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Revision of *Sceliages* Westwood, a millipede-eating genus of southern African dung beetles (Coleoptera : Scarabaeidae)

Shaun A. Forgie^{A,B}, Vasily V. Grebennikov^A and Clarke H. Scholtz^A

^ADepartment of Zoology and Entomology, University of Pretoria, Pretoria 0002, Republic of South Africa.

^BTo whom correspondence should be addressed. Email: s.forgie@uea.ac.uk

Abstract. The genus *Sceliages* Westwood (Scarabaeinae : Scarabaeini) from southern Africa is revised. Seven species are recognised: *Sc. granulatus*, sp. nov. (Botswana, South Africa), *Sc. augias* Gillet (Angola, Democratic Republic of Congo, Zambia), *Sc. adamastor* (Le Peletier de Saint-Fargeau & Serville) (South Africa), *Sc. brittoni* zur Strassen (South Africa), *Sc. difficilis* zur Strassen (South Africa, Zimbabwe), *Sc. gagates* Shipp (South Africa, Moçambique) and *Sc. hippias* Westwood (South Africa). The new species is described and the others are redescribed. Neotypes are assigned to *Sc. adamastor* and *Sc. gagates*. A key to the species is provided and male genitalia and other diagnostic characters are illustrated. A phylogenetic analysis of the genus is presented. Distribution maps of all species are provided. Mature larvae of *Sc. hippias* are described, the first for the genus. They can be distinguished from other Scarabaeinae larvae by a markedly reduced tormia on the epipharynx, and complete absence of hypopharyngeal sclerites (oncyli). Millipede relocation and burial behaviour of the adults of *Sc. hippias* and *Sc. adamastor* are described. We also provide descriptions of the brood chamber and brood balls of *Sc. hippias*.

Locality details for each species

Sceliages adamastor (Le Peletier de Saint-Fargeau & Serville)

Material examined

Sceliages adamastor

Neotype. ♂, 'South Africa, WC, De Hoop Nature Res., 34°25'S 20°24'E, 2.xi.2000, millipede baited p/f trap, S.A. Forgie', in SANC.

Sceliages iopas

Holotype. ♀, 'South Africa, *Sceliages iopas* Westwood, 1837. Type coll. 428' in HECO.

Paratype. 1 ♂, 'South Africa, *Sceliages iopas* Westwood, 1837. Type coll. 428' in HECO.

Sceliages curvipes

Holotype. ♂, 'South Africa, *Sceliages curvipes* Gillet, 1911' in BMNH.

Other material examined. 17 ♂, 4 ♀. **South Africa, Western Cape Province:** De Hoop Nature Reserve (34°25'S 20°24'E). 13.x.1984, J.H. Giliomee (1 ♂ UPSA). De Hoop Nature Reserve, nr Koppie Alleen, 34°28'S 20°28'E, 40 m alt. Strandveld, 3–7.x.1994, S. van Noort (2 ♂ SAMC). De Hoop Nature Reserve, (Cape Agulhas, 60 km NE) 34°25'S 20°24'E, millipede trap nr sand dunes, 10 h 30 for c. 1 h, 2 November 2000, S.A. Forgie (2 ♂, 2 ♀ BMNH, 1 ♂, 1 ♀ SANC, 1 ♂, 1 ♀ UPSA). Klippe Rugt Farm, 34°42'S 20°12'E, vegetated dunes, night, 27.x.1983, Endrödy-Younga, E-Y 2026 (1 ♂ TMSA). **Northern Cape:** Klipvlei, Garies, Namaqualand (30°25'S 17°54'E), November 1931, museum staff (2 ♂ SAMC). Victoria West, 'Cape-Karoo', 31°24'S 23°07'E, ground traps, 94 days, baited with meat, 18 ix. 1983, Penrith, E-Y 2012 (4 ♂ TMSA). **Eastern Cape:** Papiessfontein, Gamtoos (River) Mouth (33°57'S 25°04'E), January 1960, 'S.A.M.' (3 ♂ SAMC). **(?)Orange Free State (Free State):** Modder River, Brandfort, November 1939, museum staff (1 ♂ SAMC).

