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A new species of *Stenorrhachus* McLachlan from Chile
(Neuroptera: Nemopteridae) with biological notes

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A new species of *Stenorrhachus* McLachlan from Chile (Neuroptera: Nemopteridae) with biological notes

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Abstract. A new species of *Stenorrhachus* (McLachlan), *S. chilensis* (Neuroptera: Nemopteridae), is described from Chile with biological observations of *Stenorrhachus walkeri* (McLachlan). A key to the two species is provided as well as diagnoses of the adults and of the larva of *Stenorrhachus walkeri*.

Resumen: Se describe una especie nueva de *Stenorrhachus* (McLachlan), *S. chilensis* (Neuroptera: Nemopteridae), de Chile con notas biológicas sobre *Stenorrhachus walkeri* (McLachlan). Se da una clave para las dos especies además descripciones de los adultos y de la larva de *S. walkeri*.

Introduction

A new species of *Stenorrhachus* McLachlan (Neuroptera: Nemopteridae) was discovered at about 1000 meters in the highlands of north central Chile. Also, we discovered a large population of *Stenorrhachus walkeri* (McLachlan) flying among yellow *Haplopappus* (Asteraceae) flowers growing on sand dunes by the ocean at Tongoy near Coquimbo. The blind larvae were discovered by digging about 30 cm. into the sand. After processing the material, we discovered that all 80 collected specimens were males. The answer to this anomaly became known some months later after we reared the larvae and discovered that the females are practically wingless. This is the first known case of flightless females in the family Nemopteridae. A key to the two species is presented based mainly on differences of the male terminalia and genitalia. Also, the larva is described with photos. *Stenorrhachus* is the only genus of the subfamily Nemopterinae in the New World.

Depositories

Specimens studied are deposited in the following collections:

- BMNH** The Natural History Museum, London, UK.
- CASC** California Academy of Sciences, San Francisco, California, U.S.A.
- FSCA** Florida State Collection of Arthropods, Gainesville, Florida, U.S.A.
- PCRM** Private collection of Robert B. Miller, Stanfield, North Carolina, U.S.A.
- TAMU** Texas A & M University, College Station, Texas, U.S.A.
- USMB** Upper Silesian Museum, Bytom, Poland.

***Stenorrhachus* McLachlan**

Stenorrhachus McLachlan 1886: lviii. **New name** for *Stenotaenia* McLachlan 1885: 376. **Type species:** *Stenotaenia walkeri* McLachlan, by monotypy. **Preoccupied** by *Stenotaenia* Koch 1871: 85 (Chilopoda). = *Stenorrhachus* Navás 1910: 366 (misspelling). = *Stenonemia* Cowley 1941: 122. **Type species:** *Stenotaenia walkeri* McLachlan, by monotypy. Unnecessary replacement name for *Stenorrhachus* McLachlan (after Tjeder 1967: 345; Oswald 1987: 227).

Taxonomy. Navás 1910: 28 (*Stenorrhachus* = *Savigniella* Kirby; 1931 (*Stenorrhachus* valid genus)).

Further description. Cowley 1941: 123; Hoyt 1952 (mouthparts); Acker 1958:106-130, Figures 7-22 (head, thorax, wings, abdomen, male genitalia); Tjeder 1967: 291, Figures 1887-1888 (head).

Diagnosis (based on male). Head broader than high, with very short rostrum which is shorter than diameter of eye as measured from the lower eye border to tip of clypeus; clypeus small, mostly fused with very short rudiments of galea and lacinia; mandible triangular, short, apices not meeting; labrum reduced, indicated by an incomplete, sutural line; maxilla very reduced; lacinia and galea rudimentary; maxillary palpus with three segments; labium reduced with two segmented labial palpus; ocular foramen small; anterior tentorial pit large; fronto-genal and frontal sutures well developed; postfrontal suture present; antennae filiform, separated by less than diameter of antennal fossa, with 40 to 50 flagellomeres, most of which are longer than wide except basally; eye small, widely separated; legs moderately long, nearly equal in size; femora slightly swollen subbasally; basitarsus of midleg and hindleg longer than rest of tarsomeres together, that of foreleg slightly shorter; pretarsal claws weakly arched; wings lack pterostigma; several crossveins present between CuP and 1A; costal area without interconnected crossveins; forewing radial sector with branches re-branching; forewing with 20 to 26 cells between radius and radial sector, sometimes a few cells interconnected toward apex; 3 marginal cells between the apices of 2A and 1A; hindwing linear, slightly dilated toward apex, somewhat more than twice as long as forewing; abdominal spiracle I located on the extremely narrow tergite I, remaining seven spiracles located on the pleural membrane; abdomen without eversible sacs; male tergite IX fused with ectoproct which has a short postventral lobe; male gonarcus with latero-dorsal process, without mediuncus; parameres slender, fused apically, with phallic membrane dorsally; female mesothoracic wings reduced to stubs; metathoracic wings abbreviated (Figures 18-19).

