

A CHECKLIST OF THE SPIDERS (ARACHNIDA, ARANEAE) OF THE POLOKWANE NATURE RESERVE, LIMPOPO PROVINCE, SOUTH AFRICA

SUSAN M. DIPPENAAR

¹Department of Biodiversity
School of Molecular & Life Sciences
University of Limpopo
South Africa

ANSIE S. DIPPENAAR-SCHOEMAN

ARC-Plant Protection Research Institute
South Africa

MOKGADI A. MODIBA¹

THEMBILE T. KHOZA¹

Correspondence to: Susan M. Dippenaar

e-mail: susand@ul.ac.za

Postal Address: Private Bag X1106, Sovenga 0727, Republic of South Africa

ABSTRACT

As part of the South African National Survey of Arachnida (SANSA), spiders were collected from all the field layers in the Polokwane Nature Reserve (Limpopo Province, South Africa) over a period of a year (2005–2006) using four collecting methods. Six habitat types were sampled: *Acacia tortillis* open savanna; *A. rehmanniana* woodland, false grassland, riverine and sweet thorn thicket, granite outcrop; and *Aloe marlothii* thicket. A total of 13 821 spiders were collected (using sweep netting, tree beating, active searching and pitfall trapping) represented by 39 families, 156 determined genera and 275 species. The most diverse families are the Thomisidae (42 spp.), Araneidae (39 spp.) and Salticidae (29 spp.). A total of 84 spp. (30.5%) were web builders and 191 spp. (69.5%) wanderers. In the Polokwane Nature Reserve, 13.75% of South African species are presently protected.

Keywords: Arachnida, Araneae, diversity, habitats, conservation

In the early 1990s, South Africa was recognised, in terrestrial terms, as a biologically very rich country and even identified as the world's 'hottest hotspot' (Myers 1990). After the United Nations Conference on Environment and Development in 1992, South Africa ratified the Convention on Biological Diversity in 1995 with the main goal to develop a strategic plan for conservation and sustainable use of biodiversity. One of the national efforts identified as necessary to accomplish the goal was to discover, describe and to make an inventory of the species of South Africa. As a result of this, the South African National Survey of Arachnida (SANSA) was established in 1997 with the aim to develop an inventory of the arachnofauna of South Africa (Dippenaar-Schoeman & Craemer 2000). Arachnids are well represented in South Africa, with nine of the twelve arachnid orders occurring here. However, even though they constitute an abundant and successful group, they are still poorly sampled with little existing knowledge about their diversity and distribution within certain ecoregions.

South Africa has a very rich spider fauna represented by 69 families, 469 genera and about 2 000 species that occur in all of the ecoregions of South Africa (Dippenaar-Schoeman 2002a). Unfortunately, the lack of taxonomic expertise makes it impossible to identify some spider families to species and even generic levels, which could lead to under-appreciation and estimation of the actual species pool and undermines meaningful conservation. As part of SANSA, this study addressed specifically the objective to compile species lists within the Savanna Biome, starting with checklists of the conserved areas where conservation strategies are already in place.

The Savanna Biome is one of the world's major biomes and covers about one third of South Africa (Low & Rebelo 1996). It is especially well developed in the Kalahari, parts of Limpopo

and KwaZulu-Natal, Mpumalanga and the Eastern Cape. Savanna is characterised by a grassy ground layer and a distinct upper layer of woody plants that can be identified as shrubveld, woodland or bushveld. The delimiting factor is complex for the Savanna Biome and includes mainly rainfall (235 to 1 000 mm per year) and/or frost (0–120 days/year). Reports on the spiders of the Savanna Biome in South Africa are restricted to that of Roodeplaat Dam Nature Reserve (Dippenaar-Schoeman *et al.* 1989), Makalali Game Reserve (Whitmore *et al.* 2001, 2002), Western Soutpansberg (Foord *et al.* 2002), Kruger National Park (Dippenaar-Schoeman & Leroy 2003), Sovenga Hill (Modiba *et al.* 2005) and Ndumo Game Reserve (Haddad *et al.* 2006).

This is the second survey of arachnids from the Polokwane region, Limpopo Province. The study was undertaken in the Polokwane Nature Reserve (PNR) which lies in the Savanna Biome, and is situated in the Central Bushveld Bioregion, specifically the Polokwane Plateau Bushveld vegetation unit (Mucina *et al.* 2005, Mucina & Rutherford 2006). A significant portion of the reserve includes a unique and threatened habitat type known as the Pietersburg Plateau False Grassland. The reserve was given conservation status and was proclaimed as a municipal reserve after officially being opened in 1971. Currently the reserve conserves one of the largest pristine examples of this habitat type, along with its associated plant and animal species.

As part of the MSc studies of the third and fourth authors, spiders were sampled from six habitat types over a period of a year using four collecting methods, sampling all the field layers. This paper is the first in a series of papers on the reserve and provides only an annotated checklist for the spiders of the reserve. Detailed information about the abundance and species richness of spiders collected from different habitat types, during different seasons and using different sampling methods will be published in succeeding papers.

STUDY AREA

The Polokwane Nature Reserve (23°58'S 29°28'E) covers an area of approximately 3 200 ha and lies on an elevated plateau with an altitude ranging between 1 200 and 1 500 m above sea level. The climate is moderate with mean summer day-time high of 28 °C and a mean winter night-time low of 5 °C. The average annual rainfall for the area is 478 mm. The Polokwane Plateau Bushveld vegetation unit is characterised by open *Themeda* grassland with scattered *Acacia* trees and bush clumps. The dominant trees are *Acacia tortillis* (Forssk.) Hayne and *A. rehmanniana* Schinz. Other interesting plant communities and habitats in the reserve include riverine and sweet thorn thickets, granite outcrops, quartzite pebble slopes, saline patches and a mountain aloe, *Aloe marlothii* A. Berger thicket situated on a shale outcrop (Grosel pers. comm.).