Sceliages augias Gillet

Material examined

See Remarks.

Sceliages augias

Holotype. ♀, 'Angola, Benguela, F.C. Wallman Leg.' in Institut Royal des Sciences Naturelles de Belgique (ISNB), Brussels, 10.640.

Other material examined. 7 ♂, 2 ♀. **Angola:** Casonda (7°23'S 20°54'E) (1 ♂ TMSA). **Democratic Republic of Congo:** Mukana (Mukama [sic]), 1810 m, 29.xi.1948, Mis.G.F. de Wittex 2033a (1 ♂ ISNB). **Zambia:** 'Rhodésie du Nord', Abercorn (Mbala) (8°50'S 31°23'E), 1600 m, 12.iv.1943, H.J. Brédo (1 ♂ ISNB). Algoa (Kabwe), Broken Hill, 180 km E (14°26'S 30°18'E), January 1913, Ll. Lloyd (1 ♂ BMNH). Mpika, Muchinga Mountains (11°42'S 27°10'E), 1500 m, January 1908, S.H. Neave (1 ♂ ISNB). 'Rhodésie du Nord', Mweru-Wantipa, H.J. Brédo (1 ♂ ISNB). Serenje (13°10'S 30°47'E), 1500 m, December 1912, Ll. Lloyd (1 ♀ BMNH). Serenje District, 1350 m, 28.xii.1907, Neave (1 ♂ BMNH). **Tanzania:** Mpwapwa (6°21'S 36°29'E), no collection data, 'Nevinson Coll. 1918-14' (1 ♀ BMNH).

NB. Further records are cited by zur Strassen (1965: 221), one of which is incorporated on Fig. 81: Congo: Kankunda, Upemba National Park (8°36'S 26°26'E), 1300 m, 24–28 November 1947, G.F. de Witte (1 ♂ Musée Royal de l'Afrique Central, Tervuren (MACT)). Zambia: Mpika, Muchinga Mountains, 1500 m, January 1908, S.H. Neave (1 ♂ MACT).

Sceliages brittoni zur Strassen

Material examined

Sceliages brittoni

Holotype. ♂, 'South Africa: SW Cape (Western Cape Province), Leipoldtville, Eland's Bay (32°13'S 18°29'E), October 1947, museum exped.' In SAMC.

Paratypes. 1 ♀, 'South Africa: SW Cape (Western Cape Province), Darling (33°23'S 18°23'E), October 1906, L.Péringuey' in SAMC. 1 ♀, 'Eland's Bay, October 1947, museum exped.' In SAMC. 1 ♀, 'Saldanha Bay (33°03'S 18°00'E), September 1960 'S.A.M'. in SAMC.

