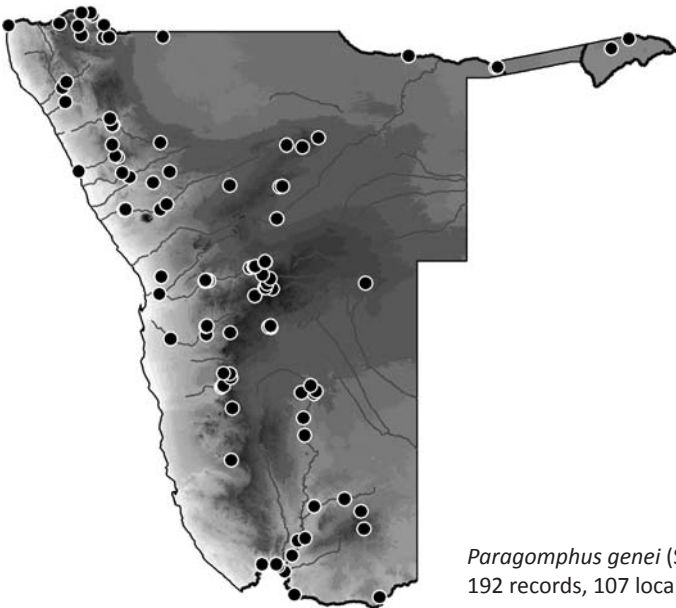
Paragomphus cataractae Pinhey, 1963
10 records, 6 localities.



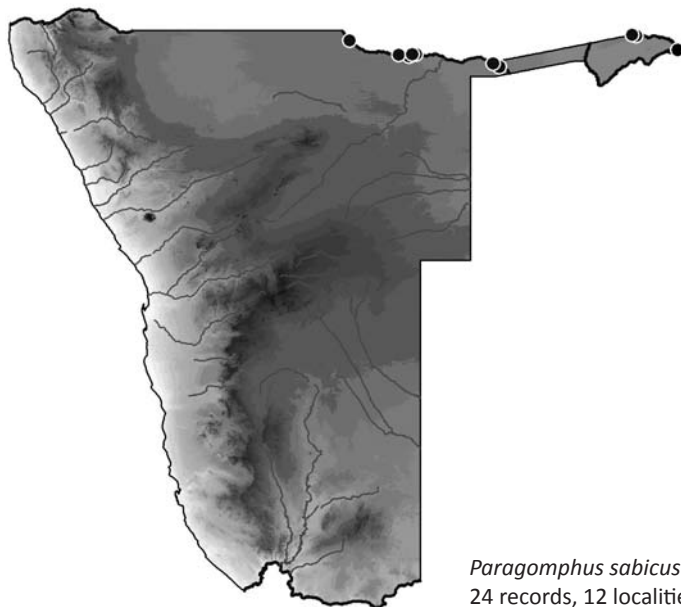
Paragomphus cognatus (Rambur, 1842)
5 records, 5 localities.



Paragomphus elpidius (Ris, 1921)
15 records, 11 localities.

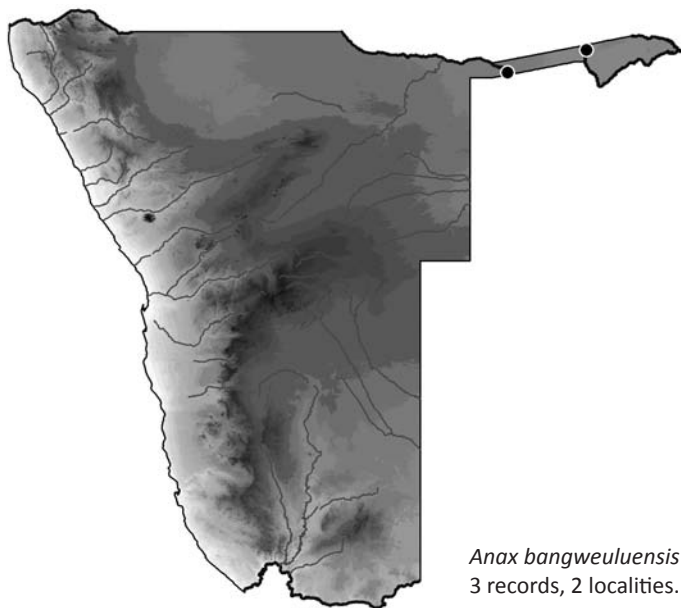


Paragomphus genei (Selys, 1841)
192 records, 107 localities.

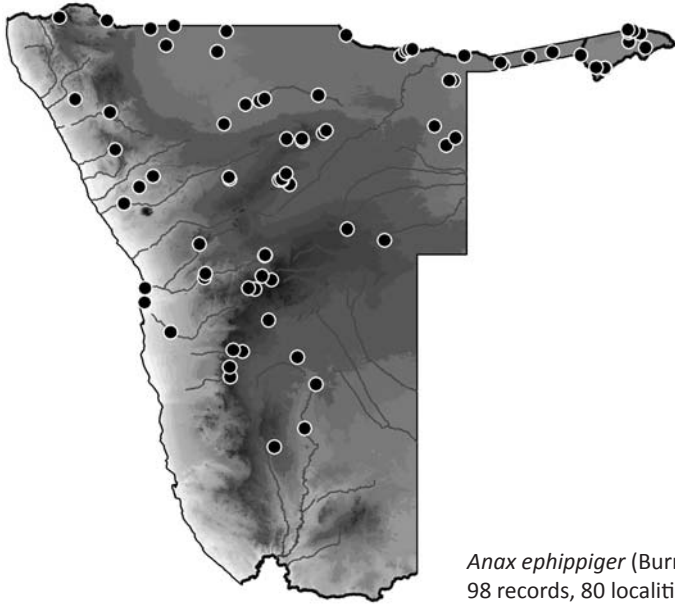


Paragomphus sabicus Pinhey, 1950
24 records, 12 localities.

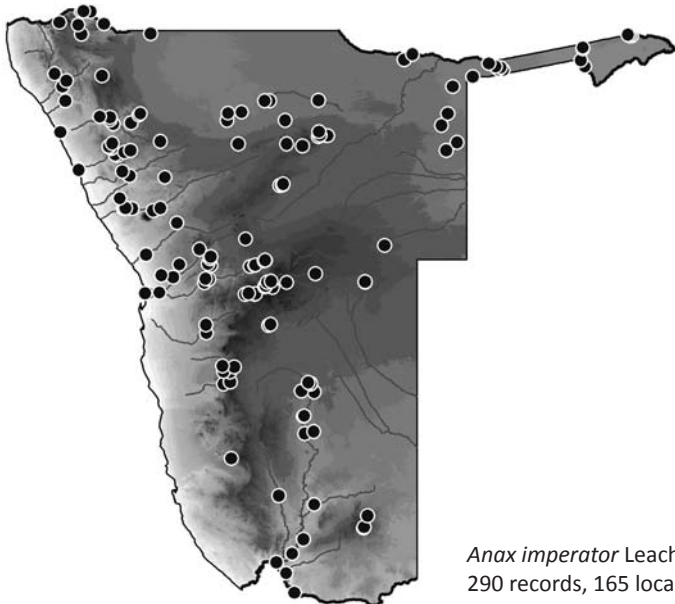
Distribution maps: Aeshnidae



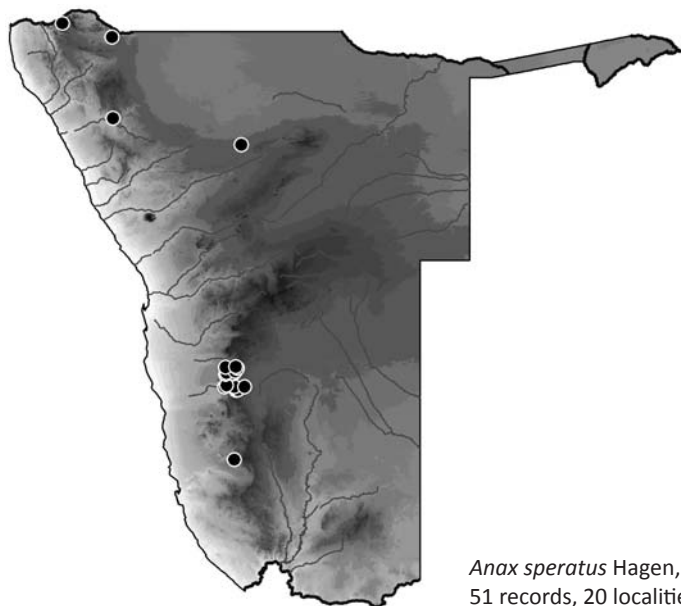
Anax bangweuluensis Kimmins, 1955
3 records, 2 localities.



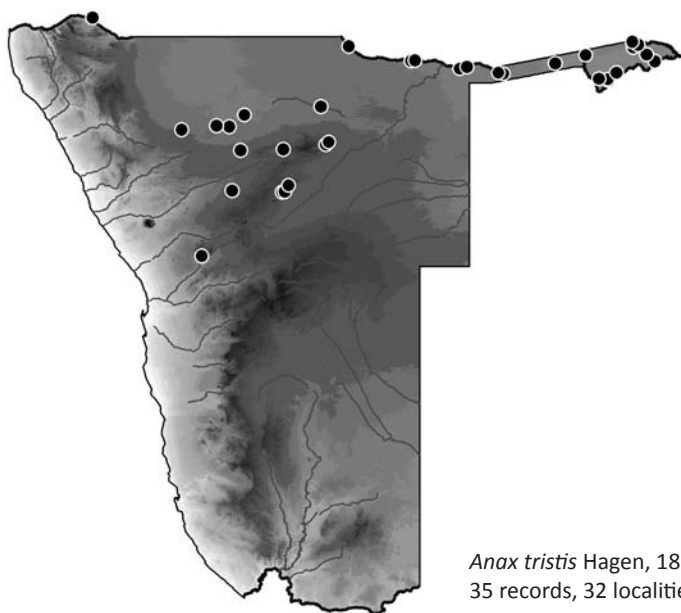
Anax ephippiger (Burmeister, 1839)
98 records, 80 localities.



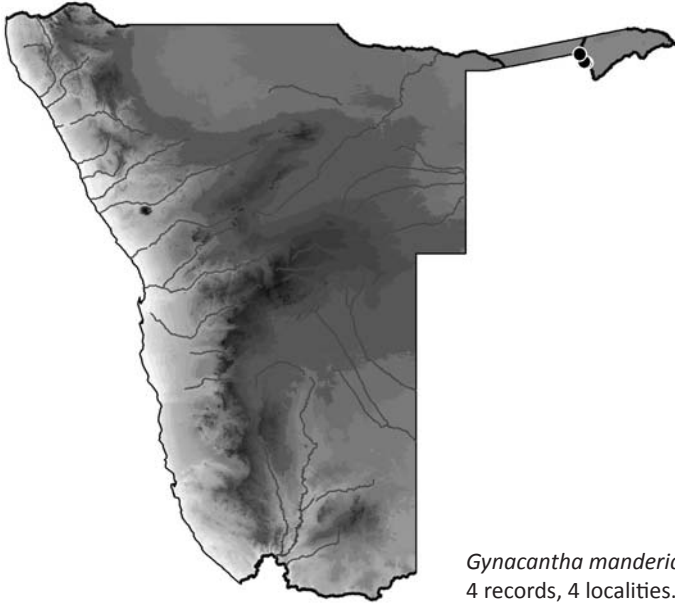
Anax imperator Leach, 1815
290 records, 165 localities.



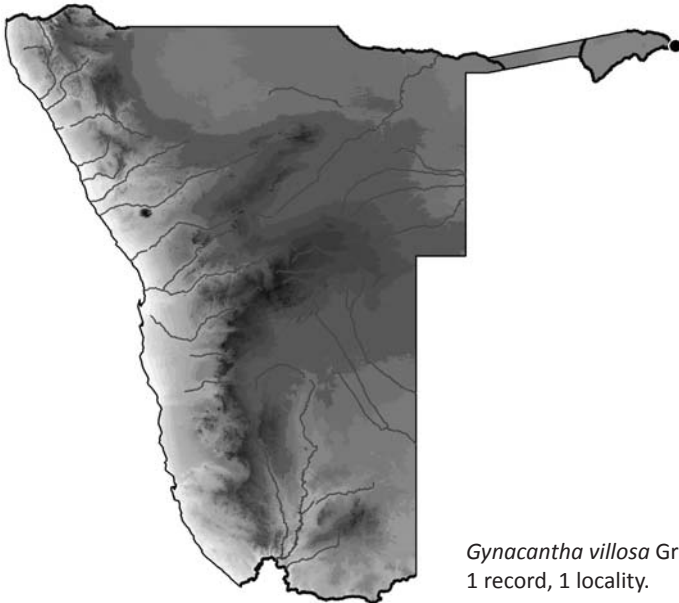
Anax speratus Hagen, 1867
51 records, 20 localities.



