

A check list of the spider fauna of the Western Soutpansberg, South Africa (Arachnida: Araneae)

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By virtue of its geological history and geographical location the Soutpansberg constitutes a refuge for a high diversity of organisms. The Western Soutpansberg forms part of the Savanna Biome and is presently the area with the highest concentration of Natural Heritage Sites in South Africa. A unique private initiative is under way to improve its national and international conservation status in a bid to conserve the mountain. A checklist of the spider species of the Western Soutpansberg collected over a five-year period is presented. Forty-six families, represented by 109 genera and 127 species have been collected. Of the species collected, 81 (64 %) were wandering spiders and 46 (36 %) web builders. The Thomisidae have the highest number of species (15) followed by the Araneidae and the Salticidae with 10 species each. Ninety-six genera are represented by a single species. Ninety six percent of the species collected are new records for the area. This survey is the first for the area and forms part of the South African National Survey of Arachnida (SANSA).

Keywords: biodiversity, guilds, conservancy.

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Introduction

In ratifying Agenda 21 at the Earth summit in Rio de Janeiro (1992) and the convention on biological diversity in 1995, South Africa is obliged to develop a strategic plan for the conservation and sustainable use of biodiversity. However, meaningful conservation cannot take place if the species involved are not known. Although Araneae constitutes an abundant and highly successful group of invertebrates, little is known about their diversity in large parts of South Africa. Compared with areas in the Northern Hemisphere ecological surveys of African spiders are sparse (Dippenaar-Schoeman & Jocqué 1997). This is also true for spider fauna in conserved areas with the only check lists compiled being those for the Mountain Zebra National Park (Dippenaar-Schoeman 1988), Roodeplaats Dam Nature Reserve (Dippe-

naar-Schoeman *et al.* 1989), Karoo National Park (Dippenaar-Schoeman *et al.* 1999) and Makelali Nature Reserve in the Limpopo Province (Whitmore *et al.* 2001). In 1997, the South African National Survey (SANSA) was initiated. One of its aims is to make inventories of the arachnid fauna of South Africa (Dippenaar-Schoeman & Craemer 2000). As part of SANSA, various projects are in progress, such as inventories of the spider fauna in different floral biomes and to determine the number of species that are already protected in existing conservation areas.

The Limpopo Province is often perceived as savanna and bushveld, however, the Soutpansberg mistbelt has a totally unique composition of plants, animals, and invertebrates. By virtue of its geological history and geographical location the Soutpansberg moun-

tain archipelago constitutes a refuge for a disproportionately high diversity of organisms. The floral environment is very diverse, with a higher generic diversity than that of the Cape Flora and include the following: savannah bushveld, indigenous forests with ancient yellowwood trees, very 'sensitive wetlands', and Soutpansberg fynbos similar to that found in the Western Cape (Hahn *pers. comm.*). The Western Soutpansberg is presently the area with the highest concentration of Natural Heritage Sites in South Africa and is part of a unique private initiative to improve its national and international conservation status in a bid to conserve the mountain (Rosmarin *et al.* 1998). This involves the establishment of various reserves and a conservancy. A process is also in motion to get the Soutpansberg recognized as a World Heritage Site and also to include it in UNESCO's man and biosphere program as a Biosphere Reserve.

The eastern part of the Soutpansberg, especially the area around the Hanglip Forest, has been fairly well sampled and numerous species described. However, very little is known about the western part. In this study an inventory was made of spider species present in the Western Soutpansberg. Spiders were collected from various habitats over a 5-year period. This is the first inventory of the spiders from the Western Soutpansberg. It is a contribution towards the Soutpansberg conservancy objectives and also forms part of the South African National Survey of Arachnida (SANSA) for the Limpopo Province and Savanna Biome.

