

# A checklist of the spiders (Arachnida, Araneae) of the Au-grabies National Park in the Northern Cape Province, South Africa

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## ABSTRACT

This paper provides the first annotated species list of spiders presently known and protected in the Au-grabies National Park. A total of 109 species from 29 families are presently protected in the park. The most species-rich families are the Salticidae (17 spp.), Gnaphosidae (17 spp.) followed by the Thomisidae (8 spp.), while 9 families are represented by singletons. Their conservation status and level of endemism based on their known distribution are provided and approximately 4.9 % of the total South African spider fauna are protected in the Au-grabies National Park, and 37 of the species recorded are South African endemics and 7 species are Northern Cape endemics and one species, *Hexophthalma leroyi* Lotz, 2018 is an endemic to the park.

## INTRODUCTION

The South African National Survey of Arachnida (SANSa) was initiated in 1997 with the main aim to document the diversity and distribution of arachnids in the country. Surveys are carried out across the country (Dippenaar-Schoeman *et al.* 2015), thereby generating data that are needed for conservation assessment of species.

South Africa's spider species are not evenly distributed across the country and the highest diversity recorded in the provinces of Limpopo and KwaZulu-Natal (Foord *et al.* 2011b). Little is still known from the spiders of the Northern Cape. The first survey of this area was published by Simon (1910) in which he described several new species. The only other Northern Cape surveys were from pistachio orchards (Haddad *et al.* 2005a; 2005b; 2006), Nama Karoo grassland (Haddad & Dippenaar-Schoeman, 2005) and the spiders of the Tswalu Kalahari Reserve (Dippenaar-Schoeman *et al.* 2018).

This paper presents the first information on the spider fauna of the Au-grabies National Park in the Northern Cape. Information on endemism and conservation status for 108 species are provided.

## METHOD

**Study area:** The Au-grabies National Park (ANP), is located 120 km west of Upington in the Northern Cape Province an area of 820 km<sup>2</sup> (Fig. 1). The ANP was proclaimed in 1966 and is situated on both sides of the Orange River between 28°25'S-28°38'S latitude and 20°15'E-20°20'E longitude. The park is a semi-desert arid rocky area and the Orange River flows through the rocky topography (Fig. 2).

The river divides the park into a northern (13 700 ha) and southern (4 500ha) area. It is the largest conservation area within the Orange River Nama Karoo biome. The rainfall, mainly during the summer, is erratic and can be as high as 391 mm per year but as low as 40 mm per year in winter, June and July. The winters are cold, as low as -2.9°C (June and July) and highest in summer (December, January and February) at 42.9°C.

**Sampling methods and identification:** Sampling of invertebrates especially in arid regions are time consuming and difficult. Ad hoc specimens were mainly sampled by visiting scientist as well as sampling by the fourth author that was employed in the ANP for a short period. He sampled specimens by hand and preserved it in 70% ethanol. Identifications were done in Pretoria and voucher specimens are housed in the National Collection of Arachnida (NCA) at the ARC-Plant Health and Protection in Pretoria. Specimens housed in the NCA and documented on the SANSa database were used to compile the first checklist of the spiders of ANP (Appendix 1). Some of the species could not be identified to species level because only immature specimens were sampled or the taxonomy of the family is still unresolved.

**Endemism value:** The endemism value was provided for each species (Appendix 1) based on the current known distribution of a species. Seven endemism categories are recognized: 6 = ANPE, known only from type locality (Au-grabies National Park Endemic); 5 = NCE, known only from the Northern Cape Province but wider than type locality; 4 = SAE known from two adjoining provinces (South African Endemic); 3 = South Africa, known from more than

two provinces or two provinces not adjoining (SAE); 2 = STHE, known from southern Africa (south of Zambezi and Kunene Rivers)THE); 1 = AE, known from the Afrotropical Region (African Endemic); 0 = Africa and wider (C).