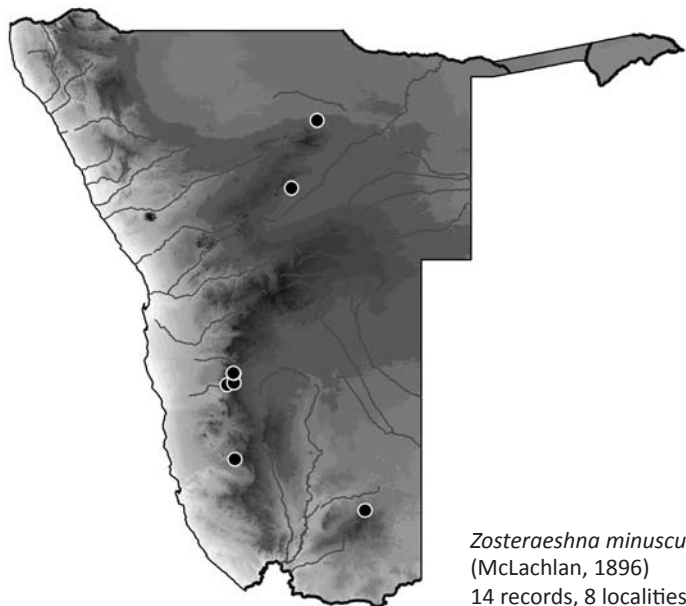
Anax tristis Hagen, 1867
35 records, 32 localities.



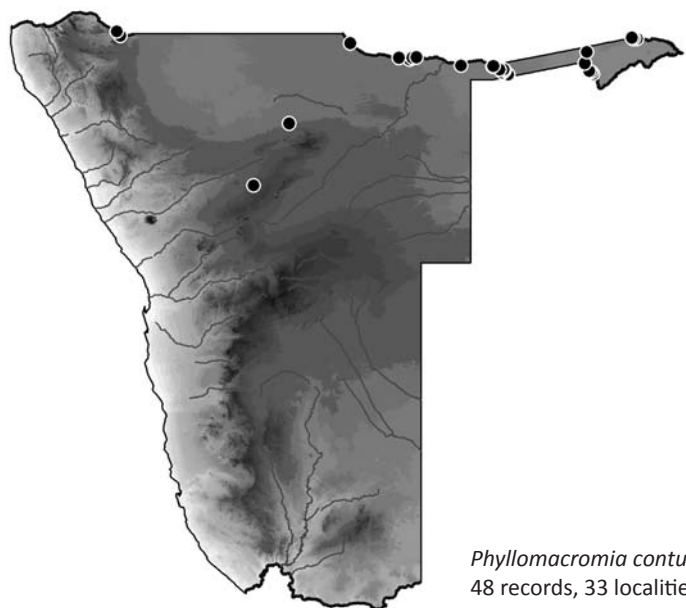
Gynacantha manderica Grünberg, 1902
4 records, 4 localities.

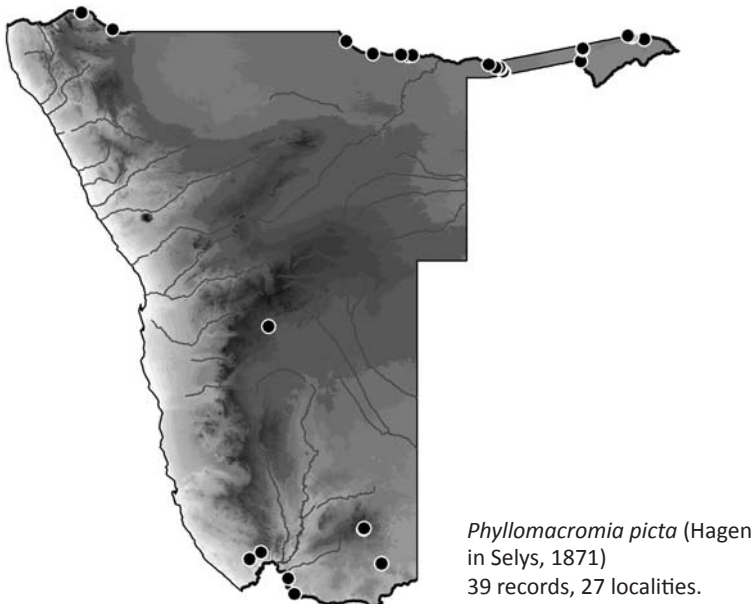
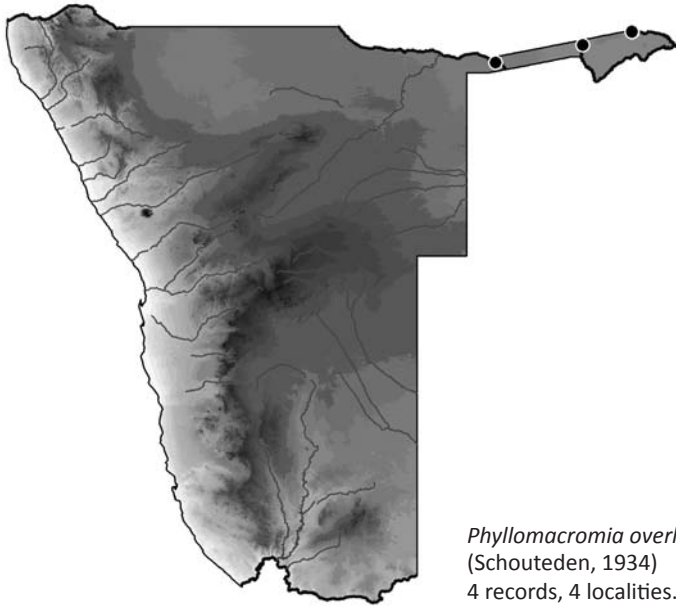


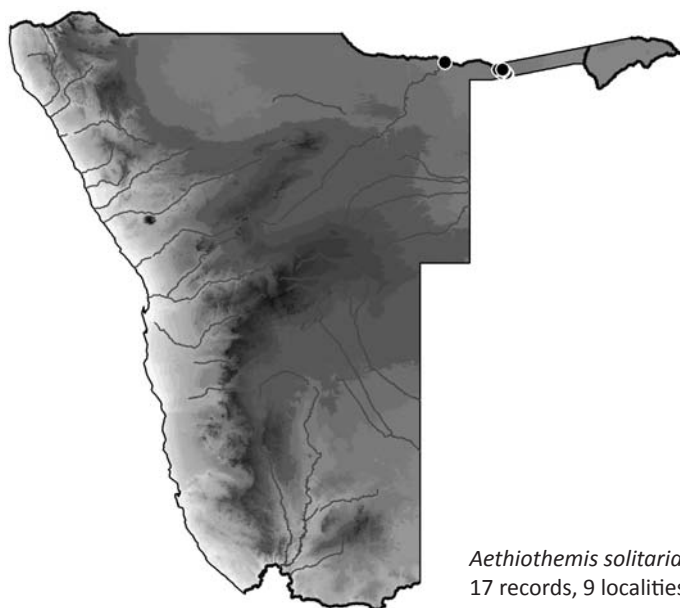
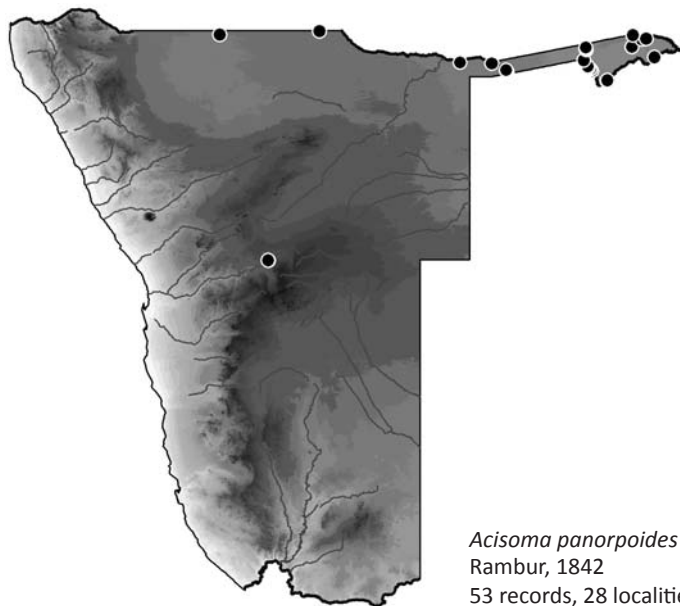
Gynacantha villosa Grünberg, 1902
1 record, 1 locality.

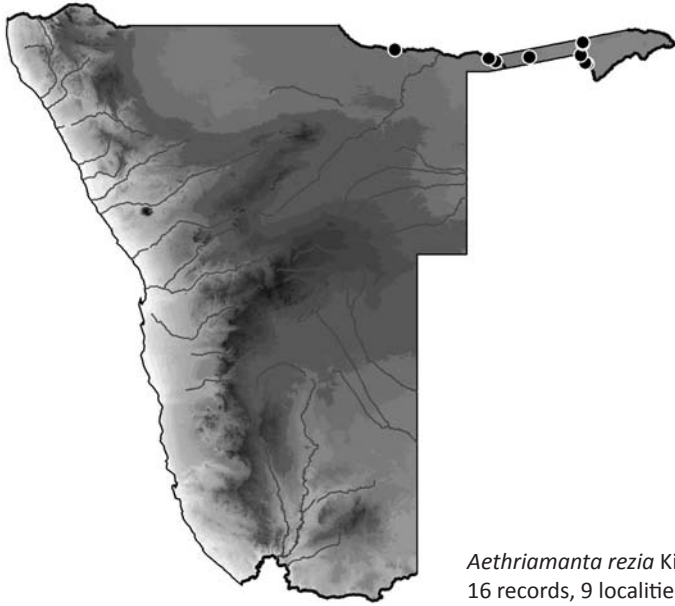


Distribution maps: Macromiidae

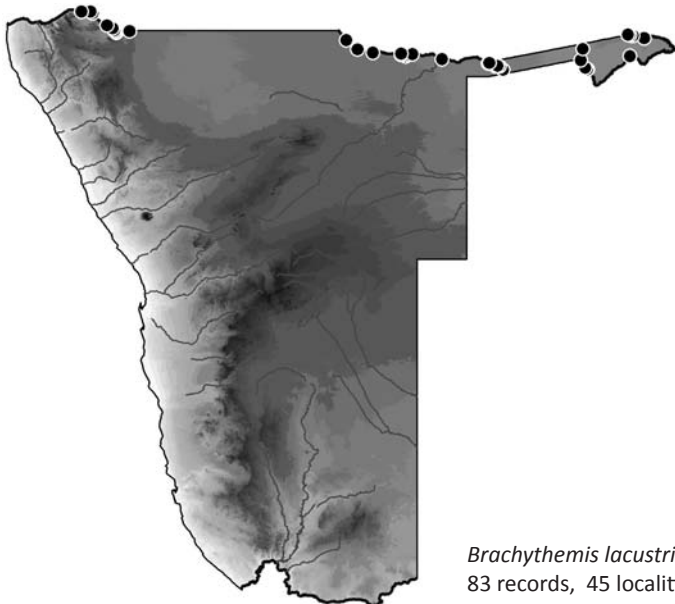




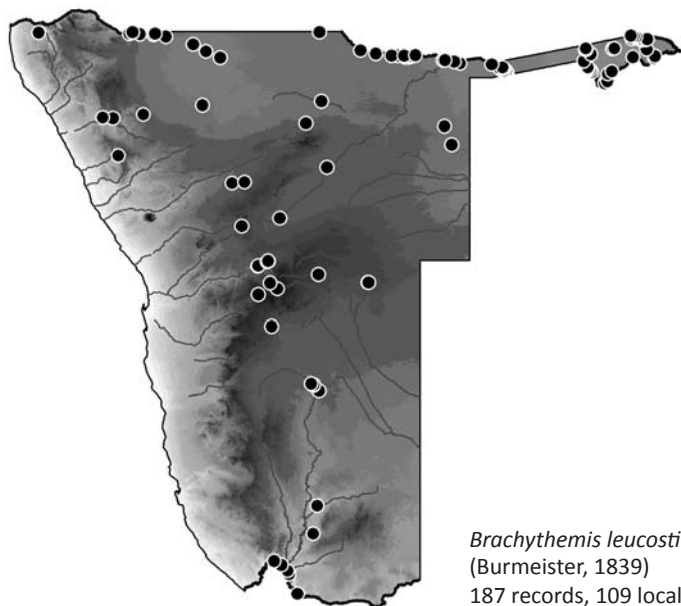
Distribution maps: Libellulidae



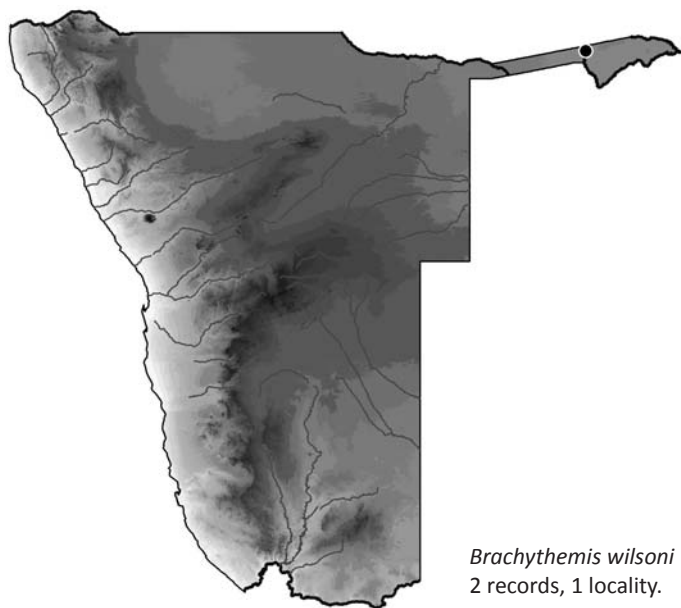
Aethriamanta rezia Kirby, 1889
16 records, 9 localities.