Study area

The Soutpansberg is the northernmost mountain range in South Africa, situated within the Limpopo Province and stretches about 100 km in an east-west direction. The Western Soutpansberg, which this survey deals with, stretches from the Sand River, which is near Louis Trichardt to the town of Vivo about 70 km west (Fig. 1). The area consists of 4 physiognomic units: (1) the southern plains; (2) western plains (1200 m

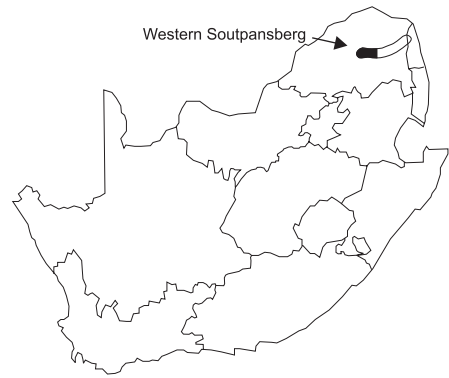


Fig. 1 Position of the study area within South Africa.

above sea level (a.s.l.)); (3) the middle plateau (1200-1300 m a.s.l.) the mountain range (1300-1900 m a.s.l.); and (4) the northern upper plateau (1600-1900 m a.s.l.). The highest peak of the Soutpansberg, Letjume (23°02'S, 29°26'E) at 1747 m a.s.l., falls within this area.

Materials and methods

Sporadic collecting was mainly undertaken from 1996–2000. Spiders were sampled by hand (plant and ground search, turning rocks, and sifting of leaf litter) or using a sweepnet or beating tray for grass and low shrubs. Pitfall trapping was undertaken for a 10-week period (from 3 May 1997–13 July 1997), with 50 pitfall traps in an old and secondary growth forest at the farm Lajuma. Since collecting for the current study was on an *ad hoc* basis for relatively short periods, the results may not reflect the true diversity and species richness of the area, but nevertheless, they give an indication of species present (minimum community). It is also important to note that most of the collecting took place on the farm Lajuma, restricting most of the collecting to an area < 500 ha. The material collected was identified by the second author and is housed in the National Collection of Arachnida (NCA) at the ARC-Plant Protection Research Institute in Pretoria.

General ecology

Ecological and behavioural classification follows Dippenaar-Schoeman *et al.* (1999) and is summarised in Table 1.

Table 1
Ecological and behavioural classification of spider taxa
 (Dippenaar-Schoeman et al. 1999)

Guilds	Micro-habitats
Wandering spiders (W)	
Ground wanderers (GW)	Free living (FGW) Burrow living (BGW)
Plant wanderers (PW)	Free living (FPW) Burrow living (BPW)
Web builders (WB)	Adapted orb-webs (AOWB) Funnel-web (FWB) Gumfoot-web (GWB) Orb-web (OWB) Retreat-web (RWB) Sheet-web (SHWB) Space-Web (SWB)

Results and discussion

Numbers present

During the five-year survey a total of 46 families represented by 109 genera and 127 species were collected (Table 3). Of the species collected 81 (64%) were wandering spiders and 46 (36%) web builders. All the species are new records for the Western Soutpansberg. The Thomisidae had the highest number of species (15) followed by the Araneidae and Salticidae each with 10 species, and the Gnaphosidae with eight. Ninety-six genera are each represented by a single species. One new species, the miturgid, *Cheirromiona lajuma*, has been described, and some undetermined species might be new to science e.g. *Poecilomigas* sp. and *Mimetus* sp. However, only after revisionary studies could this be determined.

Ground layer

Twenty-eight families, represented by 53 species are associated with the ground layer (Tables 2 & 3).

Ground web dwellers: 15 species make their webs on or close to the ground surface. The following web dwellers were found: the funnel-webs of the Agelenidae and sheet-webs of the Hahniidae are made mainly in open grass areas; retreat-webs of the families Amaurobiidae (*Pseudauximus*), Eresidae (*Penestomus*), Hersiliidae (*Tama*), Oecobiidae (*Uroecobius*) and Phyxelididae (*Vidole*) are made on or below rocks; space-webs of the Pholcidae is made in old mammal-made holes and in dark crevices and the gum-foot web of a *Steatoda* sp. of the Theridiidae are made under stones. This is the first record of *Penestomus* (Eresidae) and *Tama* (Hersiliidae) collected outside the Cape Provinces of South Africa (Dippenaar-Schoeman 1989; Smithers 1945).

