

THE PENESTOMIDAE OF SOUTH AFRICA



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THE PENESTOMIDAE OF SOUTH AFRICA

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ABSTRACT

The family Penestomidae is known only from South Africa and Lesotho from a single genus and 9 species of which eight are endemic to South Africa. The family is rare and very few specimens are found in collections. Of the nine species only two are known from both sexes with the result that they still are listed as Data Deficient and two species *Penestomus montanus* Miller, Griswold & Haddad, 2010 and *Penestomus egazini* Miller, Griswold & Haddad, 2010 are listed as Rare. The species are mainly known from the Eastern and Western Cape with only one species *Penestomus zulu* Miller, Griswold & Haddad, 2010 known from KwaZulu-Natal. The type locality of *Penestomus kruger* Miller, Griswold & Haddad 2010 is wrongly listed as Kruger National Park instead of Karoo National Park.

ACKNOWLEDGEMENTS

We thank the Agricultural Research Council (ARC) and the South African National Biodiversity Institute (SANBI) Threatened Species Programme; the Universities of the Free State, Venda and Pretoria; the National Research Foundation (NRF) for generously funding and support. The staff of the Arachnology section at the National Collection of Arachnida (Connie Anderson, Petro Marais, Sma Mathebula, Robin Lyle and Annette van den Berg), as well as several volunteers from the public, are thanked for their assistance with the sorting and databasing of specimens collected during the SANSA surveys. Various students, members of the public and the Spider Club of Southern Africa collected material for SANSA. We also thank the South African National Parks and E. Oppenheimer & Son for support and providing opportunity to collect in the parks and reserves as well as the provincial conservation agencies for collecting permits. We are especially thankful to all the photographers who provided photographs for the SANSA Virtual Museum without their contribution this guide would have not been possible.



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Penestomus sp. from Cradock Photo Charles Haddad

NOTE: More species might be present as a large number of immature specimens were sampled but could not be identified to species level from the following localities: Magaliesburg; Umgeni Valley; Sani Pass; Lhuvhondo Nature Reserve, Mosselbay and Saldanha Bay. Important that these areas must be sampled to obtain adults.

FAMILY PENESTOMIDAE Simon, 1903

The family Penestomidae is known only from South Africa and Lesotho from a single genus and 9 species of which 8 are endemic to South Africa (World Spider Catalog 2021).

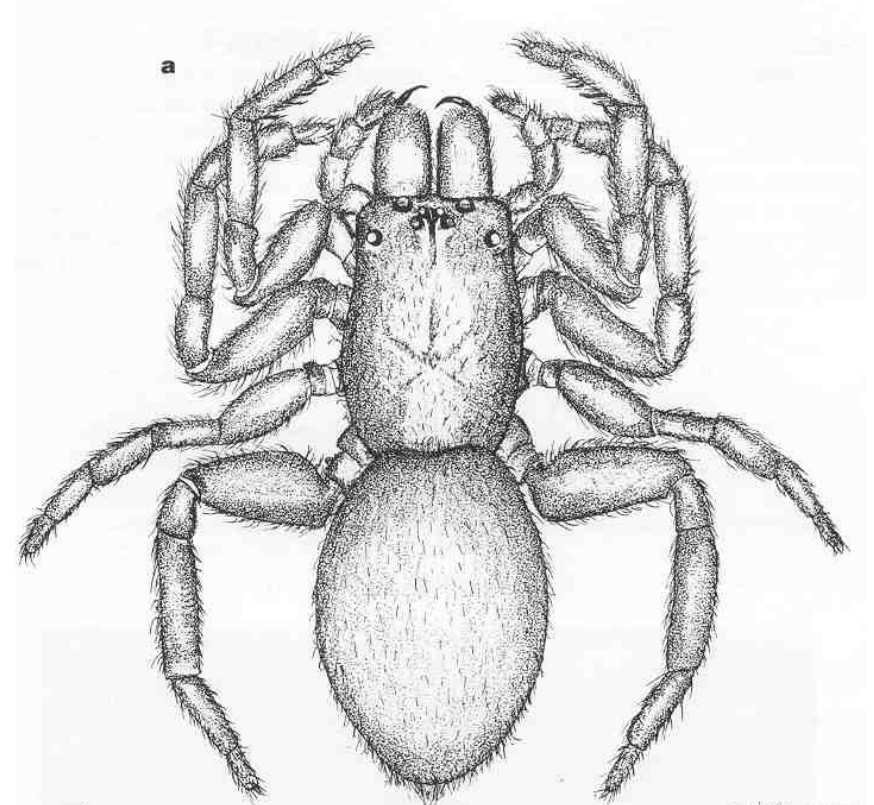
COMMON NAMES: Flat Velvet Spiders.