Discussion. This is the first known genus of Nemopteridae in which the female has greatly reduced wings and is flightless. The very short rostrum is found in a few afro-tropical genera such as *Savignyella* Kirby, *Semirhynchia* Tjeder and *Derhynchia* Tjeder. The latter genus (Tjeder 1967) lacks the rostrum altogether. *Savignyella* and *Semirhynchia* have a well developed labrum but the labrum is weakly developed in *Stenorrhachus*. Two species are now recognized. The type species was found around coastal sand dunes in Coquimbo Province whereas a second species was found at about 1000 meters in Coquimbo and Antofagasta Provinces. The two species have notable differences in the structure of the male genitalia.

Key to species of *Stenorrhachus*

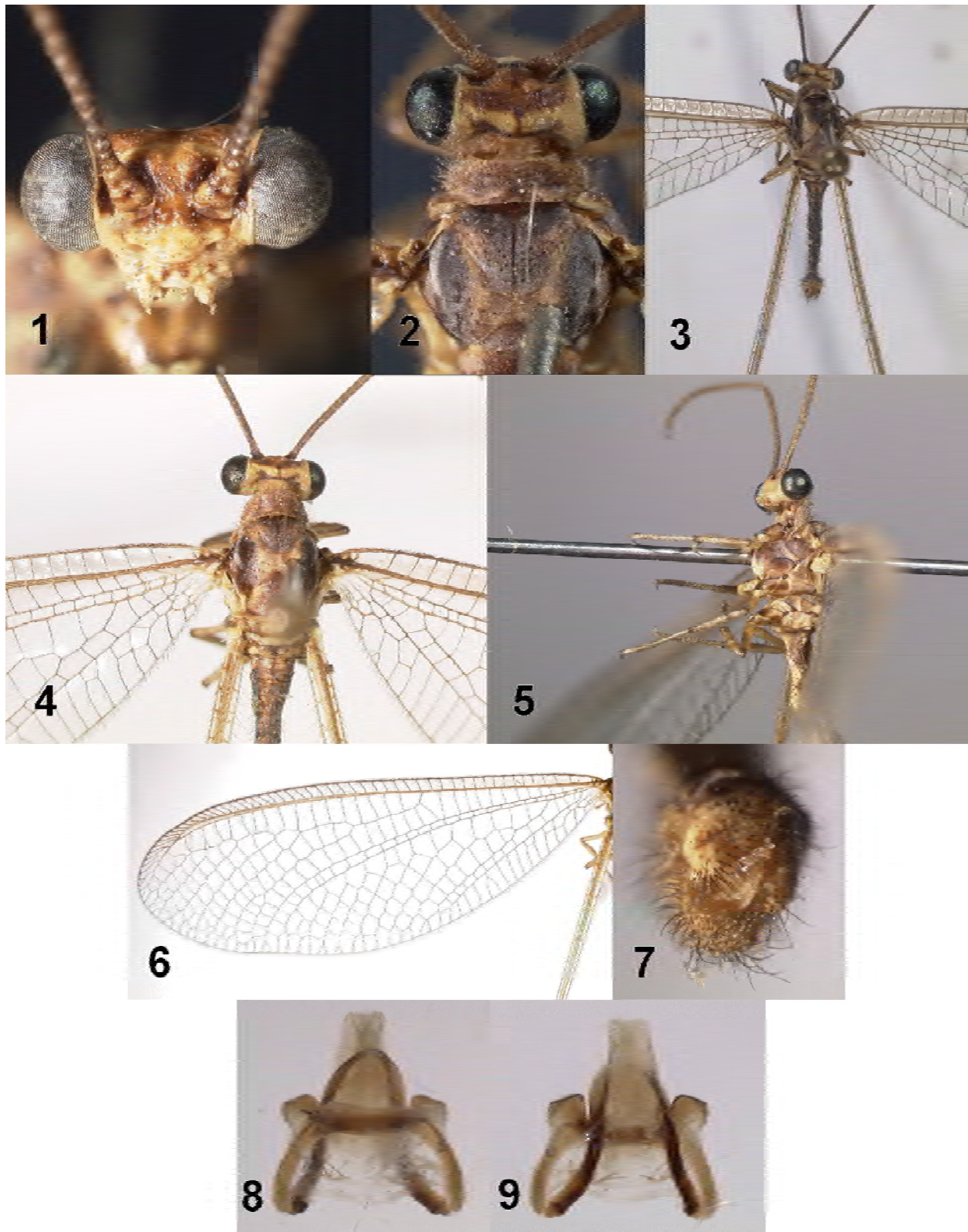
1. Labial palpus longer than maxillary palpus, basal segment about twice as long as greatest diameter, second segment with long apical setae (longer than palpomere); male ectoproct with postventral lobe longer than greatest diameter; sternite IX not extending beyond posterior margin of lobe; male paramere with anterior fragment about five times longer than wide (Figure 17); gonarcus regularly curved without latero-dorsal process (Figure 16) *Stenorrhachus walkeri* (McLachlan)
- Labial palpus about as long as maxillary palpus, basal segment about 1.5 times longer than greatest diameter, second segment with short apical setae; male ectoproct with postventral lobe about as long as greatest diameter; sternite IX extending at least to posterior margin of lobe; male paramere about eight times longer than greatest width (Figure 9); gonarcus strongly bent posteriorly at lateral margin where a large, broad latero-dorsal process is present. (Figure 8) *Stenorrhachus chilensis* new species