METHODS

Six different habitat types were selected subjectively to represent most of the habitat diversity in the reserve and included: 1. *Acacia tortillis* open savanna, 2. *A. rehmanniana* woodland, 3. false grassland, 4. riverine and sweet thorn thicket, 5. a northern slope granite outcrop, and 6. *Aloe marlothii* thicket on shale outcrop.

Four collecting methods were used, namely grass sweep netting, tree beating, active searching and pitfall trapping. Leaf litter sifting was attempted once on the *A. rehmanniana* woodland site but was discontinued because of insufficient leaf litter. Sampling was conducted once a month in each of the six habitat types for a duration of 12 months (March 2005 to February 2006).

Pitfall trapping: Containers with a 10 cm diameter were planted with the upper rim level with the ground surface and covered by a funnel leading to a smaller container filled with 70% EtOH to immobilise and preserve caught specimens. Ten traps, 10 m apart, were planted per habitat site, consisting of a central trap with three arms in three different directions, each arm consisting of three traps. The traps were checked every day during the week of sampling per site. The pitfall traps were open for five consecutive days, resulting in 60 trap days per site and therefore 360 trap days for all sampling sites during the sampling period of one year. This resulted in a total of 3 600 pitfall trap samples taken during the study.

Sweep netting: A sweep net with a diameter of 31 cm was used to sample through grass and herbs. Sweeping was conducted once a month for two hours at each site, while walking from the central pitfall trap throughout the sampling site. Collected material was gathered into marked plastic bags and sorted in the laboratory.

Tree beating: Trees and shrubs were beaten with a 0.21 kg baton to dislodge specimens which were caught on a sheet and collected in plastic bags. Bigger trees received up to 20 beatings while smaller trees and shrubs received fewer beatings. This method was applied once a month for two hours at each site. Collected material was sorted in the laboratory.

Active searching was undertaken once a month for two hours at each site. The area covered was from the central pitfall trap working outwards and covered the whole sampling site. Specimens were searched and collected from all field layers.

Collected spiders were fixed and preserved in 70% EtOH and identified up to family level using the African spider family keys (Dippenaar-Schoeman & Jocqué 1997) while genus and species determinations were done by the second author. Voucher specimens were deposited in the National Collection of Arachnida (NCA) at the Plant Protection Research Institute in Pretoria, an institute of the Agricultural Research Council.

Two main guilds can be distinguished among spiders, namely wanderers and web builders. The wanderers can be further divided into plant wanderers (PW) and ground wanderers (GW). Plant wanderers were separated and placed in a guild based on the vegetation type that they were most commonly found on, namely plant wanderers found on foliage (PWF), plant wanderers found on grass (PWG) and plant wanderers found on bark (PWB) while ground wanderers may be free living or burrow dwelling (BD). The web-building spiders can also be subdivided into different guilds based on the structure of the webs that they build: sheet-web builders (SWB), space-web builders (SPWB), orb-web builders (OWB), funnel-web builders (FWB), retreat-web builders (RWB), tube-web builders (TWB) and gumfoot-web builders (GWB).

RESULTS AND DISCUSSION

A total of 13 821 spiders were caught during the sampling period, representing 39 families, 156 determined genera and 275 species (see Table 1). The 39 families represent 56.5% of the currently recognised families for South Africa (Dippenaar-Schoeman & Jocqué 1997). The representation and numbers caught (irrespective of other factors such as length of sampling period, size of sampling area etc.) compare favourably with

TABLE 1
Spider families collected in the Polokwane Nature Reserve indicating the number of species and percentage of the total number of specimens collected

FAMILIES	GENERA	SPECIES	SPECIMENS	%
<i>Agelenidae</i>	2	2	11	0.08
<i>Amaurobiidae</i>	1	1	1	0.01
<i>Ammoxenidae</i>	1	1	61	0.44
<i>Araneidae</i>	23	39	916	6.63
<i>Barychelidae</i>	1	1	3	0.02
<i>Caponiidae</i>	1	1	16	0.12
<i>Clubionidae</i>	1	2	17	0.12
<i>Corinnidae</i>	4	4	7	0.05
<i>Ctenidae</i>	1	1	3	0.02
<i>Cyrtachenidae</i>	1	1	6	0.04
<i>Dictynidae</i>	1	1	5	0.04
<i>Eresidae</i>	3	3	2 547	18.43
<i>Gnaphosidae</i>	13	25	499	3.61
<i>Hersiliidae</i>	1	1	11	0.08
<i>Idiopidae</i>	3	3	7	0.05
<i>Linyphiidae</i>	4	4	5	0.04
<i>Lycosidae</i>	8	21	784	5.67
<i>Mimetidae</i>	1	1	4	0.03
<i>Miturgidae</i>	1	3	289	2.09
<i>Nemesiidae</i>	1	1	2	0.01
<i>Nephilidae</i>	1	1	31	0.22
<i>Oonopidae</i>	1	1	1	0.01
<i>Oxyopidae</i>	3	16	3 415	24.71
<i>Palpimanidae</i>	2	3	53	0.38
<i>Philodromidae</i>	7	12	621	4.49
<i>Pholcidae</i>	1	1	4	0.03
<i>Pisauridae</i>	5	6	232	1.68
<i>Prodidomidae</i>	1	1	9	0.07
<i>Salticidae</i>	18	29	1 056	7.64
<i>Scytodidae</i>	1	1	2	0.01
<i>Segestriidae</i>	1	1	4	0.03
<i>Selenopidae</i>	2	2	9	0.07
<i>Sparassidae</i>	3	5	25	0.18
<i>Tetragnathidae</i>	1	2	4	0.03
<i>Theraphosidae</i>	3	3	10	0.07
<i>Theridiidae</i>	9	22	778	5.63
<i>Thomisidae</i>	17	42	2 212	16.00
<i>Uloboridae</i>	2	4	42	0.30
<i>Zodariidae</i>	6	7	119	0.86
TOTAL	156	275	13 821	100