TYPE SPECIES: *Penestomus planus* Simon, 1902

DIAGNOSTIC CHARACTERS: Body size: 3-7 mm. Colour: various hues of dark-brown, yellowish brown to grey, abdomen sometimes with distinct patterns formed by white setae; carapace rectangular, flattened, usually thickly clothed with fine setae; fovea circular but variable in depth; eyes 8, median eyes close together, with lateral eyes wide apart and posterior lateral eyes usually positioned back on the carapace; abdomen rounded to oval and thickly clothed with fine setae, frequently with white markings; legs short and stout and thickly clothed with hairs; calamistrum short to reduced.

LIFE STYLE: They are found on the soil surface in silk tunnels made under stones in dark sheltered places.

TAXONOMIC NOTES: the family was previously placed as a subfamily in the Eresidae and only recently it was elevated to family level.



Penestomus sp. after Dippenaar-Schoeman & Jocqué (1997)

GENUS *PENESTOMUS* Simon, 1902

COMMON NAME: Flat Velvet Spider

TYPE SPECIES: *Penestomus planus* Simon, 1902

MORPHOLOGY: Distinguished from Eresidae by the flat body and position of the posterior lateral eyes, which are several eye diameters behind the posterior median eyes in Eresidae but are less than three eye diameters behind the posterior median eyes in Penestomidae. Total length 3–6 mm. Carapace subrectangular with shallow ovoid fovea; eight eyes in two rows; posterior eye row slightly recurved, more widely spaced than anteriors; sternum ovoid, longer than wide, not fused to labium; endites parallel, with serrula. promargin of fang furrow armed with four-six teeth increasing in size from base of fang to the penultimate tooth; proximal tooth small; retromargin of fang furrow armed with two-three teeth. Female pedipalp with dentate claw; tarsus with pro-ventral cluster of macrosetae. Leg tarsi each with multidentate paired claws and untoothed median claw.

LIFESTYLE: Little is known about *Penestomus* except that they live in silk retreats in tunnels in boulders and under debris on the ground. Prey remains include members of the Formicidae, Curculionidae and small Gryllidae.

TAXONOMIC NOTES: The family was revised by Miller et al. (2010).



Penestomus egazini Grahamstown Photo J. Miller

Penestomus armata (Lehtinen, 1967)

COMMON NAME: Alicedale Flat Velvet Spider

NATIONAL STATUS: DDT

NATIONAL RATIONALE: A Eastern Cape endemic described by Lehtinen (1967) as *Wajane armata* from Alicedale in the Eastern Cape. Male type sampled in 1916 (EOO <100 km²; AOO=4 km²; 283-1212m a.s.l.). Too little is known about the location, habitat and threats of this taxon for an assessment to be made. More sampling is needed, to collect the female and determine the species' range. Therefore, listed as Data Deficient for taxonomic reasons.

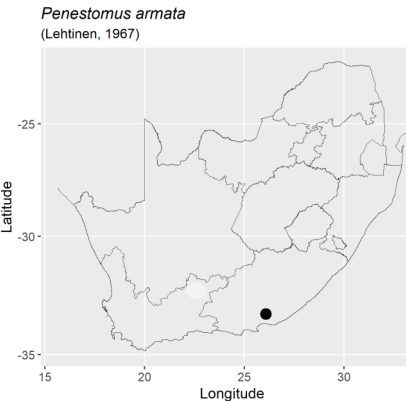
LIFESTYLE: Retreat-web spiders. Sampled from the Thicket biome.

GLOBAL DISTRIBUTION: South Africa.