Stenorrhachus chilensis Miller and Stange, new species

(Figures 1-9)

Holotype male. 16 km. south Vallenar, Antofagasta, Chile, 1000 m., 10.II.1989, R. Miller & L. Stange (FSCA).

Diagnosis. Labial palpus about as long as maxillary palpus, basal segment about 1.5 times longer than greatest diameter, second segment with small apical setae; postventral lobe of male ectoproct about as



Figures 1-9. *Stenorrhachus chilensis* Miller and Stange, male. 1) Face. 2) Head and thorax, dorsal view. 3) Whole body. 4-5) Head and thorax, dorsal and lateral view. 6) Forewing. 7) Terminalia, posterior view. 8-9) Genitalia, dorsal and caudal view.

long as greatest diameter; male paramere about eight times longer than greatest width; mediuncus nearly straight at middle, then bent strongly backwards at lateral margin with a large latero-dorsal process near angle.

Description. Holotype male: length of body 12 mm, forewing 24 mm., greatest width 10 mm. hindwing 59 mm. **Coloration:** general coloration light brown to pale yellow; face (Figure 1) mostly pale yellowish ventrally becoming darker dorsally; scape and petiole mostly pale yellow with small dark brown ring apically; antennal flagellomeres brown with very narrow pale ring apically; vertex (Figure 2) mostly pale yellow with dark brown anterior row and posterior row connected with narrow dark brown stripe medially; large black area behind antennal sockets; pronotum (Figure 4) without definite markings, mostly dark brown with some pale yellow and with brown spots at base of most setae; mesonotum mostly dark brown anteriorly and laterally, pale yellow in middle before scutellum which has a large brown median area and has pale yellow brown spots at base of many setae; pleura straw colored, mottled with darker brown; legs (Figure 5) mostly pale brown with coxae mostly dark brown except apically; femur with considerable dark brown anteriorly, tibia with small subbasal and apical dark brown rings; tarsi pale brown; pretarsal claws dark brown; abdomen (Figure 3) predominately dark brown except for terminal segments which are mostly pale brown dorsally, dark brown spots at many setal bases; wings (Figure 6) translucent except some brownish suffusion in costal and subcostal area; wing veins and crossveins uniformly dark brown. **Chaetotaxy:** all setae on body and wings dark brown; leg setae short, shorter than diameter of leg; conspicuous setae present on pronotum, pteronotum, abdomen, and longest on terminalia (Figure 8). **Structure:** labial palpus about as long as maxillary palpus, basal segment about 1.5 times longer than greatest diameter, second segment with small apical setae; antenna with about 45 flagellomeres which are mostly about twice as long as broad; head (Figure 1) with interocular distance about twice as long as vertical distance from labrum to vertex; pronotum (Figure 4) much wider posteriorly than anteriorly; abdomen short, about as long as length of head and thorax together; forewing venation (Figure 8); hindwing elongate, ribbon-like, not expanded posteriorly; genital capsule (tergites IX to XI) enlarged, much wider than rest of abdomen; sternite IX reaching to posterior margin of postventral lobe of ectoproct which is about as long as greatest diameter; paramere about eight times longer than greatest width (Figure 9); mediuncus nearly straight at middle, then bent strongly backwards at lateral margin with large broad latero-dorsal process near angle (Figure 8).

Variation: length of body 7 to 12 mm., forewing 15 to 24 mm., hindwing 42 to 60 mm.

Paratypes. 25 males. February. CHILE. **Antofagasta:** 16 km. south Vallenar, 1000 m., 10.II.1989, R. Miller & L. Stange (at light) (20 m, 23f, CASC; FSCA; PCRM; TAMU; USMB). **Coquimbo:** Vicuña, 9.II.1989, R. Miller & L. Stange (2m, FSCA).

Discussion. This species differs notably from *S. walkeri* in the shorter male ectoproct (postventral lobe about as long as greatest diameter) and male genitalia (Figures 8, 9) which has the anterior fragment of the male paramere longer and more slender and the gonarcus which has a broad latero-dorsal process near the strong posterior angle. *S. chilensis* appears to be somewhat smaller (forewing 15 to 24 mm) than *S. walkeri* (forewing 23 to 27 mm) and has darker markings. Also, the labial palpus and pretarsal claws are shorter and the male abdomen of *S. chilensis* is slightly longer than in *S. walkeri*. This species occurs at high elevation (1000 meters) whereas *S. walkeri* appears to prefer the coastal sand dunes.