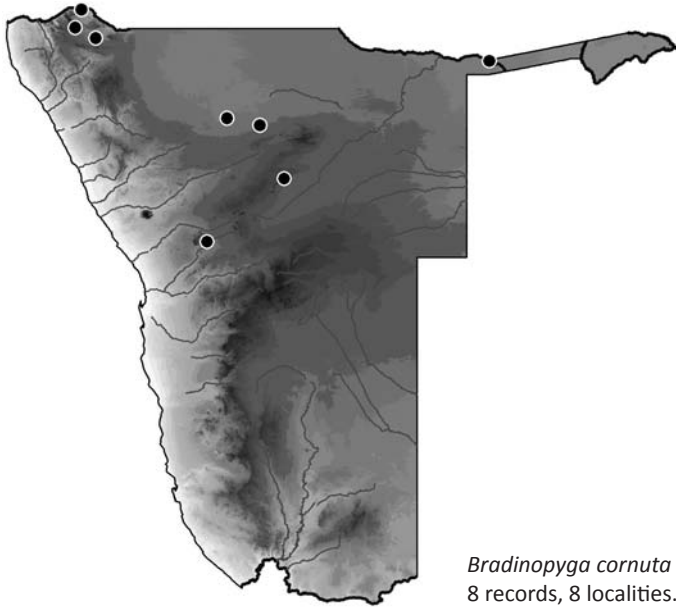
Brachythemis lacustris (Kirby, 1889)
83 records, 45 localities.



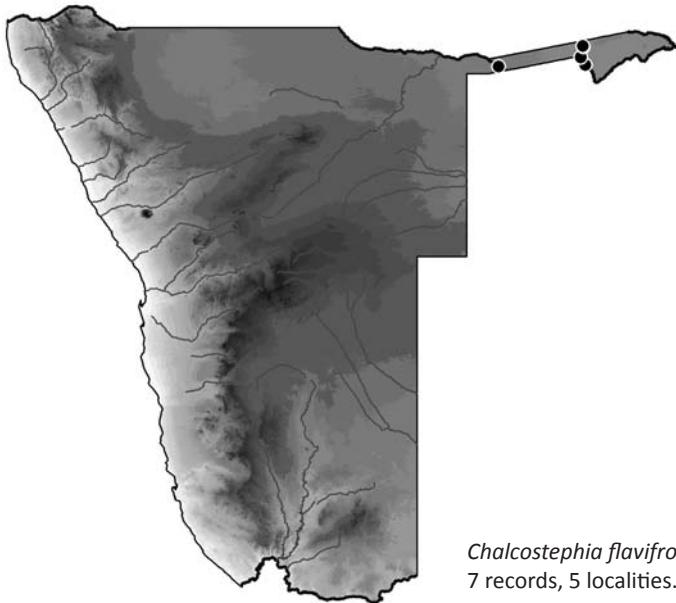
Brachythemis leucosticta
(Burmeister, 1839)
187 records, 109 localities.



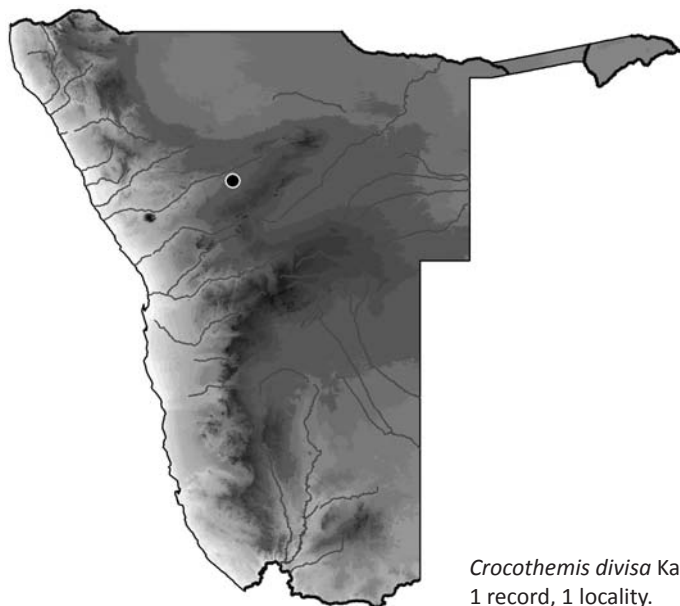
Brachythemis wilsoni Pinhey, 1952
2 records, 1 locality.



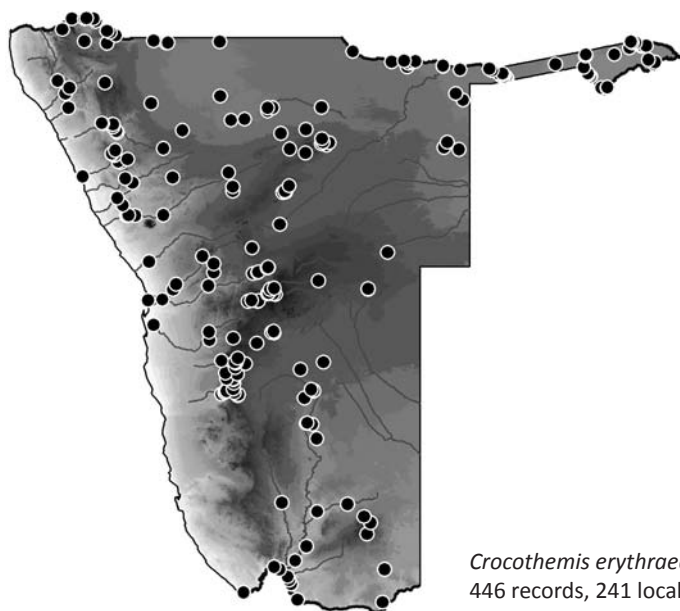
Bradinopyga cornuta Ris, 1911
8 records, 8 localities.



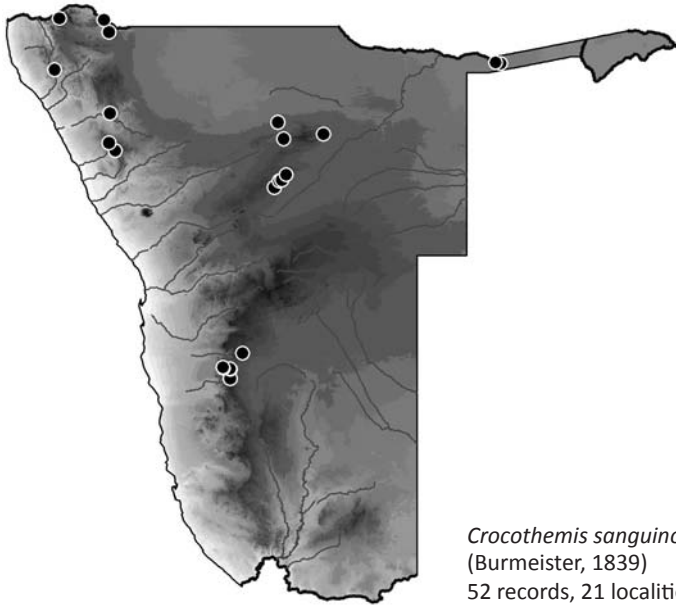
Chalcostephia flavifrons Kirby, 1889
7 records, 5 localities.



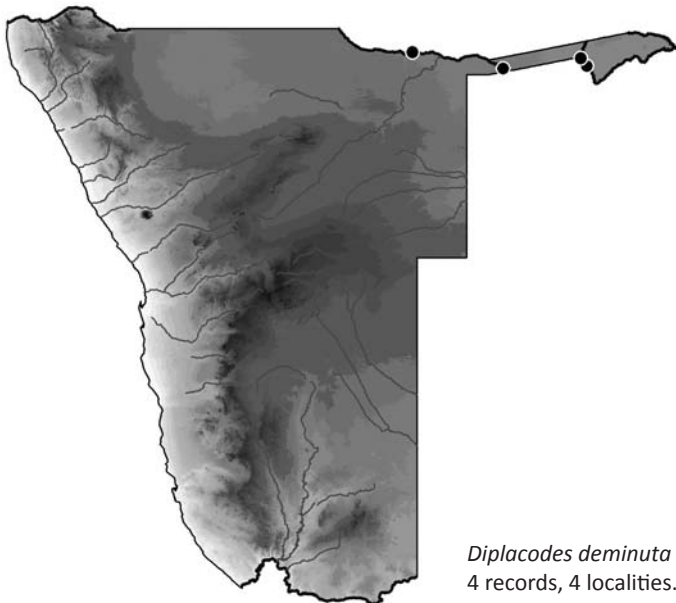
Crocothemis divisa Karsch, 1898
1 record, 1 locality.



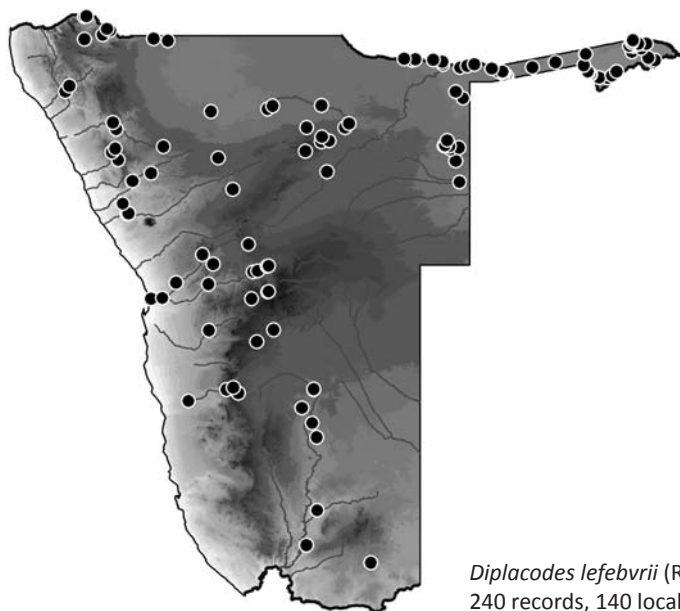
Crocothemis erythraea (Brullé, 1832)
446 records, 241 localities.



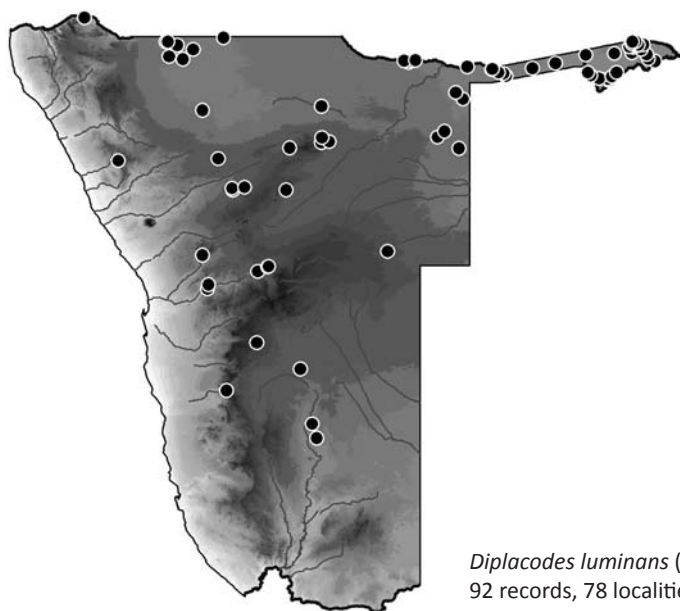
Crocothemis sanguinolenta
(Burmeister, 1839)
52 records, 21 localities.



