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A review of the genus *Philodicus* Loew, 1848 in southern Africa (Diptera: Asilidae)

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ABSTRACT

The history of taxonomic work undertaken on Afrotropical *Philodicus* Loew, 1848 is summarised. Details relating to the southern African fauna are provided. Five species occur in the sub-region: *P. cinerascens* (Ricardo, 1900), *P. dubius* Ricardo, 1921, *P. fraterculus* (Walker, 1855), *P. swynnertoni* Hobby, 1933 and *P. tenuipes* Loew, 1858. A lectotype and paralectotype are designated for *P. dubius*. A key to the species is provided along with new illustrations of male terminalia in order to facilitate identification. All known records are provided for these species along with distribution maps and notes on their biology. All species are found near places where free water may be found. All known prey records are provided and discussed, and a strong preference for grasshoppers (Acrididae) is noted.

KEY WORDS: Afrotropical Region, Diptera, Asilidae, *Philodicus*, distribution, biology.

INTRODUCTION

Philodicus Loew, 1848 is an attractive genus (Fig. 1) of fairly large robber flies with some 20 recognised Afrotropical species (Oldroyd 1980). The genus is also well represented in the Oriental Region with 19 recognised species being listed by Oldroyd (1975). Two species are catalogued for the Palearctic Region (Lehr 1988), while a single species is listed as occurring in the Australasian and Oceanian Regions (Daniels 1989).

The taxonomic history of Afrotropical *Philodicus* can be briefly summarised as follows:

Wiedemann (1819) – Described *Asilus javanus* from the Oriental Region as well as *fraternus* from ‘Guinea’.

Wiedemann (1828) – Described *Asilus ludens* from ‘Aus Nubien’ (Sudan).

Macquart (1838) – Described *Trupanea limbata* from Senegal.

Loew (1848) – Described *Philodicus* with Oriental type species *Asilus javanus* Wiedemann, 1819, by monotypy.

Walker (1849) – Described *Asilus turinus* from Sierra Leone.

Walker (1851) – Described *Trupanea temerarius* from Senegal.

Walker (1855) – Described *Trupanea fraterculus* from ‘Port Natal’ (= Durban, South Africa).

Loew (1858) – Described *P. obscuripes* from ‘Guinea’, and *P. tenuipes* from ‘Caffraria’ (eastern South Africa).

Wulp (1889) – Described *Apoclea infuscata* from ‘du Congo’ (DR Congo).

Bigot (1891) – Described *Alcimus aethiopicus* and *Rhadiurgus notatus* from ‘Assinie’ (Ivory Coast).

Bezzi (1892) – Described *P. pavesii* from ‘Obbia’ (= Hobyo) ‘Somali’ (Somalia).

Wulp (1899) – Described *P. gracilis* from ‘Lehej’ and ‘Haithalhim’ in Yemen.

Ricardo (1900) – Described *Alcimus cinerascens* from ‘Fort Johnston, Nyasaland’ (Malawi).



Fig. 1. *Philodicus tenuipes* Loew, 1857. Male habitus.

Kertész (1909) – Catalogued four Afrotropical *Philodicus* species (*gracilis*, *obscuripes*, *pavesii*, *tenuipes*), four *Alcimus* Loew, 1848 (*aethiopicus*, *fraternus*, *limbata*, *ludens*), one *Rhadiurgus* Loew, 1849 (*notatus*), three *Promachus* Loew, 1848 (*fraterculus*, *temerarius*, *turinus*) and one species of *Apoclea* Macquart, 1838 (*infuscata*).

Ricardo (1921) – Reviewed the genus, describing *P. dubius* from ‘M’Fongosi, Zululand’ (KwaZulu-Natal, South Africa), *walkeri* from ‘Sierra Leone’ and ‘Bugama, Nigeria’, *nigrescens* from ‘Lualaba River, Congo’ (DR Congo) and *umbripennis* from ‘S.W. Nyasa’ and ‘Nyasaland’ (Malawi). *Alcimus fraternus* was transferred to *Philodicus*, and new records of some species were provided (*gracilis* – ‘Arabia’, *temerarius* – Cameroon, Sierra Leone, Liberia, Nigeria, Nyasaland (Malawi), Gold Coast (Ghana), *fraterculus* – ‘Junction Blaauw Krantz and Tugela River, Natal’ (South Africa), *turinus* – Gold Coast (Ghana), Nigeria, British East Africa (Kenya), Nyasaland (Malawi), *fraternus* – Sierra Leone, Nigeria, Gambia, Gold Coast (Ghana), Dahomey (Benin), Mozambique. A key to nine species was provided (*dubius*, *fraterculus*, *fraternus*, *gracilis*, *nigrescens*, *temerarius*, *turinus*, *umbripennis*, *walkeri*) and *obscuripes* listed as a synonym of *temerarius*.

Becker (1922) – Described *P. ocellatus* from ‘aus Sennar’ ‘Anglo-Ägyptischen Sudan’ (Sudan).

Ricardo (1922) – Included *cinerascens* in a key to nine Afrotropical species of *Alcimus* and records the species from ‘M’fongosi, Zululand’ (a region of KwaZulu-Natal, South Africa).

Ricardo (1925) – Transferred *cinerascens* from *Alcimus* to *Philodicus* with *umbripennis* as a synonym. She also described *P. nigripes* from ‘Eastern Mbale Dist., S. of Mt. Elgon, Uganda’, ‘Bulawayo’ (Zimbabwe), ‘Mt. Mlanje, Nyasaland’ (Malawi) and ‘Hope Fountain, S. Rhodesia’ (Zimbabwe) without designating a holotype.

- Curran (1927) – Described *Alcimus doris* and *A. biseriatus* from ‘Belgian Congo’ (DR Congo), illustrating *A. fraternus* for comparison.
- Hobby (1933) – Described *P. swynnertoni* from ‘Mt. Chirinda, S.E. Rhodesia’ (Zimbabwe).
- Blasdale (1957) – Revised the ‘Ethiopian’ (Afrotropical) *Philodicus* fauna, recognising 20 species. He described seven new species – *alcimoides* from Sudan, Gold Coast (Ghana) and Sierra Leone, *flavipes* from ‘Gold Coast’ (Ghana), *furunculus* from Sudan, *pallidus* from ‘Somaliland’ (Somalia), as well as *palustris*, *robustus* and *yirolensis* from Sudan. A number of new synonyms were listed – *limbatus* and *turinus* for *fraternus* and *aethiopicus*, *notatus*, *walkeri* and *biseriatus* for *temerarius*. He also synonymised *Alcimus brachypteratus*, an unavailable name (MS name of Bigot published as synonym), with *temerarius*. Two species groups were recognised – *alcimoides* group (*alcimoides*, *cinerascens*, *dubius*, *gracilis*, *pallidus*, *pavesii*, *tenuipes*), and *fraternus* group (*doris*, *flavipes*, *fraterculus*, *fraternus*, *furunculus*, *ludens*, *nigrescens*, *nigripes*, *palustris*, *robustus*, *swynnertoni*, *temerarius*, *yirolensis*) and a key to all recognised species was also provided.
- Hull (1962) – Included *Philodicus* in his account of world asilid genera, listing 12 ‘Ethiopian’ (Afrotropical) species – *cinerascens*, *cothurnata*, *dubius*, *gracilis*, *nigrescens*, *nigripes*, *obscuripes*, *ocellatus*, *pavesii*, *swynnertoni*, *tenuipes*, *walkeri*. [Note: *Teretromyia* was included as a synonym of *Philodicus* and *T. cothurnata* Bigot, 1859 listed as a *Philodicus*. In addition, *obscuripes* Loew, 1858 had been synonymised with *temerarius*].
- Hull (1967) – Described *P. compactus* from South Africa and *multicellula* from ‘Basutoland’ (Lesotho).
- Londt (1978) – Reviewed the southern African fauna, providing a key to five species (*cinerascens*, *dubius*, *fraterculus*, *swynnertoni*, *tenuipes*). *P. compactus* was synonymised with *dubius* while *nigripes* and *multicellula* were synonymised with *fraterculus*.
- Oldroyd (1980) – Catalogued the Afrotropical fauna listing 20 valid species and 12 synonyms (*alcimoides*, *cinerascens* (syn. *umbripennis*), *doris*, *dubius* (syn. - *compactus*), *flavipes*, *fraterculus* (syn. *nigripes*, *multicellula*), *fraternus* (syn. *limbata*, *turinus*), *furunculus*, *gracilis*, *ludens*, *nigrescens*, *ocellatus*, *pallidus*, *palustris*, *pavesii*, *robustus*, *swynnertoni*, *temerarius* (syn. *obscuripes*, *infuscata*, *aethiopicus*, *notatus*, *walkeri*, *biseriatus*), *tenuipes*, *yirolensis*). *Trupanea limbata* Macquart, 1838 is listed both as a valid species of *Alcimus* (as *limbatus*) and a synonym of *P. fraternus*. *P. nigripes* was erroneously omitted while *cothurnata* is assigned to *Promachus*).
- Tomasovic (2012) – Studied the aedeagal structure of eight Afrotropical species (*alcimoides*, *cinerascens*, *doris*, *fraternus*, *furunculus*, *nigrescens*, *swynnertoni*, *temerarius*) confirming the synonymy of *biseriatus*, *infuscata* and *obscuripes* with *temerarius*.

There were, therefore, 20 valid species of Afrotropical *Philodicus* at the commencement of this study – those catalogued by Oldroyd (1980) (i.e. *alcimoides*, *cinerascens*, *doris*, *dubius*, *flavipes*, *fraterculus*, *fraternus*, *furunculus*, *gracilis*, *ludens*, *nigrescens*, *ocellatus*, *pallidus*, *palustris*, *pavesii*, *robustus*, *swynnertoni*, *temerarius*, *tenuipes*, *yirolensis*) and 12 species names considered synonyms (*aethiopicus*, *biseriatus*, *brachypteratus*, *infuscata*, *limbata*, *multicellular*, *nigripes*, *notatus*, *obscuripes*, *turinus*, *umbripennis*, *walkeri*).

The taxonomy of the genus was competently handled by Blasdale (1957). Unfortunately he had very little southern African material and this persuaded Londt (1978) to study the genus in a southern African context using material largely deposited in southern African collections. Southern Africa is here defined as all territory south of the Kunene and Zambezi rivers. In the more than 35 years since Londt's 1978 paper, many more specimens have accumulated and so a reappraisal is considered useful. Although no new taxa have emerged, a far better understanding of the distributions of those species inhabiting the region is now possible and more information is available relating to habitat preferences and prey choices. With the work of Blasdale (1957) and Londt (1978) being available it is not considered necessary to redescribe the southern African *Philodicus* species. However, in order to make identifications easier some new illustrations of terminalia are presented along with an updated key.

MATERIAL AND METHODS

Much of the material previously recorded by Londt (1978) has been re-examined and included in the lists of material supplied for each species and marked with an asterisk (*). While it was not considered necessary to recall previously cited specimens from collections outside of South Africa, information concerning these is briefly provided and the locality data plotted on maps. Genital illustrations are designed to complement those of Londt (1978) and Blasdale (1957) and to feature characteristics helpful in identification of the species. The key provided is a modification of that published by Londt (1978). With the focus being primarily on the distributions and biology of species, available material is listed and analysed as fully as possible. Square brackets are used for comments, notes or updated information. While more recently collected specimens usually provide detailed information relating to the localities and habitats from which material was obtained, it has been necessary to attempt to establish precise geographic coordinates for many localities. Although Google Earth and other online gazetteer sources have been used extensively to accomplish this, there remain a few specimens whose origin is doubtful or unknown. Material studied is listed under the countries of origin and ordered according to latitude. Abbreviations for institutions housing material cited are as follows (older citations being supplied in brackets), the names of people who have assisted me in recent times are acknowledged in brackets. In some instances material cited earlier (Londt 1978) was not reworked and so no acknowledgement is necessary.

BMSA	–	National Museum, Bloemfontein, South Africa (A. Kirk-Spriggs);
MZLU (= E.M.L.)	–	Zoological Museum, Dept. Zoology, Lund, Sweden;
NMNW (= S.M.)	–	State Museum, Windhoek, Namibia;
NMSA (= N.M.)	–	KwaZulu-Natal Museum, Pietermaritzburg, South Africa (B. Muller);
SAMC (= S.A.M.)	–	South African Museum, Cape Town, South Africa (D. Larsen);
SANC	–	National Collection of Insects, Pretoria, South Africa (R. Urban);
USNM	–	National Museum of Natural History, Smithsonian Institution, Washington, DC, USA. (T. Dikow).

Abbreviations used by Londt (1978) and repeated here under material that has not been restudied include:

- A.M. – Albany Museum, Grahamstown, South Africa;
 B.M.(N.H.) – The British Museum (Natural History)[Natural History Museum, London (NHMUK)], London, UK;
 C.M. – Museu Dr Alvaro de Castro, Maputo, Mozambique [material now incorporated in the NMSA collection];
 D.M. – Durban Museum [Durban Natural Science Museum], Durban, South Africa;
 N.M.R. – National Museum of Rhodesia [Zimbabwe], Bulawayo, Zimbabwe;
 P.P.R.I. – Plant Protection Research Institute, Salisbury (Harare), Zimbabwe.

TAXONOMY SOUTHERN AFRICAN SPECIES

Philodiscus Loew, 1848

Philodiscus Loew, 1848: 391. Type species: *Asilus javanus* Wiedemann, 1819, by monotypy.

Diagnosis (compiled using key characters as published by Londt (2005)): *Head*: Antennal stylus composed of only 2 elements (an attenuated segment-like element tipped with a seta-like sensory element); face with a slight gibbosity ventrally; postocular setae dorsally short, straight or only slightly proclinate. *Thorax*: Dorsocentral macrosetae confined to mesonotal region posterior of transverse suture; scutellum with fewer than 8 apical macrosetae, disc with setae only (no macrosetae); wing with complete supernumerary crossvein present between R_{2+3} and R_4 ; supernumerary crossvein shortish and at most running parallel to R_{4+5} for a short distance; cell r_4 long and diverging gradually towards wing margin; hind margin of wing with a double row of microtrichia diverging from the plane of wing membrane.