***Stenorrhachus walkeri* (McLachlan)**

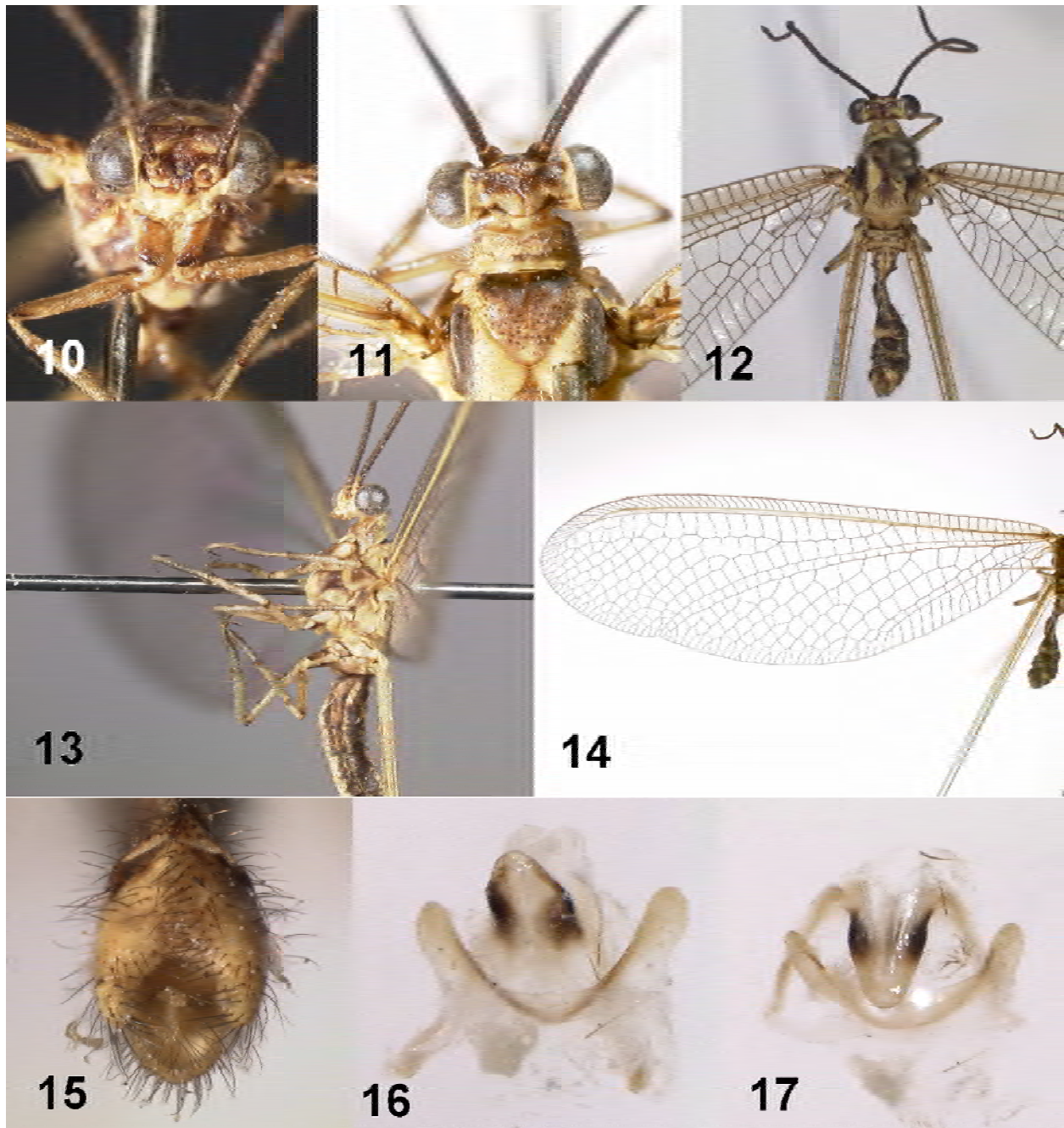
(Figures 10-25)

Stenotaenia walkeri McLachlan 1885: 376. **Holotype male**, Coquimbo, Chile, 22.II.1880 (BMNH).

