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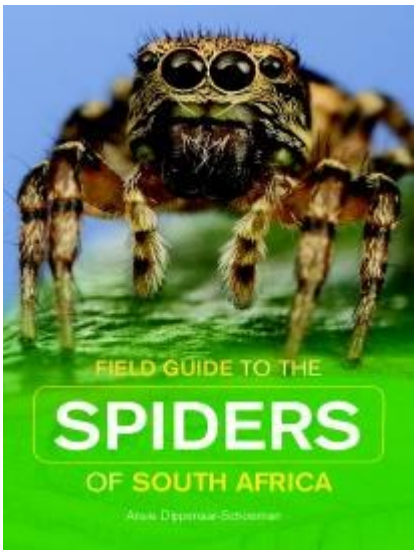
SOUTH AFRICAN NATIONAL SURVEY OF ARACHNIDA

SANSA NEWSLETTER

Sansa news 39

THE FIELD GUIDE TO THE SPIDERS OF SOUTH AFRICA TO BE REVISED



Penguin Random House Publishers have offered to reprint the field guide that has already been out of print for some time.

South Africa has a rich spider fauna and presently 72 families represented by 2270 species are known from the country. Consequently, it is impossible to capture all 2270 species in one book, representative genera and species were chosen to give the reader a broad view of the South African spider diversity, and to enable the observer to identify the more common spiders they may encounter in the field, and in and around their houses. This revised Spider Guide is the most comprehensive to date for South African spiders, and provides the latest information on all 72 spider families, with representatives of 396 genera and 878 species. South African spider systematics are still evolving and changing, and with each new publication new taxonomic data becomes available. Since the publication of the first guide in 2014, the following families have now been recognized and newly added: Bemmeridae, Entypesidae, Euagridae, Ischnothelidae, Pycnothelidae, Stasimopidae, Cheiracanthiidae and Trachelidae, while family names like Chummidae, Prodidomidae and Nephilidae have been synonymized with other families. The same has happened with genera, where new genera were added, others transferred to other families, and in several the generic names were changed.

The images of dead spiders that were included in the previous edition were replaced with images of living spiders. I am grateful to all the photographers that have shared their images with me - without their contributions this would have been impossible. However, there are still several spider genera that have not yet been photographed, e.g. the Anapidae and *Rastellus* of the Ammoxenidae.

To get a complete view of all the South African spiders, the online "Spider Identification Guides" need to be consulted. In the guides, information for all species in the country are provided. These guides are free and can be requested from the author.

INSIDE THIS ISSUE:

Editors

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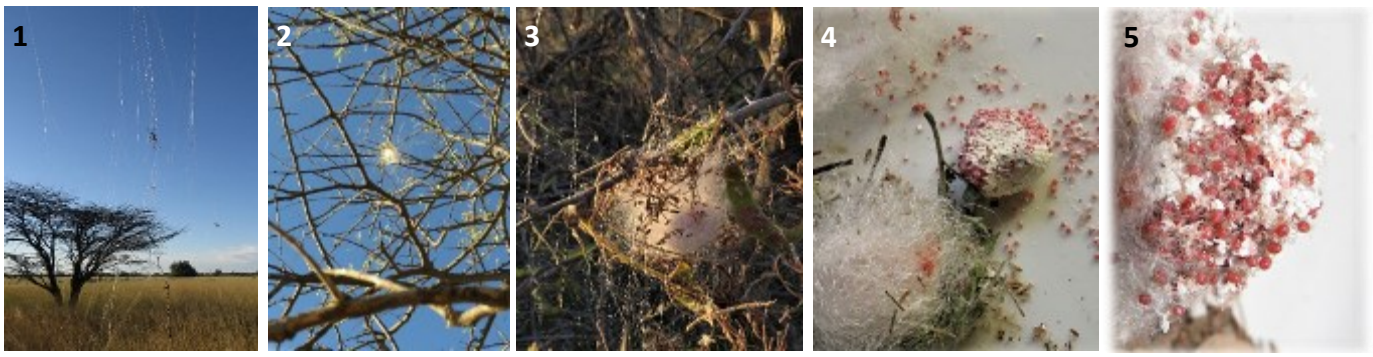
MORE ON THE EGG SACS ORB-WEB SPIDERS

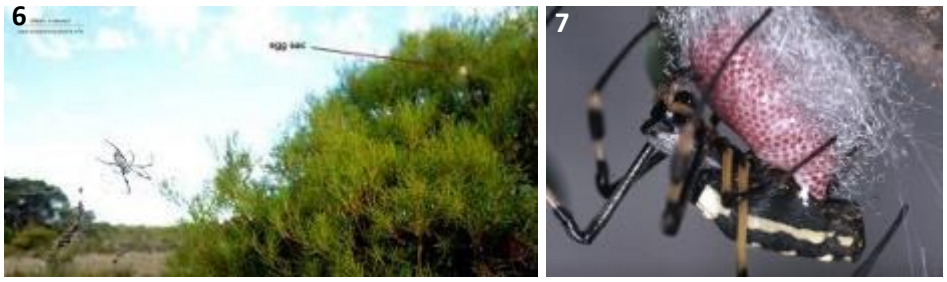
FIRST QUERY FROM ANKA EICHHOFF FROM NAMIBIA – COULD THIS BE A *TRICHONEPHILA* EGG SAC?

Between vlei grass and the outer twigs of an *Albizia anthelmintica* tree there was a big *Trichonephila senegalensis* web (Fig. 1). It took me some time to find the egg cocoon, which was quite far away from the actual web high up in the tree (Fig. 2). It looks like a little ball of loose cottonwool. On a sickle bush I saw two silken balls (similar to the one in the *Albizia*) hidden behind dry leaves and pods. The silk ball had a red tint (Fig. 3). Inside the strong shiny silk cover was a ball consisting of many little red eggs. The eggs were held together by a white substance forming a very thin, now dry, layer. Several eggs broke loose (Fig. 4). I kept the egg balls in an empty jam bottle in the warm kitchen. After some time I had a look at the glass again and observed movement between the silk strands; all the eggs had hatched. The spiderlings have a red abdomen and light brown carapace (Fig. 5).

ANKA EICHHOFF (anka.eichhoff@gmail.com)



Editor: We searched the internet and asked around, but apparently little is known about *Trichonephila* egg sacs. Only one image was found showing the egg sac in a tree (Fig. 6). Going through photographs from the SANSA Virtual Museum, we found two photos taken by the late Boeta Fourie, showing the egg-laying process of *Trichonephila senegalensis*, similarly showing the red eggs (Fig. 7).



SECOND QUERY CAME FROM HUGH HERON

On 21st July I came across a bright yellow spider cocoon in low growth (under 1m) bordering a flowerbed (they have also been seen in creepers over walls in the past). Do you recognize it at all? I collected it and have held it in a container (colour has faded considerably) in the hope that I could see the spiderlings, but no joy … instead just over a dozen Phoridae flies emerged. This got my attention, because many years ago (April 1988) I found an *Argiope* egg-cocoon that was similarly parasitised. See "Argiope eggs fall victim to parasitic Phoridae" in Spider Club News 5(2): 7-9 (1990). To the best of my knowledge this is only the second occasion that this has been recorded for local spiders: hence my query as to the identity of the cocoon. HUGH HERON (hughheronescombe@gmail.com)

Unknown spider cocoon on ventral leaf surface of *Sphagneticola trilobata* (Linnaeus) Pruski (Asteraceae). Front garden flowerbed, Escombe (21st July, 2021).

THIRD QUERY CAME FROM RENATA KRUYSWIJK

Renata took a video of this *Zelotes* sp. in Hermanus making her egg sac. The last photo was by Vida vd Walt showing the colour of the finished egg sac.

Editor: Species identified as *Zelotes invidus* (Purcell, 1907)

THE MYSTERIOUS GREEN THERIDIID SPIDER

The following notes and photographs were received from Anne Metcalf (metcalfp@tiscali.co.za) from KwaZulu-Natal. "These beautiful spiders were found in my garden. The spiders have transparent green bodies. Note the black spots on the abdomen and a ring of black spots around the margin of the cephalothorax. A male/female pair were observed on opposite ends of a single leaf. The pair came together in a flurry of legs and bodies twice for a few seconds in the center of the leaf. I wondered whether this was a courtship display. The egg sac with about 20 eggs is covered with a thin silk layer and deposited on the leaf. At one stage she moved the egg sac around. The spiderlings emerged and stayed in the vicinity of the female and egg sac. They were observed feeding on an insect but scuttling back to the vicinity of their egg sac when disturbed by the camera flash."
CONTACT : metcalfp@tiscali.co.za

Female in dorsal and lateral views

A male (left) and a female (right) found together under a *Dombeya* leaf

Female

A female with her egg sac

A female and her spiderlings

Male

Spiderlings at different stages of development

Spiderlings feeding on insect prey on the leaf surface

CONTINUED ON NEXT PAGE

EDITORS: We have received several photographs of these long-bodied green spiders. The photo on the right is from Vernon Crookes Nature Reserve, which was taken by Rudi Steenkamp.

Working through the "The Theridiidae (Araneae) of the World" of Vanuytven (2021), the closest genus where they may fit in is *Chrysso*. However, no species have been recorded from the Afrotropical Region yet.

What is **very important** is that specimens must not only be photographed, but also collected for further studies.

Female from Vernon Crookes (Photo: Rudi Steenkamp)

STUDENT PROJECT: SPIDERS AS PREDATORS AND FOOD IN MACADAMIA ORCHARDS

Agriculture dominates land use changes globally, and has an enormous impact on spider diversity, e.g. it is listed as the biggest threat to SA's national red list of spiders. Agriculture also facilitates invasion by exotic spiders. Spiders are pivotal in these systems, not only providing pest control services, but also providing food for other predators. The Chair in Biodiversity Value and Change at the University of Venda recently set up an exclusion experiment (Fig. 1) to quantify the impact of birds and bats on macadamia nut production. South Africa is currently the biggest producer of Macadamia nuts globally and the industry is growing exponentially.

These exclusion experiments also gave us the opportunity to see how spiders respond to predation by birds and bats. Treatments consisted of cages closed up with wire mesh, preventing birds and bats from entering, but allowing macroinvertebrates to enter. These cages were maintained for two years, and as part of an honours project in the chair by Shaun Manzini, we fogged (Fig. 2) trees inside and outside the cages and in the adjacent natural vegetation at the end of the experiment. Cages were set up across ten farms along an elevational transect and include treatments and control sites on the edge and inside the orchard.