**Conservation status:** As part of the Red Listing Spider project the preliminary conservation status of, species were determine. Immatures or those represented by new or undetermined taxa were not evaluated (NE), species known from only one sex, or were only very old material were available and a species could not be identified it was listed as DDT (data deficient for taxonomic reasons or DD when a lack of distribution data. Species with a broad distribution (categories 0–2) were considered to be of Least Concern (LC); those of categories 3 and 4 were considered to be South African endemics (SAE) and many of them are also LC; while species of special concern usually belong to category 5 or 6.



FIGURE 1: Map showing the of the Augrabies National Park

## RESULTS AND DISCUSSION

### Family diversity

A total of 108 species from 85 genera and 30 families have been recorded from ANP to date (Table 1, Appendix 1). The only known records of spiders of the ANP was the 27 spp. listed in the First Atlas of South African Spiders (Dippenaar-Schoeman *et al.* 2010) and two species that were recently newly recorded from the park *Diploglena arida* Haddad, 2015 (Haddad 2015) and *Hexophthalma leroyi* Lotz, 2018 (Lotz 2018).

In this study, the Salticidae (17 spp.), Gnaphosidae (17 spp.) and Thomisidae (8 spp.) were the most species-rich families (Table 1). It compare well with the survey of the Tswalu Kalahari Reserve where 32 families represented by 108 genera and 136 species have been sampled (Dippenaar-Schoeman *et*

*Et al.* 2018) and where the Salticidae, Thomisidae and Gnaphosidae were the most diverse families. The Tswalu Kalahari Reserve fall within the Savanna Biome and the vegetation are more diverse than in ANP and this could explain the higher diversity.

**Salticidae:** The Salticidae are free-living spiders found on vegetation and the soil surface. All of the seventeen species are new records for the park. Only three of the species are endemic to South Africa, while eight are southern African endemics and three African endemics. No species is endemic in the Northern Cape but two species are possible new to science. *Hasarius adansoni* (Audouin, 1826) is the only cosmopolitical species sampled.

**Gnaphosidae:** The Gnaphosidae are free-living spiders found mainly on the soil surface. Members of this family is known to be more abundant in drier regions. Five species *Asemesthes numisma* Tucker, 1923, *Austrodomus zuluensis* Lawrence, 1947, *Theuma maculata* Purcell, 1907, *Xerophaeus hottentottus* Purcell, 1908 and *Zelotes lavus* Tucker, 1923 were previously reported from the park. Five species are endemic to South Africa while six are southern African endemics and only one has a wide African distribution. No gnaphosid species is endemic in the Northern Cape but two species are possible new to science.

**Thomisidae:** Thomisids are mainly plant dwellers and are easily dispersed by wind and most species have a wide distribution. No species have previously been reported from the ANP. Seven of the eight species have a wide distribution throughout Africa and only one species are a Northern Cape endemic, *Xysticus namaquensis* Simon, 1910.

TABLE 1: Spider diversity of Augrabies National Park, with total number of families, genera (G) and species (S) sampled.

FAMILY	G	S	FAMILY	G	S
Agelenidae	2	2	Pholcidae	2	2
Ammoxenidae	1	2	Phyxelididae	1	1
Araneidae	3	4	Salticidae	15	17
Caponiidae	1	1	Scytodidae	1	1
Cheiracanthiidae	2	2	Segestriidae	1	1
Clubionidae	1	1	Selenopidae	1	3
Dictynidae	1	1	Sicariidae	2	2
Eresidae	3	5	Sparassidae	3	4
Gnaphosidae	11	17	Theraphosidae	2	2
Hersiliidae	2	3	Theridiidae	6	7
Lycosidae	3	3	Thomisidae	6	8
Oecobiidae	2	2	Trachelidae	1	1
Oxyopidae	2	4	Uloboridae	1	1
Palpimanidae	2	3	Zodariidae	4	5
Philodromidae	3	4			



**FIGURE 2:** Habitat types in the Augrabies National Park. Photo credits Elton le Roux

### Species endemism and conservation

Of the 109 species known from the ANP, most of the species (85%) have a wide distribution and their conservation status are of Least Concern (Table 2, Appendix 1). Eight species are data deficient and need more collecting and description of opposite sex.