(*value excluding undetermined genera)

TABLE 2

Checklist of the spiders of the Polokwane Nature Reserve, Limpopo Province, South Africa (PW: plant wanderer; GW: ground wanderer; BD: burrow dweller; SWB: sheet-web builder; SPWB: space-web builder; OWB: orb-web builder; FWB: funnel-web builder; RWB: retreat-web builder; GWB: gumfoot-web builder; TWB: tube-web builder)

* possibly new

FAMILY	SPECIES	GUILD	FIELD TYPE
Agelenidae	<i>Agelena</i> sp. (immature)	FWB	on soil
	<i>Olorunia</i> sp. (Immature)	FWB	on soil
Amaurobiidae	<i>Pseudauximus</i> sp. (immature)	RWB	debris
Ammoxenidae	<i>Ammoxenus amphalodes</i> Dippenaar & Meyer, 1980	GW	soil
Araneidae	<i>Acanthepeira</i> sp. *	OWB	vegetation
	<i>Araneidae</i> sp. (genus undetermined)	OWB	vegetation
	<i>Araneus apricus</i> (Karsch, 1884)	OWB	vegetation
	<i>Araneus coccinella</i> Pocock, 1898	OWB	vegetation
	<i>Araneus nigroquadratus</i> Lawrence, 1937	OWB	vegetation
	<i>Araniella</i> sp. 1*	OWB	vegetation
	<i>Araniella</i> sp. 2*	OWB	vegetation
	<i>Araniella</i> sp. 3*	OWB	vegetation
	<i>Argiope aurocincta</i> Pocock, 1898	OWB	vegetation
	<i>Argiope australis</i> (Walckenaer, 1805)	OWB	vegetation
	<i>Argiope lobata</i> (Pallas, 1772)	OWB	vegetation
	<i>Argiope trifasciata</i> (Forsk., 1775)	OWB	vegetation
	<i>Argiope</i> sp. (immature)	OWB	vegetation
	<i>Caerostris sexcupidata</i> (Fabricius, 1793)	OWB	vegetation
	<i>Chorizopes</i> sp. *	OWB	vegetation
	<i>Cyclosa insulana</i> (Costa, 1834)	OWB	vegetation
	<i>Cyphalanthus larvatus</i> (Simon, 1881)	OWB	vegetation
	<i>Cyrtophora citricola</i> (Forsk., 1775)	OWB	vegetation
	<i>Gasteracantha sanguinolenta</i> C.L. Koch, 1884	OWB	vegetation
	<i>Gea infusca</i> Tullgren, 1910	OWB	vegetation
	<i>Hypsosinga lithyphantoides</i> Caporacci, 1947	OWB	vegetation
	<i>Hypsosinga</i> sp. 2	OWB	vegetation
	<i>Larinia natalensis</i> (Grasshoff, 1971)	OWB	vegetation
	<i>Lipocrea longissima</i> (Simon, 1881)	OWB	vegetation
	<i>Mahemba hewitti</i> (Lessert, 1930)	OWB	vegetation
	<i>Nemoscolus elongatus</i> Lawrence, 1947	OWB	vegetation
	<i>Nemoscolus</i> sp. 2	OWB	vegetation
	<i>Neoscona blondeli</i> (Simon, 1886)	OWB	vegetation
	<i>Neoscona moreli</i> (Vinson, 1863)	OWB	vegetation
	<i>Neoscona penicillipes</i> (Karsch, 1879)	OWB	vegetation
	<i>Neoscona quincasea</i> Roberts, 1983	OWB	vegetation
	<i>Neoscona subfusca</i> (C.L. Koch, 1837)	OWB	vegetation
	<i>Paraplectana</i> sp. 1	OWB	vegetation
	<i>Pararaneus cyrtoscapus</i> (Pocock, 1898)	OWB	vegetation
	<i>Prasonica</i> sp. 1*	OWB	vegetation
	<i>Pycnacantha tribulus</i> (Fabricius, 1781)	OWB	vegetation
	<i>Singa lawrencei</i> (Lessert, 1930)	OWB	vegetation
	<i>Singa</i> sp. 2	OWB	vegetation
	<i>Singa</i> sp. 3	OWB	vegetation
Caponiidae	<i>Caponia chelifera</i> Lessert, 1936	GW	soil
Clubionidae	<i>Clubiona abbajensis</i> Strand, 1906	PW	vegetation
	<i>Clubiona</i> sp. (immature)	PW	vegetation
Corinnidae	<i>Casteineira</i> sp. 1	GW	soil
	<i>Cetonana simoni</i> (Lawrence, 1942)	GW	soil
	<i>Copa flavoplumosa</i> Simon, 1885	GW	soil
	<i>Graptartia mutillica</i> Haddad, 2004	GW	soil
Ctenidae	<i>Ctenus</i> sp. 1	GW	soil
Cyrtachenidae	<i>Ancylotrypa brevipalpis</i> (Hewitt, 1916)	BD	burrow soil
Dictynidae	<i>Archaeodictyna</i> sp. 1	RWB	vegetation
Eresidae	<i>Dresserus colsoni</i> Tucker, 1920	RWB	soil debris
	<i>Gandanameno fumosus</i> (C.L. Koch, 1837)	RWB	tree
	<i>Stegodyphus dumicola</i> Pocock, 1898	RWB	tree

Table 2 continued . . .