Figure 1. Exclusion cages in Macadamia orchards.

Preliminary results suggest that spiders are often the dominant invertebrate group in these orchards, often even more abundant than ants. Their numbers increased in the cages, pointing to the importance of spiders as prey for bats and birds. Large female orb-weavers such as *Gasteracantha* and *Trichonephila fenestrata* were also only present within the cages. Salticidae, Clubionidae, Sparassidae and Cheiracanthiidae dominated, while there were very few web-dwelling spiders such as Theridiidae, a dominant family in the surrounding landscape of the Soutpansberg. Ultimately, there is also a strong relationship between spider diversity/abundance and the management practices on farms. One of the farms does not spray any insecticides, and as expected, it has a diverse and large spider community. The next step is to relate invertebrate diversity, and that of spiders in particular, to macadamia nut yield and quality at these sites. Cursory inspection of results points to factors other than pesticide application, and spiders could play a key role explaining the differences observed.

Figure 2. Fogging of control plots inside the orchard.

This project is funded by the NRF under the SARChI chair in Biodiversity and Value and the DFG (German Research Foundation) as part of the SALLnet research project. https://www.uni-goettingen.de/en/592566.html

PROJECT LEADER: Stefan Foord
Student: Shaun Manzini

BIOLOGY AND BEHAVIOUR OF SYMPATRIC SOUTH AFRICAN *HELIOPHANUS* SPIDERS

South Africa has a rich diversity of jumping spiders, with more than 350 species described so far. *Heliophanus* is one of the most species-rich genera in the world, with almost 170 species described to date, of which the majority were described from Africa. South Africa has a particularly rich fauna, with 40 species recorded from the country so far. Unfortunately, very little is known about the biology and behaviour of most of them, with the exception of an agrobiont species from pistachio orchards (*H. pistaciae*) and a termitophagous species (*H. termitophagus*).

Unsurprisingly, there are many sites in South Africa where a considerable number of species occur in sympatry (i.e. together at the same site), e.g. 11 species from Ndumo Game Reserve, eight species from the Free State National Botanical Gardens (FSNBG), or seven species from the Erfenis Dam Nature Reserve. This raises questions regarding the isolation mechanisms that these sympatric species use to ensure sexual isolation: are they behavioural, physiological, temporal or morphological, or combinations of these?

During June 2021, Dr Michael Vickers joined the Arachnid Systematics and Ecology group at the University of the Free State, where he will spend two years on a post-doctoral study investigating various aspects of the reproductive biology of grassland *Heliophanus* species from central South Africa. He recently completed his Ph.D study at the University of Florida, with a dissertation titled "Predator Psychology and Responses to Aposematic Signals in Jumping Spiders."

The purpose of Mike's postdoctoral study is to understand the role that elaborate ornamentations (e.g., bright colours) and visual displays (e.g., mating dances) play in shaping mate preference, which is still elusive despite over 150 years of research efforts. Biologists are still trying to understand complex patterns in nature, which occasionally challenge our current understanding of how mate preferences are shaped. How do females perceive, process, and act upon colouration and ornamentation in potential mates? Do males use ornamentation and colouration as signals to increase their chances of mating? Therefore, Mike has proposed to study a genus of jumping spiders (*Heliophanus*) where males use vibrant and energetic courtship displays. Specifically, he will study *Heliophanus* found in the grassland habitat at Bloemfontein in central South Africa (Fig. 1), to tease apart the intricacies of how their colouration and ornamentation may be used to court females.

In this novel research plan, he aims to address the main question of how individuals of six of the eight sympatric species in the genus *Heliophanus* (smaller species in the subgenera *Helafricanus* and *Heliocapensis*) respond to encounters with both con- and heterospecifics of the opposite sex. Five of the six species are strongly sexually dimorphic, with males black with white markings (e.g. Fig. 2) and females brown or grey with blackish markings (Fig. 3). In order to address this question, he will 1) use descriptive information, scanning electron microscopy, and spectrophotometry to identify distinct markings or scale patterns/structures in each of the sympatric species that aid in species recognition; 2) record, quantify, and analyze male visual displays during courtship, and corresponding hetero- and conspecific female responses, in both field observations and laboratory trials; and 3) use DNA barcoding to successfully match the sexes of sympatric species, specifically to assess whether observed behaviours support current taxonomic knowledge in these spiders.

This research is a great starting point for future work on the behavioural and physiological aspects of species recognition. It is hoped this work might stimulate African researchers to understand the processes and protocols necessary to study spider behaviour more intensively in the future. When considering the incredible biodiversity of jumping spiders in the Afrotropical Region, this would provide the tools to investigate several lineages unique to the continent.

Figure 1. The open grassland and hillside woodland at the Free State National Botanical Gardens (Photo: C. Haddad).

Figure 2. Male *Heliophanus pistaciae* from Amanzi Private Game Reserve (Photo: C. Haddad).

Figure 3. Female *Heliophanus nanus* from Erfenis Dam Nature Reserve (Photo: C. Haddad).

PRESENT STATUS OF THE ENTYPESIDAE IN SOUTH AFRICA

Dr Duinesky Rios-Tamayo from CONICET – The National Scientific and Technical Research Council in Argentina – visited the National Collection of Arachnida at the ARC during 2018, on a CONICET post-doctoral scholarship. During that time, he revised the Entypesidae and published three scientific papers with other arachnologists. To summarize, they described a new genus *Afropesa* and revalidated two genera, *Brachytheliscus* and *Hermochola*; nine new species were described. The present species list for South African Entypesidae includes the following species:

Afropesa Zonstein & Ríos-Tamayo, 2021

- *Afropesa gauteng* Zonstein & Ríos-Tamayo, 2021
- *Afropesa schoutedeni* Benoit, 1965
- *Afropesa schwendingeri* Zonstein & Ríos-Tamayo, 2021

Brachytheliscus Pocock, 1902 (revalidated)

- *Brachytheliscus bicolor* Pocock, 1897

Hermacha Simon, 1889

- *Hermacha brevicauda* Purcell, 1903
- *Hermacha curvipes* Purcell, 1902 (*incertae sedis*)
- *Hermacha evanescens* Purcell, 1903
- *Hermacha fulva* Tucker, 1917
- *Hermacha lanata* Purcell, 1902
- *Hermacha maraisae* Ríos-Tamayo, Engelbrecht & Goloboff, 2021
- *Hermacha mazoena* Hewitt, 1915
- *Hermacha montana* Ríos-Tamayo, Engelbrecht & Goloboff, 2021
- *Hermacha nigra* Tucker, 1917 (*incertae sedis*)
- *Hermacha nigrispinosa* Tucker, 1917
- *Hermacha purcelli* (Simon, 1903)
- *Hermacha septemtrionalis* Ríos-Tamayo, Engelbrecht & Goloboff, 2021
- *Hermacha sericea* Purcell, 1902
- *Hermacha tuckeri* Raven, 1985

Hermachola Hewitt, 1915 (revalidated)

- *Hermachola capensis* (Ausserer, 1871)
- *Hermachola crudeni* (Hewitt, 1913)
- *Hermachola lyleae* Ríos-Tamayo, Engelbrecht & Goloboff, 2021

Lepthercus Purcell, 1902

- *Lepthercus confusus* Ríos-Tamayo & Lyle, 2020
- *Lepthercus dippenaarae* Ríos-Tamayo & Lyle, 2020
- *Lepthercus dregei* Purcell, 1902
- *Lepthercus engelbrechti* Ríos-Tamayo & Lyle, 2020
- *Lepthercus haddadi* Ríos-Tamayo & Lyle, 2020
- *Lepthercus filmeri* Ríos-Tamayo & Lyle, 2020
- *Lepthercus kwazuluensis* Ríos-Tamayo & Lyle, 2020
- *Lepthercus lawrencei* Ríos-Tamayo & Lyle, 2020
- *Lepthercus mandelai* Ríos-Tamayo & Lyle, 2020
- *Lepthercus rattrayi* Hewitt, 1917
- *Lepthercus sofiae* Ríos-Tamayo & Lyle, 2020

Dr Duinesky Rios-Tamayo

Some species are burrowers, constructing distinctive vertical or Y-shaped burrows with an open, circular burrow entrance. Others make messy silken retreats under rocks. Some species are recorded from the arid Nama Karoo and Succulent Karoo biomes. The genera have never been revised and species level relationships have never been assessed. In some areas, entypesids can be among the most abundant species, with large numbers of males being recorded from pitfall trap studies of general arthropod diversity. The recent conservation assessment based on the IUCN Red List criteria highlighted the shortcomings of our current knowledge of the group, with most species qualifying for Data Deficient status.

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RÍOS-TAMAYO, D. & LYLE, R. 2020. The South African genus *Lepthercus* Purcell, 1902 (Araneae: Mygalomorphae): phylogeny and taxonomy. *Zootaxa* **4766**: 261-305.

ZONSTEIN, S.L. & RÍOS-TAMAYO, D. 2021. *Afropesa*, a new spider genus from South Africa (Araneae: Entypesidae). *Israel Journal of Entomology* **51**: 7-34.

Hermacha sp. (Photo: P. Webb)

RECENT PUBLICATIONS

BIRD, T.L., VAN RENSBURG, R. & DIPPENAAR-SCHOEMAN, A.S. 2021. Medically important spider bites in southern Africa. *South African General Practitioner* **2**: 112–117.

CHIKOWORE, G., MARTIN, G.D. & CHIDAWANYIKA, F. 2021. An assessment of the invasive alien tree, *Robinia pseudoacacia* canopy traits and its effect on grassland microclimates and subsequent arthropod assemblages. *Journal of Insect Conservation* **25**: 429–439.

DU PLESSIS, C.E. & REUTER, H. 2021. Cytotoxic spider bites – cases of mistaken identity. *South African General Practitioner* **2**: 137–142.

LISSOWSKY, N., KRALJ-FIŠER, S. & SCHNEIDER, J.M. 2021. Giant and dwarf females: how to explain the fourfold variation in body size and fecundity in *Trichonephila senegalensis* (Aranea: Nephilidae). *Biological Journal of the Linnean Society* **133**: 1016–1030.

MICHÁLEK, O., PEKÁR, S. & HADDAD, C.R. 2021. Fundamental trophic niche of two prey-specialized jumping spiders, *Cyrba algerina* and *Heliophanus termitophagus* (Araneae: Salticidae). *Journal of Arachnology* **49**: 268–271.