Taxonomy. McLachlan 1886: lviii (in *Stenorrhachus*); Cowley 1941: 122 (in *Stenonemia*).

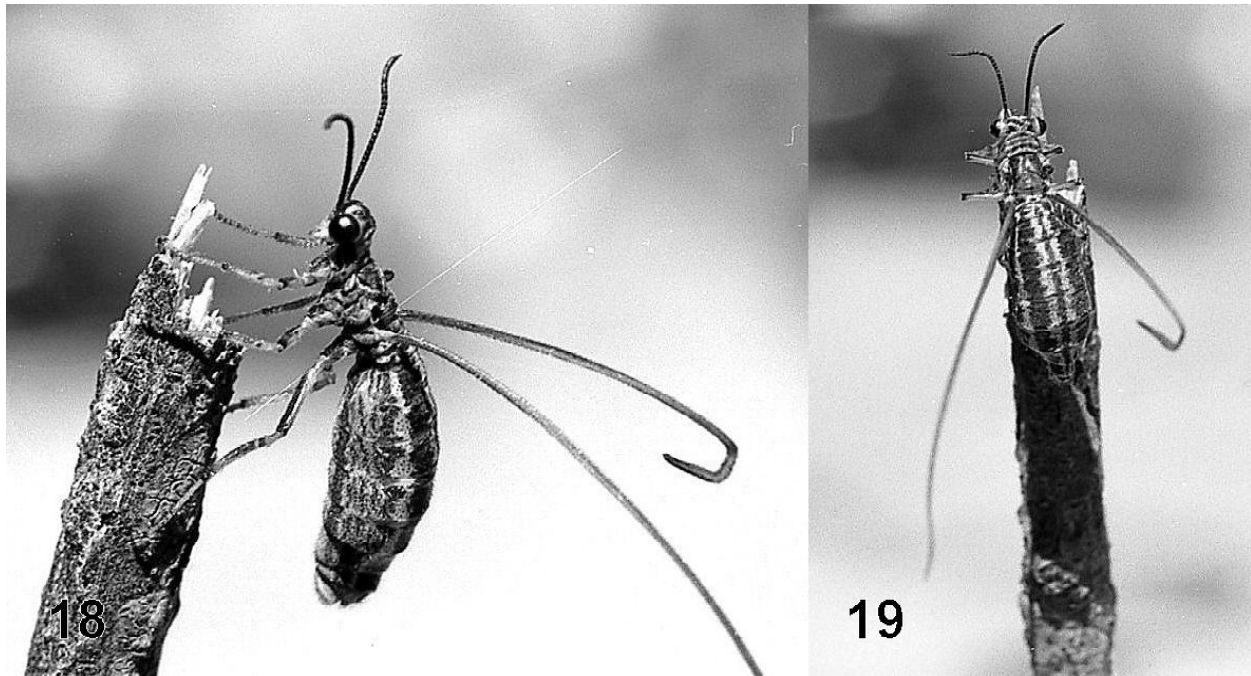
Further description. Acker 1958: 106-130, Figures 7-22; Stange and Williner 1981: 35, Figure 1 (head).