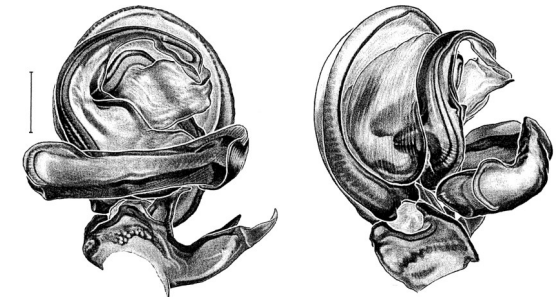
DISTRIBUTION IN SOUTH AFRICA: *Eastern Cape*: Alicedale (-33.31, 26.08).

CONSERVATION MEASURES: Threats to the species are unknown. More sampling is needed, to collect the female and determine the species' range.

TAXONOMIC NOTES: Revised by Miller et al. (2010), known only from the male. Carapace orange, rugose. Sternum pale yellow. Chelicerae orange, with five promarginal teeth, two retromarginal teeth. Legs brown basally, pale yellow distally. Abdomen light gray dorsally with pair of light dorsolateral patches (Miller et al. 2010).



Penestomus armata male after Miller et al. (2010)



Penestomus armata male palp after Miller et al. (2010)

***Penestomus croeseri* Dippenaar-Schoeman, 1989**

COMMON NAME: Croeser's Flat Velvet Spider

NATIONAL STATUS: DDT

NATIONAL RATIONALE: An Eastern Cape endemic described by Dippenaar-Schoeman (1989) and known only from two female syntypes sampled in 1980 from the type locality Grahamstown (EOO= <100 km²; AOO= 4 km²; 552 m a.s.l.). Too little is known about the location, habitat and threats of this taxon for an assessment to be made. More sampling is needed, to collect the male and determine the species' range. Therefore, listed as Data Deficient for taxonomic reasons.

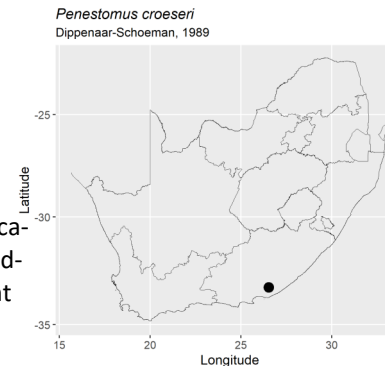
LIFESTYLE: The holotype was sampled in riverine bush from the soil surface in retreat-web. Sampled from the Thicket Biome.

GLOBAL DISTRIBUTION: South Africa.

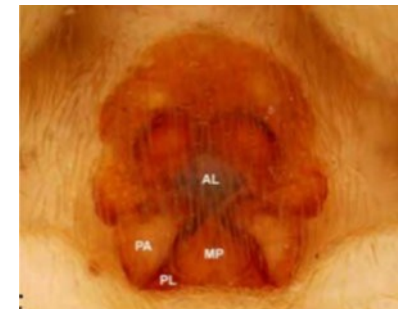
DISTRIBUTION IN SOUTH AFRICA: *Eastern Cape*: Grahamstown (-33.3, 26.52).

CONSERVATION MEASURES: Threats to this species are unknown but status of species still unsure and more sampling needed.

TAXONOMIC NOTES: Revised by Miller et al. (2010), known only from the female. Carapace red-brown, lighter posteriorly with smooth texture, with sparse fine black setae and broad white setae mostly at margin and fovea region. Sternum dusky pale yellow. Chelicerae red-brown, with six promarginal teeth, three retromarginal teeth; with fine black setae only. Legs brown basally, anterior legs red-brown distally, posterior legs pale yellow distally. Abdomen medium gray dorsally without light dorsolateral patches, covered by fine black setae, broad white setae around margin (Dippenaar-Schoeman 1989, Miller et al. 2010).



Penestomus croeseri female after Miller et al. (2010)



Epigyne after Miller et al. (2010)

Penestomus egazini Miller, Griswold & Haddad 2010

COMMON NAME: Grahamstown Flat Velvet Spider

NATIONAL STATUS: Rare

NATIONAL RATIONALE: An Eastern Cape endemic described Miller et al. (2010) from Grahamstown. The type series (>15 specimens) were sampled in 2006. Presently known from a few other localities in the Eastern Cape (EOO= 284 km²; AOO=12 km²; 283-648m a.s.l.). Due to the species having a small restricted distribution range (< 500 km²) it is regarded as Rare.