NYFFELER, M. & GIBBONS, J.W. 2021. Spiders (Arachnida: Araneae) feeding on snakes (Reptilia: Squamata). *Journal of Arachnology* **49**: 1–27.

RÍOS-TAMAYO, D., ENGELBRECHT, I. & GOLOBOFF, P.A. 2021. A revision of the genus *Hermacha* Simon, 1889 (Mygalomorphae: Entypesidae), in southern Africa with revalidation of *Hermachola* Hewitt, 1915, and *Brachytheliscus* Pocock, 1902. *American Museum Novitates* **3977**: 1–80.

Zannie van der Walt

We received the sad news that Zannie van der Walt recently died after Covid complications. Zannie was one of the first people stationed in a nature reserve to contact us and offering to collect Arachnida for the South African National Survey of Arachnida (SANSA). He was stationed at the Swartberg Nature Reserve (SNR) situated in the Large Swartberg mountain range, in the Oudtshoorn district of the Western Cape Province. He collected spiders from the reserve over a 10-year period, which was one of the inventory projects of SANSA for spiders of the Succulent Karoo and Fynbos Biomes. In a paper (Dippenaar-Schoeman *et al.* 2005), a total of 45 families comprising 136 genera and 186 species were listed from the reserve. The material collected in the SNR formed part of revisionary studies for several genera. The SNR is the type locality for *Tyrotama abyssus* Foord & Dippenaar-Schoeman, 2005 (Hersiliidae). A Thomisidae species was named after Zannie (*Heriaeus zanii* Van Niekerk & Dippenaar-Schoeman 2013) in recognition of his contribution to spider research in the Western Cape.

REFERENCE: DIPPENAAR-SCHOEMAN, A.S., VAN DER WALT, A.E., DE JAGER, M., LE ROUX, E. & VAN DEN BERG, A. 2005. The spiders of the Swartberg Nature Reserve in South Africa (Arachnida: Araneae). *Koedoe* **48**: 77–86.

PROBLEM SOLVED?

SANSA NEWS No 28 JAN APRIL 2017

Richard McKibbin sent us these pictures of a spider photographed at Hammanskraal. Unfortunately the specimen of this "first seen spider" was not sampled. A search party tried to recollect it but was unfortunately not successful.

While working on the Identification guides I came across the following drawing of the species ***Araneus tatianae*** from the Congo.

Araneus tatianae Lessert, 1938 |Congo
Araneus tatianae Lessert, 1938: 449, f. 35(Df).

A review of the spider species *Cheiracanthium furculatum* (Araneae: Cheiracanthiidae)

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ABSTRACT

Cheiracanthium furculatum is an African species described by Karsch (1879) from Gabon. It occurs widely throughout Africa, and was introduced in several European countries. They are free-running plant-dwellers that play an important role in agroecosystems. In southern Africa they are very commonly found in houses, where they come into contact with humans and deliver bites at night. Unfortunately, misinformation on the species is circulating widely, particularly causing problems concerning their medical importance. Detailed information on their morphology, behaviour, distribution, and medical and environmental importance is provided.

Key words: agroecosystem, grapes, medical importance, South African National Survey of Arachnida (SANSA), synanthropic, yellow sac spider

INTRODUCTION

The genus *Cheiracanthium* C.L. Koch, 1839 is widely known, with 214 species globally (World Spider Catalog 2021). From the Afrotropical Region 19 species are recognized. They are known as yellow or long-legged sac spiders, due to the sac-like retreats they build. In this paper, we focus on the species *C. furculatum* Karsch, 1879, which is widespread throughout Africa, Madagascar and the Comoros, and the Cape Verde Islands.

Cheiracanthium furculatum is one of the best sampled and studied spider species in southern Africa. This includes their medical and environmental importance. Unfortunately, misinformation on the species is circulating widely, causing problems about their medical importance and accurate diagnosis of bites (Du Plessis & Reuter 2021). In this paper, we provide detailed information on the morphology, behaviour, distribution, and medical and environmental importance of this particular species.

Data obtained over a period of 50 years were used. The three authors were all involved with museum collections. Primary data sampled with the specimens contains valuable information on their distribution and general behaviour. The authors were are also involved in the South African National Survey of Arachnida (SANSA) (Foord *et al.* 2011; Dippenaar-Schoeman *et al.* 2015). Through SANSA, the First Spider Atlas (Dippenaar-Schoeman *et al.* 2011) and First Spider Red List (Foord *et al.* 2020) have been compiled. As part of SANSA, a Virtual Museum was developed to document the photographs submitted by the public. It presently contains >4000 images submitted by >100 photographers (Dippenaar-Schoeman *et al.* 2012).

TAXONOMY

The genus *Cheiracanthium* was first placed in the Clubionidae, but it was transferred to the Miturgidae by Ramírez (1997) and then to the Eutichuridae by Ramírez (2014). Presently, Cheiracanthiidae is recognized as the valid family name.

In a revision of the *Cheiracanthium* of the Afrotropical Region, Lotz (2007) examined 925 specimens from 21 museum collections. In older publications, *Cheiracanthium lawrencei* Roewer, 1951 was the species commonly mentioned from South Africa. However, *C. lawrencei* Roewer, 1951 was a replacement name for *Cheiracanthium*

Figure 1. *Cheiracanthium furculatum* female (Photo: P. Webb).

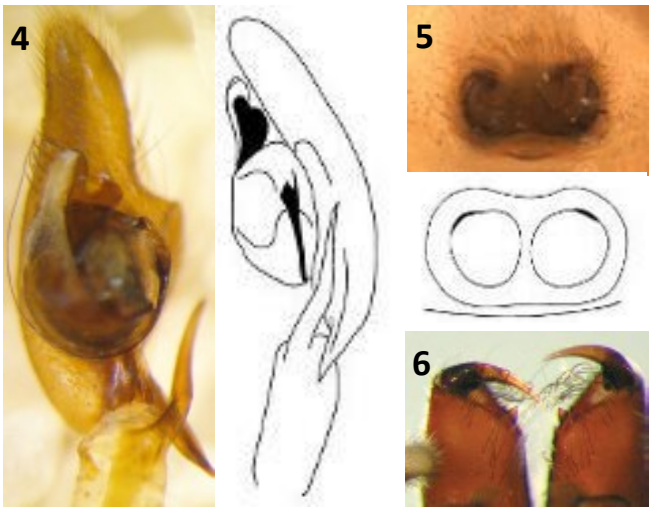
Figure 2. *Cheiracanthium furculatum* male (Photo: P. Webb).

inornatum Lawrence, 1927, a preoccupied name (O. Pickard-Cambridge 1874). In this revision, Lotz (2007) synonymized ten species with *C. furculatum*, including *C. lawrencei.* This gives an indication on how widespread the species is.

MORPHOLOGY

Cheiracanthium furculatum are two-clawed, medium-sized spiders (females TL 7–12 mm, males 5–11 mm), recognized by their uniform creamish-yellow bodies with chelicerae and eye area blackish-brown (Figs 1, 2); eyes in two rows, fovea indistinct; chelicerae robust with long fangs (Figs 3, 6); abdomen without long curved erect setae anterodorsally and with distinct heart-mark; leg I longer than IV; male palp with long cymbial and retrolateral tibial apophyses (Fig. 4); female genitalia with small, well-separated spermathecae (Fig. 5).

Fig. 3. *Cheiracanthium furculatum* female, anterior view (Photo: P. Webb)



Figures 4-6. *Cheiracanthium furculatum*: 4. Male palp; 5. Epigyne; 6. Chelicerae.

DISTRIBUTION

Cheiracanthium furculatum is the most widely distributed species of the genus in Africa. It has been collected from almost all terrestrial habitats and biomes, except habitats such as deserts and caves (Lotz 2007). So far it has been collected from Angola, Botswana, Cape Verde, Comores, D.R. Congo, Equatorial Guinea, Ethiopia, Gabon, Kenya, Mali, Mozambique, Namibia, Nigeria, Rwanda, Senegal, South Africa, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe (Lotz 2007) (Fig. 7). A specimen was also collected at Marion Island in the southern Atlantic Ocean (Khoza *et al.* 2005).

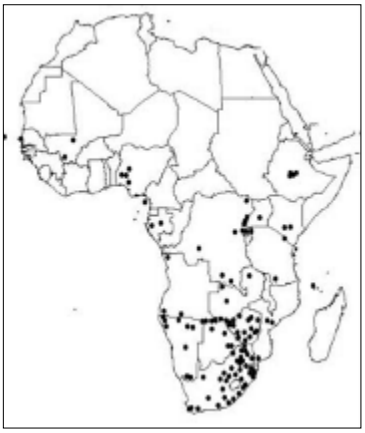


Figure 7. Distribution of *Cheiracanthium furculatum* in Africa (from Lotz 2007).

The species has recently been recorded in Europe, from Belgium (Bosselaers 2013), Germany (Bayer 2014) and Poland (Rozwałka *et al.* 2017). Specimens of *C. furculatum* were found in grapes imported from South Africa. The scale of this import is probably quite large. Although spiders may be of benefit as predators in vineyards, they may also pose problems as possible invasive species when they land up in containers of table grapes and are inadvertently exported. When the grapes are harvested, some spiders escape detection during the packing process by hiding in silk retreats made in bunches of grapes. The grapes are chilled prior to export, causing the spiders to become dormant and immobile. Spiders are able to lower their metabolic rates, enabling them to survive long periods of exposure to low temperatures. When the exported containers are opened at the retailers or by consumers in recipient countries, the spiders may escape after this period of inactivity (Fig. 8). According to Rozwałka *et al.* (2017), the climatic conditions in Central and Western Europe exclude an acclimatization of *C. furculatum* in the wild, but it is likely that this species may be settling in the south of the continent. However, with climate change prevailing, things might change.

Figure 8. *Cheiracanthium furculatum* from exported grapes.

***Distribution in South Africa**:* Four-hundred of the adult specimens (43%) examined by Lotz (2007: 25-28) came from South Africa. In Table 1 the number of specimens and percentage of total specimens examined from each province are shown. The majority of specimens were from Gauteng (40 %) and the Free State (23 %) (Table 1).

Table 1. *Cheiracanthium furculatum* records from the nine provinces in South Africa, based on data from Lotz (2007).

PROVINCE	SPECIMENS	%
GAUTENG	159	39.8
FREE STATE	91	22.8
NORTHWEST	63	15.8
KWAZULU-NATAL	31	7.8
EASTERN CAPE	20	5.0
LIMPOPO	14	3.5
WESTERN CAPE	11	2.8
MPUMALANGA	6	1.5
NORTHERN CAPE	5	1.3
TOTAL	**400**	

This data corresponds with the SANSA database (2021) on the distribution of *C. furculatum* in South Africa, as shown in Fig. 9. For more detailed distribution data see Dippenaar-Schoeman *et al.* (2021).