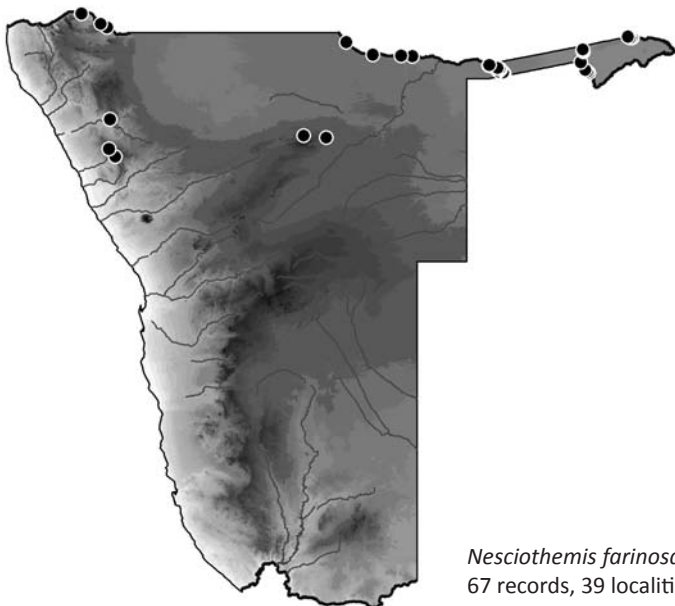
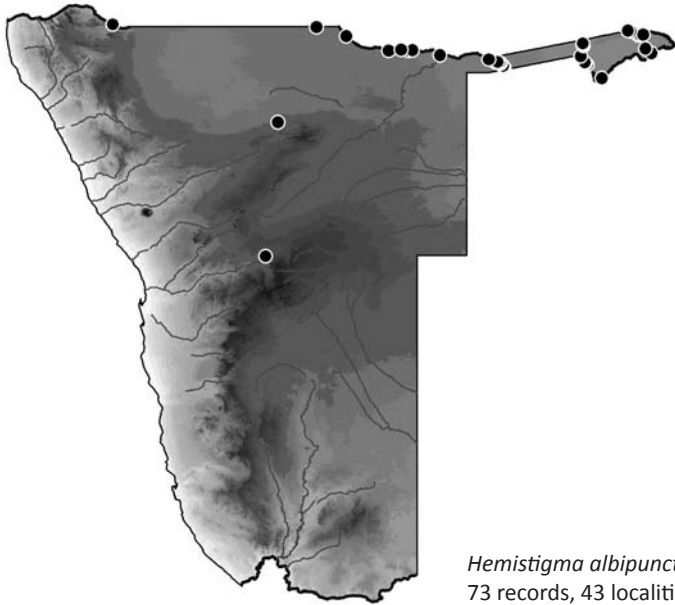
Diplacodes deminuta Lieftinck, 1969
4 records, 4 localities.

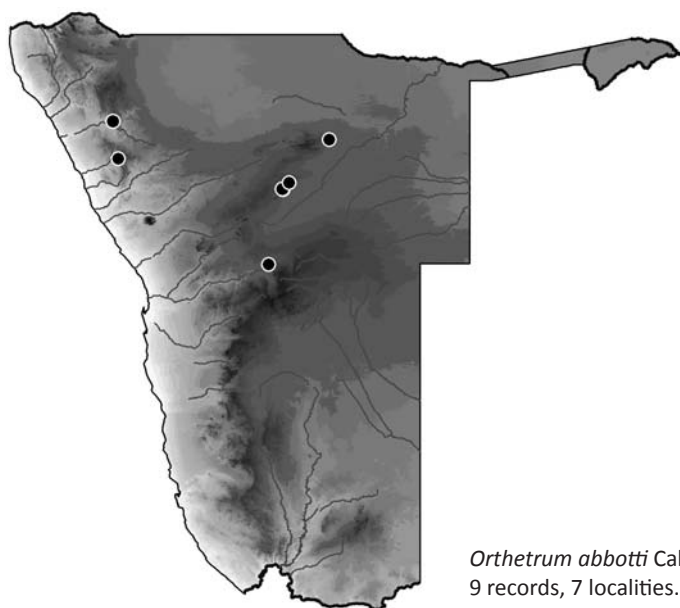
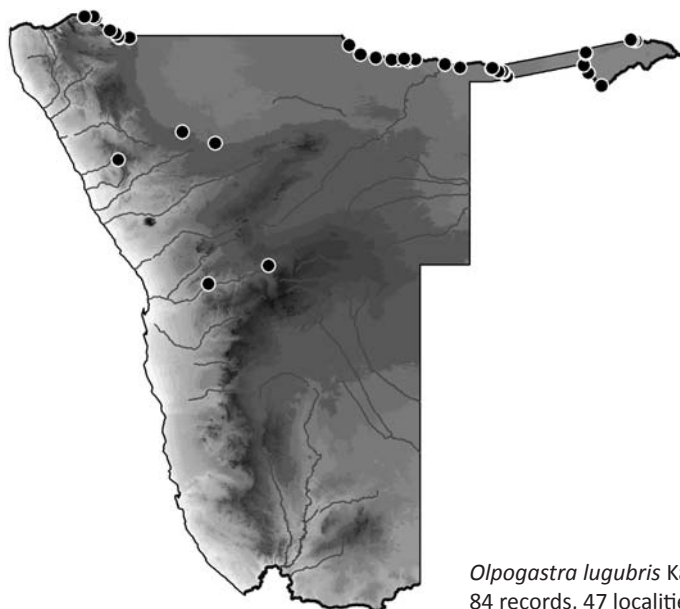


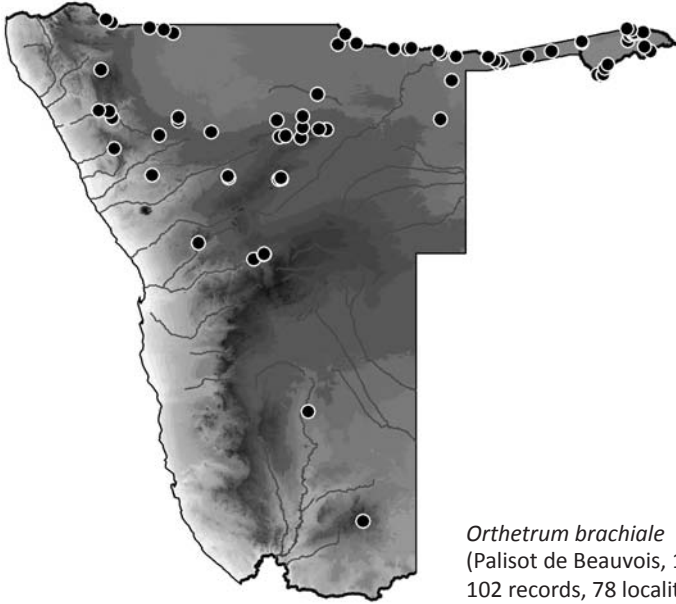
Diplacodes lefebvrii (Rambur, 1842)
240 records, 140 localities.



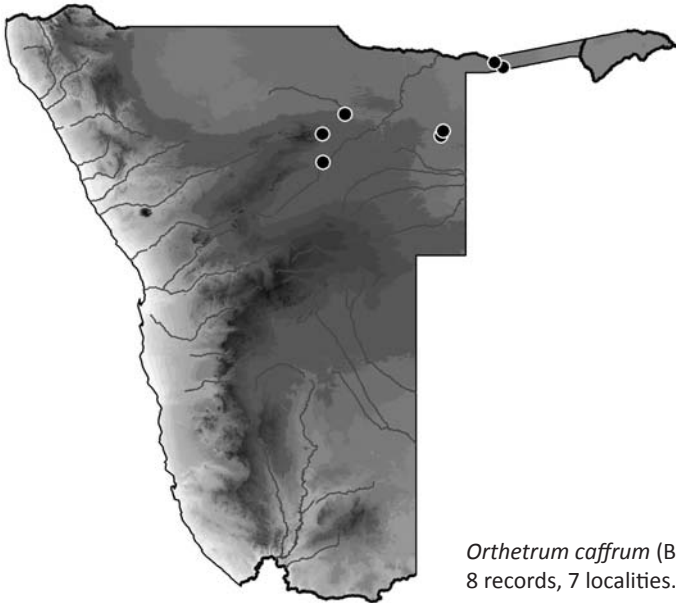
Diplacodes luminans (Karsch, 1893)
92 records, 78 localities.



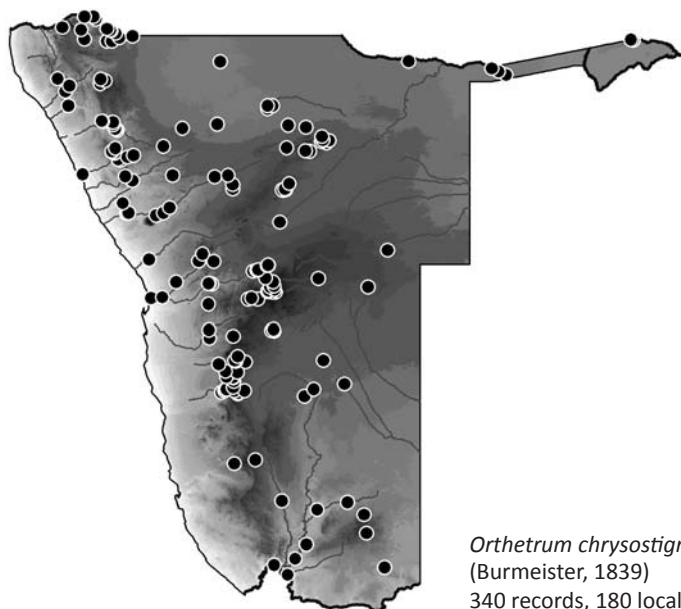




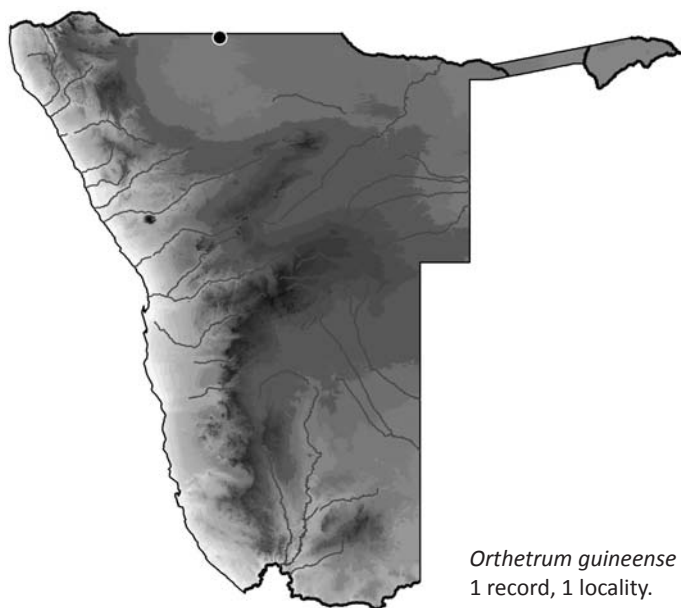
Orthetrum brachiale
(Palisot de Beauvois, 1817)
102 records, 78 localities.



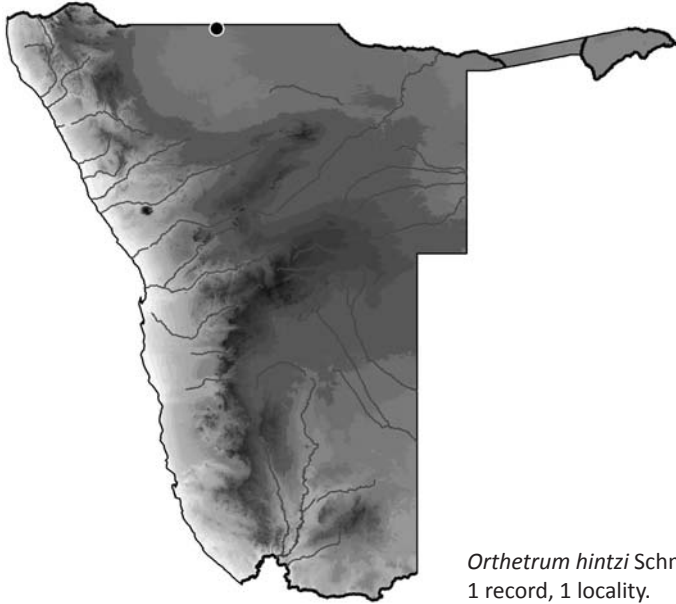
Orthetrum cafferum (Burmeister, 1839)
8 records, 7 localities.



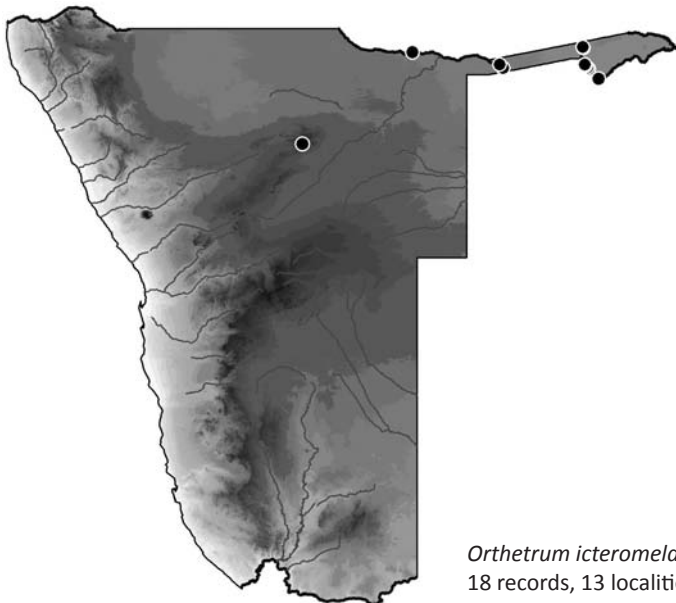
Orthetrum chrysostigma
(Burmeister, 1839)
340 records, 180 localities.