Key to the southern African species of *Philodiscus* (adapted from Londt 1978)

- 1 Anterior and posterior surfaces of femur 1 lacking macrosetae; antennal stylus at least as long as twice the length of postpedicel; ♀ ovipositor (S8) distally broad and spade-like (*alcimoides* group) 2
- Femur 1 with at least one short stout black bristle on posterior surface; antennal stylus shorter than twice the length of postpedicel; ♀ with macrosetae laterally on T3; ♀ ovipositor (S8) distally narrow and spike-like (*fraternus* group) 4
- 2 Wing longer than 1.5 cm; terminalia as in Figs 7–10 ***dubius*** Ricardo, 1921
- Wing shorter than 1.5 cm 3
- 3 Male aedeagus swollen subapically, lacking three well defined terminal projections; terminalia as in Figs 21–24; widely distributed in both eastern and western southern Africa (Fig. 25) ***tenuipes*** Loew, 1857
- Male aedeagus not swollen subapically, with three well defined terminal projections; terminalia as in Figs 2–5; southern African distribution limited to north-eastern region (Zimbabwe, Mozambique) (Fig. 6) ***cinerascens*** (Ricardo, 1900)
- 4 1–3 short black macrosetae on anterior surface of prothoracic femur; ♀ with macrosetae laterally on T4–6; terminalia as in Figs 17–20 ***swynnertoni*** Hobby, 1933

- Anterior face of prothoracic femur lacking macrosetae; ♀ lacking macrosetae on T4–6; terminalia as in Figs 12–15.....*fraterculus* (Walker, 1855)

Philodicus cinerascens (Ricardo, 1900)

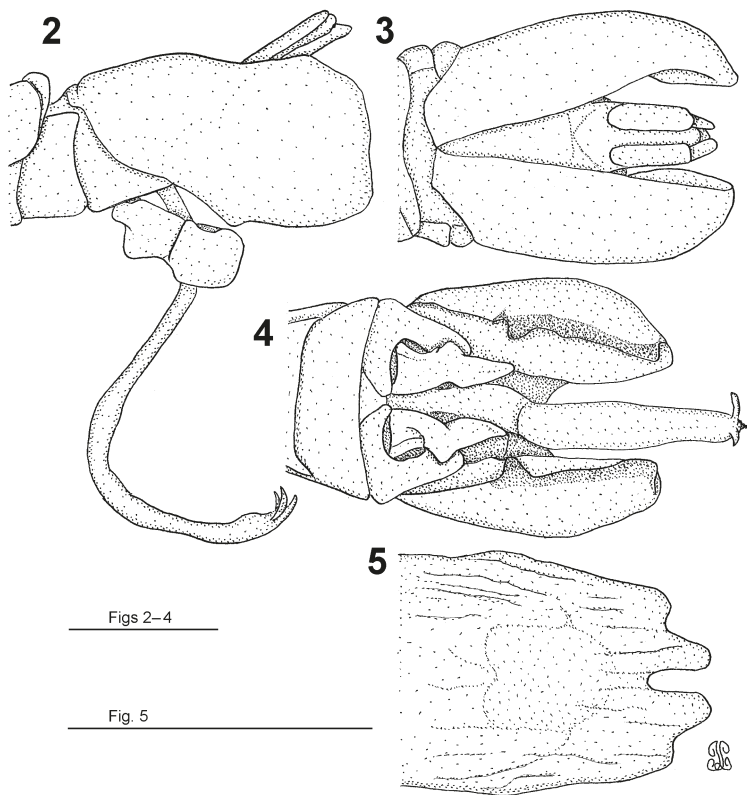
Figs 2–6

Alcimus cinerascens Ricardo, 1900: 176; 1922: 42.

Philodicus umbripennis Ricardo, 1921: 184; 1925: 236.

Philodicus cinerascens: Ricardo 1925: 236; Blasdale 1957: 139 (pl. I, fig. 5 ♂ gen., Pl. II, fig. 4 ♀ S8); Hull 1962: 456; Londt 1978: 422 (figs 5 ♂ gen, 6 aed.); Oldroyd 1980: 342 (catalogue); Tomasovic 2012: 25 (fig. 2 aed.).

Ricardo (1900) described *Alcimus cinerascens* on 3♂ 4♀ from ‘Fort Johnston, Nyasaland [Malawi] (P. Rendall)’. She calls both males and females ‘types’ and so all should be considered ‘cotypes’ or ‘syntypes’. With the close similarity to *tenuipes* there is a need for the designation of a lectotype. Ricardo (1921) again handled *Philodicus*, but not *cinerascens* which she had placed in *Alcimus*. However she described *umbripennis*, which she later synonymised with *cinerascens*. *P. umbripennis* was based on ‘Type (male), type (female), from S.W. Nyasa (R. Webb), 96, 261; another male from Nyasaland, Nov. 1892 (H.H. Johnston), 94, 12; another female from Nyasaland (Dr.



Figs 2–5. *Philodicus cinerascens* (Ricardo, 1900). (2–4) male terminalia: (2) lateral, (3) dorsal and (4) ventral views; (5) female distal end of S8.

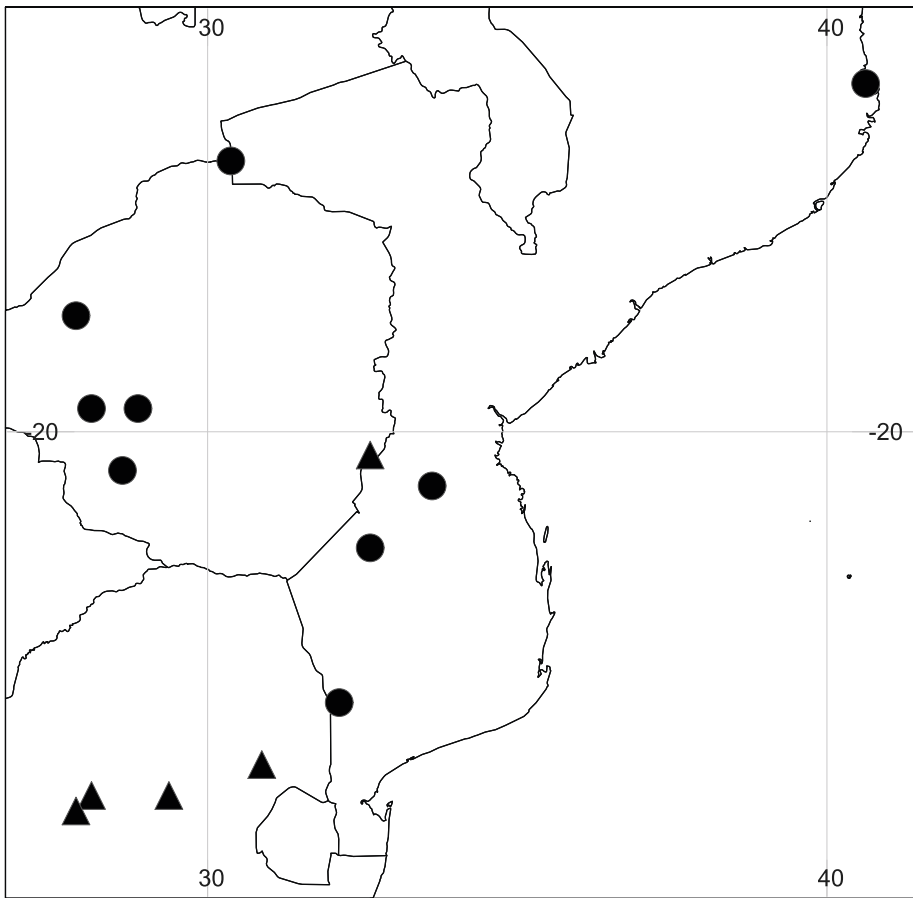


Fig. 6. Southern African distribution of *Philodicus cinerascens* (Ricardo, 1900) (●) and *P. swynnertoni* Hobby 1933 (▲).

H.G. Eldred). The species is evidently fairly common at some locations in Malawi as I have collected and studied the following material from a hill behind the hotel at Senga Bay: 5♂ 'Malawi Senga Hills [c. 13°43'S 34°37'E 490 m] / 1-2.xii.1980 1334DA / Ca. 500m, Stuckenberg / & Londt *Brachystegia* / woodland near lake' (NMSA); 5♂ 3♀ 'Malawi SE1334DC / Senga Bay 20km NE of / Salima 7-8.iii.1987 / J & A Londt Woodland / on hill behind hotel' (NMSA).

Material examined: MOZAMBIQUE: 2♂ 'Namelala [Namelala c. 14°28'S 40°37'E 20 m] / 22/11/56 / Col. Trav[illegible] Dias' (NMSA)*; 2♂ 'Mombane [? Mambone c. 20°59'S 33°39'E 160 m] Mozam. / No. / 22-25-III-1964 / Coll. A.L. Moore', 'USNMENT01100102-USNMENT01100105 [respectively]' (USNM); 2♂ 2♀ 'Massangena [c. 21°46'39"S 32°37'40"E 215 m] Mozam. / No. / 1-II-1964 / Coll. A.L. Moore', 'USNMENT01100087 [♂ + ♀] & USNMENT01100088 [♂ + ♀] [respectively]' (USNM); 6♂ 7♀ 'Massangena Mozam. / No. / 1-8-II-1964 / Coll. A.L. Moore', 'USNMENT01100087-USNMENT01100098 [respectively - 3 pairs with same numbers]' (USNM); 1♀ 'Mapulanguene [c. 24°29'31"S 32°04'54"E 155 m] Mozam. / No. / 3-6-III-1964 / Coll. A.L. Moore', 'USNMENT01100099' (USNM). ZIMBABWE: 2♂ 1♀ 'Country Rhodesia / Loc Lusulu [c. 18°04'S 27°50'E 990 m] / Date 28/xi/63 / Coll R.J. Phelps' (NMSA)*.

Note: Ricardo's (1922) record of the species from 'M'fongosi, Zululand (W. E. Jones)' (SAMC) is erroneous, the material actually belonging to the closely similar *tenuipes*.

Material not re-examined: Additional southern African material from Zimbabwe was listed in Londt's (1978) addendum as follows: 'Rhodesia [Zimbabwe]: 4♂ 4♀ Matopos [Matobo National Park - c. 20°36'S 28°30'E c. 1385 m], 7.ii.1920 11.ii.1924 20.ii.1938 (N.M.R.); 1♂ 6♀, Turk Mine [c. 19°43'S 28°48'E 1305 m], 10.xi.1957 (N.M.R.); 1♂ 2♀, Sawmills [c. 19°35'S 28°02'E 1130 m], 12.vi.1920 10.ii.1920 23.ii.1922 (N.M.R.); 1♀, Runde [c. 19°56'S 29°58'E 1045 m] Tribal Trustland, 23.iv.1971, Payne (N.M.R.); 1♀, Mwanzanania, Kanyemba [c. 15°38'S 30°25'E 350 m], 27.ix.1976, Mpala (N.M.R.).'

Distribution, phenology and biology: Southern African distribution is limited to a few localities in Zimbabwe (Fig. 6) where the species has been collected in September, November, February, March, April and June (Table 1) – seemingly throughout the year. The species has been collected sympatrically with *dubius* at Massangena. Little is known of its biology. Malawian specimens were collected in *Brachystegia* woodland near the shores of Lake Malawi. The female ovipositor is distally broad and spade-like so may be adapted for digging in loose sand. No prey records are available.

Philodicus dubius Ricardo, 1921

Figs 7–11

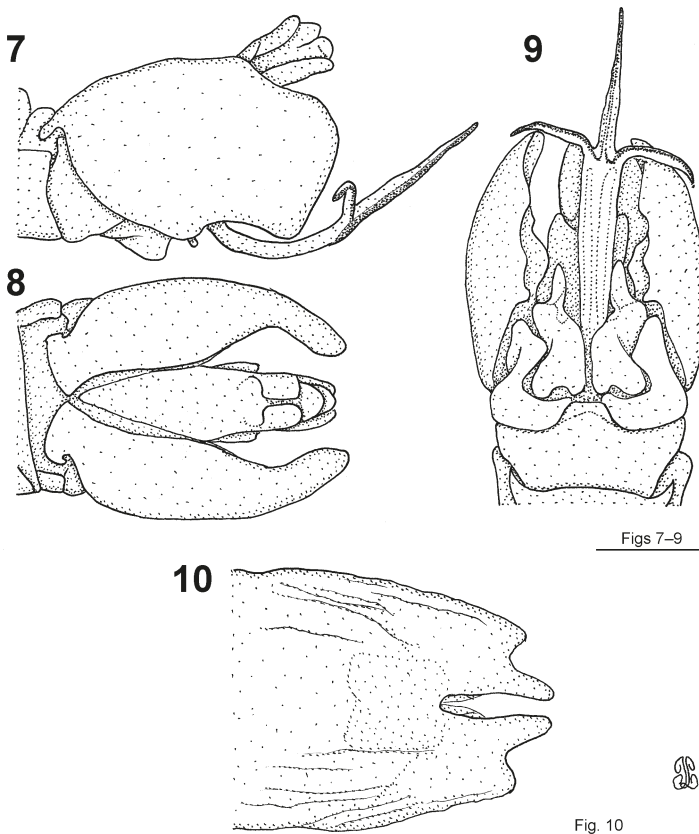
Philodicus dubius Ricardo, 1921: 179; Blasdale 1957: 139 (pl. I, fig. 1 ♂ gen., pl. II, fig. 1 ♀ S8); Hull 1962: 456; Londt 1978: 420 (figs 3 ♂ gen., 9 aed.).

Philodicus compactus Hull, 1967: 256 (fig. 6 ♂ gen.).