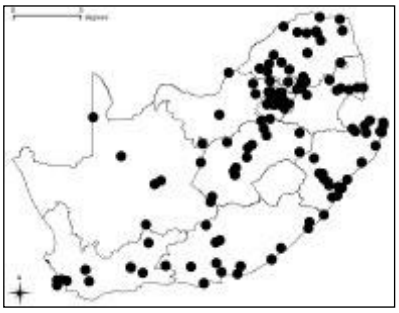


Figure 9. Distribution of *Cheiracanthium furculatum* in South Africa (after Dippenaar-Schoeman *et al.* 2010).

BEHAVIOUR: IMPORTANCE AS AGROBIONT SPECIES

They are nocturnal, free-running hunters, hiding in a silk sac-shaped retreat made on plants (Fig. 10), frequently in rolled-up leaves, when not active (Lotz 2007; Dippenaar-Schoeman 2014). Four types of sac retreats are made and used for resting, mating, breeding and hibernating. During the period the eggs develop, the female encloses herself with the eggs to guard them.

Figure 10. *Cheiracanthium furculatum* female on sac retreat (Photo: P. Webb).

Cheiracanthium spp. play an important role in agroecosystems throughout the world. They are aggressive feeders. This was confirmed by Rozwałka *et al. (*2017), who remarked that the species showed aggressive behaviour during breeding experiments. *Cheiracanthium furculatum* is the dominant sac spider recorded from crops in South Africa, and is recognized as an agrobiont species in vineyards and pistachio nuts (Haddad *et al.* 2005; Dippenaar-Schoeman *et al.* 2013). It is also the dominant sac spider recorded from citrus in South Africa (Van den Berg *et al.* 1992). Their silk retreats, which are usually constructed between rolled up leaves, frequently trap citrus psylla (Van den Berg *et al.* 1992).

The species was also collected during cotton surveys (Dippenaar-Schoeman *et al.* 1999). In the laboratory they preyed on all larval stages of the cotton bollworm. During feeding studies they killed more than 200 *Spodoptera* larvae in a short period of time, but not always feeding on them. According to Brettell & Burgess (1973), *C. furculatum* was frequently found in the narrow space between the bract and boll of cotton in Zimbabwe. They were also sampled from avocado, citrus, cotton, lucerne, macadamia, maize, mango, pecans, pistachio, potatoes, strawberries, tomatoes and vineyards (Dippenaar-Schoeman *et al.* 2013).

BEHAVIOUR: IN HOUSES

We found that *C. furculatum* make their retreats in houses during the day in the folds of material such as curtains, bedding and clothes. The spider will also use gaps between books and magazines or even a corner to make their retreats. At the NCA we have frequently received specimens collected from curtain folds in a house, and up to seven specimens per house were sometimes collected.

Queries to the National Collection of Arachnida (NCA) and the National Museum in Bloemfontein (NMBA) about spiders in and around houses were frequently accompanied with reports of bites. More than 1000 records of spiders recorded from houses and gardens were extracted from the databases at the two collections, as well as information from the Identification Service and Virtual Museum. Of these species, only species of 10 genera can be considered as permanent house-dwellers. However, most of them are too small to harm people or their behaviour does not bring them directly into contact with humans. *Cheiracanthium furculatum* is by far the most abundant species (>500 specimens, 52%) sampled from houses in the Gauteng and the Free State provinces, while they occur in low numbers from the three Cape provinces (Dippenaar-Schoeman & Lotz 2017). Therefore, species' distribution patterns need to be taken into account before any decision about their medical importance can be taken.

MEDICAL IMPORTANCE

Data showed that *C. furculatum* are frequently encountered in houses in parts of South Africa. As they are nocturnal wandering spiders, they come in contact with humans, especially at night when they accidentally land in beds. The first report on *Cheiracanthium* envenomation in southern Africa was provided by De Meillon & Gear (1947). After receiving unexplained report of bites in Gauteng, Dr G. Newlands (then working at the Medical Research Institute and later at the Ditsong Museum) started to investigate spider bites in the Gauteng area. The spider was identified as *C. furculatum* (then *C. lawrencei*). His research resulted in a series of papers (Newlands 1975, 1976, 1977, 1978, 1986; Newlands & Atkinson 1988, 1990a, b; Newlands *et al.* 1980; Snyman & Larsen 2005; Müller *et al.* 2012; Bird *et al.* 2021).

Research on *Cheiracanthium* spp. also formed part of three MSc studies (Lotz 1995; Croucamp 1999; Du Plessis 2019) and a PhD study (Newlands 1986). They found that *C. furculatum* has been implicated in more than 75 % of all spider envenomations in Gauteng (Newlands *et al.* 1980; Lotz 1995). The venom of *C. furculatum* was subjected to a preliminary analysis as part of the Croucamp MSc (Croucamp 1999; Croucamp & Veale 1999). They found the molecular mass of the polypetides in the range of 14 kDa to 200 kDa, which is not in contradiction with the results of the detailed analysis of *Cheiracanthium punctorium* (Villers, 1789) venom by Vassilevski *et al.* (2010).

The first author started working at the NCA in 1967 and through queries to the ARC-Spider Identification Service the problem of sac spiders in houses was confirmed. The >800 photographs sent in to the Virtual Museum confirms their presence in houses. Reports were also received from people that had been bitten. The bites occurred at night while the individuals were sleeping and when they move around in bed, disturbing the spider. The patient is often not immediately aware of being bitten, as the bite is not very painful, but fang marks and bleeding usually confirm the bite.

The bite site first resembles a mosquito or flea bite, and sometimes two fang bite-marks are visible (Fig. 11). A typical bull's-eye lesion develops and the surrounding area gradually becomes swollen, red and painful (Fig. 12). The centre of wound undergoes necrotic changes, leaving an ulcerated wound; local tissue damage and necrosis may be minimal or extensive (severity variable). Systemic symptoms may be experienced after a day or two, e.g. tender lymph nodes, rash, low-grade fever, headache, muscle and joint pain. After a couple of days the lesion may resemble a furuncle or carbuncle. In most cases the process is self-limiting. In the minority of cases the local lesion may be complicated by an aggressive, spreading cellulitis and a subcutaneous suppuration. The necrotic tissue detaches after about 2-3 weeks. On two occasions bites were reported where the spider was caught but no necrosis developed. Like snake bites, these could have been “dry” bites, where no venom is released.

In discussions with several general practitioners and a doctor at an Emergency Unit at a hospitals in Pretoria, this type of wound (Figs 10, 11) is very commonly encountered. In Fig. 11, the two bite entry points made by the fangs are clear. Unfortunately, there is no institution in Gauteng and the Free State to document accurate records of bites, as is found at the Tygerberg Poison Information Centre in Cape Town. The Tygerberg Poison Information Centre reported only three sac spider bites over a period of four years (Müller *et al.* 2017). However, the lack of bite reports can be explained by *C. furculatum* being quite rare and sparsely distributed in the Western Cape (Fig. 7; Table 1).

Figure 11. *Cheiracanthium furculatum* bite, showing the two fang marks.

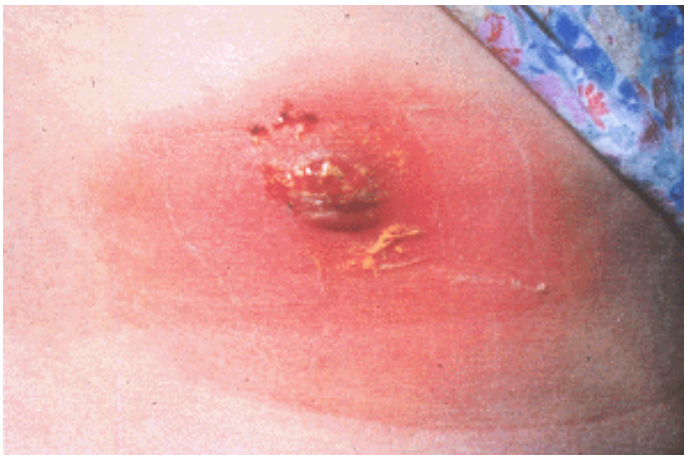


Figure 12. *Cheiracanthium furculatum* bite, showing the swollen, red area around the bite site.

CONCLUSION

The majority of suspected *C. furculatum* bites among humans are unintentional and mostly harmless. The bites are not life threatening and are usually self healing. It must be kept in mind that these could be more serious illnesses (Du Plessis & Heal 2021).

Dermonecrotic arachnidism is the potential cutaneous reaction to spider bite venom. The yellow sac spider, genus *Cheiracanthium*, is historically considered capable of inducing dermonecrotic lesions. However, this has been debated. In Vetter *et al.* (2006), for example, the research results from *C. furculatum* were questioned, because they did not fit in with the two *Cheiracanthium* species studied in the U.S.A. Since then, several case studies have been published on *Cheiracanthium* bites in Europe (Divito *et al*. 2009; Papini 2012; Nentwig *et al*. 2013; Varl *et al*. 2017).

In South Africa, the Vetter article was unfortunately followed by some, leading to the spread of misinformation regarding *C. furculatum*. An example is the statement "the early 1980’s **supposed bites** from the common House Sac spider *Cheiracanthium furculatum* have been believed to be medically important and to cause slow-healing (necrotic) sores. This reputation came about from **a study** conducted several decades ago using **circumstantial evidence**. How the researchers proved that the sores were caused by a spider bite is not recorded. The **media** got hold of this research, it was repeated many times in both scientific and popular literature without rigorous investigation, and a legend was born” (Leroy 2015).

However this information is wrong as we now know the following about *C. furculatum*:

- It is a species with a wide distribution throughout Africa and the surrounding islands.
- It was recently introduced to several European countries through export grapes from South Africa and Morocco.
- It is an important predator sampled from agroecosystems.
- It is a species that is commonly found in houses in parts of South Africa.
- It is a species with a disjunct distribution pattern in South Africa, with most specimens recorded from the Gauteng and Free State Provinces.
- It is the most abundant species (>501 specimens, 52%) sampled from houses in the Gauteng and the Free State Provinces.
- In houses they make silk retreats in folds of material during the day and are easily seen and collected.
- They are aggressive medium-sized spiders with strong fangs.
- At night they wander around, frequently landing in bedding.
- In the Gauteng and the Free State Provinces bites are frequently reported.
- Although not life threatening, the bite can cause a lot of discomfort, pain and necrosis.
- It is a species that we recommend be removed from houses.