Biology. Stange 2008: 2110.



Figures 10-17. *Stenorrhachus walkeri* (McLachlan), male. **10)** Face. **11)** Head and thorax. **12-13)** Whole body, dorsal and lateral view. **14)** Forewing. **15)** Terminalia, posterior view. **16-17)** Genitalia, dorsal and caudal view.

Diagnosis. Male: length of body 9 to 13 mm; forewing 23 to 27 mm; hindwing 52 to 65 mm. **Coloration:** similar to *S. chilensis* but has less dark brown marking on the body; posterior margin of the vertex has sublateral dark spots which are usually separated medially; forewing subcostal and radial veins yellowish. **Structure:** labial palpus longer than maxillary palpus, basal segment about twice as long as greatest diameter, second segment with long apical setae (longer than palpomere); male ectoproct with postventral lobe longer than greatest diameter; sternite IX not extending to posterior margin of postventral lobe; male genitalia (compare Figures 8, 9 with 16, 17) with the gonarcus smoothly curved and without much development of the latero-dorsal process; anterior fragment of the paramere is short and stocky, about five times longer than greatest diameter.



Figures 18-19. *Stenorrhachus walkeri* (McLachlan), female, lateral and dorsal view.

Female (Figures 18, 19): darker brown than the male (especially the dorsal thorax) with small differences in markings; pronotum with three transverse dark stripes; enlarged abdomen dark brown with a broad median pale band which encloses a dark brown median stripe; mesothoracic wing vestigial (about 0.5 mm long) and the hindwing present but only about 45% as long as that of male; mesothoracic wing weakly developed with corresponding reduction in the size of the female mesothorax; lateral distance between the forewing bases about the same as that between the hindwing bases (in the male the distance between the forewing bases is much greater than that between hindwing bases); antenna with about 32 flagellomeres (compared to 47 to 52 flagellomeres in the male), about one-half as long as the male antenna; pronotum about as wide anteriorly as posteriorly (in contrast to the male in which the anterior width is much wider than the posterior width); tibiae strongly bowed, especially hindtibia (male tibiae nearly straight; abdominal diameter about three times greater than in the male).

Larva (Figures 20-26). Blind larva about 8 mm in length; pale brown coloration and densely covered by long white hair-like setae, without distinct markings; head capsule smooth with long white setae, about twice as wide as long; mandible short, stout, about one-half as long as length of head capsule, without teeth but with many hair-like setae, especially on dorsal surface; legs are all about the same length; tibia (Figures 24, 25) with many spine-like setae near apex; foretarsal claws are much larger than the midtarsal and hindtarsal claws; posterior sternite (Figure 26) with many stout setae.