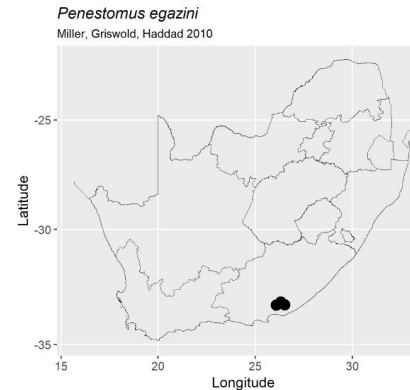
LIFESTYLE: Some specimens were sampled from under *Eucalyptus* bark. Prey remains suggest a diet dominated by Formicidae (especially *Camponotus* and *Lepisiota*) with some Coleoptera and Hemiptera. One specimen also collected inside a garden woodshed. They are found in the Thicket Biome.

GLOBAL DISTRIBUTION: South Africa.

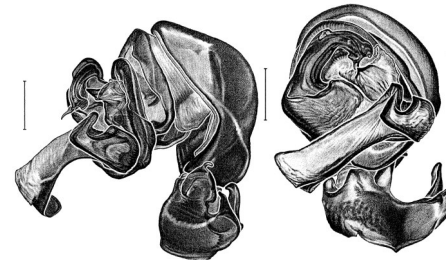
DISTRIBUTION IN SOUTH AFRICA: Eastern Cape: Grahamstown (-33.3, 26.52); Alicedale (-33.31, 26.08); 27km SSE of Cradock (32°23.094'S, 25°44.980'E).

CONSERVATION MEASURES: There are not significant threats to this species. Some more sampling is needed.

TAXONOMIC NOTES: Known from both sexes. Carapace brown, rugose, covered by fine black setae, with broad white setae concentrated in thoracic region. Sternum dusky pale yellow. Chelicerae brown, with six promarginal teeth, three retromarginal teeth; with fine black setae only. Legs brown basally, pale yellow distally. Abdomen dark gray dorsally with pair of narrow light dorsolateral patches, covered with mixture of fine black and broad white setae (Miller et al. 2010).



Penestomus egazini Grahamstown Photo J. Miller



Male palp after Miller et al. (2010)



Penestomus egazini female after Miller et al. (2010)



Epigyne after Miller et al. (2010)

Penestomus kruger Miller, Griswold & Haddad 2010

COMMON NAME: Kruger Flat Velvet Spider

NATIONAL STATUS: DDT

NATIONAL RATIONALE: A Western Cape endemic described by Miller et al. (2010) and known only from the type locality Karoo National Park sampled in 1984 (EOO= <100 km²; AOO= 4 km²; 1212 m a.s.l.). The type locality was originally wrongly listed as Kruger National Park. Too little is known about the habitat and range of this taxon for an assessment to be made. More sampling is needed, to collect the male and determine the species' range. Therefore, listed as Data Deficient for taxonomic reasons.

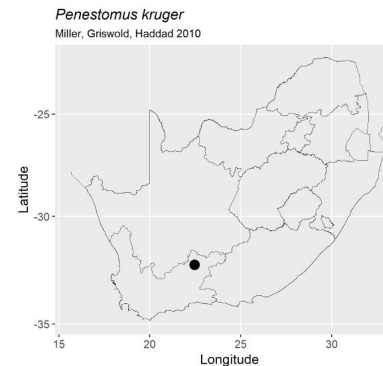
LIFESTYLE: Retreat-webs are made underneath rocks. Sampled from the Nama Karoo Biome.

GLOBAL DISTRIBUTION: South Africa.

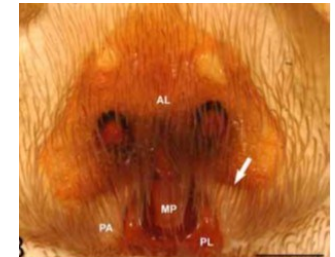
DISTRIBUTION IN SOUTH AFRICA: *Western Cape*: Mid Plateau, Karoo National Park (-32.28, 22.46).