Also, the decision that a spider bite is only registered as a bite when the spider is collected is not correct, as it will exclude bites received at night by nocturnal species. The specific aggression of the spider species and the adaptation of the species to human environments must also be taken into account, and then *Cheiracanthium furculatum* meets all these criteria.

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Notes on the orb-web spiders of Mpetsane Conservancy Estate in the Free State (Arachnida: Araneae) - part 2

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ABSTRACT

This paper provides notes on the behaviour of species of the families Araneidae and Tetragnathidae presently protected at Mpetsane Conservation Estate in the Free State. A variety of webs were observed that include true orb-webs, adapted orb-webs and reduced orb-webs.

Key words: Araneidae, diversity, grasslands, Tetragnathidae

INTRODUCTION

In Africa, the Grassland Biome is largely limited to the central plateau of South Africa, Lesotho and parts of Swaziland (Dippenaar-Schoeman & Haddad 2013). A total of 63 families, 274 genera and 789 described species have been documented from the Grassland Biome to date (Haddad *et al.* 2013). Different species are adapted to particular microhabitats within grasslands, either living on the ground, on grasses or on the foliage of woody plants, with few species abundant in multiple strata (Haddad *et al.* 2013).

Observations showed that there are several unique orb-web spiders at the Mpetsane Conservation Estate (MCE) in the Free State Province, South Africa (Dippenaar-Schoeman *et al.* 2021). These species have special adaptations in body form, colour, and web and retreat construction. Grasses are extensively used as frameworks for web construction, as retreats, or to attach their eggs sacs. Many orb-web species are nocturnal, to escape the high daytime temperatures in the summer, predators like birds, and to utilize the large quantity of insects available at night. These species have special adaptations in shape and colour that make them cryptic on grass during the day. By preying on insects and even other arachnids, spiders are an important link in the grassland food web.

This report was not conceived as a scientific study as such, but is the result of observations and a photographic survey undertaken regularly over a 14-year period in a grassland fragment at MCE (Dippenaar-Schoeman *et al.* 2021). No quantitative methods were used and the main focus was hand searching and observations on the web inhabitants. More than 2000 photographs of the arachnids of MCE were taken over the years.

The use of a web to capture prey is assumed to have developed long after spiders came into existence, and it took more than 200 million years for the first orb-web to appear. The great diversity in web types suggests that this strategy is very successful. The webs of spiders are highly specialised structures that might be considered an extension of the spider's tactile sense organs. Although some webs may seem to be a chaotic arrangement of silk threads, all threads serve a definite purpose. The following orb-web types are known:

- adapted orb-webs – adapted in shape to catch a certain group of prey e.g. moths.
- reduced orb-webs, which include "webs" that consist of only of a few strands of silk with more active involvement of the spiders in the hunting process.
- typical orb-webs: diurnal and nocturnal.

STUDY AREA

The survey was carried out in grassland at the Mpetsane Conservation Estate (MCE) that is situated in the Eastern Free State highlands, some 14 km from Clocolan (Dippenaar-Schoeman *et al.* 2021). Of the 138 species known from the area, the most species-rich family is the Araneidae (21 spp.) (Table 1). A large number of the species have been photographed and the diverse orb-web spiders

Figure 1: Orb-web at MCE (Photo: A. Jones)

Table 1: Orb-web species sampled from Mpetsane Conservation Estate

ARANEIDAE

Argiope aurocincta Pocock, 1898 (Fig. 14)

Argiope australis (Walckenaer, 1805) (Figs 11, 12, 15)

Argiope lobata (Pallas, 1772) (Fig. 13)

Cyclosa insulana (Costa, 1834) (Fig. 26)

Cyrtarachne ixoides (Simon, 1870) (Figs 5-7)

Cyrtophora citricola (Forsskål, 1775) (Figs 1-4)

Kilima decens (Blackwall, 1866) (Fig. 20)

Larinia bifida Tullgren, 1910 (Fig. 22)

Neoscona blondeli (Simon, 1885) (Fig. 23)

Neoscona moreli (Vinson, 1863) (Fig. 21)

Neoscona subfusca (C.L. Koch, 1837) (Fig. 24)

Neoscona triangula (Keyserling, 1864) (Fig. 25)

Pycnacantha tribulus (Fabricius, 1781) (Figs 8-10)

Trichonephila fenestrata Thorell, 1859 (Fig. 17)

Trichonephila senegalensis annulata (Thorell, 1859) (Figs 18-19)

TETRAGNATHIDAE

Leucauge festiva (Blackwall, 1866) (Figs 27-29)

Tetragnatha demissa L. Koch, 1872 (Fig. 26)

1. ADAPTED ORB-WEBS

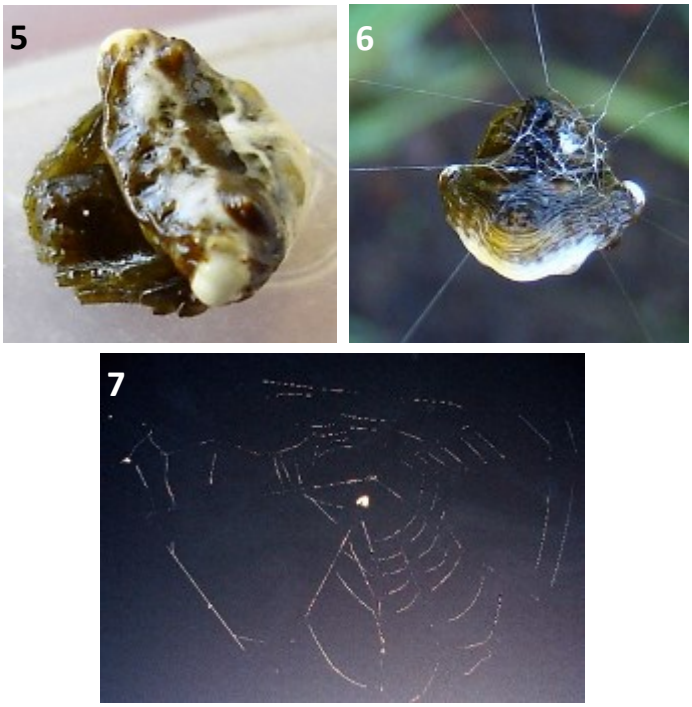
Cyrtophora citricola: The tropical tent-web spiders are represented by a single cosmopolitan species, *Cyrtophora citricola*, which was commonly found at MCE. They make a modified orb-web consisting of a horizontal orb with a very tightly woven mesh, and a tight, permanent, non-sticky spiral that is either dome- or bowl-shaped (Figs 1-3). The web is semi-permanent, with the hub open and irregular in shape and size. They are commonly found in grasslands (Francini et al. 2013). The open hub serves as a passage between the upper and lower levels of the web. The webs are usually arranged one above the other, with irregular barrier webs located above the layered webs (Figs 1-3). The adults sometimes build a retreat among dry leaves and egg sacs in the web. The spiders are diurnal and tend to stay in the hub, operating from beneath the orb-web. Flying insects are initially caught in the upper webbing, while the spider waits to kill the prey once it lands on the orb-web. They repair their webs every day and renew the entire web from time to time. When disturbed, they immediately drop out of the web. At the same time, the colour pattern of the abdomen changes rapidly so that the spider blends in with its immediate background.

On two occasions, 14 April 2018 and 21 March 2021, very high densities of juveniles were observed at MCE. Their tent webs covered large areas (Fig. 4).

Figures 1-4. *Cyrtophora citricola* tropical tent-webs.

Cyrtarachne ixoides: The first record of the bird-dropping spider *Cyrtarachne ixoides* from South Africa was discovered in the garden at MCE (Dippenaar-Schoeman & Jones 2008). This orb-weaving spider of the subfamily Cyrtarachninae (Araneidae) (Fig. 5) is known to construct another type of adapted orb-web to catch Lepidopteran prey, known as a "spanning-thread web" (Figs 6-7). This is basically an orb-web, but the web diameter, sticky spiral spacing and viscid thread diameter differs from that of typical orb-webs. The viscid threads are studded with large droplets that are very effective to catch prey coming in contact with them. Each of the short threads between the radii is known as a spanning thread, and is unique in that it breaks when prey comes in contact with it. The prey fly into the web, get stuck to a viscid thread, the thread breaks, and the spider pulls the prey up to the centre of the web to feed. Each of the spanning threads are good to only capture one prey item. It was suggested that the low-shear joint reduces the momentum of the prey and increases the likelihood of being captured.

During the day, the spider rests on nearby vegetation, mimicking bird-droppings. Some studies found that 92% of the prey was moths. Several photographs of the Clocolan bird dropping spider are available and most of the prey are moths, but the odd other insect is also captured, such as crane flies (Diptera: Tipulidae).



Figures 5-7. *Cyrtarachne ixoides* female and web.

2. REDUCED ORB-WEBS

Pycnacantha tribulus: The hedgehog spiders are rare inhabitants of the Grassland Biome and are occasionally found in grasses and low vegetation. Their spiky bodies and creamy-brown body allow the spiders to blend in with grass, particularly *Themeda* and *Cymbopogon* species that have a spiky inflorescence (Fig. 8). The spiders rest on the vegetation during the day, and in the evening spin a reduced orb-web in the form of a triangular trapezium between two adjacent grass stems. Here they hang upside down (Figs 9-10), capturing flying moths when within striking range, using the front two pairs of legs (Dippenaar-Schoeman & Leroy 1996). These spiders are suspected to produce molecules that mimic female moth pheromones that attract male moths. Egg sacs are attached to vegetation. The species is very rare and has only been observed twice in 14 years at MCE.

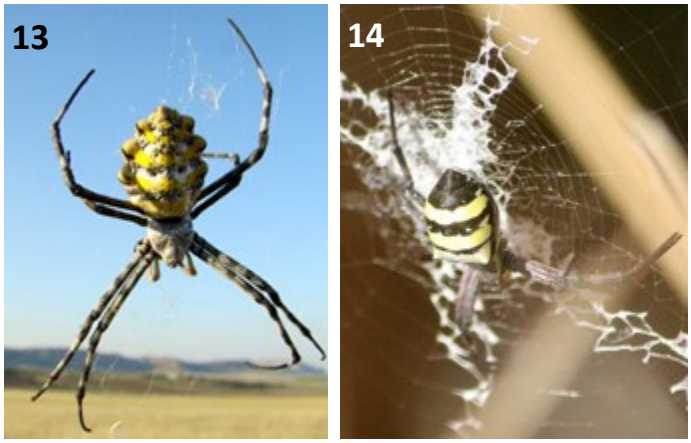
Figures 8-10. *Pycnacantha tribulus* female.