Ground burrow dwellers: the burrow living ground dwellers are all members of the Mygalomorphae and represent two trapdoor spider species of the families Cyrtauchenidae, Idiopidae, and two baboon spiders of the family Theraphosidae. *Homostola pardalina* (Hewitt) (Cyrtauchenidae) is the first record of this genus from the Limpopo

Table 2
Spider species associated with the ground and field layers of the Western Soutpansberg

Layer	webs	%	burrows	%	free living	%	Total
ground	15	28	4	8	34	64	53
field	31	42	2	3	41	55	74
Total	46		6		75		127

Table 3

Check list of spiders of the Western Soutpansberg region collected from 1996 to 2000

Family, genus, species	guilds	habitat	abundance
1. Agelenidae			
<i>Benoitia australis</i> (Simon, 1896)	FWB	G	2
<i>Olorunia ocellata</i> Pocock, 1900	FWB	G	2
2. Amaurobiidae			
<i>Pseudauximus annulatus</i> Purcell, 1908	RWB	G	2
3. Anapidae			
<i>Metanapis bimaculata</i> (Simon, 1895)	OWB	F	1
4. Araneidae			
<i>Araniella</i> (undetermined sp.)	OWB	F	1
<i>Araneus strupifera</i> Simon, 1886	OWB	F	2
<i>Caerostris sexcuspidata</i> (Fabricius, 1793)	OWB	F	2
<i>Cyclosa insulana</i> (Costa, 1834)	OWB	F	3
<i>Cyrtophora citricola</i> (Forsk., 1775)	OWB	F	3
<i>Gasteracantha sanguinolenta</i> C.L. Koch, 1845	OWB	F	3
<i>Neoscona blondeli</i> (Simon, 1885)	OWB	F	3
<i>Neoscona quincasea</i> Roberts, 1983	OWB	F	2
<i>Neoscona subfusca</i> (C.L. Koch, 1837)	OWB	F	3
<i>Nemoscolus vigintipunctatus</i> Simon, 1897	OWB	F	2
5. Caponiidae			
<i>Caponia</i> sp. (undetermined sp.)	FGW	G	2
6. Clubionidae			
<i>Clubiona</i> sp. (undetermined sp.)	FPW	F	1
<i>Clubiona lawrencei</i> Roewer, 1951	FPW	F	2
7. Corinnidae			
<i>Castianeira fulvipes</i> Simon, 1896	FGW	G	1
<i>Cetonana simoni</i> (Lawrence, 1942)	FGW	G	2
<i>Trachelas scopulifer</i> Simon, 1896	FGW	G	1
8. Ctenidae			
<i>Ctenus transvaalensis</i> Benoit, 1981	FGW	G	2
9. Cyatholipidae			
<i>Cyatholipus isolatus</i> Griswold, 1987	SHWB	F	1
10. Cyrtaucheniidae			
<i>Homostola pardalina</i> (Hewitt, 1913)	BGW	G	2
11. Deinopidae			
<i>Deinopis cornigera</i> Gerstaecker, 1873	AOWB	F	1
12. Dictynidae			
<i>Devade</i> sp. (immature)	RWB	F	2
13. Eresidae			
<i>Penestomus</i> sp. (immature)	RWB	G	1
14. Gnaphosidae			
<i>Aphantaulax inornata</i> Tucker, 1923	FGW	G	3
<i>Asemesthes numisma</i> Tucker, 1923	FGW	G	3
<i>Drassodes</i> (undetermined sp.)	FGW	G	
<i>Echemus erutus</i> Tucker, 1923	FGW	G	3
<i>Megamyrmekion transvaalense</i> Tucker, 1923	FGW	G	2
<i>Setaphis arcus</i> Tucker, 1923	FGW	G	3

Table 3 (continued)