CONSERVATION MEASURES: Threats to the species are unknown. More sampling needed

TAXONOMIC NOTES: Carapace red-brown, lighter posteriorly with smooth texture, covered by fine black setae; broad white setae mostly posterior to fovea. Sternum pale yellow. Chelicerae red brown, with six promarginal teeth, two retromarginal teeth; with fine black setae only. Legs dusky orange basally, anterior legs red-orange distally, posterior legs orange distally. Abdomen dark gray dorsally with light dorsolateral patches, smaller light patches anteriorly and above spinnerets (Miller et al. 2010).



Penestomus krugeri after Miller et al. (2010)



Epigyne after Miller et al. (2010)

Penestomus montanus Miller, Griswold & Haddad 2010

COMMON NAME: Lesotho Flat Velvet Spider

NATIONAL STATUS: Rare

NATIONAL RATIONALE: A southern African endemic described by Miller et al. (2010) from Ha Mphahama, Lesotho. In South African it is sampled from Qacha's Nek as well as Prentjiesberg in the Eastern Cape at 1400-1900 m a.s.l. (EOO= 1 570 km²; AOO=28 km²; 1364-1853 m a.s.l.). Due to the species having a small restricted distribution range and there being no threats it is listed as Rare.

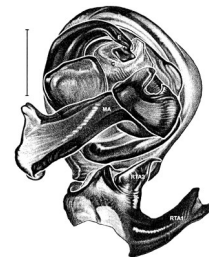
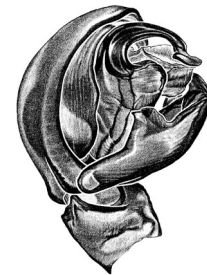
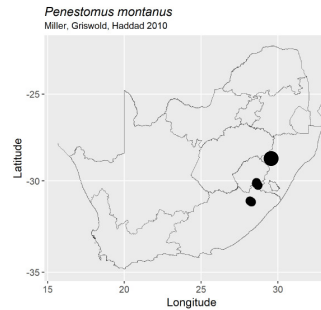
LIFESTYLE: They constructed their retreat-webs underneath rocks lying on the soil surface. The webs followed a winding path that varied from ca. 6 cm in early instar immatures to ca. 18 cm in one adult female. Prey remains included Formicidae, Curculionidae and small Gryllidae. Sampled from the Grassland Biome (Haddad et al. 2013).

GLOBAL DISTRIBUTION: Lesotho and South Africa.

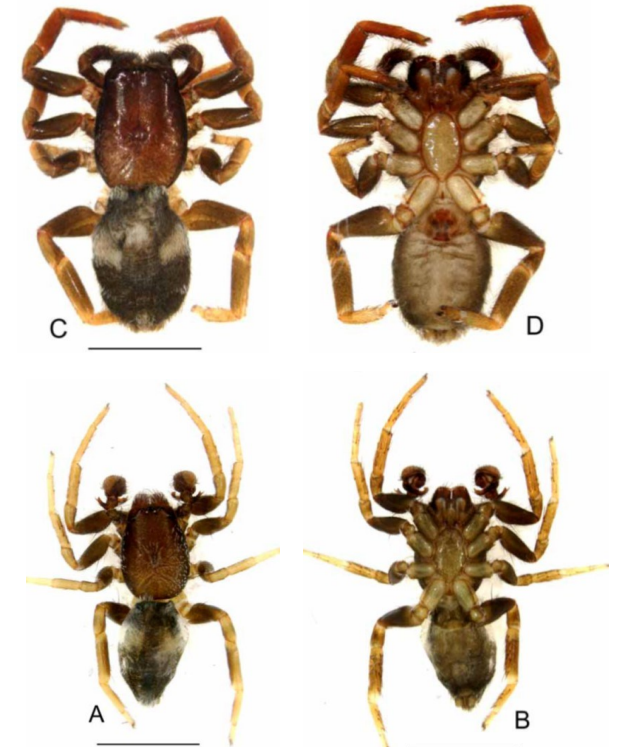
DISTRIBUTION IN SOUTH AFRICA: Eastern Cape: Qacha's Nek (-30.25, 28.7); Qacha's Nek 1748 m a.s.l. (-30.1650, 28.6205); Qacha's Nek 1829 m a.s.l. (-30.1511, 28.6264); Qacha's Nek 1692 m a.s.l. (-30.1554, 28.5932); Prentjiesberg, 1482 m a.s.l. (-31.1159, 28.1745); Prentjiesberg (-31.18, 28.28). **KwaZulu-Natal:** Sani Pass (-30.19, 30.24).