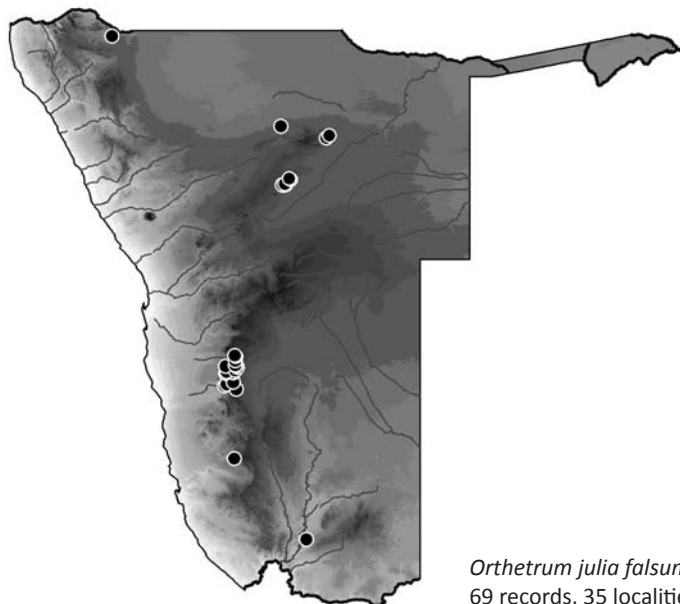
Orthetrum guineense Ris, 1910
1 record, 1 locality.



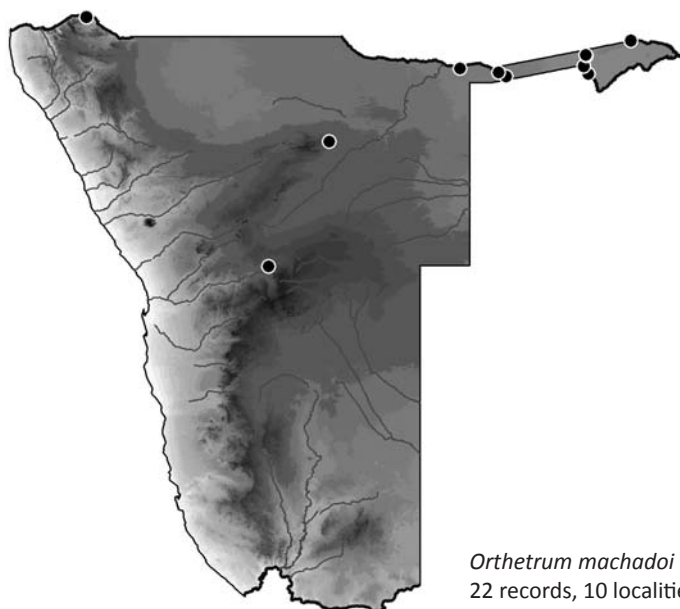
Orthetrum hintzi Schmidt, 1951
1 record, 1 locality.



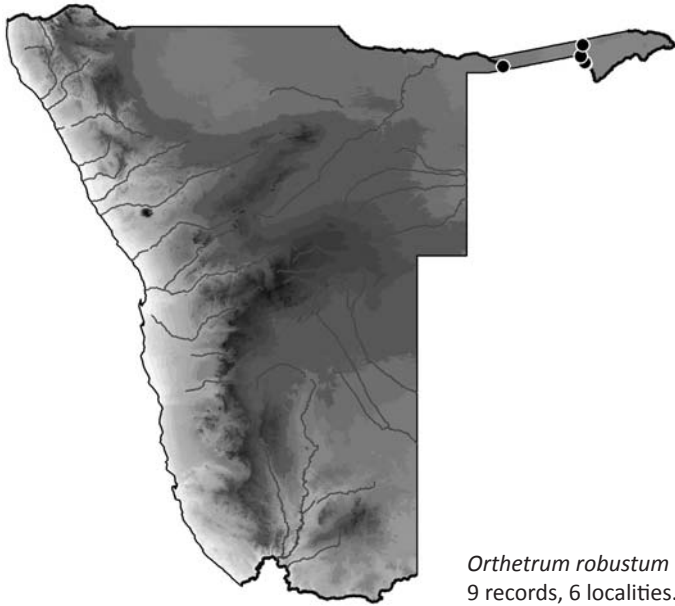
Orthetrum icteromelas Ris, 1910
18 records, 13 localities.



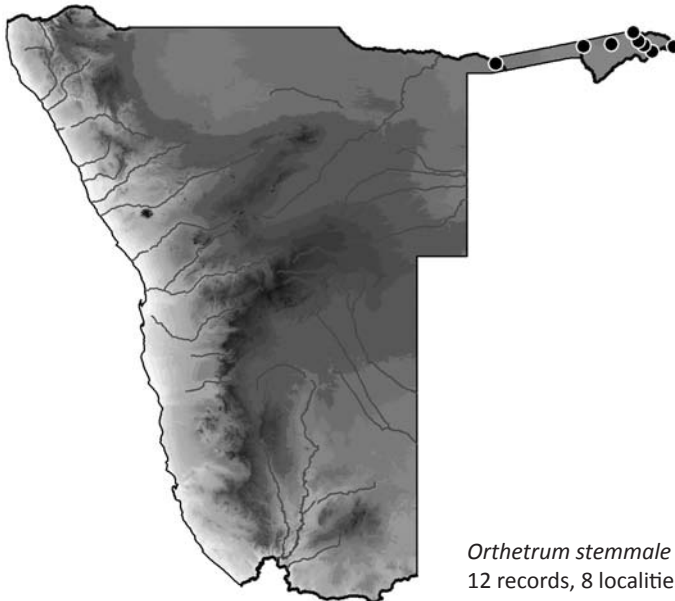
Orthetrum julia falsum Longfield, 1955
69 records, 35 localities.



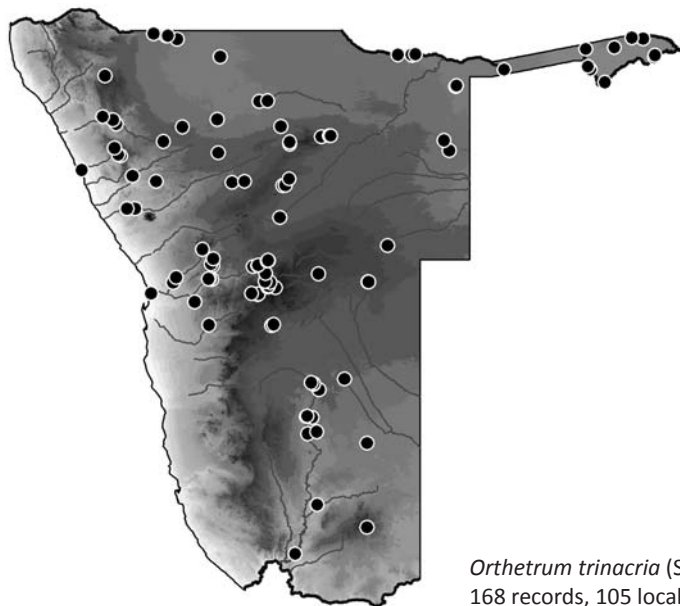
Orthetrum machadoi Longfield, 1955
22 records, 10 localities.



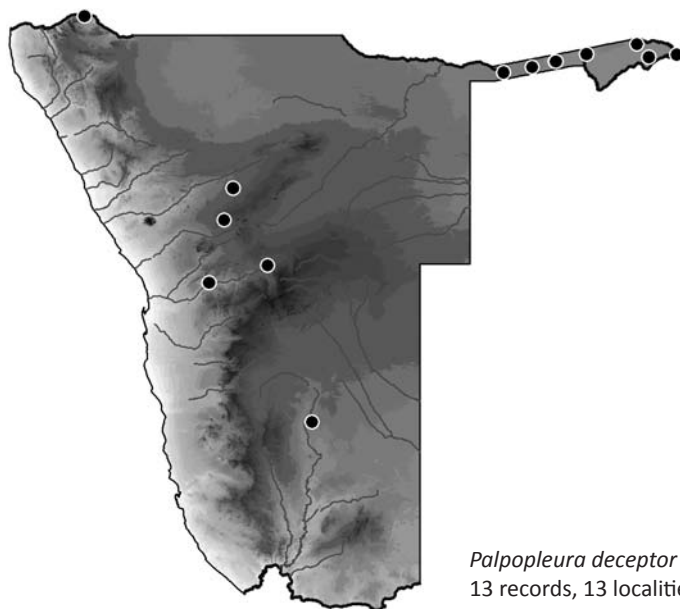
Orthetrum robustum Balinsky, 1965
9 records, 6 localities.



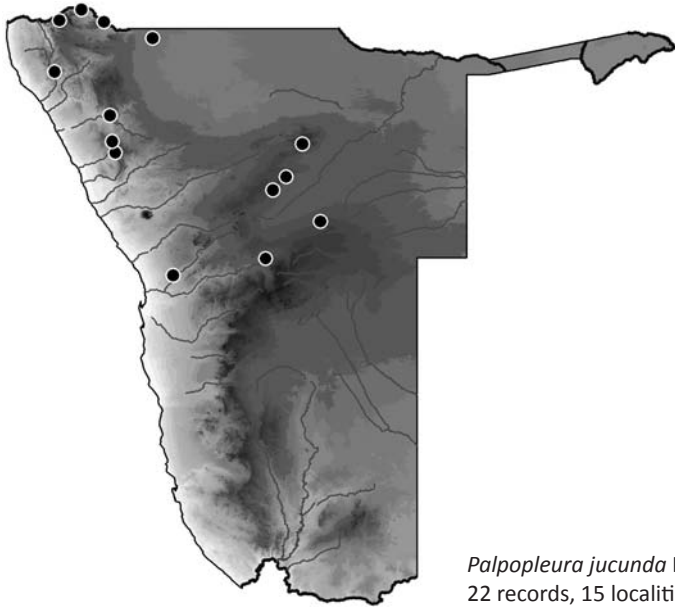
Orthetrum stemmale (Burmeister, 1839)
12 records, 8 localities.



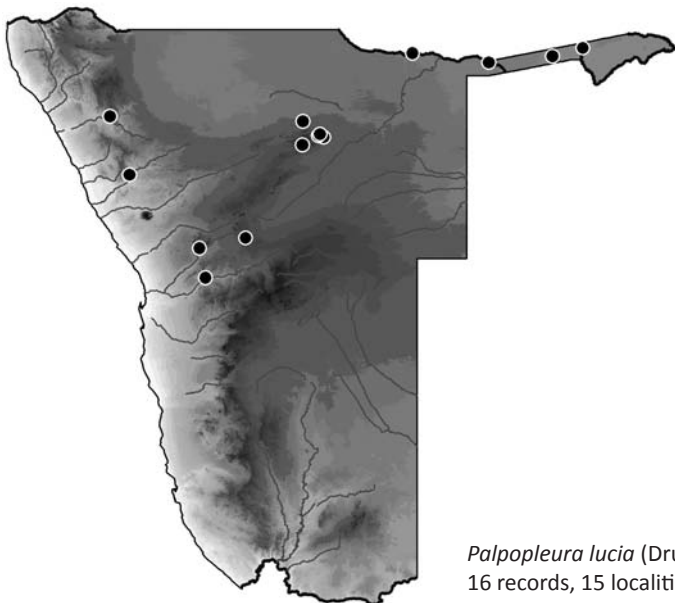
Orthetrum trinacria (Selys, 1841)
168 records, 105 localities.



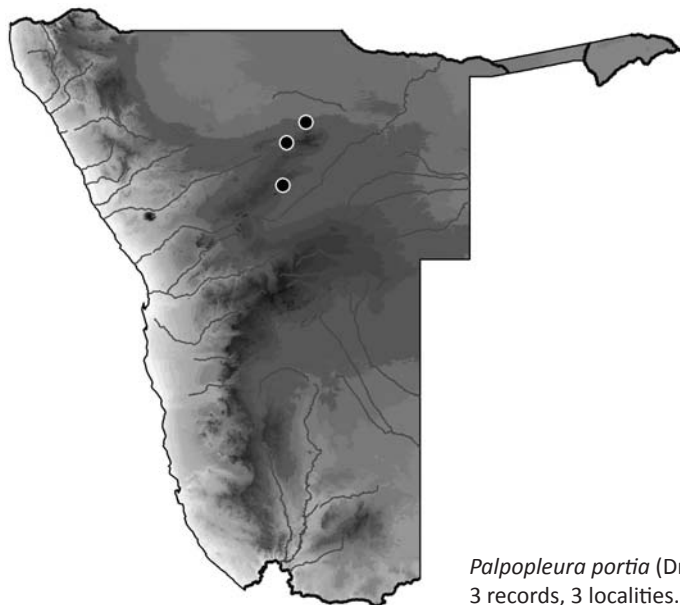
Palpopleura deceptor (Calvert, 1899)
13 records, 13 localities.