Family, genus, species	guilds	habitat	abundance
<i>Xerophaeus</i> sp. (undetermined sp.)	FGW	G	1
<i>Zelotes tuckeri</i> Roewer, 1951	FGW	G	3
15. Hahniidae			
<i>Hahnia</i> sp. (immature)	SWB	G	1
16. Hersiliidae			
<i>Hersilia sericea</i> Pocock, 1898	FPW	F	1
<i>Tama arida</i> Smithers 1945	RWB	G	1
17. Idiopidae			
<i>Idiops castaneus</i> Hewitt, 1913	BGW	G	1
18. Linyphiidae			
<i>Microlinyphia sterilis</i> (Pavesi, 1883)	SHWB	G	2
<i>Neriene natalensis</i> Van Helsdingen, 1969	SHWB	G	2
<i>Linyphiidae</i> genus A	SHWB	F	1
<i>Linyphiidae</i> genus B	SHWB	F	1
19. Liocranidae			
<i>Hortipes contubernalis</i> Bosselaers & Jocqué, 2000	FGW	G	1
20. Lycosidae			
<i>Pardosa crassipalpis</i> Purcell, 1903	FGW	G	3
<i>Pardosa leipoldti</i> Purcell, 1903	FGW	G	2
<i>Proevippa fascicularis</i> (Purcell, 1903)	FGW	G	3
<i>Proevippa wanlessi</i> (Russell-Smith, 1981)	FGW	G	1
21. Migidae			
<i>Poecilomigas</i> (undetermined new sp.)	BPW	F	1
22. Mimetidae			
<i>Mimetes</i> (undetermined new sp.)	FPW	F	1
23. Miturgidae			
<i>Cheiracanthium africanum</i> Lessert, 1921	FPW	F	3
<i>Cheiramiona simplicitarise</i> Simon, 1910	FPW	F	2
<i>Cheiramiona</i> (new sp. <i>in press</i>)	FPW	F	1
24. Mysmenidae			
undetermined new sp.	OWB	F	1
25. Nemesidae			
<i>Entypesa schoutedeni</i> Benoit, 1965	BPW	F	1
26. Oecobiidae			
<i>Uroecobius ecribellatus</i> Kullman & Zimmerman, 1976	RWB	G	2
27. Oxyopidae			
<i>Hamataliwa kulczynskii</i> (Lessert, 1915)	FPW	F	2
<i>Oxyopes jacksoni</i> Lessert, 1915	FPW	F	2
<i>Oxyopes longispinosus</i> Lawrence, 1938	FPW	F	2
<i>Oxyopes pallidecoratus</i> Strand, 1906	FPW	F	2
<i>Peucetia viridis</i> (Blackwall, 1858)	FPW	F	1
28. Palpimanidae			
<i>Palpimanus transvaalicus</i> Simon, 1893	FGW	G	1
29. Philodromidae			
<i>Philodromus browningi</i> Lawrence, 1952	FGW	F	1
<i>Suemus punctatus</i> Lawrence, 1938	FGW	F	1
<i>Thanatus vulgaris</i> Simon, 1870	FGW	F	2

Table 3 (continued)

Family, genus, species	guilds	habitat	abundance
30. Pholcidae			
<i>Micropholcus</i> (undetermined new sp.)	SPWB	G	1
<i>Pholcus ciliatus</i> Lawrence, 1938	SPWB	G	2
<i>Smeringopus natalensis</i> Lawrence, 1947	SPWB	G	2
<i>Spermophora peninsulæ</i> Lawrence, 1964	SPWB	G	2
31. Phyxelididae			
<i>Vidole sothoana</i> Griswold, 1990.	RWB	G	2
32. Pisauridae			
<i>Euprosthonopsis pulchella</i> (Pocock, 1902)	FWB	F	2
<i>Cispus problematicus</i> Blandin, 1978	FPW	F	2
33. Prodidomidae			
<i>Austrodomus</i> sp. (undetermined sp.)	FGW	G	1
<i>Theuma purcelli</i> Tucker, 1923	FGW	G	2
34. Salticidae			
<i>Brancus bevisi</i> Lessert, 1925	FPW	F	2
<i>Cosmophasis australis</i> Simon, 1902	FPW	F	2
<i>Heliophanus orchestra</i> Simon, 1885	FGW	G	2
<i>Festucula</i> sp. (immature)	FGW	F	1
<i>Massagris</i> sp. (undetermined new sp.)	FGW	G	2
<i>Natta horizontalis</i> Karsch, 1879	FGW	G	2
<i>Pachyballus transversus</i> Simon, 1900	FPW	F	1
<i>Stenaelurillus</i> (undetermined sp.)	FPW	F	2
<i>Thyene inflata</i> (Gerstaecker, 1875)	FPW	F	2
<i>Thyenula ogdeni</i> (Peckham & Peckham, 1903)	FPW	F	3
35. Scytodidae			
<i>Scytodes</i> sp. A	FGW	G	1
<i>Scytodes</i> sp. B	FGW	G	2
<i>Scytodes fusca</i> Walckenaer, 1837	FGW	G	3
36. Segestriidae			
<i>Ariadna</i> (undetermined sp.)	RWB	F	2
37. Selenopidae			
<i>Selenops brachycephalus</i> Lawrence, 1940	FGW	G	2
<i>Selenops tenebrosus</i> Lawrence, 1940	FGW	G	2
<i>Selenops zuluanus</i> Lawrence, 1940	FGW	G	1
38. Sicariidae			
<i>Loxosceles spiniceps</i> Lawrence, 1952	FGW	G	1
39. Sparassidae			
<i>Olios</i> (undetermined sp.)	FPW	F	1
<i>Palystes johnstoni</i> Pocock, 1896	FPW	F	2
40. Thomisidae			
<i>Diaea puncta</i> Karsch, 1884	FPW	F	2
<i>Heriaeus fimbriatus</i> Lawrence, 1942	FPW	F	1
<i>Misumenops rubrodecoratus</i> Millot, 1941	FPW	F	3
<i>Monaeses austrinus</i> Simon, 1910	FPW	F	2
<i>Oxytate argenteooculata</i> (Simon, 1886)	FPW	F	2
<i>Oxytate concolor</i> (Caporiacco, 1947)	FPW	F	1
<i>Runcinia aethiops</i> Simon, 1901	FPW	F	2
<i>Runcinia flavida</i> Simon, 1881	FPW	F	3
<i>Synema imitator</i> Roewer, 1951	FPW	F	2
<i>Thomisops pupa</i> Karsch, 1879	FPW	F	2
<i>Thomisus daradioides</i> Simon, 1890	FPW	F	3