Ricardo (1921) described the species on 'Type (male) and another, type (female), all from M'fongosi, Zululand (W. E. Jones), March 1911, in Cape Museum Coll' and so did not designate a holotype, but merely listed a male and a female as 'types'. These two specimens, which must be considered syntypes, have been studied, along with others from the same locality, and the male is here designated Lectotype. The female is considered a Paralectotype, while other material has no type status as there is no evidence that Ricardo actually studied them.

Type material: Lectotype: 1♂ 'Holo- / type' (orange), 'Mfongosi [c. 28°43'S 30°50'E 575 m] / Zulu L. [Zululand] / W E Jones / Dec. 1911', '*Philodicus dubius* / n.sp. Ricardo ♀ [error]', 'Ricardo / determ.' (pale blue), 'SAM-DIP / A007818' (SAMC)*. Paralectotype: 1♀ 'Type / HT' (circular, red edge – scribbled on illegibly), 'Mfongosi / Zulu L. / W E Jones / Dec. 1911', '*Philodicus dubius* / Ricardo', 'Allotype / ♀ of *Philodicus* / *dubius* Ric. / A.J.H.' (attached by Dr A.J. Hesse, 'SAM-DIP / A007818' (SAMC)*

Material examined: BOTSWANA: 2♂ 'V.-L. Kal. Exp. / Metsimaklaba [c. 24°32'S 25°29'E 1115 m] / 7–12/3/1930' (NMSA)*; 2♂ 'V.-L. Kal. Exp. [Kalahari Expedition] / Metsimaklaba / 7–12/3/1930', 'USNMMENT01100079 & USNMMENT01100080 [respectively]' (USNM). MOZAMBIQUE: 1♂ 8♀ 'Mombane [?] Mambone c. 20°59'S 33°39'E 160 m] Mozam. / No. / 22–25-III-1964 / Coll. A.L. Moore', 'USNMMENT01100103–USNMMENT01100104, USNMMENT01100106–USNMMENT01100111 [respectively]' [2♀ with Acrididae] (USNM); 2♂ 'Masseangena [c. 21°46'39"S 32°37'40"E 215 m] Mozam. / No. / 1-II-1964 / Coll. A.L. Moore', 'USNMMENT01100085 & USNMMENT01100086 [respectively]' (USNM); 1♀ 'Moçambique / Lago Chuali [c. 25°00'S 32°56'E 20 m] / 5-4-1980 / Coll. H.R. Feijen' (NMSA); 1♂ 1♀ 'Moamba [c. 25°36'14"S 32°14'46"E 110 m] Mozam. / No. / 9–12-III-1964 / Coll. A.L. Moore', 'USNMMENT01100100 [?] & USNMMENT01100101 [♂] [respectively]' (USNM); 1♂ 'Moçambique / Goba [c. 26°12'S 32°08'E 85 m] / 19/3/1980 / Coll. H.R. Feijen' (NMSA); 1♂ 'P. E. Africa [Portuguese East Africa = Mozambique] / Guendri [?] Quendri] / B. Lebied' 'SAM-DIP / A007822' (SAMC)*. SOUTH AFRICA: 3♂ 2♀ 'Sth Africa: Limpopo / Messina Nature Reserve / 22°24'54"S 30°05'12"E / J.G.H. Londt & T. Dikow / 487m 14.ii.2005 *Mopane* / dry woodland Sand Riv' (NMSA); 1♂ 'Kruger National Park / Limpopo Junction [c. 22°26'S 31°18'E 200 m] / 29.xi.1959 / H.K. Munro & / A.C. v. Bruggen' (SANC); 2♂ 2♀ 'Sth Africa: Limpopo / Ben Lavin Nature Res. / 23°08'38"S 29°57'03"E / J.G.H. Londt & T. Dikow / 865m 13.ii.2005 *Acacia* / *Zizyphus* dry woodland' [1♀ feeding on Acrididae] (NMSA); 1♀ 'South Africa 2327BD / Transvaal Ellisras [= Lephalale c. 23°40'S 27°45'E 825 m] / 30.i.1978 JGH Londt / Grass near trees on / Mokolo River banks' (NMSA)*; 1♂ 'South Africa N.W. Tvl / Mogol Nature Reserve / Ellisras Dist. 23.58S / 27.45E 19–23.xi.1979 / G.L. Prinsloo' (SANC); 2♀ 'Sth Africa: Transvaal / Kruger National Park / Vicinity of Skukuza [c. 25°00'S 31°36'E 285 m] / 9–12.iv.1985 J. Londt / SE2431DC Bushveld' (NMSA); 1♀ 'South Africa Transvaal / Kruger Park 9.xii.1972 / Lower Sabie Camp [c. 25°07'S 31°55'E 175 m] area



Figs 7–9

Fig. 10

Figs 7–10. *Philodiscus dubius* Ricardo, 1921. (7–10) male terminalia: (7) lateral, (8) dorsal and (9) ventral views. (10) female distal end of S8.

/ open savannah & river banks / B & P Stuckenberg 2531Bb' [feeding on ♂ *P. tenuipes*] (NMSA)*; 1♀ 1? 'Mfongosi [c. 28°43'S 30°50'E 575 m] / Zululand' 'SAM-DIP / A007820' (SAMC); 1♂ 1♀ 'Mfongosi / Zulu L. / W E Jones / Mch 1911', 'Preying on / Dragonflies / W E Jones', 'SAM-DIP / A007821' (SAMC); 2♂ 2♀ 'Mfongosi / Zulu L. / W E Jones', 'SAM-DIP / A007819' (SAMC); 1♂ 1♀ 'South Africa: Natal / Umlalazi Nature Res. [c. 28°57'S 31°46'E 5 m] / 26–27.i.1987 / JGH Londt SE2831DD / Dune forest & margin' (NMSA); [♀ feeding on Acrididae] (NMSA). SWAZILAND: 1♀ 'Swaziland #48 / Mbuluzi Nature Reserve / 26°08'S 32°00'E 200m / Date: 25.iv.1991 / J. Londt & L. Schoeman / Mixed woodland area' (NMSA); 5♂ 'Swaziland #45 / 13km N of Ngogolo / 26°19'S 31°38'E 300m / Date: 22–24.iv.1991 / J. Londt & L. Schoeman / Panata Ranch/Bushveld' (NMSA). ZIMBABWE: 1♀ 'Africa Rhodesia / Loc Rekomitjie [Farm c. 16°28'S 29°31'E 1140 m] / Date 25/xi/76 / Habit Thicket / Collector R.J. Phelps' (NMSA); 1♂ 'Country Rhodesia / Loc Kariba [c. 16°47'S 28°52'E 815 m] / Date 14/v/64 / Coll R.J. Phelps' (NMSA); 1♀ same data but 17/v/64 (NMSA); 1♂ 1? 'Balla-Balla [= Mbalabala c. 20°27'00"S 29°02'09"E 1105 m] / S. Rhodesia / iii.1931 / A. Cuthbertson', 'USNMENT01100075' (USNM).

Material not re-examined: Londt (1978) records the types of *P. compactus*, housed by MZLU, as follows: 'South Africa: Natal, 1♂ holotype, Tugela River, 12 mi., N.W. Bergville [c. 28°44'S 29°21'E 1140 m], 31.iii.1951, loc. No. 255, Brink & Rudebeck (E.M.L.); Transvaal, 1♀ paratype, Kruger National Park, Skukuza [c. 24°59'S 31°35'E 285 m], 29.iv.1951 loc. No. 283, Brink & Rudebeck (E.M.L.)'. In addition Londt (1978) lists the following material, mostly from Zimbabwe: 'Mozambique: 1♀, Base Camp, Massangera Dist., Save River [c. 21°06'S 34°42'E 15 m], 11.xii.1972, de Moor (N.M.R.). Lesotho: 1♀, Mamathes [c. 29°08'S 27°51'E 1685 m], 20.ii.1954, Jacot-Guillarmod (A.M.). Rhodesia: 2♂ 2♀, 153 km S.E. Nuanetse

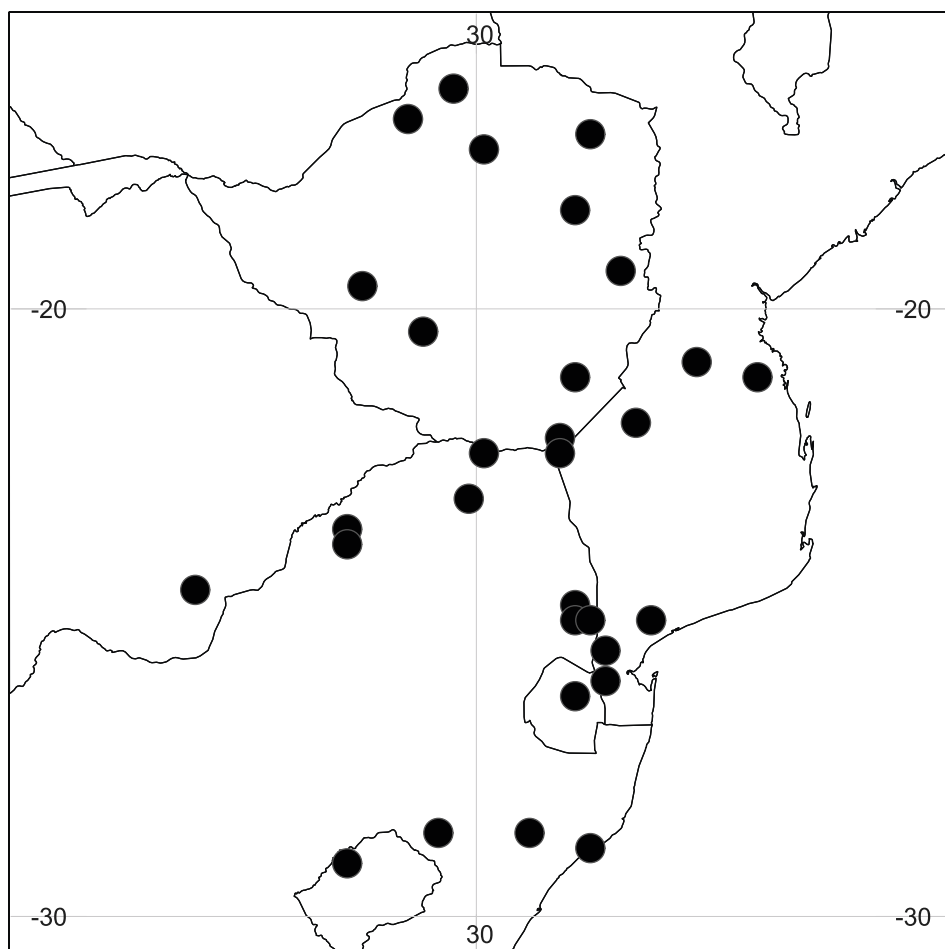


Fig. 11. Southern African distribution of *Philodicus dubius* Ricardo, 1921.

[Nuanetsi - c. 22°10'S 31°24'E 225 m], v & iv.1961 (N.M.R.); 1♂ 3♀, 27 km S. Chituropadzi [?], Limpopo River, ♀-29.iv.1968 ♀-28.iv.1968 ♀-1.v.1968 ♂-3.iv.1968, Pinhey (N.M.R.); 2♂ 1♀, Chikwarawara Dip, Chipese [Chipesa - c. 18°24'S 31°41'E 1400 m] T.T.L., 3, 4, 5.xii.1974, de Moor (N.M.R.); 1♀, Bazeley Bridge [Bazeley Bridge - c. 19°15'S 32°29'E 800 m], Odzi River, i.1966 (N.M.R.); 1♂, Sawmills [c. 19°35'S 28°02'E 1130 m], 13.iv.1920 (N.M.R.); 1♀, Hippo Valley [c. 21°10'S 31°33'E 370 m] Citrus Estate, Lundi River, Chiredzi, 6.v.1978, Wheeler (N.M.R.); 3♀, Lomagundi [c. 17°22'S 30°12'E 1160 m], 18.iv.1940, Collins (P.P.R.1); 1♂ 1♀, Hippo Pools [c. 17°04'S 31°52'E 750 m], Hartley, ♀ with *Pseudugrion* sp.-Odonata, 1.iii.1935, Williams (P.P.R.1); 1♂ 1♀, Kariba [c. 16°47'S 28°52'E 815 m], 18.iv.1964, Simmonds & Phelps (N.M. [no longer in the collection]).

Distribution, phenology and biology: Distributed fairly widely throughout the eastern parts of southern Africa (Fig. 11). Adults are active throughout the warmer, and wetter, months of the year, having been recorded from November through to May (Table 1). The species has been collected sympatrically with *cinerascens* as well as *tenuipes* on which it has also been caught feeding. Label data suggest that the species inhabits a variety of open woodland habitats, often in the vicinity of or along the banks of rivers and streams. Prey records limited to 5, with only females involved – Orthoptera: Acrididae

(4), Diptera: Asilidae (1) *P. tenuipes*. In addition Londt (1987) records a female with a damselfly (*Pseudagrion* sp.) while label data provided by W.E. Jones records specimens as feeding on 'dragonflies'. The female ovipositor is distally broad and spade-like so may be adapted for digging in loose sand.

Philodiscus fraterculus Walker, 1855

Figs 12–16

Trupanea fraterculus Walker, 1855: 597.

Promachus fraterculus: Kertész 1909: 220 (catalogue).

Philodiscus nigripes Ricardo, 1925: 237; Blasdale 1957: 145 (pl. I, fig. 7 ♂ gen., pl. II, fig. 8 ♀ S8); Hull 1962: 456.

Philodiscus fraterculus: Ricardo 1921: 180; Blasdale 1957: 145 (pl. II, fig. 17 ♀ S8); Londt 1978: 424 (figs 7–8, 13–14 ♂ gen.); Oldroyd 1980: 342 (catalogue).