Other material examined. 23 ♂, 7 ♀. **South Africa, Western Cape Prov.:** Namaqualand Kommandokraal farm, 31°30'S 18°13'E, on sandy ground, 23.ix.1994, Endrödy and Bellamy, E-Y 3033 (1 ♂ TMSA). Langebaan, Geelbek, 12 km SE (33°06'S 18°02'E), col. in sand and shrubland, 1–29.x.1979, Davis and Payton (3 ♂, 2 ♀ SANC). Langebaan, Geelbek, 12 km SE, 29.x.1979, A.L.V. Davis (1 ♂ SANC). Nortier farm, 32°02'S 18°20'E, ground traps, meat bait, 25.viii.1981, Endrödy-Younga, E-Y 1845 (1 ♂ TMSA). Seweputs coast, 31°39'S 18°17'E, ground traps, 64 days, banana bait 23.viii.1981, Endrödy-Younga, E-Y 1836 (1 ♂ TMSA). **Northern Cape Prov.:** Hondeklipbaai, 30°19'S 17°16'E, September 1974, E.K. Hartwig (1 ♀ SANC). Hondeklipbaai, 12 km E, 30°21'S 17°25'E, ground traps, 58 days, millipede bait, 30.viii.1977, Endrödy-Younga, E-Y 1359 (11 ♂, 4 ♀ TMSA). Kotzesrus, 30°57'S 17°50'E, white dunes, day, ground traps, 62 days, meat bait, 23.viii.1979, Endrödy-Younga, E-Y 1581/4 (2 ♂ TMSA). Quaggafontein, 30°13'S 17°33'E, ground traps, 60 days, millipede bait, 29.viii.1977, Endrödy-Younga, E-Y 1356b (1 ♂ TMSA). Vlake farm, Gemsbok, 30°30'S 17°29'E, ground traps, 56 days, meat bait, 1.xi.1977, Endrödy-Younga, E-Y 1366 (1 ♂ TMSA). Vlakte farm, Gemsbok, 30°30'S 17°29'E, singled, dunes, day, 30.viii.1977, Endrödy-Younga, E-Y 1361 (1 ♂ TMSA).

Sceliages difficilis zur Strassen

Material examined

Sceliages difficilis

Holotype. ♀, 'South Africa: Eastern Cape Province, Grahams town, ex. coll. Fry 1905 – 100', in BMNH.

Paratypes. 1 ♂ and 1 ♀, 'South Africa: Natal (Kwazulu-Natal), Krantzkop (Kranskop) (28°58'S 30°51'E), November 1917, K.H. Barnard', in SAMC. 1 ♂, 'Natal (Kwazulu-Natal), pt. '58.13'', in BMNH. 1 ♂, 'Natal (Kwazulu-Natal), ex. coll. Pascoe', in BMNH. 1 ♂, 'Natal (Kwazulu-Natal), Durban, A.E.Miller', in SAMC. 1 ♂, 'Zimbabwe: Salisbury(Harare), Mashunaland (17°50'S 31°03'E), 1893, G.A. Marshall', in SAMC. 1 ♂, 'Inyanyadzi River (Nyanyadzi), Gazaland (19°45'S 32°25'E), November 1901, G.A.K. Marshall', in BMNH. 1 ♂, 'Africa, austr., Coll. J.J.Gillet', in ISNB.

Other material examined. 28 ♂, 18 ♀. **South Africa, Gauteng:** Boekenhoutskloof, Pretoria, 30 km NE (25°31'S 28°25'E), ex. Millipede (trap), 10.00 hours, 10.xi.1976, P.D. Stickler (5 ♂, 1 ♀ SANC). Same locality, 20.i.&24.ii.1977, G. Bernon (1 ♂, 2 ♀ SANC). Johannesburg (26°12'S 28°05'E), January 1939, W.G.Kobrow (1 ♂, 1 ♀ TMSA). Rhenosterpoort Farm, 25°43'S 28°56'E, horse dung, 27.xii.1975, L.Schulze E-Y 999 (1 ♂, 1 ♀ TMSA). Same locality, 5.xi.1978, L.Schulze (1 ♂, 1 ♀ TMSA). Valhalla, Pretoria (25°49'S 28°08'E), 1.xi.1963, (?)Zeiler (1 ♀ TMSA). Mpumalanga, Groenvaly farm, nr Badplaas, 50 km N (25°50'S 30°45'E), pitfall trap, millipede baited, 20.x.1995, S.H.Ford (3 ♂, 1 ♀ UPSA). Lydenburg District, Kopies Kraal, 25°06'S 30°12'E, singled on ground, 6.xii.1996, Endrödy-Younga, E-Y 3253 (2 ♂ TMSA). **Northern Province:** Motlakeng, Blouberg (23°05'S 29°01'E), 1600–1900 m, 6–15.i.1955, Transvaal Mus. Exped. (1 ♀ TMSA). Nylsvley Nature Reserve, 24°39'S 28°42'E, 24.xi.1998, R. Kutranov (1 ♂ UPSA). Nylsvley, Smith Farm, 24°40'S 28°42'E, cattle dung, 5 days, 17.ix.1975, Endrödy-Younga, E-Y 920 (1 ♂ TMSA). Pietersburg (23°50'S 29°20'E), 7.xii.1961, A.Spies (1 ♂ TMSA). Sand River, Thabazimbi 24°32'S 27°39'E, 31.iii.–3.iv.1986 (1 ♀ UPSA). Iron Crown, 2 km W, Wolkberge, Haenertsberg Distr. (24°00'S 29°57'E), 2230 m, March 1970, O. and L. Prozesky (1 ♀ TMSA). **Kwazulu-Natal:** 'ZuluLand', 1894, Capel (ex. Nevinson coll. 1918–14) (1 ♂ BMNH, *Sceliages iopas* W.). 'Natal', (ex. Nevinson coll. 1918–14) (1 ♂ BMNH). (Free State), Glen, 28.xi.1914. (1 ♀ SANC).