CONSERVATION MEASURES: There are not significant threats to this species as it occurs on mountain ranges.

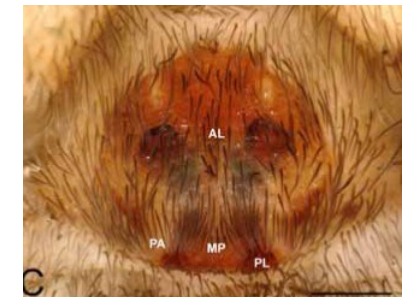
TAXONOMIC NOTES: Known from both sexes. Carapace brown, rugose, covered by fine black setae, with broad white setae concentrated in thoracic region, fovea round, shallow. Sternum dusky pale yellow. Chelicerae dark red-brown, with four promarginal teeth, two retromarginal teeth. Chelicerae with fine black setae, those of male with broad white setae in addition. Legs with broad white setae (more in male than female) and fine black setae. Tibiae with two rows of dorsal trichobothria, metatarsi with one distal trichobothrium. Legs brown basally, pale yellow distally. Abdomen dark gray dorsally with pair of light dorsolateral patches, covered with mixture of fine black and broad white setae (Miller et al. 2010).



Male palpus after Miller et al. (2010)



Penestomus montanus female and male after Miller et al. 2010



Epigyne after Miller et al. (2010)

Penestomus planus Simon, 1902

COMMON NAME: Willowmore Flat Velvet Spider

NATIONAL STATUS: DDT

NATIONAL RATIONALE: A South African endemic described by Simon (1902) from Willowmore in the Eastern Cape. Recorded from two provinces but all the specimens were sampled prior to 1902 (EOO= 10 702 km²; AOO= 12 km²; 66-855 m a.s.l.). The status of the species remains obscure. Some more sampling is needed to collect the male and to determine the species' current range. Therefore, listed as Data Deficient for taxonomic reasons.

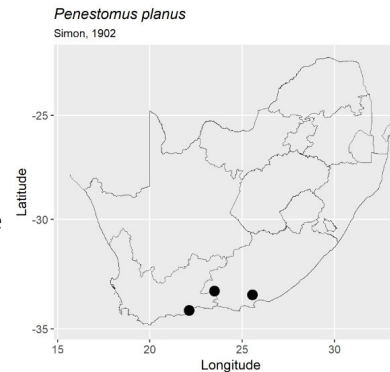
LIFESTYLE: They make retreat-webs underneath rocks. Sampled from the Fynbos and Nama Karoo biomes.

GLOBAL DISTRIBUTION: South Africa.

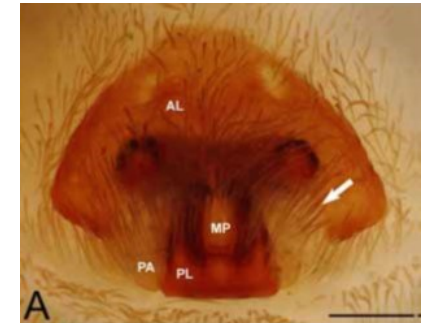
DISTRIBUTION IN SOUTH AFRICA: *Eastern Cape:* Willowmore (-33.3, 23.5); Dunbrody (-33.47, 25.55). *Western Cape:* Mossel Bay (-34.18, 22.12).

CONSERVATION MEASURES: There are not significant threats to this species. Some more sampling is needed.