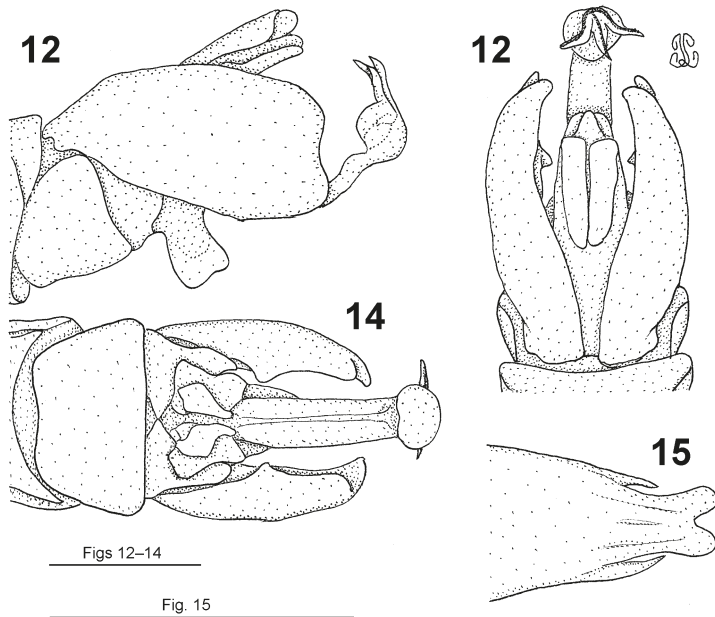
Philodiscus multicellula Hull, 1967: 255 (fig. 7 wing); Oldroyd 1980: 342 (catalogue).

Material examined: BOTSWANA: 1♀ 'Botswana / Okavango Delta / Drotzky's Cabins / 25km S Shakawe / riverine forest / 16.02.2002 / 18°34'50.1"S / 21°53'07.7"E / leg. J. Kipping', 'USNMENT00876187' (USNM). NAMIBIA: 1♀ 'Kavango River bank / at: 18°13'S 21°45'E / Mahango Game Reserve / 28.II.1992 / M. Pusch & E. Marais' (NMNW); 7♂ 'Kaoko Otavi [c. 18°18'05"S 13°39'11"E 1430 m] / S.W.A.' ~ 'Mus. Exped. / Mar. 1926', 'SAM-DIP / A007825' (SAMC)*; 1♀ 'Namibia: Tsumkwe Dist. / Cwiba River / 18°26'18"S 20°42'49"E / 30.xii.1998 / A.H. Kirk-Spriggs / Sweeping floodplane' (NMNW); 2♀ 'Kaudom-Cwiba Junction / Kaudom Game Reserve / 18°28'S 20°49'E / 14–16.i.1991 / E. Marais' (NMNW). SOUTH AFRICA: 1♂ 'Lake Funduzi [= Funduzi c. 22°51'S 30°19'E 880 m] / 28.i.1931 / G. v. Son' (NMSA)*; 1♂ 'South Africa Tvl / Wylliespoort, Ingwe / Motel 22.58S / 29.57E 20–22.i.1982 / C.D. Eardley' (SANC); 1♂ 'Entabeni Forest [c. 22°59'S 30°16'E 1320 m] / 6.xii.1964 / Vári & Potgieter' (NMSA)*; 1♂ 1♀ 'Entabeni Forest / 12–17.i.1971 / R. Jones' (NMSA)*; 1♀ same data but 19.i.1971 (NMSA)*; 1♀ 'SE2329Ab [no locality given – nearest centre is Vivo c. 23°03'S 29°17'E 875 m] / iii.1976 / E.A. Boomker' (NMSA); 1♀ 'P.burg [Pietersburg = Polokwane c. 23°54'S 29°27'E c. 1255 m] N. Prov. RSA / 23°25'S 30°30'E / 9.iv.1996 / C. Weerepas' (NMSA); 1♂ 'South Africa E Tvl / Mogol Nat. Res. / Ellisras Dist. / 23.58S / 27.45E / 28.i.1988 / V.N. Uys' (SANC); 1♀ 'South Africa Tvl / Mogol Nature Reserve / Ellisras Dist. 23.58S / 27.45E 25–26.i.1982 / M.W. Mansell' (SANC); 1♂ 1♀ 'South Africa Tvl / Mogol Nature Reserve / Ellisras Dist. 23.58S / 27.45E 20.i.1983 / G.L. Prinsloo' (SANC); 1♂ 'South Africa / Limpopo / Wolkberg Wild. area / 24°02'S 30°05'E / 15.xii.2005 / M. Potgieter' (SANC); 2♂ 3♀ 'South Africa 2428BB / Transvaal Hangklip [c. 24°03'S 28°47'E 1085 m] / JGH Londt 31.i.1978 / Open grassland' (NMSA)*; 1♀ 'Makapansgat [near Mokopane c. 24°11'S 29°01'E 1140 m] / 2429AA RSA / 18.iv.86 / M.H. Villet' (NMSA); 1♂ 'South Africa / Pietersburg [= Polokwane] / 24°14'40"S/29°15'30"E [c. 1335 m] / 22.v.1989 / R.F. Lutchman / Department of Entomology / University of Pretoria' (NMSA); 2♂ 4♀ 'Sth Africa: Limpopo / Doorndraai Dam Nature / Res. 16.ii.2005 / 24°17'41"S/28°46'41"E / J.G.H. Londt & T. Dikow / 1182m Woodland at dam' [2♀ with Acrididae, Tridactylidae] (NMSA); 8♂ 5♀ 'South Africa 2428AD / Transvaal Waterberg / Mts. Tarentaal Pass [c. 24°18'S 28°23'E 1610 m] / 30.i.1978 JGH Londt / Short open grassveld' [1♂ feeding on Tabanidae] (NMSA)*; 1♂ 'South Africa, Tvl / Doorndraai Dam / Nature Res. 24.18S / 28.44E 4–7.ii. / 1980 C.G. Moolman' (SANC); 1♂ 'Sth Africa: Limpopo / Doorndraai Dam Nature / Res. 16.ii.2005 1210m / 24°19'56"S 28°42'57"E / J.G.H. Londt & T. Dikow / *Terminalia* woodland' (NMSA); 1♂ 1♀ 'South Africa Tvl / Naboomspruit Dist. / Die Oog 24.27S / 28.37E 4–7.ii. / 1980 C.G. Moolman' (SANC); 1♀ 'South Africa Tvl / Groenfontein 35km E / Thabazimbi 24.34S 27.45E 27.xi.1980 / C. Kok' (SANC); 1♂ 'RSA Gauteng / Matla Mamba / Thabazimbi [c. 24°36'S 27°24'E 1075 m] / 21–23 Feb '13 / M. McLoughlin' (SANC); 3♂ 2♀ 'Sth Africa: Limpopo / Nylsvley Nature Reserve / 24°37'45"S 28°40'58"E / J.G.H. Londt & T. Dikow / 1097m 12.ii.2005 Mixed / *Rhus Acacia* savanna' (NMSA); 2♂ 1♀ 'South Africa Tvl / 10 km NE Nylstroom [Modimolle] / 24.38S 28.29E 4.ii. / 1980 C.G. Moolman' (SANC); 2♂ 4♀ 'Sth Africa: Limpopo / Nylsvley Nature Reserve / 24°38'35"S 28°41'48"E / J.G.H. Londt & T. Dikow / 1080m 12.ii.2005 *Acacia* / woodland near bird hide' (NMSA); 1♂ 1♀ 'Sth Africa: Limpopo / Nylsvley Nature Reserve / 24°39'00"S 28°40'24"E / J.G.H. Londt & T. Dikow / 1094m 11.ii.2005 *Acacia* / woodland at camp site' (NMSA); 1♂ 'Nylstroom [= Modimolle c. 24°42'00"S 28°24'22"E 1180 m] / 16–31/12/21 / G.P.F. v. Dam', 'USNMENT01100075' (USNM); 1♀ 'South Africa / Trsvl., 5mi. W. / Warmbad [= Bela-Bela c. 24°53'S 25°17'E 1150 m] / 24–25 Feb. 1968 / Krombein & Spangler', 'USNMENT01100127' (USNM); 1♀ 'Platriver [= Utsane c. 24°54'S 28°16'E 1130 m] / Wtb. [= Waterberg] Distr. / I.II 1903 / R.V. Jutrencha' (NMSA)*; 1♀ 'Sth Africa: Limpopo / Het Bad Nature Res. / 24°54'16"S:28°17'34"E / J.G.H. Londt & T. Dikow / 1122m 17.ii.2005 *Acacia* / woodland nr. small dam' (NMSA); 1♀ 'S Africa: Mpumalanga #7 2000 / Ohrigstad Dam / 24°57'S 30°38'E [c. 1390 m] / Date: 22.iii.2000 / Coll: D.A. Barraclough' (NMSA); 1♀ 'South Africa / Gauteng / Kempton

Park / 25°9'S 28°14'E / 18.04.2004 / M.L. Fourie' (SANC); 1♀ 'Witrivier [= White River c. 25°19'S 31°01'E 900 m] / I.F.W. / Mei [May] 67' (NMSA); 1♂ 'South Africa Tvl / Loskopdam Nat. Res. / 25.25S 29.20E / 12–13.xii.1985 / C.D. Eardley' (SANC); 1♀ 'South Africa Tvl / Loskop Nature / Res. 25.25S 29.20E / 9–13.ii.1981 S.J. / van Tonder, C. Kok' (SANC); 1♀ 'Loskopdam [c. 25°26'S 29°18'E 1005 m] / SE2529Ad / 15.iii.1980 / C.B. Meyer / Dept of Entomology / University of Pretoria' (NMSA); 1♂ 'S. Africa: Mpumalanga / Kwandebele, Moloto / 25°28'S 28°37'E [c. 1255 m] / 2–10.iv.1998 / leg. S. Ratlou', 'Univ. of Pretoria / Dept. Zoology & / Entomology / 2nd Year Collection' (NMSA); 1♀ 'South Africa Tvl / Rooipoort stream / Verena [c. 25°29'S 29°02'E 1405 m] District / 22.ii.1987 / R.H. Watmough' (SANC); 1♀ 'RSA NW Rustenburg / 25°37'S 27°15'E [c. 2230 m] / 22.ii.97 / R. Veldtman' (NMSA); 1♀ 'Waterv., OND [?] Waterval-Onder c. 25°38'52"S 30°22'48"E 1220 m] / Dec 1908 / T. Jenkins', 'USNMENT01100077' (USNM); 1♂ 'RSA Tvl Rustenburg / 25°40'S 27°16'E [c. 1150 m] / 22.ii.1997 / D. Marle' (NMSA); 1♀ 'SA NW Rustenburg / 25°41'S 27°14'E [c. 1150 m] / L. van der Walt / 22.ii.1997' (NMSA); 2♀ 'Pretoria / W. boom [Wonderboom c. 25°41'S 28°12'E 1400 m] 29.i.16 / H.K. Munro', [1♀ with] 'caught / ♂ Tabanid' (NMSA)*; 1♀ 'Wonderboom / 8.2.07 / C. Swierstra' [feeding on Acrididae nymph] (NMSA)*; 1♂ 'South Africa: Pretoria [c. 25°45'S 28°11'E c. 1345 m] / S25° O28° [Oos = East] ca / 1.ii.1987 / leg. W. Myburgh / Department of Entomology / University of Pretoria' (NMSA); 1♀ 1? 'Pretoria [c. 25°45'S 28°11'E 1315 m] Tvl / 28. xii.1921' (NMSA); 1♂ 'Pretoria / Feb 71 / T.M. de M.' (NMSA); 1♂ 'Pretoria / 11.i.14 / H.K. Munro' (NMSA)*; 1♂ 1♀ 'Pretoria / 25.12.12 / H.K. Munro' (NMSA)*; 1♂ same data but 12.1.19 (NMSA)*; 8♂ 11♀ 'Sth Africa Transvaal / Cycad Trail / Dist Middelburg [c. 25°46'S 29°28'E 1525 m] / R. Elferink 3.i.1983' (NMSA) [1 pair pinned together]; 3♂ 3♀ same data but 4.i.1983 (NMSA); 1♂ same data but 5.i.1983 (NMSA); 1♀ 'South Africa: Bronkhorstspuit [25°48'S 28°45'E c. 1485 m] / 25°40'S 28°55'E 12.iii.89 / J.H. Venter / Department of Entomology / University of Pretoria' (NMSA); 1♂ 'South Africa: Tvl / Bronkhorstspuit [25°48'S 28°45'E c. 1485 m] / 14.4.87 / SE2528Dc / Leg. K. Viviers / Department of Entomology / University of Pretoria' (NMSA); 8♂ 7♀ 'S Africa: NW Province / Mafikeng Game Reserve / Kolobe Drinking Pond / 25°50'59"S 25°43'10"E / 1320m 16.iii.2003 J. Londt / *Rhus lancea* savanna' (NMSA); 1♂ 3♀ 'S Africa: NW Province / Mafikeng Game Reserve / Noka Picnic Site 1350m / 25°51'04"S 25°44'06"E / 17.iii.2003 J. Londt *Rhus* / and mixed grass savanna' (NMSA); 1♂ 'W.T. / Koster [c. 25°52'S 26°54'E 1610 m] Tvl / 5/1/1927' (NMSA); 1♀ 'South Africa Rooihuiskraal / 025°53.5890'S 028°09.2920'E / 11 Feb 08 C.J. van Niekerk' (SANC); 1♂ 'S Africa Gauteng / Johannesburg, Fourways [c. 26°02'S 28°00'E 1475 m] / Magalisieg, Lesley Lane [= Leslie Avenue] / Found dead on street / Date: 15.ii.2003 / Coll: G. Redman' (NMSA); 1♂ 'Carolina [c. 26°04'S 30°07'E 1700 m] / SE2630Aa / ii.1979 L. Serfontein / Dept of Entomology / University of Pretoria' (NMSA); 1♀ 'Carolina [26°04'S 30°07'E c. 1700 m] / H. Meyer / Feb 73', 'Dept. of Entomology / University of Pretoria' (NMSA); 1♂ 'Randburg / 26°7'S 27°55'E [c. 1580 m] / 20.iii.1994 / M.M. v.d. Merwe / Department of Entomology / University of Pretoria' (NMSA); 1♀ 'Benoni [c. 26°11'S 28°19'E 1645 m] / L.A. Botha / 3/66' (NMSA); 1♀ 'St. Geo. Home (St George's Home, Bedfordview c. 26°12'S 28°08'E 1700 m] Dist / 26.3.38 / A.L. Capener / with prey' [feeding on Acrididae] (NMSA)*; 1? 'South Africa / North-West province / Helpmekaar farm / 26°20'0"S 26°10'0"E / 26.i.2008 / G. Lüssmann' (SANC); 1♀ same data but 22.iii.2008 (SANC); 1♂ 1♀ 'RSA Gauteng / Coligny / 26°20'S 26°18'E [c. 1480 m]', '15.iv.1995 / E. vd Westhuizen / 08h00–11h00' (NMSA); 1♂ 'South Africa: Kinross / 26°26'S 28°7'O [Oos = East c. 1655 m] / 16.iv.87 / H.L. Grobbelaar / Department of Entomology / University of Pretoria' (NMSA); 1♂ 3♀ 'Heidelberg [= Heidelberg c. 26°29'S 26°23'E 1545 m] / 21.i.21 T.P. [Transvaal Province] / H.K. Munro' (NMSA)*; 1♀ 'Heidelberg / 21.i.21 T.P. / H.K. Munro', 'USNMENT01100078' (USNM); 1♀ 'S.Afr. Transvaal / Barberspan [Nature Reserve c. 26°35'S 25°35'E 1355 m] / 25°07'S 26°05'E [incorrect data] / 14–21.xii.1993 / T. Joffe' (NMSA); 1♂ 'South Africa / Mpumalanga / Greylingstad / 26°40'S 28°35'E / 13.iii.2004 / L.P. van Jaarsveld' (SANC); 1♀ 'Delarey [Delareyville c. 26°41'00"S 25°28'00"E 1360 m] / W. Transvaal / Dr Brauns / i:1917 [sideways]', 'USNMENT01100076' (USNM); 1? 'P'stroom [Potchefstroom c. 26°43'S 27°06'E 1355 m] / 24.i.1911' (SANC); 1♂ 1♀ 'South Africa / Potchefstroom [c. 26°43'S 27°06'E 1355 m] / Jan 1957 J. Steytler' (NMSA); 1♀ 'South Africa / Ndumu [c. 26°56'03"S 32°16'57"E 125 m] Ntl. / i.1978 / G.L. Prinsloo / L.A.v.Luik' (SANC); 9♂ 1♀ 'S Africa: KwaZulu-Natal / Kosi Bay Nature Res. / 26°57'01"S 32°49'25"E / 13.xii.2010 JGH Londt / 38m Dry sandy pan in / Woodland savannah area' (NMSA); 1♀ 'S Africa: KwaZulu-Natal / Kosi Bay Nature Res. / 26°57'52"S 32°48'51"E / 15–16.xii.2010 6m / JGH Londt Lake Shore / Dune Forest & Woodland' (NMSA); 3♂ 4♀ 'S Africa: N Cape #14 / 20km N of Hotazel / 27 07S 22 59[E] 1050m / Date: 14.iii.1991 / Whittington & Londt / Kuruman River banks' [1♀ feeding on Acrididae] (NMSA); 1♂ 'Heilbron [c. 27°17'01"S 27°58'15"E 1550 m], OVS / (Vechtkop) / 4.2.1964 / HAD van Schalkwyk' (SANC); 1♂ 2♀ 'South Africa: N Cape / Kuruman Country Club / 27°28'17"S 023°27'30"E / J&A Londt 15-16.iii.2015 / 1325m *Acacia* savannah'. (NMSA); 1♂ 2♀ 'South Africa: KZ-Natal / Ozabeni-Manzimbomvu [Ozabeni school 27°31'S 32°35'E c. 45 m] / northern end of St. Lucia, nr. Labe Bangazi North / Subtropical coastal grassland / 29.i.2005 GBP Davies' (NMSA); 1♂ 7♀ 'South Africa: KZ-Natal / Ozabeni/KwaMbila [Ozabeni school c. 27°31'S 32°35'E 45 m] section / northern St Lucia (2732DA) / coastal grassland, Sweepnet / 04–05.iii.2006, GBP Davies' (NMSA); 4♂ 3♀ 'S Africa: NW Province / Bloemhof Dam (reserve) /