3. TYPICAL ORB-WEBS

DIURNAL SPECIES

***Argiope* spp.:** *Argiope* spp. are common grass-dwellers, and three species have been recorded from MCE: *Argiope australis* (butter spider, or black and yellow banded spider); *A. lobata* (black spot banded spider) and *A. aurocincta* (black banded orb-web spider). The first two species are commonly found at MCE. They spin a typical orb-web in the grass, with anchor threads attached to the grass. Sometimes they will attach zigzagging white stabilimentum bands that radiate from the centre. The webs are built in tall grass and low shrubs in sunny areas, and the orientation of their webs varies seasonally in relation to the midday angle of the sun. Their webs are made in a variety of habitats, in any vegetation sturdy enough to bear the weight of the web and the spider. A variety of flying and jumping insects are snared in the web, including bees, flies and grasshoppers. The prey is usually wrapped in silk through rapid movements of the hind legs, after which it is bitten and fed upon. They are active during the day when the spider hangs in the centre of the web, facing downwards. They use the same web for long periods, and as the sticky silk dries or becomes torn the web is regularly removed and replaced. Most of the webs they make are large, at least 500 mm wide with some even larger. The males have their own webs, and only a few males were found together with a female on her web.

Figure 11-12. *Argiope australis*, female (11) and male (12).



Figures 13-14. Female *Argiope lobata* (13) and *A. aurocincta* (14).

After some rain in April 2012, we discovered an "*Argiope* city" in the northern area of MCE, with between 50-60 spider webs present in the bushes. It was amazing that there were so many spiders present just in this one location on the farm, and all *Argiope australis.* Normally they are found throughout the estate. They had obviously found a good food source in this area, as high numbers of grasshoppers (Orthoptera: Acrididae: *Truxalis* sp.) were found in most webs (Jones 2012). AJ recalls: "I have often wondered how they move around, as we do have many *Argiope* here. Clearly they cannot balloon, but I was lucky enough to find one female clambering through the grassland (this was obviously very difficult for her, unlike smaller species). It took her some 5 minutes to cover 3 metres, yet she was intent on her route and would have to move several hundred metres to another site, where she would then climb grass stalks and construct another web, and set herself up once again… truly an impressive display."

Just recently, A.J. observed a large female creating a web on top of a 1.8 metre high Wild Asparagus bush (*Asparagus laricinus*). She remained there for some 73 days, feeding regularly on moths mainly, eventually she became thinner and inactive and then disappeared.

Fig. 15. *Argiope australis* eating a grasshopper.

***Trichonephila* spp.**: The golden orb-web spiders build large (1–1.5 m) orb-webs between trees and shrubs. The viscid spiral of the web is yellowish and the radii are pulled out of their direct course to give it a notched appearance. The supporting lines are very strong and some resistance is felt when one wanders into them. The spiders make use of the same web over long periods, replacing only the viscid lines. In the older spiders the web may only be half a circle, while in the younger individuals the orb is more complete. Two species have been recorded from MCE: *Trichonephila fenestrata* (Fig. 16) and *T. senegalensis annulata* (Fig. 17).

Figures 16–17. Female *Trichonephila fenestrata* (16) and *T. senegalensis annulata* (17).

During April 2021, a large aggregation of more than 50 females congregated in a clump of trees (*Celtis africana*, *Diospyros lycioides*, *Kigellaria africana* and *Cussonia paniculata*), where they created a mass of huge webs, with some lines 5 m high x 7 m wide. Their webs were just centimetres apart, yet they showed no aggression to each other. In fact, they appeared to give each other space when a prey was captured and eaten. In other bushes and small trees nearby the same phenomenon was observed; mixed species in very close company, again large groups of webs. Altogether well over 100 spiders had gathered in this part of the mountain. They remained there for over 60 days, and despite some heavy rain storms and windy days little damage was done to their webs, and they all appeared to have captured plenty of prey items: bees, flies, moths, and even a dragonfly. What was fascinating was their harmonious tolerance of each other. Several males were observed moving from web to web amongst the females (Fig. 18).

Figure 18. Numerous *Trichonephila senegalensis annulata* in an aggregation of webs.

NOCTURNAL SPECIES

A large number of species live exclusively on grass blades and can be easily recognised by their elongated bodies and long, thin legs. Their colour varies from cream to fawn to green and many species have darker longitudinal stripes over the length of their bodies that closely resemble the main vein of a blade of grass. Their often cryptic colouration, and the fact that the legs are held parallel to the body axis when resting, make many of them difficult to detect. The species that live on grass inflorescences are sometimes spiny in appearance. Their large orb-webs are usually made in grass in the early evening, mainly at sundown when moths take flight. Often the webs remain intact during the day and the spiders use the same web for days, feeding on flying insects.

Kilima decens are typical grassland species.They are very numerous at MCE. Their large orb-webs are usually made in grass at early evening mainly at sundown when moths take flight (Fig.19).

Figure 19. *Kilima decens* female.

Neoscona moreli is another very common grassland species that makes its web at night and removes it early in the morning. They are predators of a variety of insects. The scalloped abdominal pattern differs from the other grass species (Fig. 20), and the abdomen is more elongate than other members of the genus *Neoscona*.

Figures 20-21. *Neoscona moreli* (20) and *Larinia bifida* (21) females.

Larinia bifida is a typical grassland orb-web species, resembling grass in shape and colour. They are not easily seen during the day while resting on grass. When at rest they stretch their body and legs along a blade of grass. The orb-webs are made at night and removed early in the morning.

Three other species of hairy field spiders of the genus *Neoscona* are very common in grass and construct their orb-webs late in the afternoon or early evening, dismantling them in the morning. These spiders are creamy-brown with varied markings (Figs 22-24).

Fig. 22. *Neoscona blondeli* female.

Fig. 23. *Neoscona subfusca* female.

Fig. 24. *Neoscona triangula* female.

Cyclosa insulana (Fig. 25) usually build their webs in shrubs and trees, but may sometimes also be abundant in grass. The stabilimentum consists mainly of the remains of captured prey, which are attached in a vertical line in the centre of the web. The spiders take up a position in line with the stabilimentum, hence their common name, garbage-line spiders.

Fig. 25. *Cyclosa insulana* female.

Tetragnatha demissa (Fig. 26) occupy tall reeds and grasses where they usually construct orb-webs between vegetation near or horizontally over streams, rivers, dams and ponds. In *Tetragnatha* the webs are short-lived, as they are taken down and digested daily or even more frequently, and are usually horizontally oriented.

Fig. 26. *Tetragnatha demissa* female.

Leucauge festiva are brightly coloured spiders (Figs 28, 29) that spin their large orb-webs both in the morning and during the day (Fig. 27), and sometimes reuse the frame and anchor lines. The inclination of the webs varies from vertical to horizontal, but is most often at a sharp angle to the ground. The hub is open, with clear, widely spaced viscid spirals (15–30). Amazingly, several webs with more than one occupant, even three spiders in a single web together, were observed, giving each spider a part of the web to "use". Another interesting sighting was that several spiders were found up on the mountain, far from any water source.

Figures 27-29. *Leucauge festiva* female web (27) and habitus (28, 29).

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Notes on the rare nursery-web spider *Walrencea globosa* Blandin, 1979 in South Africa (Araneae: Pisauridae)

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ABSTRACT
Notes on the rare nursery-web spider *Walrencea globosa* Blandin, 1979 are provided. The species was previously known only from the type locality in South Africa. The general morphology of the species is discussed and live photographs are provided, with notes on their lifestyle.

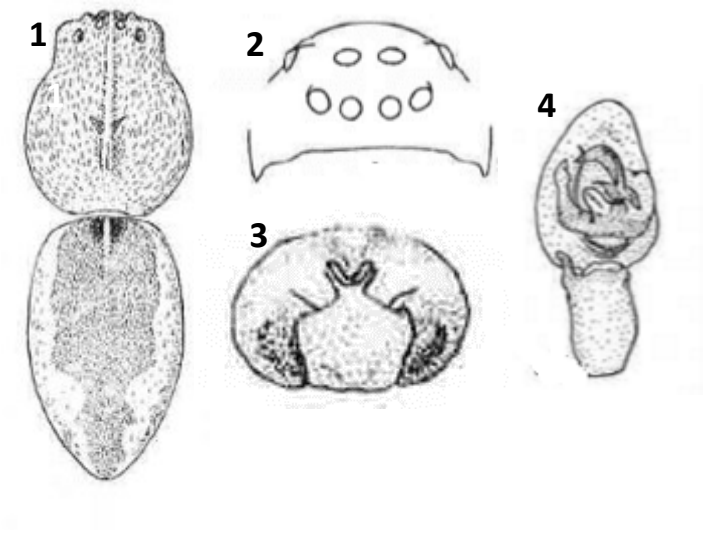
Key words: Afrotropical, Indian Ocean Coastal Belt, SANSA

INTRODUCTION

The genus *Walrencea,* described by Blandin (1979), is monotypic and known from only one South African species, *Walrencea globosa* Blandin, 1979. The type locality was only given as Natal. Although illustrated, the description of the species was poor and identification is still problematic. The status of the species therefore remained obscure. However, during surveys as part of the South African National Survey of Arachnida, some more specimens were sampled from a locality in the Eastern Cape.

METHODS

During the South African National Survey of Arachnida (SANSA), surveys were undertaken in different parts of the country. The first author surveyed large areas in the Eastern Cape. During these surveys, spiders were sampled and photographed, and the voucher specimens are deposited in the National Collection of Arachnida of the Agricultural Research Council—Plant Health and Protection division. It was while identifying some problem species that we discovered the *Walrencea globosa* specimens. The species was collected while surveying Thyspunt (34°10.424'S, 24° 40.344'E). It is a rocky stretch of coast approximately 12 km WNW of Cape Saint Francis in the Eastern Cape province of South Africa. It is just west of the beach Thysbaai and south-east of Oyster Bay. The site has been identified as a possible location for a nuclear reactor to be built by South African electricity utility Eskom.



Figures 1-4. *Walrencea globosa*. 1. Female habitus; 2. Eye pattern; 3. Epigyne; 4. Male palp (From Blandin 1979).