Zimbabwe: Harare, Mashunaland[sic], in dung, November 1898, G.A.K. Marshall (1 ♂ BMNH). Peak Mine, Selukwe (Shurugwi) (19°40'S 30°00'E), November 1920, C. Rawstone (1 ♀ SAMC). Chipinga (Chipinge) (20°12'S 32°37'E), 29.i.1982, C.R.Owen (1 ♂ TMSA). Upper Búzi R. (19°51'S 32°48'E), December 1901, G.A.K. Marshall (1 ♀ BMNH, 1908-212). Upper Búzi River, Gazaland (Melsetter Distr), December 1901, G.A.K. Marshall (1 ♂ BMNH, 1931-138). Mt. Chirinda., 'Gaza Ld.' (19°14'S 32°14'E), 1-3.i.1907, D.Odendaal (1 ♀ BMNH). Mt. Chirinda, Gazaland, December 1901, G.A.K. Marshall (1 ♂ BMNH, 1931-138). Chirinda Forest, December 1952, V.Son (1 ♀ TMSA). Umtali (Mutare) (18°58'S 32°40'E), 1902, A.Bodong (1 ♂ SAMC, specimen v.poor cond.). Umtali (Mutare), Mashonaland, December 1900, G.A.K.Marshall (3 ♂, 1 ♀ BMNH, 1904-206). 'Rhodésie', Plumtree, Rhodesia, 22.xii.1905 (1 ♂ ISNB, *Sc. adamastor* 10.640). 'Rhodésie', Salisbury (Harare), Mashonaland, November 1905, G.A.K. Marshall (1 ♀ ISNB, *Sc. adamastor*).

Sceliages gagates Shipp

Material examined

See Remarks.

Sceliages gagates

Neotype. ♂, 'Sordwana Bay, Natal (3 km from camp), 15 x 1978, Bornemissza & Aschenborn', in SANC, Database No: COLS 00045

Sceliages gagates

?*Type.* 'Limpopo' in BMNH.