27°38'05"S 25°40'13"E / 1230m 12.iii.2003 J. Londt / *Acacia*, *Ziziphus* savanna' (NMSA); 1♂ 1♀ 'South Africa OFS / Sandveld Nature Res. / 27.40S 25.45E / 25.ii.1993 R. Adam' (SANC); 4♀ 'South Africa OFS / Sandveld Nature Res. / 27.40S 25.45E / 24–25.ii.1993 / C.D. Eardley' (SANC); 1♀ 'Subtropical grassland / and open lala-palm / woodland', 'South Africa KZ-Natal / St Lucia, Charter's Creek / Makhakathana flats / 28°14'S:32°24'E, 35m a.s.l. / 15.xii.2007, G.B.P. Davies' (NMSA); 1♀ 'RSA: KZ-Natal #18 / St. Lucia East Shores / 32°25'E 28°20'S [coordinates reversed] 45m / Date: 26.ii.1995 / Coll: P.E. Reavell / Open grassland' (NMSA); 2♂ 3♀ 'Sth Africa. Cape Prov / Grootpan E Lime Acres [c. 28°22'S 23°34'E 1445 m] / 2823CB 25.iii.1982 / J. Londt & L. Schoeman / Grass in pan centre' (NMSA); 1♀ 'St Lucia [c. 28°22'S 32°25'E 25 m] Z [Zululand] / 28.12.3 / Marley' (NMSA)*; 4♂ 6♀ 'Sth Africa. Cape Prov / Roaring Sands Resort [= Witsand Nature Reserve c. 28°34'S 22°29'E 1205 m] / nr. Witsand. *Acacia* / woodland/sandy area / 2822CB 17–18.3.1982 / J. Londt & L. Schoeman' [1♀ feeding on Acrididae] (NMSA); 1♀ 'nr Melmoth [c. 28°35'S 31°24'E 720 m] / Langkloof / *Hypothelia* / grassveld' ~ '15.3.87' (NMSA); 1♀ 'South Africa: KZ-Natal / Enseleni Nature Reserve / 28°41'S 32°03'E m a.s.l. / Date: 26/07/1980 / Coll: R. Miller' (NMSA); 1♂ 1♀ 'Empangeni [c. 28°45'S 31°54'E 120 m] / Feb 06 / AVPB' (NMSA)*; 1♂ 1♀ 'Richard's Bay / Msingazi Canal [c. 28°46'S 32°07'E 5 m] / herbs in clearing / degraded swamp / forest 7.i.94' (NMSA); 1♀ 'S Africa: Natal / Richard's Bay / 28°48'S 32°06'E 30m / Date: 14.i.93 / Coll: P.E. Reavell / Lala Palm +', '*Digitaria* / veld' (NMSA); 1♀ 'South Africa: Natal / Lake Cubhu [c. 28°51'S 31°58'E 10 m] 18.ii.86 / 2851S 3157E / P. Atkinson 17m' (NMSA); 1♀ 'South Africa: Natal / Ngoye Forest [Reserve c. 28°54'S 31°27'E 515 m] / 3140E 2850S [cords reversed] 30.11.85 / P. Reavell 400m / grassveld' (NMSA); 1♂ 1♀ 'South Africa: Natal / Ngoye Forest [c. 28°54'S 31°27'E 515 m] area / 3140E 2850S 16.ii.84 / PE Reavell 400m / Ngongoni veld' (NMSA); 1♂ 1♀ 'Amatikulu / Reserve [c. 29°07'S 31°36'E 55 m] / Natal 17.11.85 [P. Reavell]' (NMSA); 1♂ 'S. Africa: OFS #4 / 15km NE Ladybrand [c. 29°12'S 27°27'E 1605 m] / 2927Ab 28.xii.1982 / Modderpoortspuit / P. Stabbins & R. Miller' (NMSA); 1♀ 'S Africa: N Cape #15 / 14km S of Hotazel / 29 19S 22 54E' 1050m / Date: 14.iii.1991 / Londt & Whittington / Ga-Mogara River bed' [feeding on Acrididae] (NMSA); 4♂ 'South Africa: Natal / Dargle [c. 29°28'S 30°06'E 1160 m]. Grassveld / 4400ft / Date: 20.ii.1987 / Coll: P.E. Reavell' (NMSA); 1♂ 'South Africa: KZ-Natal / Cumberland Nature Res. / 29°30.199S 30°30.207E / 13.i.2004 J. Londt T. Dikow / 560m Open rocky area & / *Acacia* woodland near river' (NMSA); 1♀ 'South Africa: KZ-Natal / Mdloti River mouth of / c. 29°39'S:31°09'E [c. 1 m] / open beach/shore-line / 04.iv.2006, B Stuckenberg / & G Davies' (NMSA); 5♂ 'S Africa. KZ-Natal #1 / Krantzkloof Nature Res. / 29°45'13"S 30°51'07"E J. Londt 1.ii.2000 300m / Grassland/Stream edge' (NMSA); 1♀ 'S Africa: KZ-Natal #2 2000 / Krantzkloof Nature Reserve / 29°45'13"S 30°51'07"E 300m / Date: 01.ii.2000 / Coll: S. James / Indigenous forest near stream' (NMSA); 1♂ 'RSA Cape Prov / 8km N Port Alfred [c. 33°36'S 26°53'E 28 m] / 15.iii.1984 / P.R. Meakin' (NMSA); 1♂ 'Kenton on Sea [c. 33°41'S 26°40'E 50 m] / S33°40' 026°41' / 04.xii.1988 / LG Le Roux' (NMSA); 1♂ 'Kaapstad [= Cape Town c. 33°55'S 18°25'E 4 m] / I.F.W. / April 69' (NMSA); 1♂ 'RSA: Western Cape / de Vasselot Nat. Res. At: / 33°58.194'S, 23°32.193'E / 24–27.i.2009 / A. Kirk-Spriggs, S. Otto' (BMSA). ZIMBABWE: 1♂ 1♀ 'Rhodesia / Salisbury [= Harare c. 17°52'S 31°02'E 1465 m] / A. Watsham' (NMSA); 1♂ 'Mametsi [Matetsi c. 18°21'37"S 25°54'27"E 1000 m] / S Rhodesia / Apl 1934 / R.H.R. Stevenson', 'SAM-DIP / A007824' (SAMC)*.

Material not re-examined: Londt (1978) records additional southern African material 'Lesotho: 1♀, Leribe [c. 28°57'S 28°15'E 1940 m], 12.iii.1956, L. Bevis (D.M.); 1♂, Mamathes [c. 29°08'S 27°51'E 1685 m], 11.iii.1956, L. Bevis (D.M.). Rhodesia: 1♂, Matesi [Matetsi - c. 18°21'S 25°54'E 1000 m], iv.1934, R.H.R. Stevenson (S.A.M.). South West Africa: 1♂, Kaoko Otavi [c. 18°18'S 13°39'E 1430 m], iii.1926, S.A.M. Exped., (S.A.M.).' Londt (1978) also includes some additional material in an addendum as follows: '1♀, Zoutpansberg [c. 29°00'S 29°46'E 1515 m], 8.iv.1973, Pinhey (N.M.R.). Rhodesia: 1♂, Selukwe [c. 19°40'S 30°00'E 1465 m], 19.i.1922 (N.M.R.); 1♀, Inyangombe River, Inyanga [Nyanga - c. 18°13'S 32°44'E 1620 m], XII.1920 (N.M.R.); 1♂ 3♀, Salisbury [= Harare c. 17°52'S 31°02'E 1465 m], 19.ii.1927, 19.i & 30.xi.1935, Cuthbertson (P.P.R.I.); 1♂, Kimbate Farm, Salisbury South, 20.i.1935, Williams (P.P.R.I.); 5♂ 1♀, Meadowlands, Salisbury, 30.xi.1935, Cuthbertson (P.P.R.I.); 2♂ 1♀, Cleveland Reservoir, Salisbury, 8 & 9.i.1939, Cuthbertson (P.P.R.I.); 1♀, Salisbury, 29.i.1959, Cumming (A.M.); 2♂ 4♀, 'Georgia', Gatooma [= Kadoma c. 18°20'S 29°54'E 1160 m], 3.iii.1931 (1♂–20.i.1935), Williams (P.P.R.I.); 1♀, Chimanimani Mts., Melsetter [c. 19°49'S 32°52'E 1510 m], xi.1967 (N.M.R.); 1♀, Umtali [= Mutare c. 18°58'S 32°38'E 1175 m], ii.1928 (N.M.R.). South West Africa: 1♂, Bellarode Farm, Windhoek [c. 22°34'S 17°05'E 1680 m], 9.iii.1975, de Moor (N.M.R.). Botswana: 3♂, Maun [c. 19°59'S 23°25'E 945 m], 21.iii.1974 (N.M.R.); 1♂ 1♀, 4-River Camp, Okavango [c. 18°16'S 18°26'E 1165 m], 6 & 7.xii.1973 (N.M.R.); 2♂ 1♀, Sepopa [= Sepupa c. 18°45'S 22°11'E 990 m], W. Okavango, 25 & 27.iii.1974 (N.M.R.). Type material (not studied) is also listed as 'South Africa: Natal, 1♀ holotype, Port Natal (Durban [c. 29°51'S 31°01'E 28 m]), (British Museum of Natural History). Types of *P. nigripes* are from Malawi: 1♀ holotype, Mt. Mlanje, 18.xii.1912, S. A. Neave (B.M.(N.H.)). Rhodesia: 1♂ paratype, Bulawayo [c. 20°08'S 28°37'E 1335 m]; 1♀ paratype, Hope Fountain [c. 20°16'S 28°39'E 1450 m] (National Museum Rhodesia). The type of *P. multicellula* is from Lesotho: 1♀ holotype, Hensley's Dam, 13 km. S. W. Leribe [c. 28°57'S 28°15'E 1940 m], 30.iii.1951



Figs 12–15. *Philodicus fraterculus* (Walker, 1855). (12–14) male terminalia: (12) lateral, (13) dorsal and (14) ventral views. (15) female distal end of S8.