Table 3 (continued)

Family, genus, species	guilds	habitat	abundance
<i>Thomisus. granulatus</i> Karsch, 1880	FPW	F	1
<i>Thomisus. kalaharinus</i> Lawrence, 1936	FPW	F	2
<i>Tmarus cameliformis</i> Millot	FPW	F	2
<i>Xysticus natalensis</i> Lawrence, 1938	FGW	G	2
41. Tetragnathidae			
<i>Glenognatha</i> (undetermined sp.)	OWB	F	1
<i>Leucauge festiva</i> (Blackwall, 1866)	OWB	F	2
<i>Leucauge decorata</i> (Blackwall, 1864)	OWB	F	2
<i>Nephila pilipes</i> (Fabricius, 1793)	OWB	F	2
42. Theraphosidae			
<i>Ceratogyrus bechuanicus</i> Purcell, 1902	BGW	G	1
<i>Harpactirella flavipilosa</i> Lawrence, 1936	BGW	G	2
43. Theridiidae			
<i>Coscinida tibialis</i> Simon, 1895	GWB	F	1
<i>Crustulina</i> sp. (undetermined sp.)	GWB	F	1
<i>Latrodectus geometricus</i> O.P.-Cambridge, 1904	GWB	F	2
<i>Phoroncidia eburnea</i> (Simon, 1895)	GWB	F	1
<i>Steatoda</i> (undetermined sp.)	GWB	G	2
<i>Tidarren</i> (undetermined sp.)	GWB	F	1
<i>Theridion</i> (undetermined sp.)	GWB	F	3
44. Trochanteriidae			
<i>Platyoides walteri</i> (Karsch, 1886)	FPW	F	1
45. Uloboridae			
<i>Miagrammopes</i> sp. (immature)	AOWB	F	1
<i>Uloborus lugubris</i> Berland, 1939	OWB	F	3
<i>Uloborus plumipes</i> Lucas, 1845	OWB	F	2
46. Zodariidae			
<i>Diores auricula</i> Tucker, 1920	FGW	G	2
<i>Psammoduon</i> (undetermined sp.)	FGW	G	1

Guilds: FGW = free living ground wanderers; BGW = burrow living ground wanderers; FPW = free living plant wanderers; BPW = burrow living plant wanderers.

Types of webs: AOWB= adapted orb-web; FWB = funnel-web; GWB = gumfoot- web; OWB = orb-web; RWB = retreat-web; SWB = sheet- web; SPWB = space-web.

Habitat: F = foliage (plants); G = ground.

Abundance: 1 = rare; 2 = common; 3 = abundant.

Province (Dippenaar-Schoeman 2002). They make their burrows underneath rocks with the trapdoor covered with plant material. *Idiops castaneus* Hewitt (Idiopidae) was previously collected from Newington, in the Limpopo Province. This record extends its range within the province. Members of *Idiops* make their burrows on slightly sloping grassy planes (Dippenaar-Schoeman 2002). Of the two theraphosids, the horned

baboon spider *Ceratogyrus bechuanicus* Purcell are commonly found throughout the Limpopo Province, while the occurrence of *Harpactirella flavipilosa* Lawrence is a new record for the province.