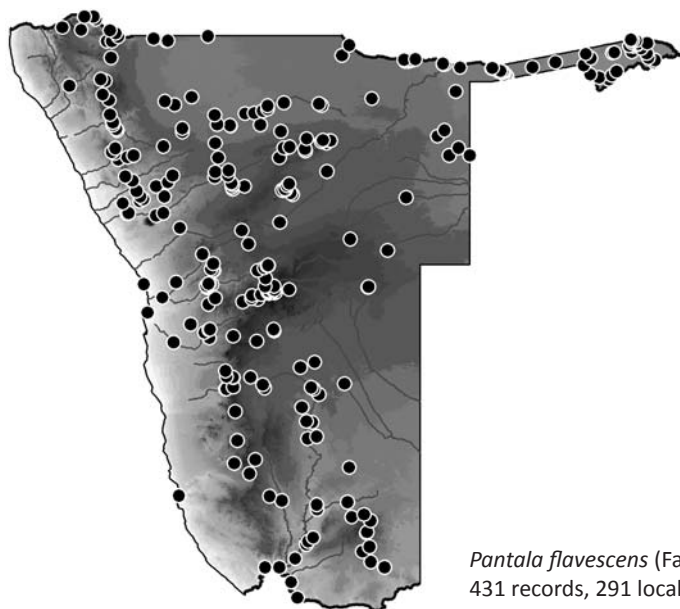
Palpopleura jucunda Rambur, 1842
22 records, 15 localities.



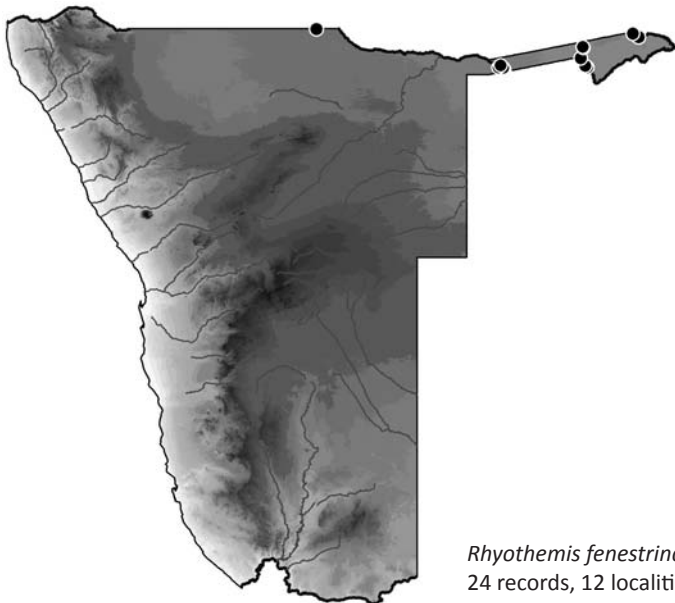
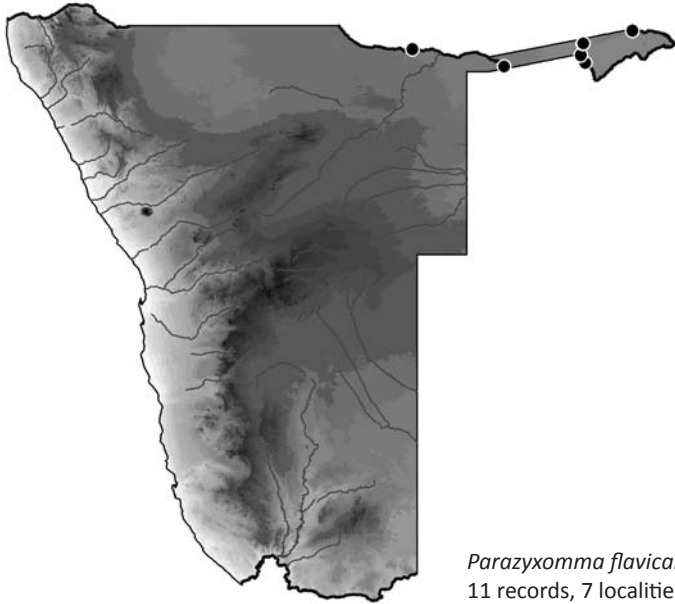
Palpopleura lucia (Drury, 1773)
16 records, 15 localities.

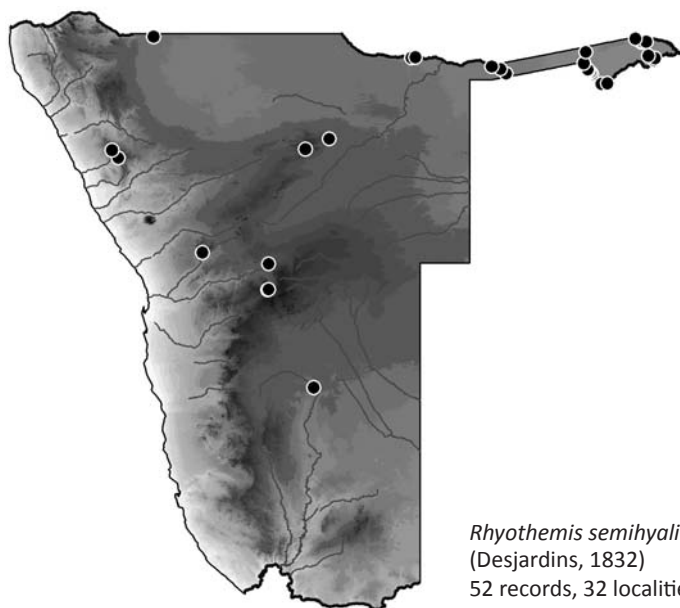
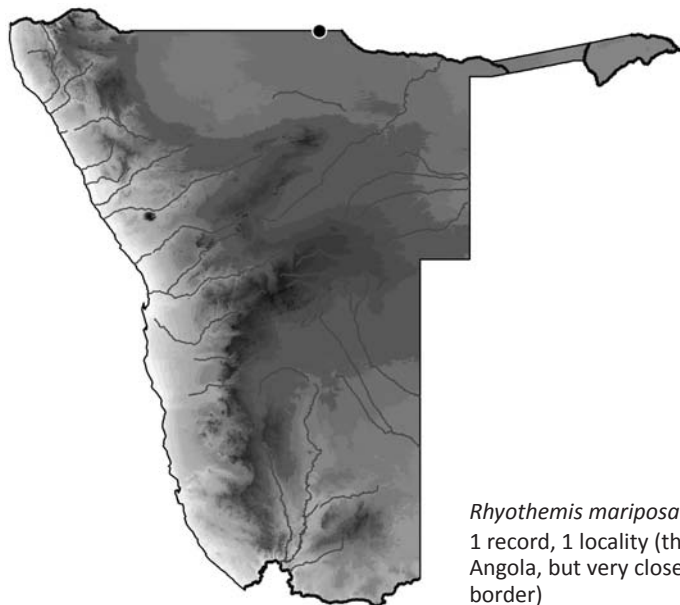


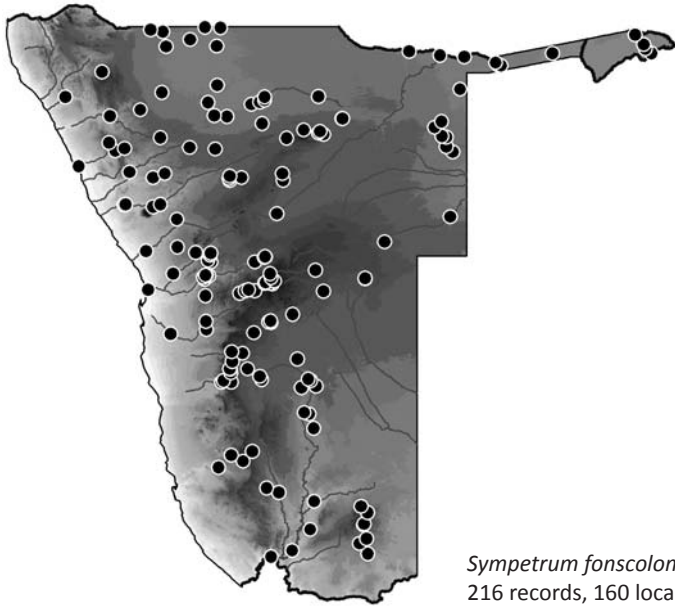
Palpopleura portia (Drury, 1773)
3 records, 3 localities.



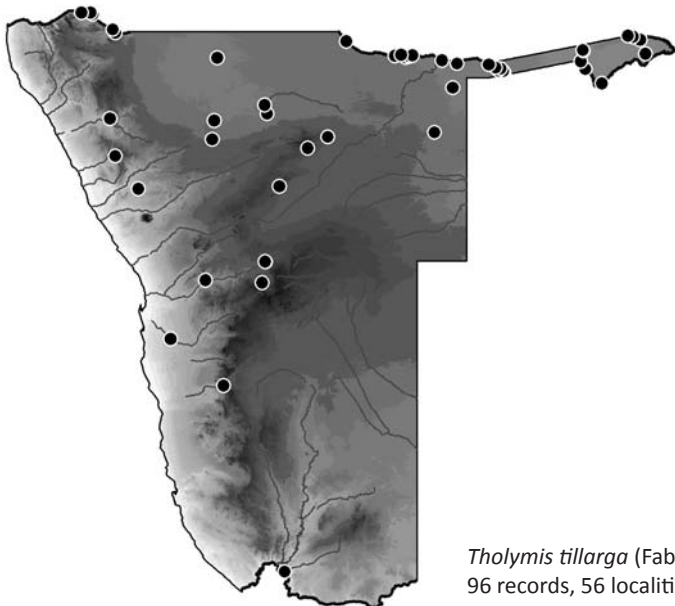
Pantala flavescens (Fabricius, 1798)
431 records, 291 localities.



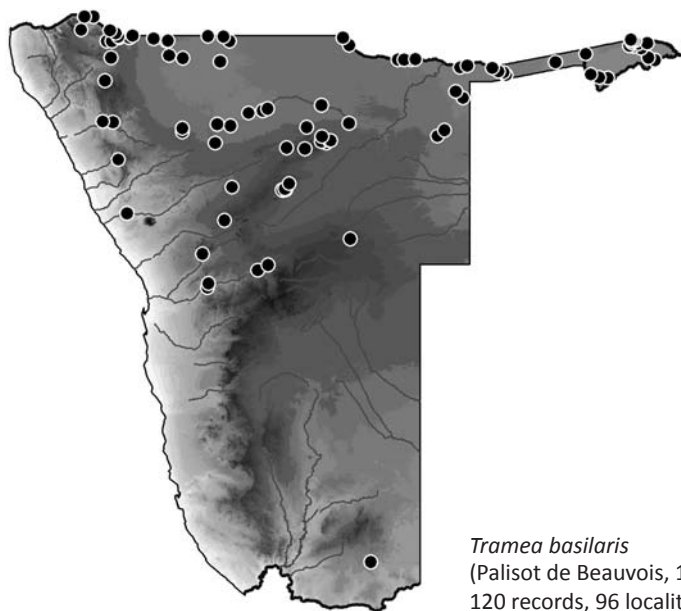




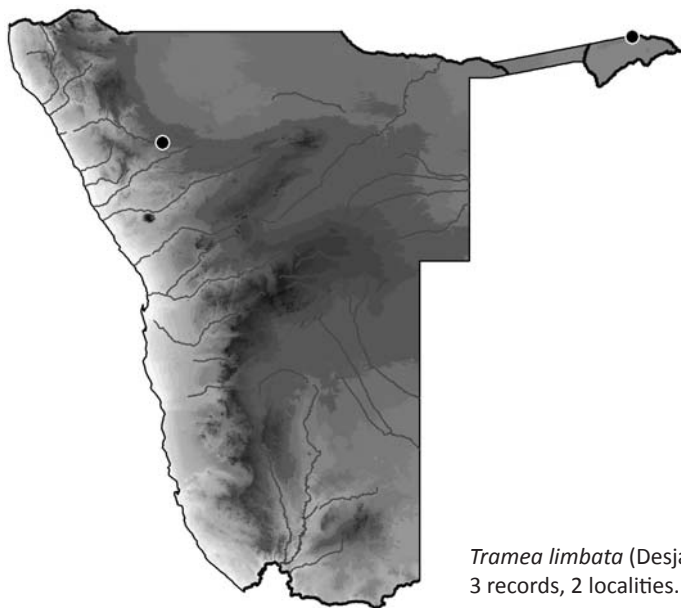
Sympetrum fonscolombii (Selys, 1840)
216 records, 160 localities.