Eight species, restricted to the Northern Cape are of special concern being (Table 3). But except for the lesser baboon spider *Harpactirella lapidaria* Purcell, 1908 that is listed as Rare the other seven species are data deficient with only the six eyed sand spider *Hexophthalma leroyi* Lotz, 2018, endemic from the ANP. Seven species are introduced and most of them have a worldwide distribution (WSC 2020).

### CONCLUSION

This survey produced the first species list for a national park in the Northern Cape. Eight species have been listed as of special concern but for seven species more specimens need to be sampled to determine their distribution range and to sample the opposite sex. However, given the opportunity to sample in the ANP and the efforts and costs required to sample, completing the inventory is unlikely to occur soon. Given the urgency for biodiversity data, especially for spider diversity, and distribution data needed for red data assessment these data set has therefore relevance.

**TABLE 2:** Conservation status and endemism of the spider species sampled at the Augrabies National Park.

DISTRIBUTION	SPP	%
<b>CONSERVATION STATUS</b>		
Data deficient (DD)	7	6.4
Not evaluated (NE)	7	6.4
Least concern	93	85.3
Rare	1	0.9
<b>ENDEMICITY</b>		
0 – Africa and wider (C)	7	6.4
1 – Africa endemics (AE)	23	21.1
2 – Southern Africa endemics (STHE)	38	34.9
3 – South Africa endemics (SAE)	14	12.8
4 – South Africa endemics (SAE): two adjacent provinces	8	7.3
5 – Northern Cape endemics (LE)	7	6.4
6 – Augrabies National Park (ANP)	1	0.9

**TABLE 3:** Species of special concern endemic protected in the Augrabies National Park (DD = data deficient, known from both sexes; DDT = data deficient; LC = Least Concern)