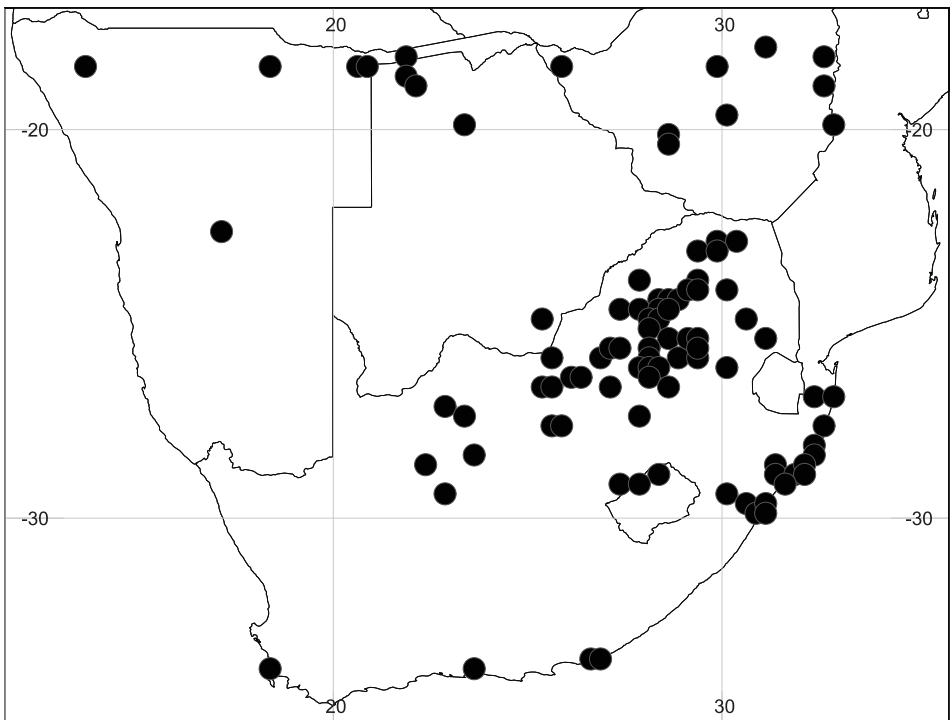


Fig. 16. Southern African distribution of *Philodicus fraterculus* (Walker, 1855).

loc. no. 254 Brinck & Rudebeck (E. M. L.).

Distribution, phenology and biology: Found over much of southern Africa (Fig. 16), records being more concentrated in the north-eastern parts which normally receive summer rainfall. Adults are summer active (Table 1), typically flying from November through to May (a single record for July). May be locally abundant. Typically inhabit grassy places in association with water (rivers, streams, dams, pans etc.). The female ovipositor is distally narrow and spike-like so may be adapted for thrusting eggs into soil. Some 24 prey records are available (7♂ (29%) 17♀ (71%)) – Orthoptera: Acrididae (10), Tridactylidae (1). Neuroptera: Myrmeleontidae (2). Diptera: Asilidae (1 – *P. fraterculus* ♂), Tabanidae (1), Bombyliidae (2), Sarcophagidae (2). Lepidoptera: Lycaenidae (1), unidentified moths (2). Hymenoptera: ? Vespidae (1), ? Halictidae (1). Cannibalism is recorded.

Of considerable interest is an analysis of the data provided for *P. nigripes* (a synonym of *fraterculus*) by Hobby (1935). He lists 33 prey records which can be repeated in the following format (orders and families in alphabetical order) – Coleoptera (2): Buprestidae (1), Cerambycidae (1). Diptera (7): Asilidae (5), Syrphidae (2). Hemiptera (5): Cicadidae (3), Lygaeidae (1), Pentatomidae (1). Hymenoptera (10): Andrenidae (2), Anthophoridae (3), Apidae (2 *Apis mellifera*), Eumenidae (1), Megachilidae (2). Lepidoptera (1): Noctuidae (1). Orthoptera (8): Acrididae (8). Although the species appears to feed on a variety of prey 24% were grasshoppers (Acrididae). The male versus female ratio is also of interest as only 12 (36%) of the predators were male while 21 (64%) were female – a clear indication that more females were found with prey than males.

Philodictus swynnertoni Hobby, 1933

Figs 6, 17–20

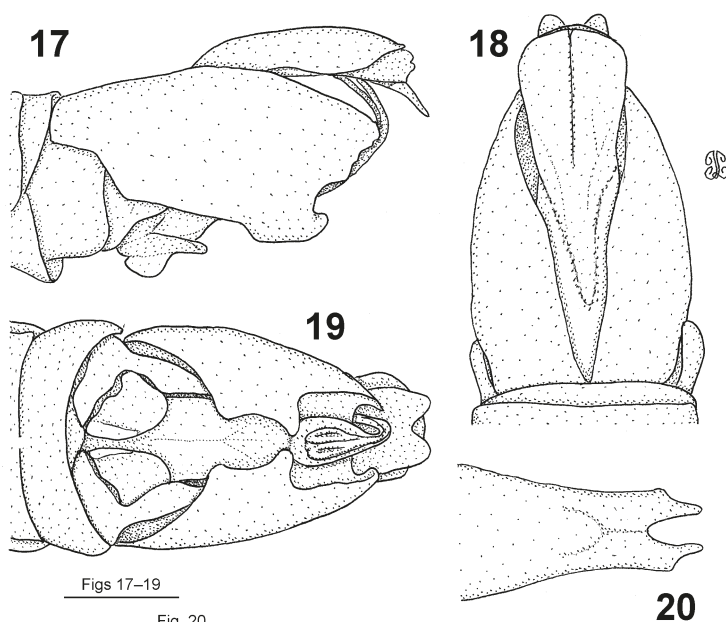
Philodictus swynnertoni Hobby, 1933: 109 (pl. II, fig. 2 ♂ gen., 3 ♀ ovipositor); Blasdale 1957: 144 (pl. I, fig. 13 ♂ gen., pl. II, fig. 6 ♀ S8); Hull 1962: 456; Londt 1978: 423 (figs 6 ♂ gen., 12 aed.); Oldroyd 1980: 343 (catalogue); Tomasovic 2012: 26.

A fairly large and distinctive species described by Hobby (1933) ‘from material preserved in the Hope Department, University Museum, Oxford. All were obtained during 1911 and 1912 by Mr. C. F. M. Swynnerton, at about 3 800ft., on Mt. Chirinda [c. 20°24'S 32°40'E 950 m], S.E. Rhodesia [Zimbabwe]’. There were no fewer than 117 specimens in the type series (♂ holotype, ♀ allotype, 60♂ 55♀ paratypes) collected from December 1911 through to March 1912.

Material examined: SOUTH AFRICA: 1♂ ‘Nelspruit [c. 25°29'S 30°58'E 735 m] / 2.1915 / A. Roberts’ (NMSA)*; 4♂ 1♀ ‘Sth Africa Transvaal / Cycad Trail / Dist Middelburg [c. 25°46'S 29°28'E 1525 m] / R. Elferink 5.i.1983’ (NMSA); 1♀ same data but 3.i.1983 (NMSA); 1♀ ‘Irene [c. 25°53'S 28°14'E 1450 m] / M.G.A. Fourie / April 1969’ (NMSA); 2♂ ‘JJO / JHB [= Johannesburg c. 26°10'S 27°58'E 1760 m] Tvl / 16.ii.1953’ (NMSA); 1♀ ‘JHB [= Johannesburg c. 26°10'S 27°58'E 1760 m] No2 / Glenwilliam [?] / 13/i/62 Muti’ (NMSA); 1♂ ‘Transvaal / Johannesburg [c. 26°10'S 27°58'E 1760 m] / Ross’ ‘SAM-DIP / A007826’ (SAMC).

Material not studied: Londt (1978) lists unstudied type material ‘Rhodesia: 1♂ holotype, 1♀ allotype, near Mt. Chirinda [c. 20°24'S 32°40'E 1010 m], 31.i.1912, C.F.M. Swynnerton (Oxford University Museum)’.

Distribution, phenology and biology: While the type series was from Zimbabwe, Blasdale (1957) records the species from ‘Sierra Leone, N. Gold Coast [Ghana], S. Nigeria, S. Sudan, Uganda, Kenya, SE. Rhodesia [Zimbabwe] (type locality), and Pretoria [in South Africa]’. Tomasovic (2012) added DR Congo to this list. The species therefore has a

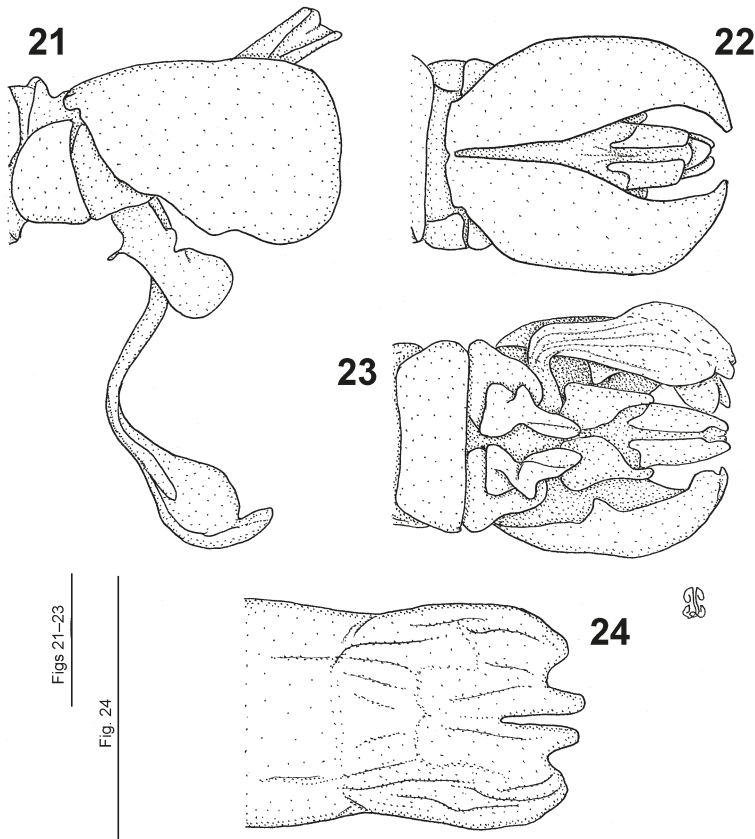


Figs 17–20. *Philodicus swynnertoni* Hobby 1933. (17–19. male terminalia: (17) lateral, (18) dorsal and (19) ventral views. (20) female distal end of S8.

wide distribution which penetrates the north-eastern parts of southern Africa (Fig. 6). Although habitat information is lacking the type series was almost certainly collected in montane grassland. Swynnerton collected the type specimens from December through to March. There is also a southern African record of the species collected in April (Table 1). Tomasovic's (2012) DR Congo records are for October and November so the species may have slightly different flight periods north of the sub-region covered by this study. While there are no prey records available for South Africa, Hobby (1935) analysed no fewer than 117 records for Zimbabwe, where the species was apparently common. Hobby's published data can be summarised as follows (orders and families in alphabetical order) – Coleoptera (5): Cerambycidae (4), Curculionidae (1). Diptera (20): Asilidae (10), Bombyliidae (7), Syrphidae (2), Tabanidae (1). Hemiptera (13): Cicadidae (7), Lygaeidae (4), Pentatomidae (1), Reduviidae (1). Hymenoptera (32): Andrenidae (1), Anthophoridae (9), Apidae (4 *Apis mellifera*), Bembecidae (1), Braconidae (1), Ichneumonidae (2), Megachilidae (7), Mutilidae (1), Scoliidae (5), Sphecidae (1). Lepidoptera (1): Sesiidae (1). Mecoptera (1): Bittacidae (1). Orthoptera (45): Acrididae (45). Although the species appears to feed on a wide range of prey some 38% were grasshoppers (Acrididae). The male versus female ratio is of interest as only 21 (26.5%) of the asilid predators were male while 86 (73.5%) were female – a clear indication that far more females were found feeding. The female ovipositor is distally narrow and spike-like so may be adapted for thrusting eggs into soil.

Philodicus tenuipes Loew, 1858

Figs 1, 21–25



Figs 21–24. *Philodiscus tenuipes* Loew, 1857. (21–23) male terminalia: (21) lateral, (22) dorsal and (23) ventral views. (24) female distal end of S8.

Philodiscus tenuipes Loew, 1858: 361 [1860: 212]; Blasdale 1957: 139 (pl. I. fig. 6 ♂ gen., pl. II. fig. 3 ♀ S*); Londt 1978: 422 (figs 4 ♂ gen, 10 aed); Hull 1962: 456; Oldroyd 1980: 343 (catalogue).

Loew (1858) described the species on Wahlberg collected material from ‘Caffraria’ [Eastern parts of South Africa]. Blasdale (1957) discusses the close similarity between this species and *cinerascens*, giving the distribution of *tenuipes* as ‘Southern Rhodesia [Zimbabwe], Pretoria [in South Africa], Cape Colony [formerly a large part of South Africa] and South West Africa [Namibia]’.