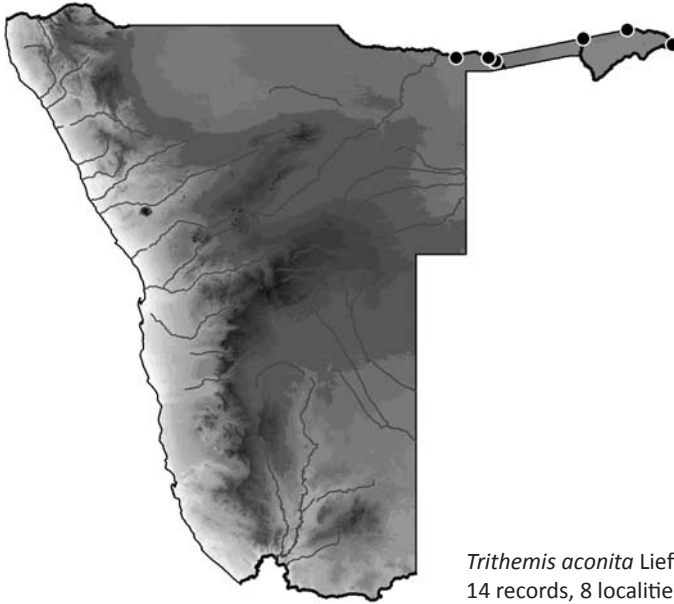
Tholymis tillarga (Fabricius, 1798)
96 records, 56 localities.



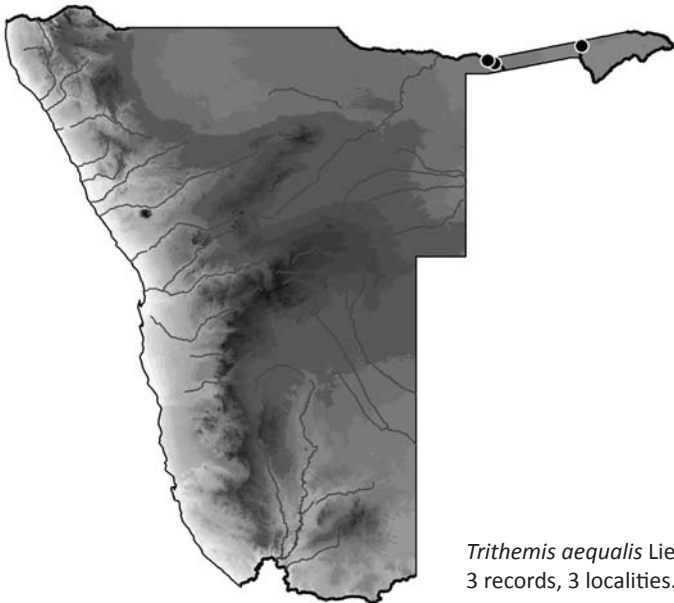
Tramea basilaris
(Palisot de Beauvois, 1817)
120 records, 96 localities.



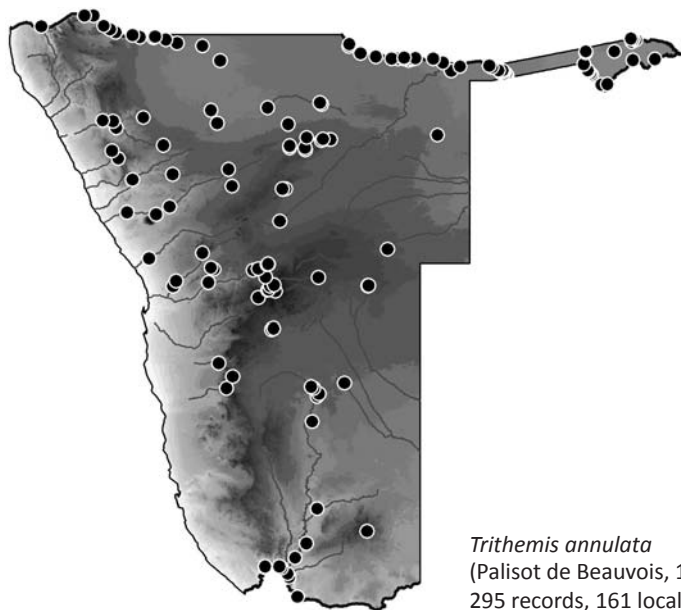
Tramea limbata (Desjardins, 1832)
3 records, 2 localities.



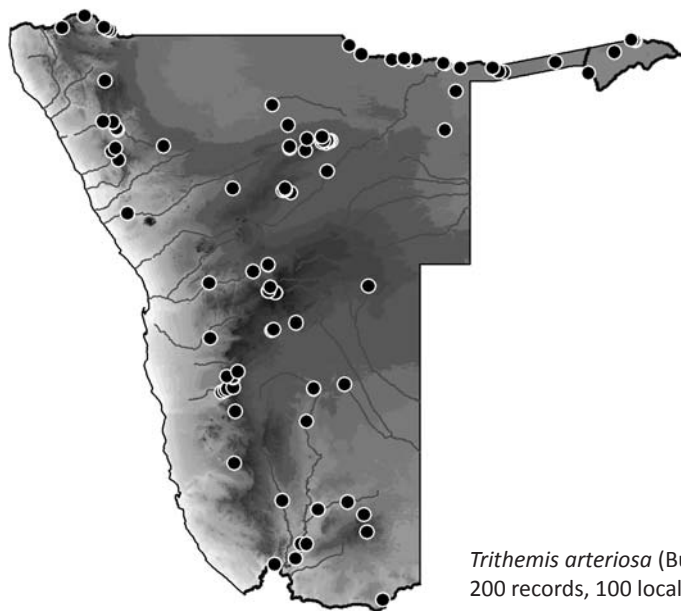
Trithemis aconita Lieftinck, 1969
14 records, 8 localities.



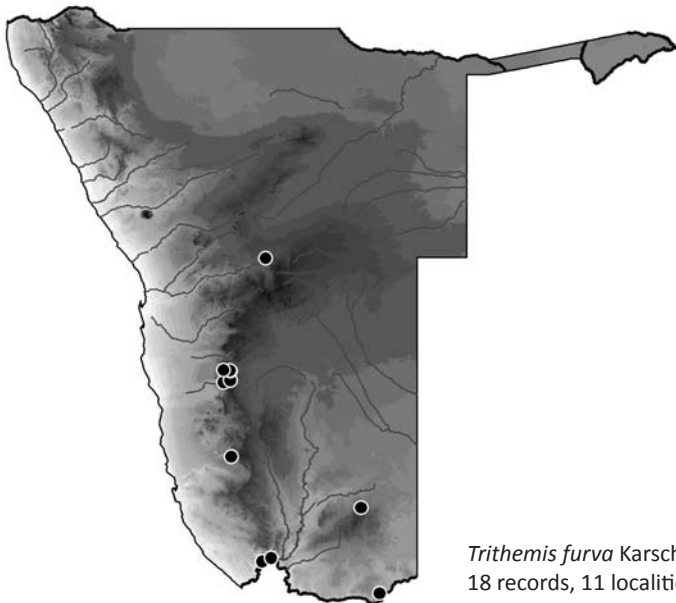
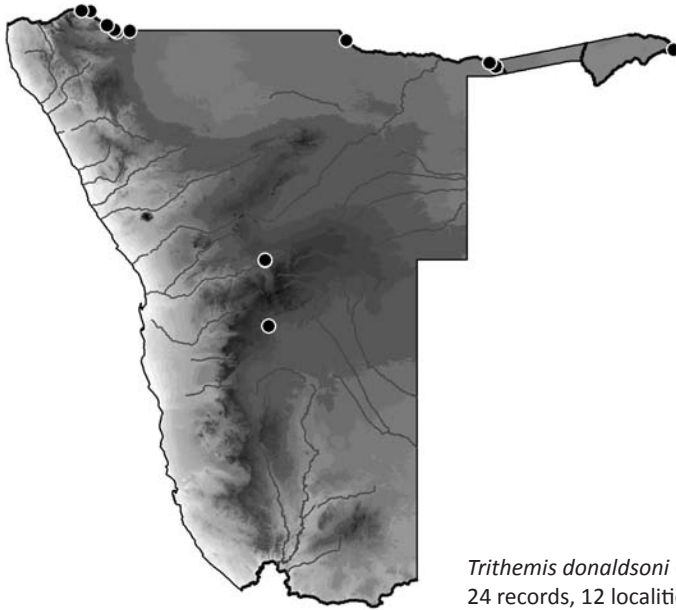
Trithemis aequalis Lieftinck, 1969
3 records, 3 localities.

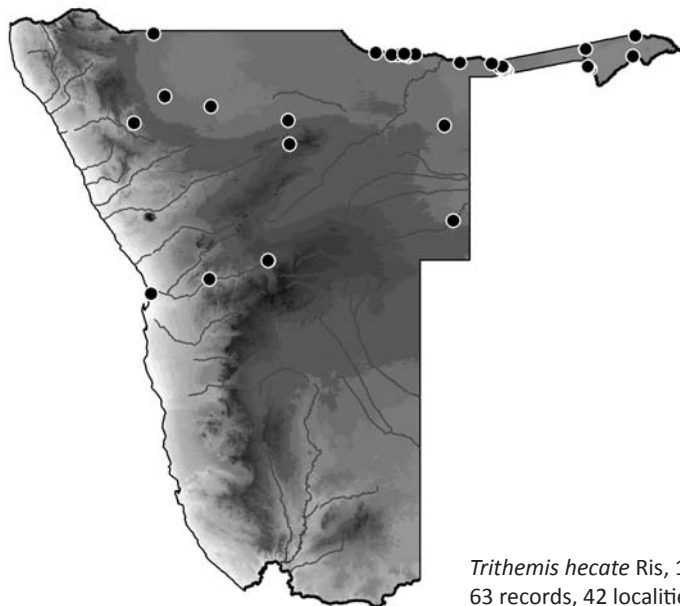


Trithemis annulata
(Palisot de Beauvois, 1807)
295 records, 161 localities.

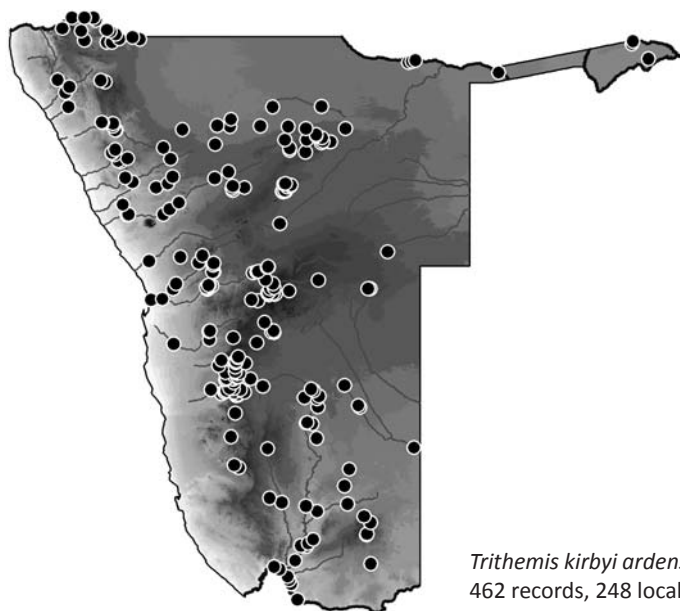


Trithemis arteriosa (Burmeister, 1839)
200 records, 100 localities.

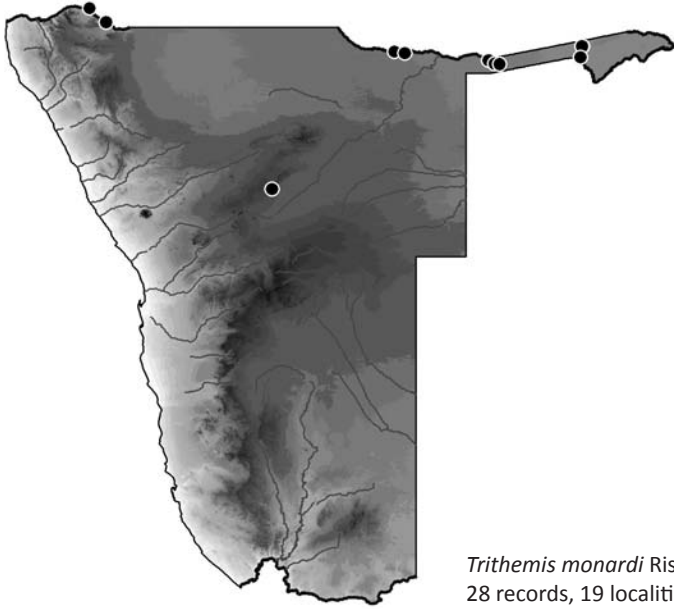




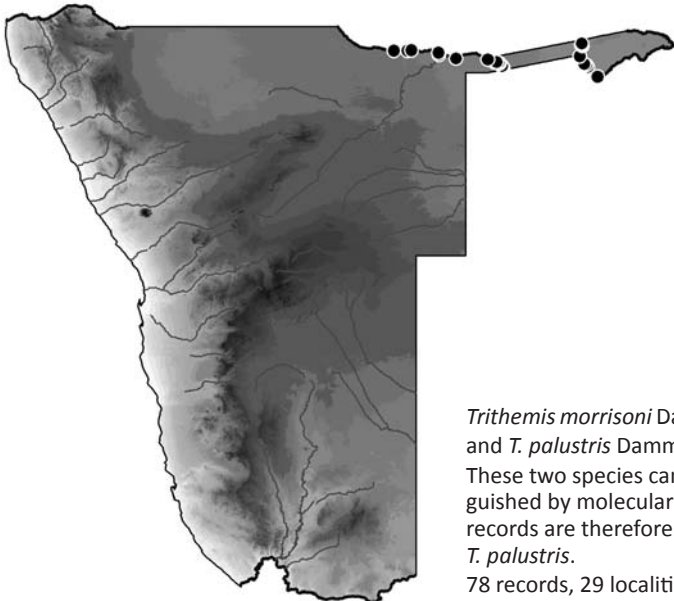
Trithemis hecate Ris, 1912
63 records, 42 localities.