TAXONOMIC NOTES: Revised by Miller et al. (2010). Male unknown. Specimen faded, carapace orange, lighter posteriorly with smooth texture, covered by fine black setae, with broad white setae concentrated in thoracic and fovea region. Sternum pale yellow. Chelicerae dark red, with six promarginal teeth, two retromarginal teeth. Legs dusky yellow basally, anterior legs orange distally, posterior legs yellow distally. Abdomen pale, but details obscured due to specimen damage (Miller et al. 2010).



Penestomus planus female after Miller et al.(2010)



Epigyne after Miller et al. (2010)

Penestomus prendinii Miller, Griswold & Haddad 2010

COMMON NAME: Prendini's Flat Velvet Spider

NATIONAL STATUS: DDT

NATIONAL RATIONALE: A South African endemic described by Miller et al. (2010) from the type locality Farm Spitskop, near Beaufort West in the Western Cape. (EOO <1000 km²; AOO= 8 km²; 1014-1432 m a.s.l.). Some more sampling is needed to collect the male and to determine the species' range. Therefore, listed as Data Deficient for taxonomic reasons.

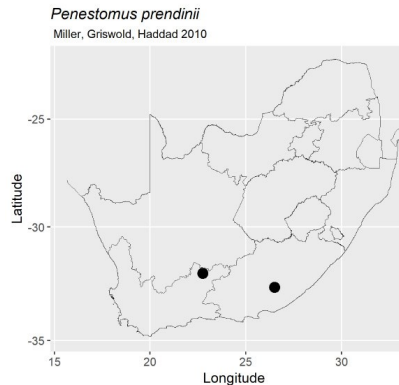
LIFESTYLE: The make a retreat-webs that are usually made underneath rocks. Sampled from the Nama Karoo and Forest biomes.

GLOBAL DISTRIBUTION: South Africa.

DISTRIBUTION IN SOUTH AFRICA: **Eastern Cape:** Fort Fordyce Forest Reserve (-32.69, 26.51). **Western Cape:** Farm Spitskop, 37.4 km NE Beaufort West (-32.07, 22.75).

CONSERVATION MEASURES: Threats to the species are unknown. Some more sampling is needed to collect the male and to determine the species' range.

TAXONOMIC NOTES: Known only from the female. Carapace brown, lateral margins somewhat rounded, covered by fine black setae, with broad white setae concentrated posterior to fovea. Sternum dusky pale yellow. Chelicerae brown, with five promarginal teeth, two retromarginal teeth; with fine black setae only. Legs dusky brown basally, anterior legs orange distally, posterior legs yellow distally. Abdomen dark gray dorsally with pair of broad light dorsolateral patches, covered with mixture of fine black and broad white setae (Miller et al. 2010).



Penestomus prendinii female after Miller et al. (2010)



Epigyne after Miller et al. (2010)

Penestomus stilleri (Dippenaar-Schoeman, 1989)

COMMON NAME: Stiller's Flat Velvet Spiders

NATIONAL STATUS: DDT

NATIONAL RATIONALE: A Western Cape endemic described Dippenaar-Schoeman (1989) as *Wajane stilleri* from the type locality Du Toit's Kloof, Paarl in 1975. The species is presently only known from a few localities (EOO <5000 km²; AOO= 12 km²; 101-1015 m a.s.l.). Too little is known about the location, habitat and range of this species for an assessment to be made. More sampling is needed, to collect the male and determine the species' range. Therefore, listed as Data Deficient for taxonomic reasons.

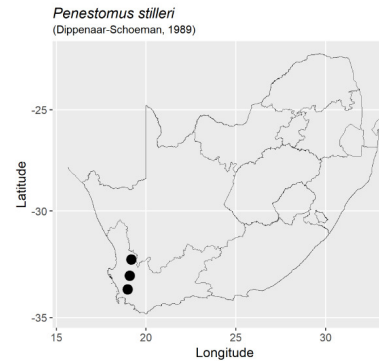
LIFESTYLE: The type species was found in silk-lined tunnels under exfoliated section of rock, in a boulder. Sampled from the Fynbos Biome.

GLOBAL DISTRIBUTION: South Africa.