TAXONOMY

***Walrencea globosa* Blandin, 1979**

Figures 1-9

Walrencea globosa Blandin, 1979: 369, figs 5, 15, 24, 35, 41.

COMMON NAME: This genus was named by Blandin (1979) after Dr Lawrence, hence the common name, Lawrence's Nursery-web Spiders.

DESCRIPTION: Size TL 8-9 mm. Carapace: a little longer than wide; narrower in eye area (Fig. 1); cephalic region broad; fovea short; carapace covered with pale setae; a white median line bordered by darker setae; number of teeth of the posterior margins of the chelicera variable (2 to 4); eyes eight in two rows (Fig. 2); ocular lines occupy a wide space; anterior row recurved ; median ocular triangle longer than wide. Abdomen with slightly abdominal folium (darker in male); marked anteriorly with short pale midline framed by dark setae (Figs 5-9); venter pale. Legs same colour as carapace, bearing strong setae. Cephalothorax covered with light hair, on which emerges a single white median line, underlined by a little hairiness. Abdomen shows slightly darker abdominal foliums (more so in males), marked in front by a short clear middle line framed by two dark markings.

Figure 5. *Walrencea globosa,* microscope photograph of female from Thyspunt (Photo: A. Dippenaar-Schoeman).

Figures 6-7. *Walrencea globosa*, immature female from Thyspunt (Photo: L. Wiese).

Figures 8-9. *Walrencea globosa*, female from Thyspunt (Photo: L. Wiese).

GLOBAL DISTRIBUTION: South Africa.

DISTRIBUTION IN SOUTH AFRICA: ***Eastern cape*****:** Thyspunt, 12km WNW of Cape St Francis, leg. L. Wiese, 2012 (NCA 2021/5669). ***KwaZulu-Natal*****:** Sodwana Bay National Park, Mgoboseleni trail (-27.543028, 32.663528), leg. M. Ramirez, Museo Argentino de Ciencias Naturales (Ramirez & Rodríguez 2021).

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First record of *Eriovixia excelsa* (Simon, 1889) from South Africa (Araneae: Araneidae)

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ABSTRACT

We present the first records of the spider *Eriovixia excelsa* (Simon, 1889) from South Africa. The general morphology of live specimens is discussed and photographs of both sexes are provided, with notes on their behaviour, distribution and conservation status.

Key words: biodiversity, distribution, South African National Survey of Arachnida (SANSA)

INTRODUCTION

The genus *Eriovixia* Archer, 1951 is a small genus known from 22 species and exhibits a wide geographical distribution from Africa to Southeast Asia. Three species are known from Africa and the rest from Asia (World Spider Catalogue 2021). The type species *Eriovixia rhinura* (Pocock, 1900) was described from Western and Central Africa, *E. napiformis* (Thorell, 1899) from East Africa and Yemen, and *E. turbinata* (Thorell, 1899) from Central Africa.

As part of the South African National Survey of Arachnida (SANSA) a large number of specimens from several localities in South Africa (Dippenaar-Schoeman *et al*. 2015) were sampled, many of them members of the family Araneidae. Several specimens sampled from orb-webs had a distinct subtriangular abdomen and a short caudal appendage. Features of the species were compared with illustrations and the original description of *Eriovixia excelsa* (Simon, 1889). This is a species with a wide distribution range known from several countries, but is recorded from South Africa for the first time here.

METHODS

Though the SANSA Virtual Museum database (Dippenaar-Schoeman *et al*. 2012) photographs of the species provided additional information on their morphology, distribution and behaviour. Voucher specimens are deposited in the National Collection of Arachnida at the Agricultural Research Council, Pretoria (NCA).

TAXONOMY

***Eriovixia excelsa* (Simon, 1889)**

Figures 1-12

Glyptogona excelsa Simon, 1889: 337.

Eriovixia excelsa Grasshoff, 1986: 118; Barrion & Litsinger, 1995: 643.

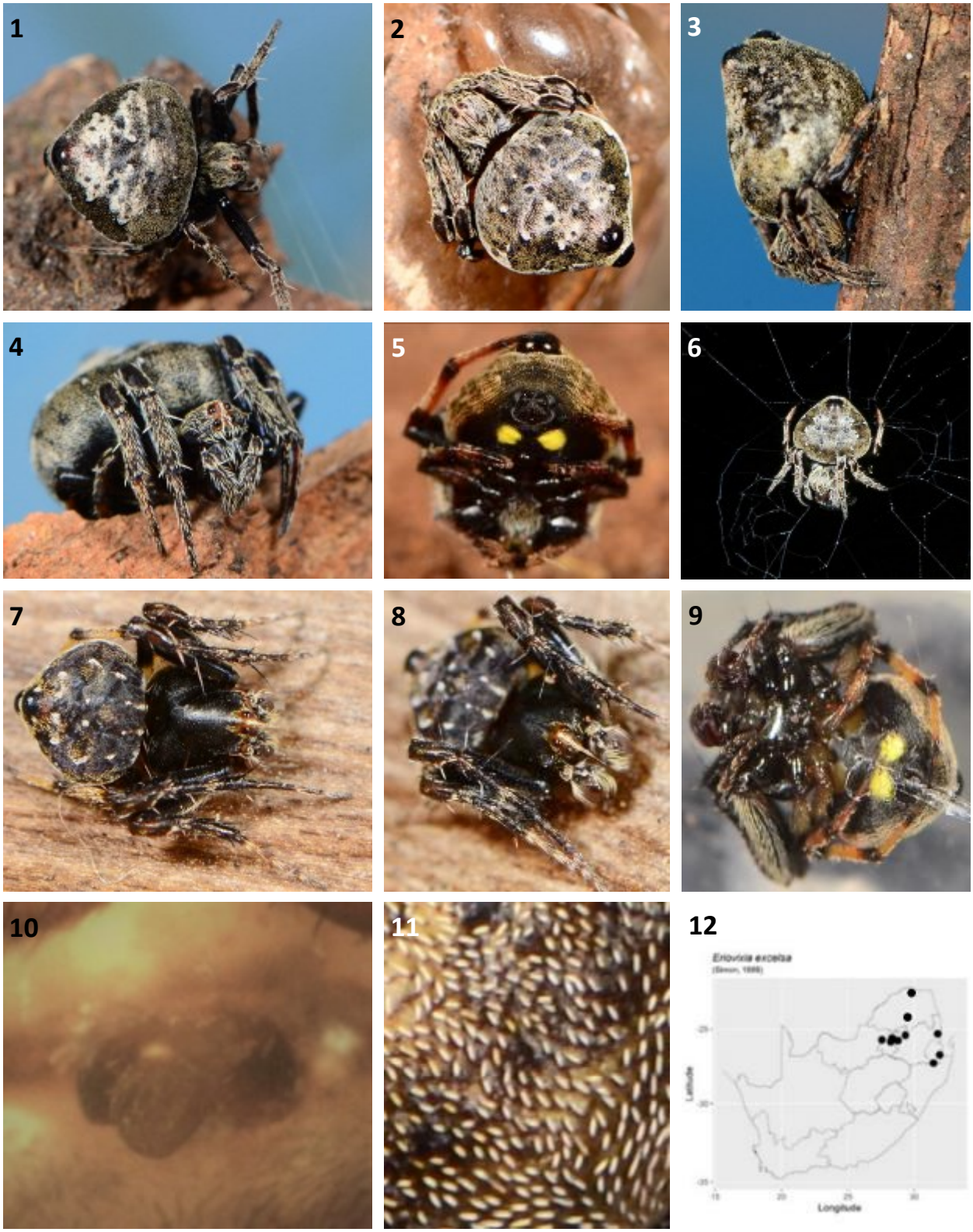
GLOBAL DISTRIBUTION: It has a worldwide distribution and is known from India, Pakistan, China, Taiwan, Philippines and Indonesia. New records are presented here from South Africa.

MATERIAL EXAMINED IN SOUTH AFRICA

The species was sampled by hand or with a sweep net in South Africa from the Savanna and Grassland biomes. It was sampled from the following localities (Fig. 12): ***Gauteng***: Ezemvelo Nature Reserve (-25.80, 28.77), 1f (NCA 2014/3458); Irene, Gem Village Field (-25.87, 28.22), 1f, 1m (NCA 2016/3902); Roodeplaat Research Station (-25.66, 28.35), 1f (NCA 2014/3792); Hammanskraal, 1f (NCA 2017/1801); Heidelberg (-26.50, 28.36) [photo]. ***KwaZulu-Natal***: Ndumo Game Reserve (-26.87, 32.24), 1f (NCA 2019/201); Pinetown (-29.81, 30.85). ***Limpopo***: Bela-Bela, Klein Kariba, 1f (NCA 2016/3708); Buzzard Mountain (-25.84, 28.28) [photo]; Kampersrust (-24.48, 30.83) [photo]; Lephalale/Ellisras (-23.67, 27.71) [photo]. ***Mpumalanga***: Kampersrus (-24.48, 30.83) [photo]; Loskop Dam Nature Reserve (-25.46, 29.23), 1f (NCA 2014/3546); Nelspruit (-25.47, 30.96), 1f (NCA 2013/1821). ***North West***: Mooinooi (-25.75, 27.56), 1f (NCA 2014/3546)

MORPHOLOGY

Description: Female: TL 4.7-5 mm. Carapace slightly longer than wide; anteriorly narrowed (Fig. 1); pilose, bearing short thick setae (Fig. 11), covered with white pubescence, especially in elevated cephalic area (Fig. 2); anterior eye row recurved, posterior eye row almost straight; anterior median eyes smaller than posterior median eyes; lateral eyes situated close together on small tubercles (Fig. 4). Sternum heart-shaped, pointed posteriorly; covered with white pubescence (Fig. 5). Leg formula: 1243; legs moderately long, thin, clothed with pubescence; femora of all legs dark; patellae and tibiae yellowish dorsally. Abdomen slightly wider than long; subtriangular with caudal appendage above and beyond spinnerets (Fig. 3); mottled grey; dorsum decorated with chalk white folium but not very distinct in many specimens; four rows of small white spots (Fig. 6); venter black with two yellow spots between spinnerets and epigyne (Fig. 5). Epigynum with short broad scape (Fig. 10). Male: a little smaller than female. Carapace shiny dark brown, with cluster of setae directed forward between eyes (Figs 7-8). Abdomen dorsum darker than female, with the four rows of white spots more prominent; dark ventrally, with two yellow spots (Fig. 9).