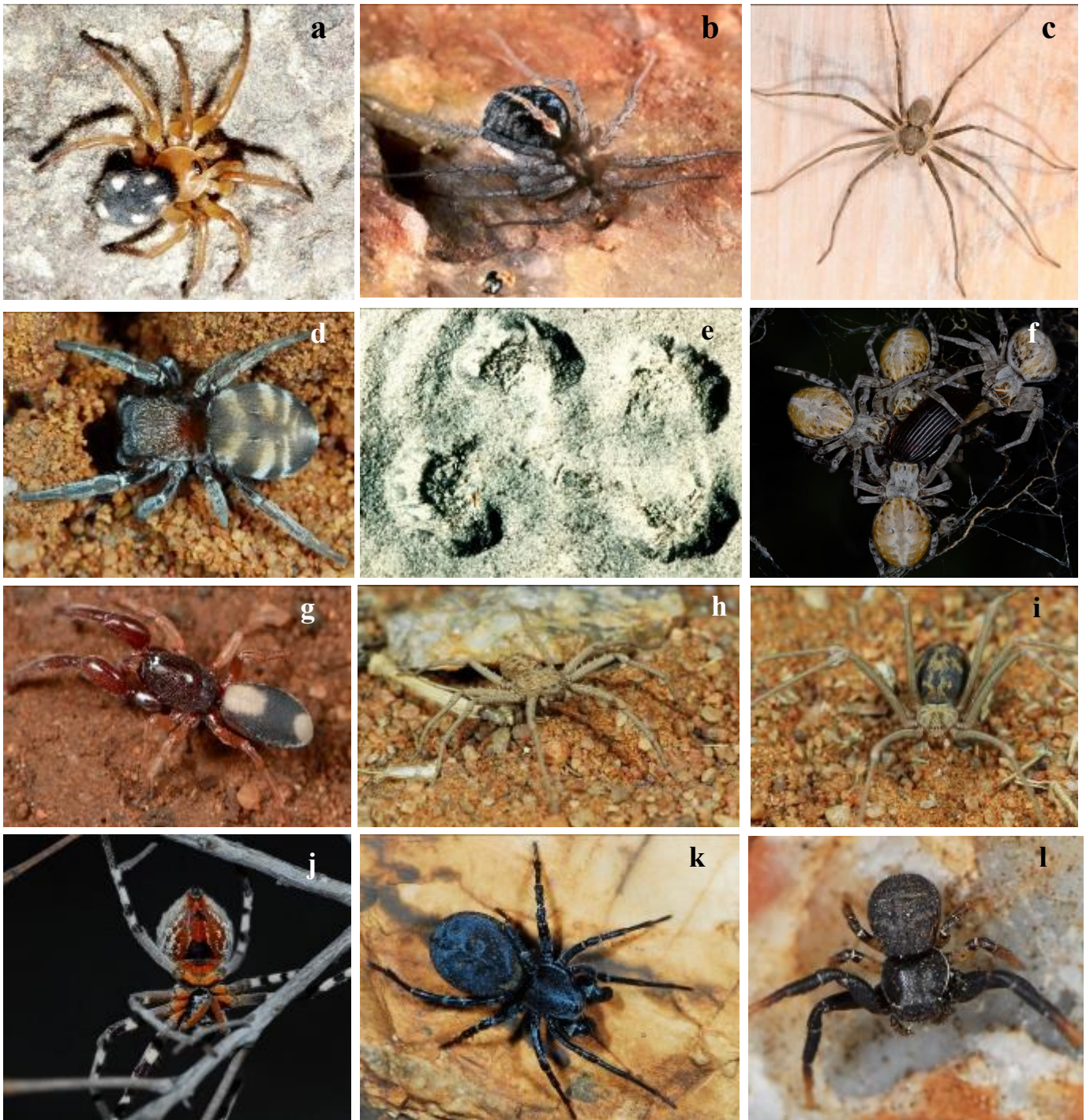
CLUBIONIDAE		
<i>Clubiona nollothensis</i> Simon, 1910	DDT	Male unknown; only restricted distribution (3 loc.); not revised.
GNAPHOSIDAE		
<i>Nomisia notia</i> Dalmas, 1921	DDT	Male unknown; restricted distribution (3 loc.); not revised.
PHILODROMIDAE		
<i>Thanatus namaquensis</i> Simon, 1910	DDT	Male unknown; restricted distribution (3 loc.); not revised
PHYXELIDIDAE		
<i>Namaquarachne thau- matula</i> Griswold, 1990	DD	Both sexes; restricted distribution (3 loc.); revised Griswold (1990)
SICARIIDAE		
<i>Hexophthalma leroyi</i> Lotz, 2018	DDT	Female unknown; only type locality; revised Lotz (2018)
SPARASSIDAE		
<i>Parapalystes euphorbi- ae</i> Croeser, 1996 (Fig.	LC	Both sexes; partly revised Croeser (1996).
THERAPHOSIDAE		
<i>Harpactirella lapidaria</i> Purcell, 1908	RA- RE	Both sexes; restricted distribution (3 loc.); not revised
THOMISIDAE		
<i>Xysticus namaquensis</i> Simon, 1910 (Fig. 3k)	DDT	Male unknown; restricted distribution (3 loc.); not revised

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**FIGURE 3 a-l.** Spiders of the Augrabies National Park: a) *Uroctea quinquenotata* Simon, 1910 (Oecobiidae); b) *Ammoxenus coccineus* Simon, 1893 (Ammoxenidae); c) *Hirriusa arenacea* (Lawrence, 1927) (Philodromidae); d) *Seothyra fasciata* Purcell, 1904 (Eresidae); e) *Seothyra* retreat in sand (Eresidae); f) *Stegodyphus dumicola* Pocock, 1898 (Eresidae); g) *Diaphorocellus biplagiatus* Simon, 1893 (Palpmanidae); h) *Hexophthalma leroyi* Lotz, 2018 (Sicariidae); i) *Loxosceles spinulosa* Purcell, 1904 (Sicariidae); j) *Parapalystes euphorbiae* Croeser, 1996 (Sparassidae); k) *Capheris crassimana* (Simon, 1887) (Zodariidae); l) *Xysticus namaquensis* Simon, 1910 (Thomisidae). Photo credits Peter Webb

**APPENDIX 1:** Spiders of the Au-grabies National Park, listing their endemism, conservation status and global distribution) \* indicates species previously recorded from the park.