Free-living ground wanderers: most ground dwellers (64 %) are free-living species that are not constructing webs to catch their prey (Table 2). The families Gnaphosidae, with eight species, and Lycosidae with four, are

the most abundant. The wolf spider, *Proevip-pa wanlessi* Russell-Smith, represented 57 % of the total number of spiders that were caught during the pitfall survey and account for most of the specimens caught in the secondary growth forest. Their numbers decreased markedly in the old growth forest. The two gnaphosids, *Zelotes tuckeri* Roewer and *Megamyrmekion transvaalense* Tucker were more commonly found in the old-growth forest than in the second growth forest.

Field layer

Plant web dwellers: from the field layer 42 % of the species collected were associated with webs (Table 2). The orb-web spiders were represented by five families (16 spp.) with the Araneidae the more abundant (10 species). Representatives of some rare families, such as Anapidae and Mysmenidae have also been collected. Little is known about these families in South Africa and both probably represent new species. Several of the orb webs constructed were large and made by members of the tetragnathids, the golden orb-web spiders (*Nephila*) and two silver vlei spider species of the genus *Leucage*. The physical structure of the habitat plays a role in the composition of the spider web dwellers (Wise 1993) as it not only provides the necessary support for anchoring webs but also increases the availability of retreat space and lead to the modification of microclimate, which could have an effect on the spiders as well as their prey.

Plant burrow dwellers: the nemesid trapdoor spider *Entypesa schoutedeni* Benoit was collected from transparent webbing from under bark. The type locality of this species, is Soutpansberg, but no exact locality was indicated. This species seems to be endemic to the Soutpansberg. The migid also known as the tree trapdoor spider probably belongs to a new species of *Poecilomigas* (Griswold *pers. comm.*). The genus makes sac-like burrows beneath the bark with a wafer-lid trapdoor (Dippenaar-Schoeman 2002). This is

the first record of the genus from the Limpopo Province.

Free-living plant wanderers: 55 % of all spiders collected from the field layer were free-living spiders. They were represented by nine families and 34 species. Most species were collected with sweepnets from grass. The more common grass dwellers were the Clubionidae, Miturgidae, Oxyopidae, Philodromidae, Thomisidae and Salticidae. A few species are almost exclusively tree dwellers, such as the Hersiliidae (*Hersilia*) and Trochanteriidae (*Platyoides*). New species of *Cheiramiona* (Miturgidae) and *Mimetes* (Mimetidae) were collected.

Conclusions

Except for taxonomic descriptions the spider fauna of South Africa is poorly known. Our knowledge of the spiders of the Limpopo Province, in particular, is based only on short collecting expeditions. The only long-term survey of spiders from this province was a study of a savanna ecosystem at the Makelali Nature Reserve where a total of 37 families, 147 genera and about 268 species were collected (Whitmore *et al.* 2001).

This is the first survey of the spiders of the Western Soutpansberg. About 96 % of the species collected are new records for the area with 10 possibly new species. The 127 species probably represents only a portion of the spider fauna present. However, it compares well with other more comprehensive surveys that have been undertaken in South Africa for example: Roodepaat Dam Nature Reserve (98 spp.), Rietondale Research Station (55 spp.), the Karoo National Park (116 spp.), and Kruger National Park (139 spp.). At family level, the spider fauna from the Western Soutpansberg is more diverse than any of the above surveys. A direct positive correlation between family and species diversity has been observed for other taxa (Andersen 1995; Balmford *et al.* 1996), pointing to a disproportionately high spider diversity for this area and higher biological

diversity in terms of kinds and disparity of attributes of species.

Although the Araneae are an abundant and highly successful group of invertebrate animals, little has been done to conserve them in South Africa. With this rich fauna of spiders present, it fulfils the objectives of the Western Soutpansberg Conservancy. An awareness of spiders present might stimulate additional collecting and more research. In the past two decades both specialists and laymen have shown considerable interest in spiders (Dippenaar-Schoeman & Van den Berg 1988) and it is accepted that eco-tourism will be one of the primary future land uses within the Soutpansberg Conservancy area. To this end an overall eco-tourism theme that retains and enhances the uniqueness of the area should be striven for. Spiders may play an important role here.

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