FAMILY	SPECIES	GUILD	FIELD TYPE
<i>Gnaphosidae</i>	<i>Aneplasa</i> sp. 1		
	<i>Asemesthes ceresicola</i> Tucker, 1923	GW	soil
	<i>Asemesthes decoratus</i> Purcell, 1908	GW	soil
	<i>Camillina aestus</i> Tucker, 1923	GW	soil
	<i>Camillina maun</i> Platnick & Murphy, 1987	GW	soil
	<i>Camillina procurva</i> (Purcell, 1908)	GW	soil
	<i>Drassodes bechuanicus</i> Tucker, 1923	GW	soil
	<i>Drassodes solitarius</i> Purcell, 1907	GW	soil
	<i>Drassodes splendens</i> Tucker, 1923	GW	soil
	<i>Drassodes stationis</i> Tucker, 1923	GW	soil
	<i>Echemus</i> sp. 1	GW	soil
	<i>Poecilochoa</i> sp. 1	GW	soil
	<i>Scotophaeus marleyi</i> Tucker, 1923	GW	soil
	<i>Setaphis anchoralis</i> Purcell, 1908	GW	soil
	<i>Setaphis arcus</i> Tucker, 1923	GW	soil
	<i>Setaphis subtilis</i> (Simon, 1897)	GW	soil
	<i>Trachyzelotes jaxartensis</i> (Kroneberg, 1875)	GW	soil
	<i>Trephopoda hanoveria</i> Tucker, 1923	GW	soil
	<i>Upognampa parvipalpa</i> Tucker, 1923	GW	soil
	<i>Xerophaeus appendiculatus</i> Purcell, 1907	GW	soil
	<i>Xerophaeus bicavus</i> Tucker, 1923	GW	soil
	<i>Zelotes reduncus</i> (Purcell, 1907)	GW	soil
	<i>Zelotes tuckeri</i> Roewer, 1951	GW	soil
	<i>Zelotes unguis</i> Tucker, 1923	GW	soil
	<i>Zelotes</i> sp. 4	GW	soil
<i>Hersiliidae</i>	<i>Tyrotama soutpansbergensis</i> Foord & Dippenaar-Schoeman, 2005	RWB	soil
<i>Idiopidae</i>	<i>Ctenolophus fernoulheti</i> Hewitt, 1913	BD	burrow soil
	<i>Idiops monticola</i> (Hewitt, 1916)	BD	burrow soil
	<i>Idiops</i> sp. 1	BD	burrow soil
<i>Linyphiidae</i>	<i>Pelecopsis</i> sp. 1	SWB	vegetation
	<i>Meioneta</i> sp. 1	SWB	vegetation
	<i>Mecynidis</i> sp. 1	SWB	vegetation
	<i>Microlinyphia sterilis</i> (Pavesi, 1883)	SWB	vegetation
<i>Lycosidae</i>	<i>Evippomma squamulatum</i> (Simon, 1898)	GW	soil
	<i>Geolycosa</i> sp. 1	GW	soil
	<i>Lycosa</i> sp. 1	GW	soil
	<i>Lycosa</i> sp. 2	GW	soil
	<i>Hogna</i> sp. 1	GW	soil
	<i>Hogna</i> sp. 2	GW	soil
	<i>Lycosidae</i> sp. 1 (genus undetermined)	GW	soil
	<i>Lycosidae</i> sp. 2 (genus undetermined)	GW	soil
	<i>Lycosidae</i> sp. 3 (genus undetermined)	GW	soil
	<i>Lycosidae</i> sp. 4 (genus undetermined)	GW	soil
	<i>Lycosidae</i> sp. 5 (genus undetermined)	GW	soil
	<i>Lycosidae</i> sp. 6 (genus undetermined)	GW	soil
	<i>Lycosidae</i> sp. 7 (genus undetermined)	GW	soil
	<i>Pardosa leipoldti</i> Purcell, 1903	GW	soil
	<i>Pardosa</i> sp. 2	GW	soil
	<i>Pardosa</i> sp. 3	GW	soil
	<i>Pardosa</i> sp. 4	GW	soil
	<i>Proevippa wanlessi</i> (Russell-Smith, 1981)	GW	soil
	<i>Proevippa</i> sp. 2	GW	soil
	<i>Trabea purcelli</i> Roewer, 1951	GW	soil
	<i>Zenonina albocaudata</i> Lawrence, 1952	GW	soil
<i>Mimetidae</i>	<i>Ero</i> sp. 1*	PW	vegetation
<i>Miturgidae</i>	<i>Cheiracanthium africanum</i> Lessert, 1921	PW	vegetation
	<i>Cheiracanthium furculatum</i> Karsch, 1879	PW	vegetation
	<i>Cheiracanthium vansonii</i> Lawrence, 1936	PW	vegetation
<i>Nemesiidae</i>	<i>Hermacha mazoena</i> Hewitt, 1915	BD	burrow soil

Table 2 continued . . .