SPECIES	END	CS	DISTR
<b>FAMILY AGELENIDAE</b>			
<i>Agelena gaerdesi</i> Roewer, 1955	2	LC	STHE
<i>Mistaria zuluana</i> (Roewer, 1955) *	1	LC	AE
<b>FAMILY AMMOXENIDAE</b>			
<i>Ammoxenus coccineus</i> Simon, 1893	2	LC	STHE
<i>Ammoxenus</i> sp. (new)		NE	
<b>FAMILY ARANEIDAE</b>			
<i>Argiope australis</i> (Walckenaer, 1805)	1	LC	AE
<i>Caerostris sexcuspidata</i> (Fabricius, 1793)	1	LC	AE
<i>Neoscona blondeli</i> (Simon, 1885)	1	LC	AE
<i>Neoscona subfusca</i> (C.L. Koch, 1837)*	1	LC	AE
<b>FAMILY CAPONIIDAE</b>			
<i>Diploglena arida</i> Haddad, 2015*	2	LC	STHE
<b>FAMILY CHEIRACANTHIIDAE</b>			
<i>Cheiracanthium furculatum</i> Karsch, 1879	1	LC	AE
<i>Cheiramiona ferrumfontis</i> Lotz, 2002	4	LC	SAE
<b>FAMILY CLUBIONIDAE</b>			
<i>Clubiona nollothensis</i> Simon, 1910	5	DDT	SAE
<b>FAMILY DICTYNIDAE</b>			
<i>Dictyna</i> sp. undetermined		NE	
<b>FAMILY ERESIDAE</b>			
<i>Gandanameno fumosa</i> (C.L. Koch, 1837)	3	LC	SAE
<i>Seothyra fasciata</i> Purcell, 1904	2	LC	STHE
<i>Seothyra schreineri</i> Purcell, 1903	2	LC	STHE
<i>Stegodyphus bicolor</i> (O.P.-Cambridge, 1869)*	2	LC	STHE
<i>Stegodyphus dumicola</i> Pocock, 1898*	2	LC	STHE
<b>FAMILY GNAPHOSIDAE</b>			
<i>Asemesthes lineatus</i> Purcell, 1908	1	LC	AE
<i>Asemesthes numisma</i> Tucker, 1923*	2	LC	STHE
<i>Austrodomus zuluensis</i> Lawrence, 1947*	3	LC	SAE
<i>Drassodes helenae</i> Purcell, 1907	3	LC	SAE
<i>Drassodes splendens</i> Tucker, 1923	2	LC	STHE
<i>Ibala arcus</i> (Tucker, 1923)	2	LC	STHE
<i>Ibala bilinearis</i> (Tucker, 1923)	2	LC	STHE
<i>Leptodrassus</i> sp. new		NE	