Biology. The blind larvae and old cocoons of *S. walkeri* were found about 30 cm. under the sand in a mixture of sand and leaf litter among the roots of *Haplopappus* (Asteraceae) plants. One larva was found with a half eaten scarab larva in its mandibles. Scarab larvae were common in the 30 cm. deep sand/litter where the *Stenorrhachus* larvae were found. The larva moves forwards in the sand and has strong fossorial legs. The emerged females probably climb the *Haplopappus* plants to await the arrival of the males. In the laboratory reared females became very inactive once they had climbed to the top of provided twigs where they maintained a distinctive pose (Figures 18, 19) most of the time. The actively flying males were not observed feeding although they were abundant among the yellow *Haplopappus* plants in the dunes. No pollen grains were observed on their bodies.

Material studied. 85 males, 1 female. January to February. **CHILE. Coquimbo:** Cerro Pan de Azucar, II.1952, L. Peña (12m, CASC); La Serena, 5.II.1945, E. Reed (1m, CASC); Tongoy, 8.II.1989, R. Miller &



Figures 20-26. *Stenorrhachus walkeri* (McLachlan), larva. **20-21)** Whole body, dorsal and ventral view. **22-23)** Head, dorsal and ventral view. **24)** Foreleg and midleg. **25)** Hindleg. **26)** Posterior sternite, ventral view.

L. Stange (70m, 1f, 2 larvae, FSCA; PCRM; TAMU; USMB); Tongoy Beach, 24.I.1987, P. Mazry (1m, CASC); between La Serena & Coquimbo, 29B56'S, 71B18W, 4.II.1945, Wagenknecht (1m, CASC).

Discussion. *Stenorrhachus walkeri* is closely related to *S. chilensis* differing notably in the shape of the male ectoproct, paramere and mediuncus as well as in details of the labial palpus. The size averages larger and the coloration is different.

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Literature Cited

- Acker, T. S. 1958.** The comparative morphology of *Stenorrhachus walkeri* (McLachlan) and of *Nemopterella* sp. (Neuroptera: Nemopteridae). *Microentomology* 23: 106-130, Figures 7-22.
- Cowley, J. 1941.** Two new generic names in the Nemopteridae (Neuroptera). *Annals and Magazine of Natural History* (11)7: 121-126.
- Hoyt, C. P. 1952.** The evolution of the mouthparts of adult Diptera. *Microentomology* 17(3): 61-125, Figures 38-72.
- Kirby, W. F. 1900.** Notes on the neuropterous family Nemopteridae. *Annals of Natural History* (7)6: 456-472.
- Koch, C. I. 1847.** System der Myriapoden, mit den Verzeichnissen und Berichtigungen zu Deutschlands Crustaceen, Myriapoden und Arachniden. F. Pustet; Regensburg. 270 p.
- McLachlan, R. 1885.** On the discovery of a species of the neuropterous family Nemopteridae in South America, with general considerations regarding the family. *Transactions of the Royal Entomological Society of London* 33: 375-379.
- McLachlan, R. 1886.** Note concerning certain Nemopteridae. *Transactions of the (Royal) Entomological Society of London (Proceedings)* 34: lvii-lviii.
- Navás, L. 1910.** Monografía de los Nemoptéridos (Insectos Neurópteros). *Memorias de la Real Academia de Ciencias y Artes de Barcelona*(3) 8: 341-408, Figures 1-24, 1 Plate.
- Oswald, J. 1987.** *Hypochrysa* Hagen, 1866 (Chrysopidae) and *Stenorrhachus* McLachlan, 1886 (Nemopteridae) are valid names in the Neuroptera. *Neuroptera International* IV (3): 225-229.
- Stange, L. A. 2008.** Lacewings, Antlions and Mantispids (Neuroptera). pages 2102-2110 (volume 3). *In*: J. Capinera (editor). *Encyclopedia of Entomology*. 2nd edition (4 volumes). Springer; London. 4346 p.
- Stange, L. A., and G. J. Williner. 1981.** Una nueva especie de *Veurise* Navás de Bolivia con notas sobre Nemopteridae en América del Sur (Insecta: Neuroptera). *Physis* (Buenos Aires) Secc.C. 39 (97): 35-39.
- Tjeder, Bo. 1967.** Neuroptera-Planipennia Nemopteridae. *South African Animal Life* 13: 290-501, Figures 1881-2438.

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