FAMILY	SPECIES	GUILD	FIELD TYPE
<i>Nephilidae</i>	<i>Nephila senegalensis</i> (Walckenaer, 1842)	OWB	vegetation
<i>Oonopidae</i>	<i>Gamasomorpha humicola</i> Lawrence, 1947	GW	soil
<i>Oxyopidae</i>	<i>Hamataliwa fronticornis</i> (Lessert, 1927)	PW	grass
	<i>Hamataliwa kulczynskii</i> (Lessert, 1915)	PW	grass
	<i>Hamataliwa strandi</i> Caporriacco, 1939	PW	grass
	<i>Oxyopes affinis</i> Lessert, 1915	PW	grass
	<i>Oxyopes bedoti</i> Lessert, 1915	PW	grass
	<i>Oxyopes bothai</i> Lessert, 1915	PW	grass
	<i>Oxyopes hoggi</i> Lessert, 1915	PW	grass
	<i>Oxyopes jacksoni</i> Lessert, 1915	PW	grass
	<i>Oxyopes pallidecoloratus</i> Strand, 1906	PW	grass
	<i>Oxyopes russoi</i> Caporriacco, 1940	PW	grass
	<i>Oxyopes schenkeli</i> Lessert, 1927	PW	grass
	<i>Oxyopes tuberculatus</i> Lessert, 1915	PW	grass
	<i>Oxyopes</i> sp. 10	PW	grass
	<i>Oxyopes</i> sp. 11	PW	grass
	<i>Oxyopes</i> sp. 12	PW	grass
	<i>Peucetia viridis</i> (Blackwall, 1858)	PW	grass
<i>Palpimanidae</i>	<i>Diaphorocellus biplagiatus</i> Simon, 1893	GW	soil
	<i>Palpimanus armatus</i> Pocock, 1898	GW	soil
	<i>Palpimanus transvaalicus</i> Simon, 1893	GW	soil
<i>Philodromidae</i>	<i>Ebo</i> sp. 1*	PW	grass
	<i>Gephyrota</i> sp. 1*	PW	grass
	<i>Hirriusa variegata</i> (Simon, 1895)	PW	grass
	<i>Philodromus browningi</i> Lawrence, 1952	PW	grass
	<i>Philodromus grosi</i> Lessert, 1943	PW	grass
	<i>Philodromus guineensis</i> Millot, 1942	PW	grass
	<i>Suemus punctatus</i> Lawrence, 1938	PW	grass
	<i>Thanatus dorsilineatus</i> Jézéquel, 1964	PW	grass
	<i>Thanatus</i> sp. 2	PW	grass
	<i>Tibellus gerhardi</i> Van den Berg & Dippenaar-Schoeman, 1994	PW	grass
	<i>Tibellus hollidayi</i> Lawrence, 1952	PW	grass
	<i>Tibellus minor</i> Lessert, 1919	PW	grass
<i>Pholcidae</i>	<i>Smeringopus atomarius</i> Simon, 1910	SPWB	soil
<i>Pisauridae</i>	<i>Afropisaura</i> sp. 1	PW	vegetation
	<i>Euprostenops australis</i> Simon, 1898	FWB	vegetation
	<i>Euprostenopsis vuattouxi</i> Blandin, 1977	FWB	vegetation
	<i>Maypacijs bilineatus</i> (Pavesi, 1895)	PW	vegetation
	<i>Maypacijs stuhlmanni</i> (Bösenberg & Lenz, 1895)	PW	vegetation
	<i>Rothus purpurissatus</i> Simon, 1898	PW	vegetation
<i>Prodidomidae</i>	<i>Theuma parva</i> Purcell, 1907	GW	soil
<i>Salticidae</i>	<i>Aelurillus</i> sp. 1*	GW	soil
	<i>Baryphas ahenus</i> Simon, 1902	PW	vegetation
	<i>Brancus bevisi</i> Lessert, 1925	PW	vegetation
	<i>Cosmophasis</i> sp. 1	GW	soil
	<i>Dendryphantes</i> sp. 1	PW	vegetation
	<i>Dendryphantes</i> sp. 2	PW	vegetation
	<i>Euophrys</i> sp. 1	PW	vegetation
	<i>Heliophanus debilis</i> Simon, 1901	PW	vegetation
	<i>Heliophanus demonstrativus</i> Wesolowska, 1986	PW	vegetation
	<i>Heliophanus insperatus</i> Wesolowska, 1986	PW	vegetation
	<i>Heliophanus transvaalicus</i> Simon, 1901	PW	vegetation
	<i>Hyllus treleaveni</i> Peckham & Peckham, 1902	PW	vegetation
	<i>Hyllus</i> sp.	PW	vegetation
	<i>Hyllus</i> sp. 3	PW	vegetation
	<i>Hyllus</i> sp. 4	PW	vegetation
	<i>Hyllus</i> sp. 5	PW	vegetation
	<i>Langelurillus</i> sp. 1	GW	soil

Table 2 continued . . .