Material examined: ANGOLA: 2♂ 1♀ ‘Cuanza [Kuanza] Riv. Mouth [? Longa River mouth c. 10°14'S 13°30'E 1 m] / 40mi. S. Luanda / Angola. Jan 1972’, ‘Collectors / B. Stuckenberg’ (NMSA)*. MOZAMBIQUE: 1♀ ‘Chinde [c. 18°35'S 36°28'E 5 m] / Mozamb. / K.H. Barnard / Nov. 1912’, ‘*Philodiscus* ♀ / *fraternus* Wied’, ‘Ricardo / determ.’ (pale blue), ‘SAM-DIP / A007808’ (SAMC); 1♀ ‘Chinde [c. 18°35'S 36°28'E 5 m] Zambezi / River Delta / Port East Africa / P.J. Usher’, ‘5.xi.57’ (NMSA)*; 1♂ 1♀ ‘Bazaruto [Island c. 21°40'S 35°27'E 0 m] / 8/3/71’ (NMSA)*; 1♂ 3♀ ‘Benguéruea [Benguerra c. 21°52'S 35°25'E 10 m] / 6/3/71’ (NMSA)*; 1♀ ‘Magaruque [Island c. 21°58'S 35°26'E 35 m] / 5/3/71’ (NMSA)*; 1♂ ‘Bangué [Island c. 22°02'S 35°27'E 0 m] / 6/3/71’ (NMSA); 2♂ 1♀ ‘Bangué / 7/3/71’ (NMSA)*; 1♂ ‘Moçambique / Namaacha [c. 25°59'S 32°02'E 535 m] / 28/7/1980 / Coll. H.R. Feijen’ (NMSA); 7♂ 8♀ ‘Inhaca Is. [c. 26°01'25"S 32°57'18"E 50 m] Mozam. / No. 942-950, 956-960 [respectively] / 17-I-1964 / Coll. A.L. Moore’, ‘USNMENT01100114– USNMENT01100126 [respectively]’ (USNM). NAMIBIA: 2♂ 2♀ ‘Otjimbombe [c. 17°30'S 14°15'E 1064 m] / Kunene R. / Mar. 1932’ ~ ‘S.W. Africa / Mus. Exped.’, ‘SAM-

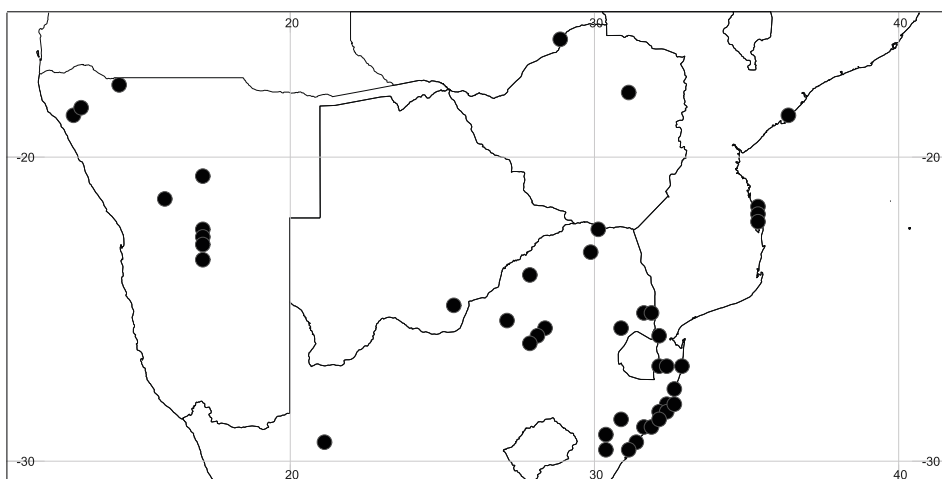


Fig. 25. Southern African distribution of *Philodicus tenuipes* Loew, 1857.

DIP / A007828 & 29' (SAMC)*; 1♂ 1♀ 'Hoarusib [c. 18°31'58"S 12°50'31"E 435 m] Otshu / S.W.A.' ~ 'Mus. Exped. / Mar. 1926', 'SAM-DIP / A007832' (SAMC)*; 2♀ 'Namibia 20.iii.1984 / 60km E Otjiwarongo / Rd 101 20 39'S 17 05'E [c. 1490 m] / Londt & Stuckenberg / Acacia thornveld and dry river course' (NMSA); 1♂ 2♀ 'South West Africa 2115Ba / Omaruru Dist. 50km N.W. Omaruru [c. 21°26'S 15°56'E 1215 m], 1200m. 5-ii-1974 / M.E. Irwin, flood plain / with large *Acacia* trees' (NMSA)*; 4♂ 1♀ 'Namibia 29.iii.1984 / 26km N Windhoek. Road / 1/6. 22 20'S 17 04'E [c. 1470 m] / Londt & Stuckenberg / Dry stream bed *Acacia* / riparian woodland' (NMSA); 3♂ 'Namibia 16.iii.1984 / 18km E Windhoek Road / 6/1. 22 32'S 17 14'E [c. 1880 m] / Londt & Stuckenberg / Damp riverbed with / *Acacias* Stony ground' (NMSA); 1♂ 3♀ 'Namibia 18.iv.1983 / Aris [c. 22°45'S 17°08'E 1805 m] 30km S Windhoek / 2217CA Stuckenberg / & Londt Thornveld' (NMSA); 1♀ 'Rehoboth [c. 23°19'S 17°05'E 1405 m] / S.W.A.' ~ 'Bell-Marley / Nov-Jan 1938', 'SAM-DIP / A007830' (SAMC)*; 1♀ 'Cayimaes [?] / S.W.A.' ~ 'Mus. Exped. / Mar. 1925', 'SAM-DIP / A007831' (SAMC)*. SOUTH AFRICA: 1♀ 'Sth Africa: Limpopo / Messina Nature Reserve / 22°24'54"S 30°05'12"E / J.G.H. Londt & T. Dikow / 487m 14.ii.2005 *Mopane* / dry woodland Sand Riv' (NMSA); 2♂ 2♀ 'Sth Africa: Limpopo / Ben Lavin Nature Res. / 23°08'38"S 29°57'03"E / J.G.H. Londt & T. Dikow / 865m 13.ii.2005 *Acacia* / *Zizyphus* dry woodland' (NMSA); 1♀ 'South Africa Tvl / D'Nyala Nat Res Ellis- / ras 23.45S 27.49E / 850m 5-6.x.1989 / M.W. Mansell' (SANC); 2♂ 'South Africa N.W. Tvl / Mogol Nature Reserve / Ellisras Dist. 23.58S / 27.45E 19-23.xi.1979 / G.L. Prinsloo, M.W. Mansell / S.J. van Tonder, C. Kok' (SANC); 2♂ 1♀ 1? 'South Africa N.W. Tvl / Mogol Nature Reserve / Ellisras Dist. 23.58S / 27.45E 19-23.xi.1979 / M.W. Mansell' (SANC); 1♀ 'South Africa / Trsvl., 5mi. W. / Warmbad [= Bela-Bela c. 24°53'S 25°17'E 1150 m] / 24-25 Feb. 1968 / Krombein & Spangler', 'USNMENT01100128' (USNM); 1♂ 2♀ 'South Africa Transvaal / Kruger Park 9.xii.1972 / Timbetene Tswiri waterholes / savannah woodl and nr Skukuza [c. 25°00'S 31°36'E 285 m] / B & P Stuckenberg 2431Dc' (NMSA)*; 1♂ 1♀ [♂ as prey for ♀] 'South Africa: Transvaal / Kruger Park 9.xii.1972 / Lower Sabie Camp area [c. 25°07'S 31°55'E 175 m] / open savannah & riverbanks / B & P Stuckenberg 2531Bb' (NMSA)*; 1♀ 'SAfrica: N-W Province / Pilanesberg National Park / Manyane Trail 15.xi.1999 / 25°15'12"S 27°13'25"E / J.G.H. Londt 1200m' (NMSA); 1♀ 'Boekenhoutskloof [c. 25°30'S 28°27'E 1180 m], S.A. / (30km NE Pretoria) / 7.xii.77 / G. Bernon' (NMSA); 1♂ 1♀ 'Noordkaap River [c. 25°44'S 30°59'E 650 m] at / Barberton Nelspruit Road / 2530DB Transvaal / 7 Nov 70 Stuckenberg / Riverbank bushveld' (NMSA)*; 1♂ 'Pretoria [c. 25°45'S 28°11'E 1345 m] / L. Schunke / 2-85 [ii.1885]', 'SAM-DIP / A007833' (SAMC); 1♂ 'JHB [= Johannesburg] [c. 26°10'S 27°58'E 1760 m] / P. Leniare / Feb 1963 / Natal A.R.I.' (NMSA); 1♂ 1♀ 'South Africa. Natal / Kosi Bay - Estuary [c. 26°54'S 32°53'E 10 m] / 2632DD 16-19.iii.1982 / Coll: D.A. Barraclough' (NMSA); 1♂ 'South Africa: Natal / 5km S Ndumu [= Ndumu] Game Res [c. 26°57'S 32°15'E 50 m] / 2632CD 6.x.1982 / coll. J. & B. Londt / Woodland near stream' (NMSA); 2♂ 1♀ 'South Africa / Natal, Zululand / Sodwana Bay [c. 27°32'49"S 32°40'10"E 40 m] / 2732DA / 8.v.1981 C. Car', 'SAM-DIP / A007834' (SAMC); 1♂ 'South Africa / Natal, Zululand / Sodwana Bay / 2732DA 15.v.1981 / C. A. Car dunes / on beach', 'SAM-DIP / A007836' (SAMC); 1♀ 'Bonamanzi / Reserve [c. 28°03'S 32°18'E 20 m] / Sand path / through sand / Forest 21.xi.95' (NMSA); 1♂ 1♀ 'South Africa, Natal Prov / Cape Vidal [c. 28°07'S 32°33'E 30 m], 20mi N St. Lucia; ME & BJ Irwin 0 to / 20m; coastal dune forest / Nov. 24. 1971 (2832Ba)' (NMSA)*; 9♂ 8♀

'South Africa: Natal / St. Lucia Nature Res. [c. 28°16'S 32°29'E 40 m] / 2832AD 18–20.xii.1981 / Londt & Stuckenberg / Coastal bush & forest' [1♀ with prey Apidae (*Apis mellifera*)] (NMSA); 1♂ 4♀ 2? 'South Africa, Natal Prov / Zululand, St. Lucia [c. 28°22'S 32°25'E 25 m], Nov. 24 / 1971; ME & BJ Irwin (2832Ad) / coastal dune assoc. 8m el.' (NMSA)*; 1♂ 1♀ 'South Africa: Natal / St. Lucia Park Reserve / ca. 28°22'S 32°25'E / J.G.H. Londt 20m / 2.ii.1988 Dune forest' (NMSA); 2♀ 'Dukuduku [Forest c. 28°23'S 32°19'E 175 m] between / St Lucia & Matubatuba / Zululand S. Africa / B & P Stuckenberg / 7–8 April 1960' (NMSA)*; 4♂ 2♀ 'S Africa: KwaZulu-Natal / Greater St. Lucia Wetland / Park Sugarloaf Camp area / 28°23'01.9"S 32°25'07.4"E / J.G.H. Londt 9.iii.2004 / -6m sand at estuary edge' (NMSA); 1♀ 'South Africa: Natal / St. Lucia Estuary [c. 28°23'S 32°25'E 0 m] / Coastal bush grassland / Date: 7.x.1983 / Coll: B.R. Stuckenberg' (NMSA); 1♂ 5♀ 'South Africa: Natal / St. Lucia Estuary [c. 28°23'S 32°25'E 0 m] / 22.ii.1979 2832AD / JGH Londt Beach' (NMSA); 1♂ 'South Africa Natal / St Lucia sea level / Oct 31, 1972, M.E. / Irwin, coastal dunes' (NMSA)*; 1♂ 3♀ 'South Africa: Natal / Umfolozi bridge / 7km SW Mtubatuba [c. 28°27'S 32°09'E 20 m] / 3.xii.75 WL Overal / DJ Brothers' (NMSA); 1♂ 'South Africa: Natal / Richard's Bay [c. 28°40'S 32°05'E 5 m] area / 3205E 2850S 12.iii.83 / PE Reavell 25m / In sand dunes' (NMSA); 1♀ 'South Africa: Natal / Enseleni Reserve [c. 28°41'S 32°00'E 30 m] / Grassveld / Date: 4.iv.81 / Coll: P. Reavell' (NMSA); 1♂ 'Mfongosi [c. 28°43'S 30°50'E 575 m] / Zulu L. [Zululand] / W E Jones' ~ 'Dec. 1914', 'SAM-DIP/A007825' (SAMC)*; 1♂ 2♀ 'R.S.A.: KZ-Natal #81 / Umlalazi Nature Reserve / 28°57'S 31°46'E 50m / Date: 8.xi.1997 / Coll: JGH & A Londt / Dune forest & margins' [1♀ with prey Caenagrionidae] (NMSA); 2♂ 1♀ 'South Africa: Natal / Umlalazi Nature Res [c. 28°57'S 31°46'E 5 m] / 2831DD 2–10.x.1982 / coll. J.G.H. Londt / Dune-forest & edges' (NMSA); 1♂ 1♀ 'South Africa: Natal / Umlalazi Nature Res. / 26–27.i.1987 / JGH Londt SE2831DD / Dune forest & margin' (NMSA); 1♂ 'Sth Africa: KZN Prov / Umlalazi Nature Res. / 28°57'02"S 31°47'13E / J & A Londt 12.xi.2014 / 8m Estuary sandy edge' (NMSA); 1♂ 1♀ 'South Africa: Natal / Umlalazi Nature Res. [c. 28°57'S 31°46'E 5 m] / 26–27.i.1987 / JGH Londt SE2831DD / Dune forest & margin' (NMSA); 1♂ 'South Africa: Natal / Umlalazi Nature Res. / ca. 28°57'S 31°40'E / 20m 28–29.i.1988 / Dune Forest J. Londt' (NMSA); 5♂ 3♀ 'S Africa: KwaZulu-Natal / Umlalazi Nature Reserve / 28°57'19"S 31°46'31"E / 5m 21.ii.2011 J.G.H. Londt / Estuary banks & forest' (NMSA); 3♂ 2♀ 'So. Africa: Nata; / 1.5 km / E. Mtunzini 2831Dd / Umlalazi Nature Res. [c. 28°57'S 31°46'E 5 m] / 24–25.iii.1979 R. Miller / Coastal dune veget.' (NMSA); 2♂ 1♀ same data but 28.i.1979 (NMSA); 1♂ 1♀ same data but 4 Nov 1979 (NMSA); 1♀ same data but 15 Feb 1981 (NMSA); 3♂ same data but 19–27 Jan 1980 (NMSA); 1♀ 'Mtunzini [c. 28°58'S 31°46'E 10 m] / Natal RSA / 14.2.85 / M.H. Villet / (coastal dunes)' (NMSA); 4♂ 2♀ 'Sth Africa: KZN Prov / Mtunzini Forest Lodge / Area 10–14.xi.2014 / 28°58'02"S 31°47'18E / J & A Londt 10m / Coastal dune vegetation' (NMSA); 1♀ 'South Africa: Natal / Mhlopheni Nature Res. [c. 29°01'S 30°25'E 915 m] / 15km SE Muden 2930AB / Coll: J.G.H. Londt / Date: 4.ii.1984' (NMSA); 5♂ 2♀ same data but 22.xii.1983 (NMSA); 1♂ 'South Africa: N Cape / Kenhardt Hartbeest Riv. / 29°20'47"S 21°08'42"E / 14.xi.2011 780m / J & A Londt Dry river bed / Sandy *Acacia* savanna' (NMSA); 2♀ 'Blythedale [c. 29°22'S 31°21'E 5 m] / Beach / Natal / 16.3.1963 / T.W. Schofield' (NMSA)*; 1♀ 'Town Bush [Reserve c. 29°33'S 30°20'E 1000 m] / Pietermaritzburg / South Africa / T. Schofield / 31.v.57' (NMSA)*; 3♂ 4♀ 'South Africa: Natal / Tongaat Riv. mouth [Mdloti River c. 29°39'S 31°08'E 5 m] / 2931CA 22.xi.1978 / open sandy area / J.G.H. Londt' (NMSA). ZIMBABWE: 2♂ 2♀ 'Country Rhodesia / Loc Chirundu [c. 16°02'S 28°51'E 400 m] / Date 18-5-1965 / Coll R. Borthwick' (NMSA); 1♂ 'Hillside [Harare c. 17°50'S 31°05'E 1485 m], S. Rhod / 17.xi.1922 / Swinburne & / Stevenson' (NMSA)*.