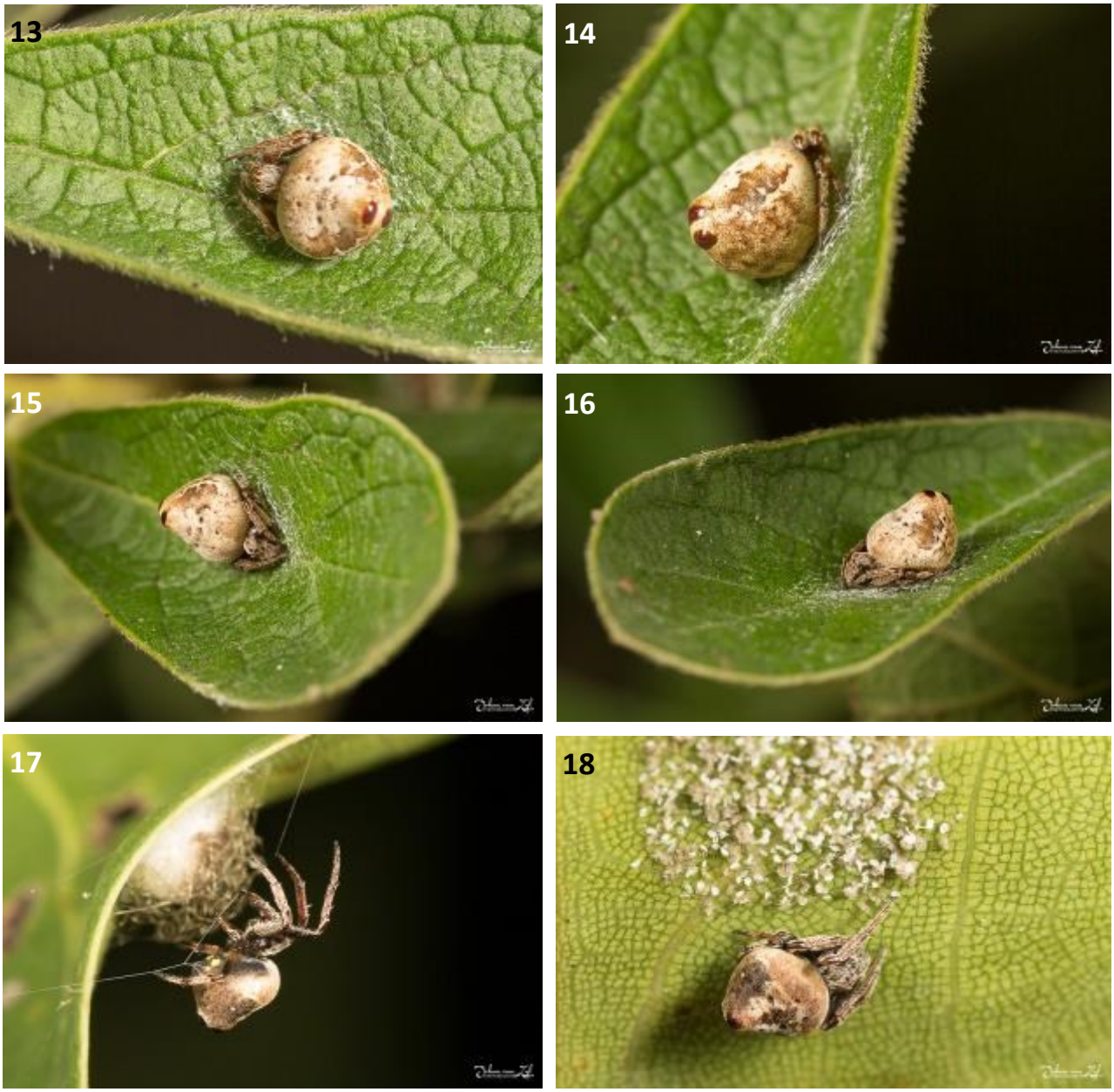


Figures 1-12 *Eriovixia excels* female (1-6, 10, 11) and male (7-9). 1-2, 7-8. Dorsal view; 3. Lateral view, showing hump; 4. Eye pattern, anterior view; 5, 9. Ventral view; 6. Female at night in orb-web; 10. Epigyne; 11. Carapace integument; 12. South African records of *Eriovixia excelsa* (Photo credits: P. Webb).

BEHAVIOUR

Eriovixia excelsa is a nocturnal orb-weaver. They spin typical geometric orb-webs between vegetation (Fig. 6), usually with a very long bridge line. On two occasions they were found to rest 1.8 to 1.9 meters above the ground on the northern side of the plants during the day. They take up a position on top of a leaf, not hiding below. Faint silk thread could be seen below the spider (Figs 13-16).

This is possibly another bird dropping mimic. The egg sac is also deposited on the leaf (Figs 17-18). Heron (2016) observed a mimetic relationship between the beetle *Cassida calvaria* and *E. excelsa* in the Palmiet Nature Reserve at Westville near Durban in October 2010. They were of similar size, colouring and body patterns (Heron 2016).



Figures 13-18 *Eriovixia excelsa.* 13-16. Female on leaf; 17. Female with egg sac; 18. Female with remnants of egg sac after spiderlings had hatched (Photo credits: J. van Zyl).

ACKNOWLEDGEMENTS

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Notes on the on the crevice-weaving spider *Andoharano ansieae* Zonstein & Marusik, 2015 in southern Africa (Araneae: Filistatidae)

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ABSTRACT

Notes on the Crevice Weaving spider *Andoharano ansieae* Zonstein & Marusik, 2015 are provided. The species was previously known only from Namibia but is also now known from South Africa. The general morphology of the species is discussed and live photographs are provided, with notes on their lifestyle.

INTRODUCTION

The Filistatidae is represented by 19 genera and 185 species. Little work has been carried out on the filistatids of the Afrotropical Region, especially in southern Africa. From the Afrotropical Region four genera are known: *Afrofilistata* Benoit, 1968, *Andoharano* Lehtinen, 1967, *Pritha* Lehtinen, 1967 and *Sahastata* Benoit, 1968. However, from southern Africa only *Andoharano ansieae* Zonstein & Marusik, 2015 is known. The species belongs to a small genus known prior to its description (Zonstein & Marusik 2015) exclusively from Madagascar

METHODS

The first author (AE) surveyed areas in Namibia. She found a tree at Grootfontein covered with webbing (Fig. 1). She later found similar webbing in other areas and sampled and also photographed the spiders (Figs 2-3). Voucher specimens were sent to the National Collection of Arachnida of the Agricultural Research Council, as well as to Dr Marusik in Russia. He confirmed the identity of the spider as *Andoharano ansieae*, a species that had recently been described from Namibia.

Fig. 1. Tree at Grootfontein, Namibia covered with webbing (Photo: A. Eichhoff).

Figures 2-3. *Andoharano ansieae* specimens sampled from Namibia in areas covered with webbing (Photos: A. Eichhoff).

In South Africa the second author (ASD) received photographs from John Luyt of specimens sampled from a property near Gravelotte and Hoedspruit in the eastern part of Limpopo (Figs 4-7). The specimen was collected in a bathroom. A voucher specimen will be deposited in the National Collection of Arachnida.

TAXONOMY

Andoharano ansieae Zonstein & Marusik, 2015
Figures 2-9
Andoharano ansieae Zonstein & Marusik, 2015: 484, figs 1-12, 14-15.

Holotype male: NAMIBIA: Rundu-Kavango, Okavango, 17°57'S 19°43'E, V.1979, leg. M.E. Baddeley (MRAC 152150). Paratypes: 1 male 2 females, collected together with the holotype.

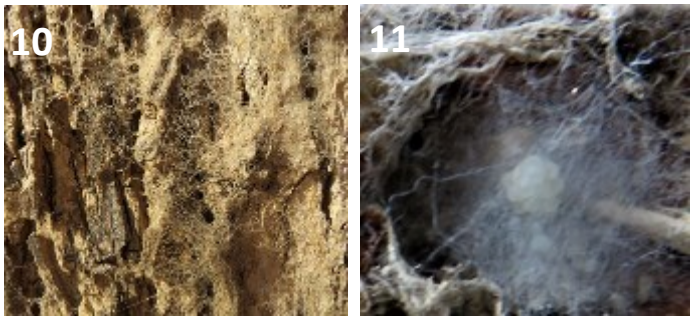
Body size: TL 3.15 mm male, 4.25 mm female. For a detailed description of the species see Zonstein & Marusik (2015). They mentioned the long hair on the male palp. Palp with all segments covered with long hairs; hairs on patella, tibia and cymbium longer than corresponding segments on legs; femur longer than patella+tibia, with long suberected ventral hairs, and decumbent dorsal hairs, longest hairs about half of the segment length; patella twice longer than wide, with long and dense dorsal hairs; tibia subconical, distal edge wider than proximal, and wider than femur width; dorsal hairs sparse in basal half and dense in distal part, some of hairs almost twice longer than tibia; cymbium short, its height shorter than diameter of bulb, apical part with dense brush of hairs forming kind of forelock hanging over the bulb, hairs 3× longer than cymbium (Figs 8-9) (Zonstein & Marusik 2015).

Figures 4-7. *Andoharano ansieae* specimens from Gravelotte (Photos: J. Luyt)

BEHAVIOUR

Filistatids are nocturnal, living in crevices in rocks, trees or walls. They have signal-webs very similar to the Segestriidae, consisting of a tubular retreat made in crevices in rocks and walls, with trip-lines radiating from the entrance (Dippenaar-Schoeman & Jocqué 1997). In Namibia they were found in webs made on walls, in and outside houses. During the day they hide under their webs, or they creep into the tube-like retreats that are integrated in the catch web, which are often spun on the edge of the web. At night they sit outside on the web, waiting for prey.
The sticky cribellate webs gather dust look dusty and untidy, with several round exit/entrance holes that lead to the actual retreats of the spiders. Every spider has its own “place”; they live solitarily, but there can be many individuals under one huge area of catch web on a tree or a wall, forming a colony.
Webs can be seen on tree trunks, on walls, old switchboards, on window handles, in the house on and behind decorative articles, behind foot skirting, cupboards, on window sills in the house. During the day these spiders sit in their retreats in the dark. When they live on trees, their retreats are under the bark (Fig. 10). They guard their egg sacs (Fig. 11), which are covered loosely by a sheet.

Figures 8-9. *Andoharano ansieae,* male palp. 8. Anterior view (Photo: J. Luyt); 9. Palp (from Zonstein & Marusik 2015).



Figures 10-11. *Andoharano ansieae*. 10. Webbing on bark; 11. Egg sac (Photos: A. Eichhoff).

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