FAMILY	SPECIES	GUILD	FIELD TYPE
	<i>Mogrus sp. 1</i>	PW	vegetation
	<i>Natta horizontalis</i> Karsch, 1879	GW	soil
	<i>Pellenes sp. 1</i>	PW	vegetation
	<i>Phlegra sp. 1</i>	GW	soil
	<i>Pseudicius sp. 1</i>	PW	vegetation
	<i>Rhene machadoi</i> Berland & Millot, 1941	PW	vegetation
	<i>Stenaelurillus nigricaudus</i> Simon, 1886	GW	soil
	<i>Stenaelurillus sp. 1</i>	GW	soil
	<i>Stenaelurillus sp. 2</i>	GW	soil
	<i>Stenaelurillus sp. 3</i>	GW	soil
	<i>Thyene inflata</i> (Gerstäcker, 1873)	PW	vegetation
	<i>Thyenula aurantiaca</i> (Simon, 1902)	PW	vegetation
<i>Scytodidae</i>	<i>Scytodes sp. 1</i>	GW	soil
<i>Segestriidae</i>	<i>Ariadna sp. 1</i>	TWB	soil
<i>Selenopidae</i>	<i>Anyphops sp. 1</i>	PW	tree
	<i>Selenops sp. 1</i>	PW	tree
<i>Sparassidae</i>	<i>Olios sp. 1</i>	PW	vegetation
	<i>Olios sp. 2</i>	PW	vegetation
	<i>Olios sp. 3</i>	PW	vegetation
	<i>Palystes superciliosus</i> L. Koch, 1875	PW	vegetation
	<i>Pseudomicrommata longipes</i> (Bösenberg & Lenz, 1895)	PW	vegetation
<i>Tetragnathidae</i>	<i>Leucauge decorata</i> (Blackwall, 1864)	OWB	vegetation
	<i>Leucauge festiva</i> (Blackwall, 1866)	OWB	vegetation
<i>Theraphosidae</i>	<i>Augacephalus junodi</i> (Simon, 1904)	BD	burrow soil
	<i>Brachionopus pretoriae</i> Purcell, 1904	BD	burrow soil
	<i>Harpactira sp. 1</i>	BD	burrow soil
	<i>Harpactirella sp. 1</i>	BD	burrow soil
<i>Theridiidae</i>	<i>Argyrodes convivans</i> Lawrence, 1937	GWB	webs other spiders
	<i>Argyrodes zonatus</i> (Walckenaer, 1842)	GWB	webs other spiders
	<i>Dipoena sp. 1</i>	GWB	vegetation
	<i>Enoplognatha molesta</i> O.P.-Cambridge, 1904	GWB	vegetation
	<i>Latrodectus geometricus</i> C.L.Koch, 1841	GWB	vegetation
	<i>Latrodectus renivulvatus</i> Dahl, 1902	GWB	vegetation
	<i>Phoroncidia eburnea</i> (Simon, 1895)	GWB	vegetation
	<i>Steatoda sp. 1</i>	GWB	soil
	<i>Theridiidae sp. 1</i> (genus undetermined)	GWB	vegetation
	<i>Theridiidae sp. 2</i> (genus undetermined)	GWB	Vegetation
	<i>Theridiidae sp. 3</i> (genus undetermined)	GWB	vegetation
	<i>Theridiidae sp. 4</i> (genus undetermined)	GWB	vegetation
	<i>Theridiidae sp. 5</i> (genus undetermined)	GWB	vegetation
	<i>Theridion purcelli</i> O.P.-Cambridge, 1904	GWB	vegetation
	<i>Theridion sp. 2</i>	GWB	vegetation
	<i>Theridion sp. 3</i>	GWB	vegetation
	<i>Theridion sp. 4</i>	GWB	vegetation
	<i>Theridion sp. 5</i>	GWB	vegetation
	<i>Theridion sp. 6</i>	GWB	vegetation
	<i>Theridion sp. 7</i>	GWB	vegetation
	<i>Theridion sp. 8</i>	GWB	vegetation
	<i>Tidarren sp. 1</i>	GWB	vegetation
<i>Thomisidae</i>	<i>Avelis hystriculus</i> Simon, 1895	PW	vegetation
	<i>Camaricus nigrotesselatus</i> Simon, 1895	PW	vegetation
	<i>Heriaeus crassispinus</i> Lawrence, 1942	PW	grass
	<i>Heriaeus transvaalicus</i> Simon, 1895	PW	grass
	<i>Hewittia gracilis</i> Lessert, 1928	PW	grass
	<i>Misumenops rubrodecoratus</i> Millot, 1942	PW	grass
	<i>Monaeses austrinus</i> Simon, 1910	PW	tree
	<i>Monaeses fuscus</i> Dippenaar-Schoeman, 1984	PW	tree
	<i>Monaeses gibbus</i> Dippenaar-Schoeman 1984	PW	tree
	<i>Monaeses paradoxus</i> (Lucas, 1846)	PW	tree

Table 2 continued . . .