DISTRIBUTION IN SOUTH AFRICA: **Western Cape:** Paarl, Du Toit's Kloof (-33.71, 18.98); Winterhoek 4400-5500 ft (-33.07, 19.09); Cederberg Wilderness Area, Crystal Pools, Wupperthal (-32.31, 19.18); Jutten Island, Saldanha Bay (-33.01, 17.93)

CONSERVATION MEASURES: Threats to the species are unknown. It is presently protected in the Cederberg Wilderness Area (Foord & Dippenaar-Schoeman 2016). More sampling is needed, to collect the male and determine the species' range.

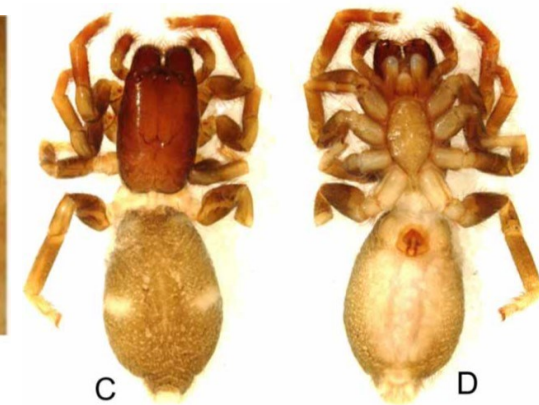
TAXONOMIC NOTES: Revised by Miller et al. (2010). Known only from the female. Carapace orange-yellow, lighter posteriorly with smooth texture. Sternum dusky pale yellow. Chelicerae orange, with five promarginal teeth, two retromarginal teeth. Legs brown basally, leg I and II orange distally, posterior legs pale yellow distally. Abdomen medium gray dorsally with light dorsolateral patches (Miller et al. 2010).



Penestomus stilleri female from Saldanha Bay Photo Norman Larsen



Epigyne after Miller et al. (2010)



Penestomus stilleri female after Miller et al. (2010)

***Penestomus zulu* Miller, Griswold & Haddad 2010**

COMMON NAME: Zululand Flat Velvet Spider

NATIONAL STATUS: DDT

NATIONAL RATIONALE: A KwaZulu-Natal endemic described by Miller et al. (2010) from the type locality Mfongosi. The type was sampled in 1918 (EOO= <100 km²; AOO= 4 km²; 73 m a.s.l.). Too little is known about the location, habitat and threats of this taxon for an assessment to be made. More sampling is needed, to collect the male and determine the species' range. Therefore, listed as Data Deficient for taxonomic reasons.

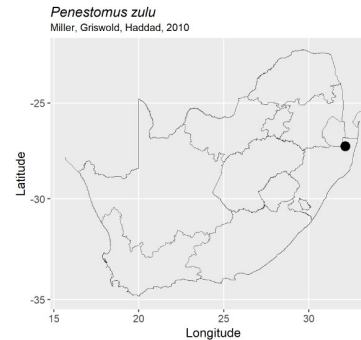
GLOBAL DISTRIBUTION: South Africa.

DISTRIBUTION IN SOUTH AFRICA: *KwaZulu-Natal*: Mfongosi (-27.28, 32.15).

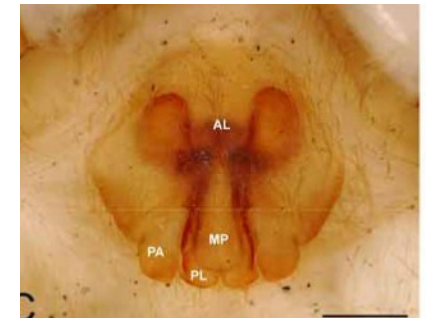
LIFESTYLE: Retreat-webs are usually made underneath rocks. Sampled from the Savanna Biome (Foord et al. 2011).

CONSERVATION MEASURES: Threats to the species are unknown. More sampling is needed, to collect the male and determine the species' range.

TAXONOMIC NOTES: Male unknown. Carapace orange, lighter posteriorly with smooth texture, covered by fine black setae and broad white setae. Sternum pale. Chelicerae red-brown, with five promarginal teeth, two retromarginal teeth. Legs dusky yellow, anterior legs orange distally. Abdomen dark gray dorsally with indistinct light dorsolateral patches (Miller et al. 2010).



Penestomus zulu female after Miller et al. (2010)



Epigyne after Miller et al. (2010)

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