Material not studied: Londt (1978) records: '1♂, Mtunzini [c. 28°58'S 31°46'E 10 m], xii.1961, W.E. Lawson (D.M.); 1♀, Twinstreams [c. 28°59'S 31°44'E 15 m], Mtunzini, 15.xii.1963, Lawson & Bouguin (D.M.); 1♂, M'Fongosi [Mfongosi c. 28°43'S 30°50'E 575 m], Zululand, xii.1914, W.E. Jones (S.A.M.).' also '2♂ 2♀, Otjimbumbé [?], Kunene River, iii.1923, S.A.M. Exped. (S.A.M.); 1♂, Hoarusib Otshu, iii.1926, S.A.M. Exped. (S.A.M.); 1♀, Cayimaais, iii.1923, S.A.M. Exped. (S.A.M.).' In additional material listed as unstudied includes: Holotype 'Caffraria': 1♀, (Rijksmuseum) and 'South West Africa: Hoarusib [c. 18°21'S 13°00'E 590 m], Otshu, iii.1926, S.A.M. Exped. (S.A.M.); Rehoboth [c. 23°19'S 17°05'E 1405 m], xi–xii.1935, Mell-Marley (S.A.M.).'

Distribution, phenology and biology: A fairly widespread species in southern Africa (Fig. 25). The species has been collected sympatrically with *fraterculus* at Bela Bela and *dubius* at Umlalazi Nature Reserve. Data presented in this paper confirm the presence of the species in Namibia, South Africa and Zimbabwe, and records, for the first time, material from Mozambique and Angola (which is not strictly speaking a southern African country). The species flies from October through to May – there being a single record for July (Table 1). Although a fairly commonly collected species, only 5 prey records are known (all associated with females): Odonata: Caenagrionidae (1). Diptera:

TABLE 1
The phenology of southern African *Philodicus* species. Months of the year abbreviated.

Species	J	A	S	O	N	D	J	F	M	A	M	J
<i>cinerascens</i>	-	-	•	-	•	-	-	•	•	•	-	•
<i>dubius</i>	-	-	-	-	•	•	•	•	•	•	•	-
<i>fraterculus</i>	•	-	-	-	•	•	•	•	•	•	•	-
<i>swynnertoni</i>	-	-	-	-	-	•	•	•	•	•	-	-
<i>tenuipes</i>	•	-	-	•	•	•	•	•	•	•	•	-
	2	0	1	1	4	4	4	5	4	5	3	1

Calliphoridae (1), Sarcophagidae (1). Hymenoptera: Apidae (2 – *Apis mellifera*). The female ovipositor is distally broad and spade-like so may be adapted for digging in loose sand.

DISCUSSION

Distribution

Philodicus is represented by five species in southern Africa. Two of these, *fraterculus* and *tenuipes* are well represented and widely distributed, found in both the drier western parts of the subcontinent as well as in the more temperate eastern parts, although records are more numerous from the east, probably because more sampling has been done in these more developed parts of the subcontinent. A third species, *dubius*, is also reasonably well represented, but confined to the eastern parts of the subcontinent in higher rainfall regions. The remaining two species, *swynnertoni* and *cinerascens*, are apparently fairly widely distributed species which have their southern limits in the north-eastern parts of the sub-region.

Biology

Philodicus is of particular interest as species appear to require the presence of surface water for their survival. All southern African species are invariably collected near fresh water sources such as rivers, streams, dams and natural pans. In some instances specimens are found in drier and even arid places where surface water is only available after rain. Dry river beds and pans are also good places to collect these flies and so I conclude that developing larvae, probably living in sand or soil, are able to survive in relatively dry places as long as rain falls from time to time. The actual habitat in which adults are found varies greatly from forest margins, woodland, savannah and semi desert. Of interest is the fact that species in Blasdale's (1957) *alcimoides* species group (e.g. *cinerascens*, *dubius*, *tenuipes*) have relatively broad spade-like ovipositors as opposed to those of his *fraternus* group (e.g. *fraterculus*, *swynnertoni*) with their narrow spike-like ovipositors. It is highly likely that these differently shaped organs reflect the nature of the substrates in which eggs are deposited. It is probable that broad, spade-like ovipositors would be better adapted for digging in loose sand while spike-like ovipositors might be better organs in more compact substrates. A study of actual oviposition sites would no doubt be instructive.

As far as prey is concerned, Londt (2006: 321), who analysed some 2000 Afrotropical asilid prey records (including records previously published by Hobby (1935)), had

this to say about the then known prey of *Philodicus*, for which he had 183 records – ‘Orthoptera (62), Hymenoptera (47), Diptera (41), Hemiptera (18), Coleoptera (7), Lepidoptera (5), Neuroptera (2), Mecoptera (1). The first three listed orders constitute 82% of prey. Significant prey families are Acrididae (62), Apidae (20), Asilidae (18) and Cicadidae (10). Acrididae represent 34% of the diet of *Philodicus*.’ Although there are a number of new prey records in this paper they merely support earlier findings. Clearly, grasshoppers are a significant food source which suggests that *Philodicus* is capable of catching flying prey as well as prey that commonly rest on the ground or on vegetation. Of interest is the fact that far more females have been collected with prey than males. Although females tend to be larger than males, and may be more readily collected, I believe the difference is more likely to relate to the need for protein for egg maturation. It is also possible that females live longer and could be more abundant than males at any one time.

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REFERENCES

- BECKER, T. 1922 [1923]. Wissenschaftliche Ergebnisse der mit Unterstützung der Akademie der Wissenschaften in Wien aus der Erbschaft Treitl von F. Werner unternommenen zoologischen Expedition nach dem anglo-ägyptischen Sudan (Kordofan) 1914. VI Diptera. *Denkschriften der Akademie der Wissenschaften in Wien*. **98**: 57–82.
- BEZZI, M. 1892. Di alcuni ditteri raccolti nel paese dei Somali dall’ingegnere L. Bricchetti-Robecchi. *Annali Museo Civico Storia Naturale Genova* **32**: 181–196.
- BIGOT, J.M.F. 1891. Voyage de M. Ch. Alluaud dans le territoire d’Assinie 8^e mémoire (Afrique occidentale) en juillet et août 1886. Diptères. *Annales de la Société entomologique de France* **60**: 365–386.
- BLASDALE, P. 1957. The Asilidae (Diptera) of the genus *Philodicus* Loew in the Ethiopian Region. *Transactions of the Royal Entomological Society of London* **109** (4): 135–148.
- CURRAN, C.H. 1927. Undescribed Asilidae from the Belgian Congo. *American Museum Novitates* **272**: 1–18.
- DANIELS, G. 1989. 37. Family Asilidae. In: *Catalog of the Diptera of the Australasian and Oceanian Regions*. ed., Evenhuis, N.L. Bishop Museum Special Publication **86**. (Asilidae: pp 326–349).
- HOBBY, B.M. 1933. Descriptions of new Rhodesian Asilidae (Dipt.). *Entomologist’s Monthly Magazine* **69**: 108–112.
- 1935. Rhodesian Asilidae (Diptera) and their prey collected by Mr C. F. M. Swynnerton. *Journal of Animal Ecology* **4**: 90–112.
- HULL, F.M. 1962. Robber flies of the World. The genera of the family Asilidae. *Bulletin of the United States National Museum* **224** (1): 1–430, (2): 431–907.
- 1967. Diptera (Brachycera): Asilidae. *South African Animal Life: Results of the Lund University Expedition in 1950–51*. Stockholm: Swedish Natural Sciences Research Council. **13**: 234–283.
- KERTÉSZ, C. 1909. *Catalogus dipteriorum hucusque descriptorum*. IV. Oncodidae, Nemestrinidae, Mydidae, Apioceridae, Asilidae. Budapestini: Museum Nationale Hungaricum. 1–348.
- LEHR, P.A. 1988. Family Asilidae. In: Soos, A. & Papp, L., eds, *Catalogue of Palaearctic Diptera*. Vol. 5. Amsterdam: Elsevier, pp. 197–326.
- LOEW, H. 1848. Ueber die europäischen Raubfliegen (Diptera Asilica). *Linnaea Entomologica, Stettin*. **3**: 386–495.
- 1858. Bidrag till kännedomen om Afrikas Diptera [part]. *Öfversigt af Konglichen Vetenskaps-Akademiens Förhandlingar* (Stockholm) **14**: 337–383.

- LONDI, J.G.H. 1978. Afrotropical Asilidae (Diptera) 2. The genus *Philodicus* Loew, 1848, in southern Africa. *Annals of the Natal Museum* **23** (2): 419–428.
- 2005. An annotated key to the genera of afrotropical Apocleinae, with descriptions of six new genera (Diptera: Asilidae). *Tijdschrift voor Entomologie* **148**: 39–62.
- 2006. Predation by Afrotropical Asilidae (Diptera): An analysis of 2000 prey records. *African Entomology* **14** (2): 317–328.
- MACQUART, P.J.M. 1838. Diptères exotiques nouveaux ou peu connus. *Mémoires de la Société (Royale) des Sciences, de l'Agriculture et des Arts à Lille*. France. **1** (2): 5–207.
- OLDROYD, H. 1975. Family Asilidae. In: Delfinado, M.D. & Hardy, D.E. eds, *A catalog of the Diptera of the Oriental region*. Honolulu: University Press of Hawaii. **2**: 99–156.
- 1980. Family Asilidae. In: Crosskey, R.W., ed., *Catalogue of the Diptera of the Afrotropical Region*. London: British Museum (Natural History), pp. 334–373, 1218, 1226, 1229.
- RICARDO, G. 1900. Notes on Diptera from South Africa (Tabanidae and Asilidae) [part]. *The Annals and Magazine of Natural History* (7) **6**: 161–178.
- 1921. Notes on the Asilinae of the South African and Oriental regions. [part] *The Annals and Magazine of Natural History* (9) **8**: 175–192.
- 1922. Notes on the Asilinae of the South African and Oriental regions. [concl.] *The Annals and Magazine of Natural History* (9) **10**: 36–73.
- 1925. New species of Asilidae from South Africa. *The Annals and Magazine of Natural History; Zoology, Botany and Geology*. (9) **15**: 234–282.
- TOMASOVIC, G. 2012. Etude sur l'édage d'espèces du genre *Philodicus* Loew 1848 (Diptera: Asilidae), conservées dans des institutions de Belgique. *Entomologie faunistique* 2012 (2011) **64** (1): 23–27.
- WALKER, F. 1849. *List of the specimens of dipterous insects in the collection of the British Museum* [part]. **2**: 231–484. British Museum, London.
- 1851. Diptera (Part II). In: *Insecta saundersiana: or characters of undescribed insects in the collection of William Wilson Saunders, Esq., F.R.S., F.L.S., &c.* 1. London: Van Voorst, pp. 77–156.
- 1855. *List of the specimens of Dipterous insects in the collections of the British Museum*. London: British Museum. Pt. 7. Supplement 3. pp. 507–774.
- WIEDEMANN, C.R.W. 1819. Beschreibung neuer Zweiflügler aus Ostindien und Afrika. *Zoologisches Magazin. Kiel*. **1** (3): 1–39.
- 1828. *Aussereuropäische zweiflügelige Insekten als Fortsetzung des Meigenschen Werkes v. 1. Pt 8. Familie: Rauberfliegen (Asilici)*. Hamburg: Schulzischen Buchhandlung, 1828–1830.
- WULP, F.M. VAN DER. 1889. Description d'une espèce nouvelle d'asilide de l'Afrique équatoriale. *Bulletin de la Société Entomologique d'Belge* **1889**: cxxvi–cxxvii.
- 1899. Asilidae from Aden and its neighbourhood. *Transactions of the Entomological Society of London* **1899**: 81–98.