FAMILY	SPECIES	GUILD	FIELD TYPE
	<i>Monaeses pustulosus</i> Pavesi, 1895	PW	tree
	<i>Monaeses quadrituberculatus</i> Lawrence, 1927	PW	tree
	<i>Oxytate argenteooculata</i> (Simon, 1886)	PW	tree
	<i>Ozyptila</i> sp. 1	PW	soil
	<i>Pactactes trimaculatus</i> Simon, 1895	PW	soil
	<i>Pherecydes tuberculatus</i> O.P.-Cambridge, 1883	PW	tree
	<i>Pherecydes</i> sp. 2	PW	tree
	<i>Runcinia aethiops</i> (Simon, 1901)	PW	grass
	<i>Runcinia affinis</i> Simon, 1897	PW	grass
	<i>Runcinia erythrina</i> Jézéquel, 1964	PW	grass
	<i>Runcinia flavida</i> (Simon, 1881)	PW	grass
	<i>Stiphropus affinis</i> Lessert, 1923	PW	soil
	<i>Synema decens</i> (Karsch, 1878)	PW	vegetation
	<i>Synema diana</i> (Audouin, 1826)	PW	vegetation
	<i>Synema imitator</i> (Pavesi, 1883)	PW	vegetation
	<i>Synema nigrotibiale</i> Lessert, 1919	PW	vegetation
	<i>Thomisops sulcatus</i> Simon, 1895	PW	vegetation
	<i>Thomisus blandus</i> Karsch, 1880	PW	grass
	<i>Thomisus citrinellus</i> Simon, 1875	PW	grass
	<i>Thomisus congoensis</i> Comellini, 1957	PW	grass
	<i>Thomisus granulatus</i> Karsch, 1880	PW	grass
	<i>Thomisus kalaharinus</i> Lawrence, 1936	PW	grass
	<i>Thomisus scrupeus</i> (Simon, 1886)	PW	grass
	<i>Thomisus stenningi</i> Pocock, 1900	PW	grass
	<i>Tmarus africanus</i> Lessert, 1919	PW	grass
	<i>Tmarus cameliformis</i> Millot, 1942	PW	grass
	<i>Tmarus cancellatus</i> Thorell, 1899	PW	grass
	<i>Tmarus comellini</i> Garcia-Neto, 1989	PW	grass
	<i>Tmarus foliatus</i> Lessert, 1928	PW	grass
	<i>Tmarus longicaudatus</i> Millot, 1941	PW	grass
	<i>Tmarus</i> sp. 7	PW	grass
	<i>Xysticus fagei</i> Lessert, 1919	GW	soil
<i>Uloboridae</i>	<i>Miagrammopes longicaudus</i> O.P.-Cambridge, 1882	OWB	vegetation
	<i>Uloborus plumipes</i> Lucas, 1846	OWB	vegetation
	<i>Uloborus</i> sp. 2	OWB	vegetation
	<i>Uloborus</i> sp. 3	OWB	vegetation
<i>Zodariidae</i>	<i>Capheris decorata</i> Simon, 1904	GW	soil
	<i>Chariobas cylindraceus</i> Simon, 1893	GW	soil
	<i>Cydrela</i> sp. 1	GW	soil
	<i>Dioreas auricula</i> Tucker, 1920	GW	soil
	<i>Dioreas</i> sp. 2	GW	soil
	<i>Psammoduon</i> sp. 1	GW	soil
	<i>Ranops</i> sp. 1	GW	soil

other surveys undertaken in the Savanna Biome. In the Makalali Private Game Reserve, 4 832 spiders were caught over a year represented by 38 families and 268 species (Whitmore *et al.* 2001); at Lajuma in the Western Soutpansberg 127 species were caught that represented 46 families (Foord *et al.* 2002); on Sovenga Hill in the Polokwane district 793 spiders were caught representing 29 families and 76 species (Modiba *et al.* 2005). In the Kruger National Park, 152 species from 40 families were recorded (Dippenaar-Schoeman & Leroy 2003). The survey of the Ndumo Game Reserve reported the highest spider diversity from any protected area in South Africa so far with 46 families and 431 species (Haddad *et al.* 2006).

The most diverse families collected at the PNR were the Thomisidae (42 spp.), representing 15.3% of the total number of species sampled, followed by the Araneidae (39 spp.; 14.2%) and the Salticidae (29 spp.; 10.5%) (see Table 1). Sixteen families were represented by a single species only. At Rooideplaas Dam Nature Reserve and Lajuma, the Thomisidae were also the most diverse with 25 and 15 species respectively, while at Ndumo Nature Reserve, the Salticidae were the most diverse with 82

species. The total spider diversity (275 spp.) represents 13.75% of the species of South African spiders (2 000 spp.), presently protected in the Polokwane Nature Reserve.

The vast majority of the spiders (191 spp.) collected were wanderers (69.5%), with web builders (84 spp.) contributing 30.5% (see Table 2). This follows the reported pattern for species of the Savanna Biome. At Ndumo Game Reserve, 75.9% were wanderers, with web builders contributing 24.1% of the species (Haddad *et al.* 2006). At Makalali Private Game Reserve, the most abundant spiders collected were also wanderers (59%), with web builders contributing 41% (Whitmore *et al.* 2002), while on Sovenga Hill, 64.9% of species were wanderers while the web builders only contributed 35.1% (Modiba *et al.* 2005). Similar results were found in the Western Soutpansberg with 64% of collected species being wanderers and 36% web builders (Foord *et al.* 2002).

Most of the Mygalomorphae spiders are protected due to the pet trade and it is important that species are protected in reserves. According to Dippenaar-Schoeman (2002b), there are 14 species of Mygalomorphae occurring in the Limpopo

TABLE 3
Checklist of the mygalomorphs of the Polokwane Nature Reserve, Limpopo Province, South Africa

FAMILY	SPECIES
Cyrtacheeniidae	<i>Ancylotrypa brevipalpis</i> (Hewitt, 1916)
Idiopidae	<i>Idiops</i> sp. <i>Ctenolophus fernoulheti</i> Hewitt, 1913 <i>Segregara monticola</i> (Hewitt, 1916)
Nemesiidae	<i>Hermacha mazoena</i> Hewitt, 1915
Theraphosidae	<i>Augacephalus junodi</i> (Simon, 1904) <i>Brachionopus pretoriae</i> Purcell, 1904 <i>Harpactira</i> sp. <i>Harpactirella</i> sp.