## APPENDIX 1: - continued.

SPECIES	END	CS	DISTR
<i>Leptodrassus</i> sp. new		NE	
<i>Prodidomus purpurascens</i> Purcell, 1904	4	LC	SAE
<i>Setaphis</i> sp. new		NE	
<i>Theuma maculata</i> Purcell, 1907*	2	LC	STHE
<i>Xerophaeus hottentottus</i> Purcell, 1908*	3	LC	SAE
<i>Xerophaeus spoliator</i> Purcell, 1907	2	LC	STHE
<i>Xerophaeus vickermani</i> Tucker, 1923	3	LC	SAE
<i>Zelotes albanicus</i> (Hewitt, 1915)	3	LC	SAE
<i>Zelotes lavus</i> Tucker, 1923*	2	LC	STHE
<b>FAMILY HERSILIIDAE</b>			
<i>Hersilia setifrons</i> Lawrence, 1928	2	LC	STHE
<i>Tyrotama arida</i> (Smithers, 1945)	3	LC	SAE
<i>Tyrotama australis</i> (Simon, 1893)	2	LC	STHE
<b>FAMILY LYCOSIDAE</b>			
<i>Hogna transvaalica</i> (Simon, 1898)	3	LC	SAE
<i>Pardosa injucunda</i> (O.P.-Cambridge, 1876)	1	LC	AE
<i>Proevippa albiventris</i> (Simon, 1898) *	2	LC	STHE
<b>FAMILY OECOBIIDAE</b>			
<i>Oecobius navus</i> Blackwall, 1859*	0	LC	C
<i>Uroctea quinquenotata</i> Simon, 1910*	4	LC	SAE
<b>FAMILY OXYOPIIDAE</b>			
<i>Oxyopes bothai</i> Lessert, 1915	1	LC	AE
<i>Peucetia crucifera</i> Lawrence, 1927*	2	LC	STHE
<i>Peucetia transvaalica</i> Simon, 1896	1	LC	AE
<i>Peucetia viridis</i> (Blackwall, 1858)*	1	LC	AE
<b>FAMILY PALPIMANIDAE</b>			
<i>Diaphorocellus biplagiatus</i> Simon, 1893	2	LC	STHE
<i>Palpimanus giltrayi</i> Lessert, 1936 *	2	LC	STHE
<i>Palpimanus namaquensis</i> Simon, 1910	2	LC	STHE
<b>FAMILY PHILODROMIDAE</b>			
<i>Hirriusa arenacea</i> (Lawrence, 1927)	2	LC	STHE
<i>Philodromus browningi</i> Lawrence, 1952	2	LC	STHE
<i>Thanatus namaquensis</i> Simon, 1910	5	DDT	SAE
<i>Thanatus vulgaris</i> Simon, 1870	0	LC	C
<b>FAMILY PHOLCIDAE</b>			
<i>Artema atlanta</i> Walckenaer, 1837*	0	LC	C
<i>Smeringopus lotzi</i> Huber, 2012	3	LC	SAE
<b>FAMILY PHYXELIIDAE</b>			
<i>Namaquarachne thamatula</i> Griswold, 1990	5	DD	NCE

## APPENDIX 1: - continued.

SPECIES	END	CS	DISTR
<b>FAMILY SALTICIDAE</b>			
<i>Aelurillus cristatopalpus</i> Simon, 1902	4	DD	SAE
<i>Dendryphantes schultzei</i> Simon, 1910	2	DD	STHE
<i>Euophrys leipoldti</i> Peckham & Peckham, 1903	4	LC	SAE
<i>Evarcha</i> sp. new		NE	
<i>Hasarius adansoni</i> (Audouin, 1826)	0	LC	C
<i>Heliophanus charlesi</i> Wesolowska, 2003	3	LC	SAE
<i>Heliophanus patellaris</i> Simon, 1901	2	LC	STHE
<i>Heliophanus pistaciae</i> Wesolowska, 2003	2	LC	STHE
<i>Icius insolidus</i> (Wesolowska, 1999)	2	LC	STHE
<i>Menemerus transvaalicus</i> Wesolowska, 1999	2	LC	STHE
<i>Mexcala rufa</i> Peckham & Peckham, 1902	2	LC	STHE
<i>Natta horizontalis</i> Karsch, 1879	1	LC	AE
<i>Pellenes tharinae</i> Wesolowska, 2006	2	LC	STHE
<i>Phlegra karoo</i> Wesolowska, 2006	2	LC	STHE
<i>Thyene inflata</i> (Gerstäcker, 1873)	1	LC	AE
<i>Thyenula</i> sp. new		NE	
<i>Tusitala barbata</i> Peckham & Peckham, 1902	1	LC	AE
<b>FAMILY SCYTODIDAE</b>			
<i>Scytodes arenacea</i> Purcell, 1904	2	LC	STHE
<b>FAMILY SEGESTRIIDAE</b>			
<i>Ariadna karrooica</i> Purcell, 1904	3	LC	SAE
<b>FAMILY SELENOPIDAE</b>			
<i>Anyphops broomi</i> (Pocock, 1900)	3	LC	SAE
<i>Anyphops hessei</i> (Lawrence, 1940)	3	LC	SAE
<i>Anyphops namaquensis</i> (Lawrence, 1940)	4	LC	SAE
<b>FAMILY SICARIIDAE</b>			
<i>Hexophthalma leroyi</i> Lotz, 2018	6	DDT	NCE
<i>Loxosceles spinulosa</i> Purcell, 1904*	4	LC	SAE
<b>FAMILY SPARASSIDAE</b>			
<i>Arandisa deserticola</i> Lawrence, 1938*	2	LC	STHE
<i>Olios correvoni nigrifrons</i> Lawrence, 1928*	1	LC	AE
<i>Olios sherwoodi</i> Lessert, 1929*	1	LC	SAE
<i>Parapalystes euphorbiae</i> Croeser, 1996	5	LC	NCE
<b>FAMILY THERAPHOSIDAE</b>			
<i>Harpactira namaquensis</i> Purcell, 1902*	4	LC	SAE
<i>Harpactirella lapidaria</i> Purcell, 1908	5	RARE	NCE
<b>FAMILY THERIDIIDAE</b>			
<i>Enoplognatha molesta</i> O.P.-Cambridge, 1904	3	LC	SAE