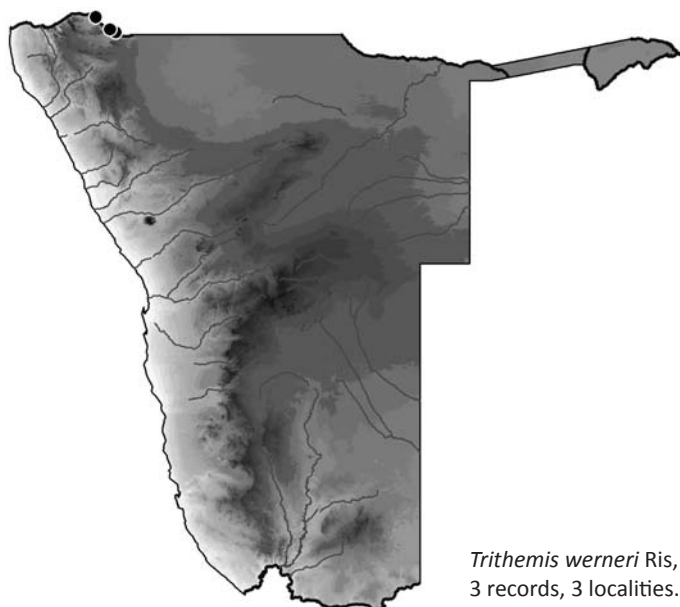
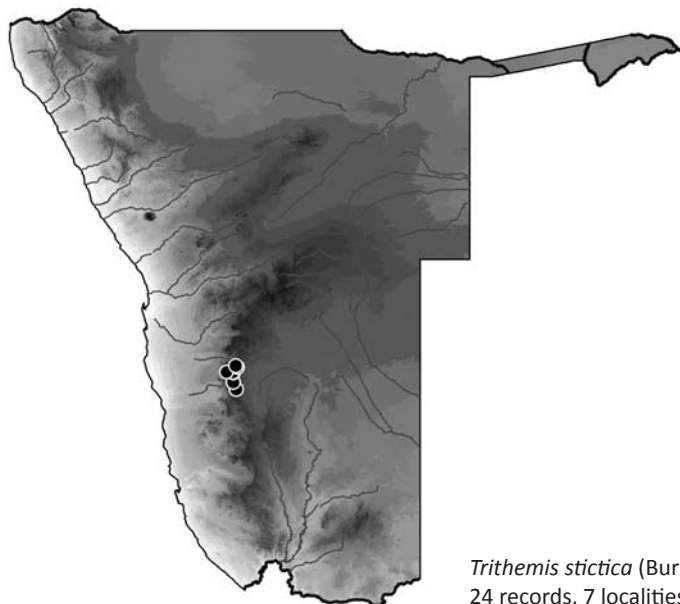
Trithemis kirbyi ardens (Gerstäcker, 1891)
462 records, 248 localities.

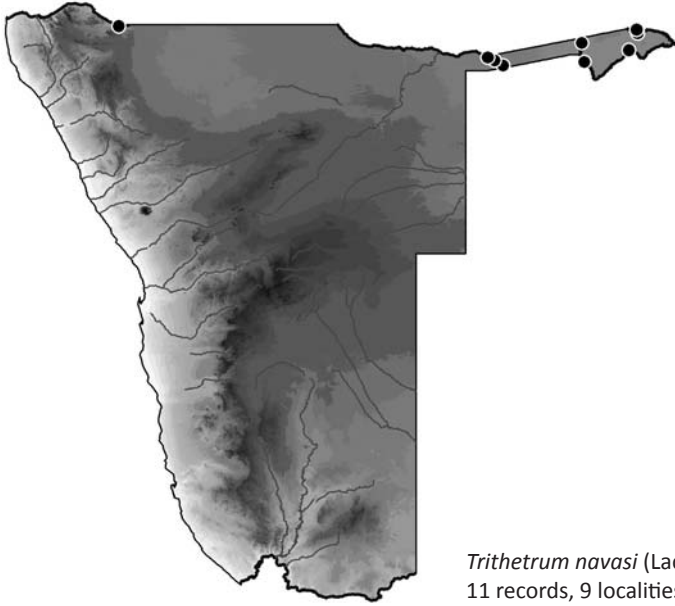


Trithemis monardi Ris, 1931
28 records, 19 localities.

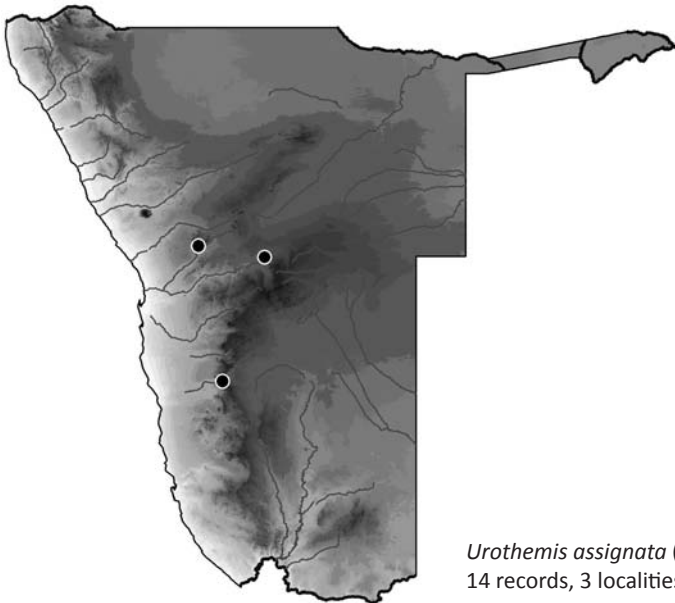


Trithemis morrisoni Damm & Hadrys, 2009
and *T. palustris* Damm & Hadrys, 2009
These two species can only be distinguished by molecular methods. Most records are therefore *T. morrisoni*/
T. palustris.
78 records, 29 localities.

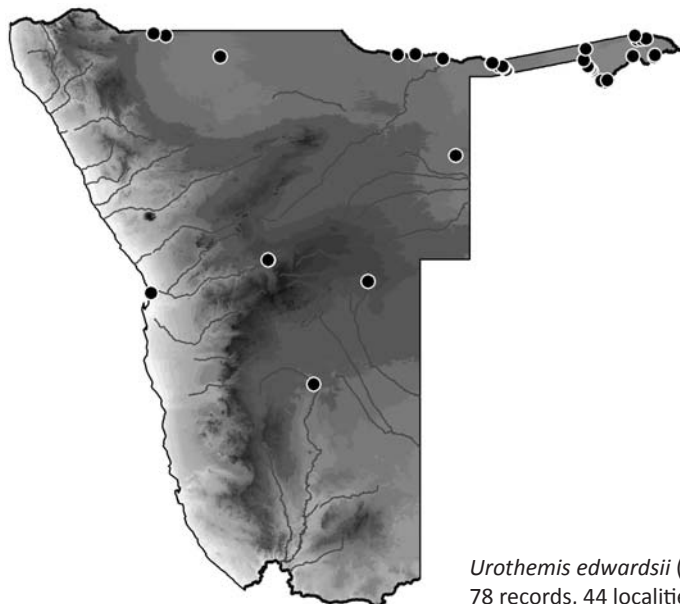




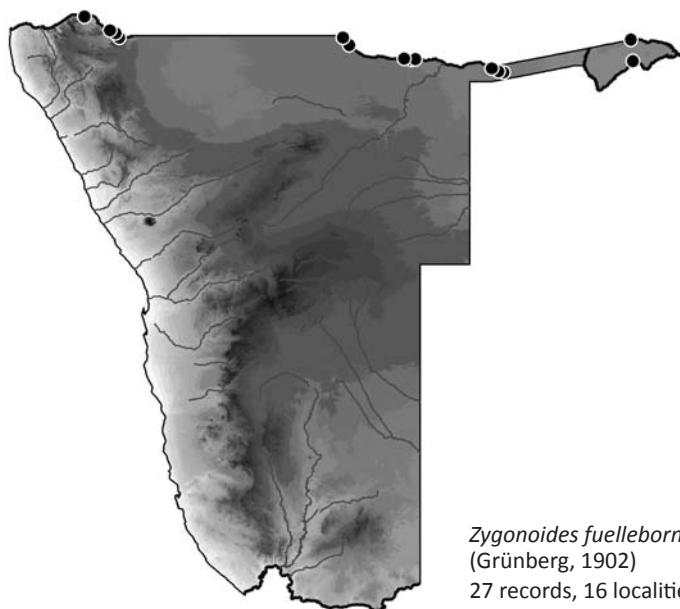
Trithetrum navasi (Lacroix, 1921)
11 records, 9 localities.



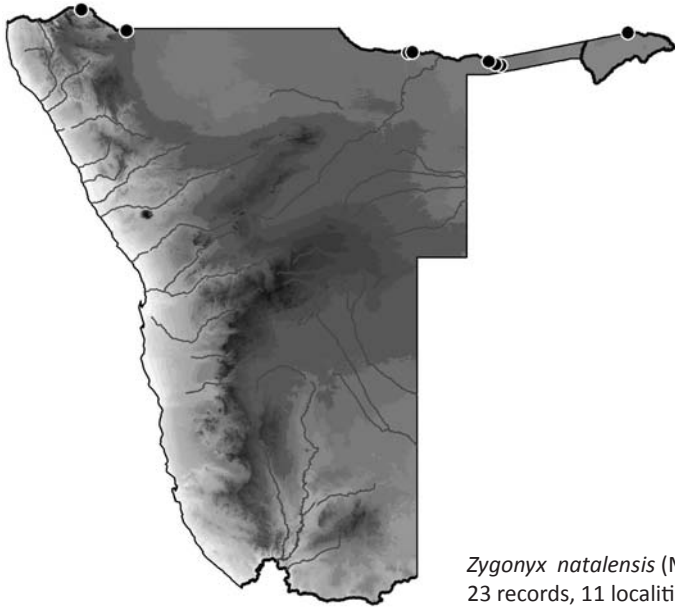
Urothemis assignata (Selys, 1872)
14 records, 3 localities.



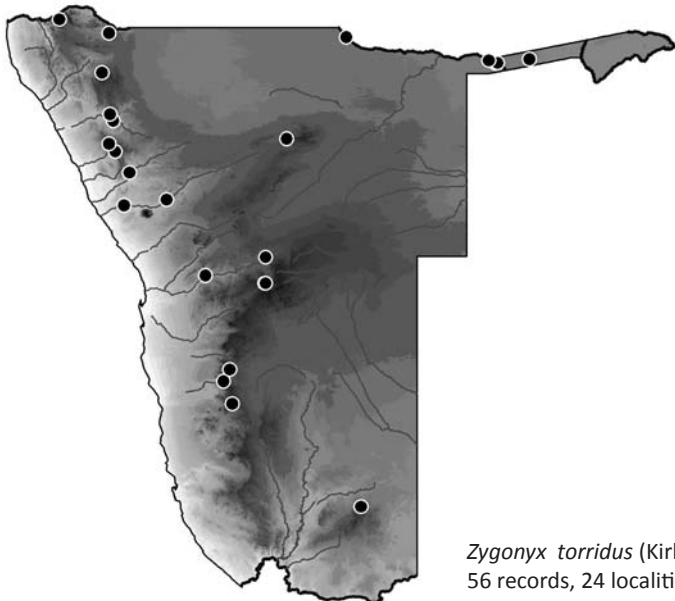
Urothemis edwardsii (Selys, 1849)
78 records, 44 localities.



Zygonoides fueleborni
(Grünberg, 1902)
27 records, 16 localities.



Zygonyx natalensis (Martin, 1900)
23 records, 11 localities.



Zygonyx torridus (Kirby, 1889)
56 records, 24 localities.

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