Province. Only one of the previously recorded species (i.e. *Augacephalus junodi* (Simon, 1904)) was encountered during the study period. However, eight additional mygalomorph species (see Table 3) have been collected: *Ancylotrypa brevipalpis* (Hewitt, 1916), *Brachionopus pretoriae* Purcell, 1904, *Ctenolophus fernoulheti* Hewitt, 1913, *Segregara monticola* (Hewitt, 1916), *Hermacha mazoena* Hewitt, 1915, *Idiops* sp., *Harpactira* sp. and *Harpactirella* sp. All of the above-mentioned species are burrow dwelling. These species are all new geographical records for the province.

CONCLUSION

Considering the duration of the current study (one year) and the large number of specimens caught (13 821), it may be expected that the study provides a good representation of families occurring in the Polokwane Nature Reserve and that an extension of the study will probably increase the number of genera and species, but will probably not increase the number of families significantly. All the reported families and species are new geographical records for the Polokwane Nature Reserve.

The large number of species (97) that could not be identified emphasises the taxonomic impediment of invertebrates in South Africa. During this study, nine possible new species were collected, and several genera were collected in South Africa for the first time. Additionally, the study provided new information on the distribution of all species concerned and provides material that can be used in future taxonomic work. This highlights the important contribution that the SANSA initiative makes to a better knowledge of the diversity of arachnids in South Africa, especially in conserved areas.

ACKNOWLEDGEMENTS

We thank the NRF (Thuthuka programme) and the University of Limpopo (Research Development and Administration) for financial aid that supported this work; the Polokwane Municipality for allowing the study on their property; the Rotary Club (Polokwane) for allowing two of the authors to stay at the Education Centre for the duration of field work and for supplying additional accommodation together with Wood Worx; Die Drift Instant Lawn for sponsorship of a bicycle trailer and Saloojee Cycle Works for discount on bicycle repairs. Additionally we thank the University of Limpopo for provision

of facilities and equipment; Ms B.P. Jordaan (Department of Biodiversity) for spending a lot of time assisting and organising to accommodate our needs in order to successfully complete the study; Ms A. van den Berg (ARC Plant Protection Research Institute) for her assistance with the family identification of specimens; and Mr C. Haddad (University of the Free State) for the identification of the Corinnidae specimens.

REFERENCES

- Dippenaar-Schoeman, A.S. 2002a. *Status of South African Arachnida fauna*. Proceedings of the symposium on the status of South African species organised by the Endangered Wildlife Trust (EWT) of South Africa. Rosebank. 4 - 7 September 2002.
- Dippenaar-Schoeman, A.S. 2002b. *Baboon and trapdoor spiders of Southern Africa: an identification manual*. Plant Protection Research Institute Handbook no. 13. Pretoria, Agricultural Research Council.
- Dippenaar-Schoeman, A.S. & Craemer, C. 2000. The South African National Survey of Arachnida (SANSA). *Plant Protection News* 56: 11–12.
- Dippenaar-Schoeman, A.S. & Jocqué, R. 1997. *African spiders, an identification manual*. Plant Protection Research Institute Handbook no. 9. Pretoria, Agricultural Research Council.
- Dippenaar-Schoeman, A.S. & Leroy, A. 2003. A check list of the spiders of the Kruger National Park, South Africa (Arachnida: Araneae). *Koedoe* 46: 91–100.
- Dippenaar-Schoeman, A.S., Van den Berg, A. & Van den Berg, A.M. 1989. Species composition and relative seasonal abundance of spiders from the field and tree layers of the Roodeplaat Dam Nature Reserve. *Koedoe* 32: 25–38.
- Food, S.H., Dippenaar-Schoeman, A.S. & Van der Merwe, M. 2002. A checklist of the spider fauna of the Western Soutpansberg, South Africa (Arachnida: Araneae). *Koedoe* 45: 35–43.
- Haddad, C.R., Dippenaar-Schoeman, A.S. & Wesolowska, W. 2006. A checklist of the non-acarine arachnids (Chelicerate: Arachnida) of the Ndumo Game Reserve, Maputaland, South Africa. *Koedoe* 49: 1–22.
- Low, A.B. & Rebelo, A.G. (eds). 1996. *Vegetation of South Africa, Lesotho and Swaziland*. Pretoria, Department of Environmental Affairs and Tourism.
- Myers, N. 1990. The biodiversity challenge: expanded hot-spot analysis. *The Environmentalist* 10: 243–255.
- Modiba, M.A., Dippenaar, S.M. & Dippenaar-Schoeman, A.S. 2005. A checklist of spiders from Sovenga Hill, an inselberg in the Savanna Biome, Limpopo Province, South Africa (Arachnida: Araneae). *Koedoe* 48: 109–115.
- Mucina, L. & Rutherford, M.C. (eds). 2006. The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. Pretoria, South African Biodiversity Institute.
- Mucina, L., Rutherford, M.C. & Powrie, L.W. 2005. *Vegetation map of South Africa, Lesotho and Swaziland*. South Africa National Biodiversity Institute (SANBI), Kirstenbosch Research Centre.
- Whitmore, C., Slotow, R., Crouch, T.E. & Dippenaar-Schoeman, A.S. 2001. Checklist of spiders (Araneae) from a Savanna ecosystem, Northern Province, South Africa: including a new family record. *Durban Museum Novitates* 26: 10–19.
- Whitmore, C., Slotow, R., Crouch, T.E. & Dippenaar-Schoeman, A.S. 2002. Diversity of spiders (Araneae) in a Savanna Reserve, Northern Province, South Africa. *Journal of Arachnology* 30: 344–356.