## APPENDIX 1: - continued.

SPECIES	END	CS	DISTR
<i>Euryopsis episinoides</i> (Walckenaer, 1847)	0	LC	C
<i>Histagonia deserticola</i> Simon, 1895*	2	LC	STHE
<i>Latrodectus geometricus</i> C.L. Koch, 1841*	0	LC	C
<i>Steatoda capensis</i> Hann, 1990	0	LC	C
<i>Theridion purcelli</i> O.P.-Cambridge, 1904	3	LC	SAE
<i>Theridion</i> sp. new		NE	
<b>FAMILY THOMISIDAE</b>			
<i>Heriaeus crassispinus</i> Lawrence, 1942	1	LC	AE
<i>Misumenops rubrodecoratus</i> Millot, 1942	1	LC	AE
<i>Monaeses austrinus</i> Simon, 1911	1	LC	AE
<i>Thomisus kalaharinus</i> Lawrence, 1936	1	LC	AE
<i>Thomisus machadoi</i> Comellini, 1959	1	LC	AE
<i>Thomisus stenningi</i> Pocock, 1900	1	LC	AE
<i>Tmarus africanus</i> Lessert, 1919	1	LC	AE
<i>Xysticus namaquensis</i> Simon, 1910	5	DDT	NCE
<b>FAMILY TRACHELIDAE</b>			
<i>Trachelas pusillus</i> Lessert, 1923	1	LC	AE
<b>FAMILY ULOBORIDAE</b>			
<i>Uloborus plumipes</i> Lucas, 1846 *	0	LC	C
<b>FAMILY ZODARIIDAE</b>			
<i>Caesetius flavoplagiatus</i> Simon, 1910	2	LC	STHE
<i>Capheris crassimana</i> (Simon, 1887) *	2	LC	STHE
<i>Capheris fitzsimonsi</i> Lawrence, 1936 *	2	LC	STHE
<i>Diores triangulifer</i> Simon, 1910 *	2	LC	STHE
<i>Psammoduon deserticola</i> (Simon, 1910)	2	LC	STHE

**Endemicity (END):** (6) only known from the type locality, Au-grabies National Park endemic; (5) endemic to Northern Province; (4) known from two adjoining provinces; (3) endemic to South Africa; (2) endemic to southern Africa; (1) endemic to the Afrotropical Region; (0) also recorded outside the Afrotropical Region.

**Conservation status (CS):** LC, least concern; DD, data deficient; NE, not evaluated; VU, vulnerable.

**Distribution (DIS):** C, cosmopolitan or wider than Africa; AE, African endemic; STHE, southern African endemic; SAE, South African endemic; NCE, Northern Cape endemic.