Other material examined. 25 ♂, 13 ♀. **South Africa, Kwazulu-Natal:** Kozi Bay, SE 27 32 Bb (26°52'S 32°50'E), 8.x.1990, T. Beyers, U.P (1 ♂ UPSA). Muzi, Tongaland (Ingwavuma Distr.) 26°52'S 32°29'E, 4.xi.1980, H.H. Aschenborn (2 ♂, 1 ♀ SANC). Muzi Area (Ubombo Distr.) 'N Natal'(27°29'S 32°23'E), December 1980, E. Klingenhofer (5 ♂, 2 ♀ SANC). Sodwana Bay, 3 km from camp (27°32'S 32°41'E), 15.x.1978, Bornemissza and Aschenborn, ex. coll. CSIRO (2 ♂ SANC). St Lucia Estuary (28°21'S 32°29'E), 23.x.1966, L.Louw (1 ♂, 1 ♀ SANC). Tembe Elephant Pk., 'N. Kwazulu Natal' 26°51'S 32°24'E, 2.xii.1998, P. le Roux (1 ♀ UPSA). **North West Province:** (?)Sand River Mountain, 24°32'S 27°39'E, 18-19.xii.1985, C.L. Bellamy and D. d'Hotman (1 ♀ UPSA). **Moçambique:** Delagoa Bay (Maputo, Baía de) (25°48'S 32°51'E), ex. Nevinson coll. 1918-14 (5 ♂, 6 ♀ BMNH, 1 ♂ collected 1895). 'Delagoa', ec. Pascoe coll. 93-60 (1 ♂ BMNH). Delagoa, No Coll. Data (2 ♂ ISNB). Delagoa, H.Junod (1 ♂ ISNB). 'Dela. B., Mozamb.'(Maputo, Baía de), ex. Fry coll. 1905-100 (1 ♂ BMNH). Inhambane (23°52'S 35°23'E), 7.xii.1912, K.H. Barnard (1 ♀ SAMC). Lourenço Marques (Maputo), 1911, J.B. Paulus (2 ♂ SAMC). Nyaka, 'P E. Afr.'(30°9'S 29°46'E), February 1924, R.F. Lawrence (1 ♂ SAMC).

Sceliages granulatus Forgie & Scholtz, sp. nov.

Material examined

See Remarks.

Holotype. ♂, 'Botswana: Kang, 35 km SE, millipede-baited pitfall trap, 23 January 1978, A.L.V. Davis' (23°46'S 22°51'E), in SANC.

Paratypes. 3 ♂, 1 ♀, same data as holotype, in SANC, 1 ♂, 2 ♀ 'Botswana: Sekoma, 26 km E, millipede-baited pitfall trap, 24–25 January 1978, A.L.V. Davis' (24°24'S 23°53'E), 1 ♂ in UPSA, 2 ♀ in SANC.

Other material examined. 3 ♂, 2 ♀. **South Africa:** 1 ♂ 'Northern Cape Province, Olifantshoek, 45 km SW, 28 February 1973, Bornemissza and Temby' (27°56'S 22°44'E) in SANC, 1 ♀ 'Vryburg' (26°57'S 24°44'E) in SAMC, 2 ♂, 1 ♀ 'South Africa: 'Cape Province', Kimberley 28°44'S 24°46'E, October–November, 1980, S. Erasmus', in SANC

Sceliages hippias Westwood

Material examined

See Remarks.

Sceliages hippias

Holotype. 1 ♂, '?type' 'Int. S. Afr.' in BMNH, 54-76.

Ateuchus microcephalus

Paratype. 1 ♀, 'Caffraria' in The Natural History Museum of Stockholm.

Other material examined. 30 ♂, 23 ♀. **South Africa:** 'Cap', No Data, Coll. J.J.Gillet (1 ♂ ISNB).

Mpumalanga: Watervalriverpass, 24°54'S 30°21'E, on ground and bush, 28.xi.1986, Endrödy-Younga, E-Y 2326 (1 ♀ TMSA). Lydenburg, Waterval Pass, 11 km NE, 15.xi.1972, A. Strydom (1 ♂ TMSA). Lydenburg District (1 ♂, 1 ♀ SAMC). Schmoemansville (25°01'S 30°31'E), December 1932, G. Kobrow (1 ♀ TMSA). **Kwazulu-Natal:** 'Burn' (1 ♂ SAMC). Tugela Ferry (28°44'S 30°27'E), 14.xi.1971, C.H. Draper (1 ♀ TMSA). Weenen (28°51'S 30°04'E), November 1926, H.P. Thomasset (2 ♂ BMNH). Tugela River, Weenen, November 1996 (1 ♂, 1 ♀ DMSA). **Northern Province:** Blouberg (23°05'S 29°01'E), 1910 m–2138 m, 10.i.1955, Transvaal Museum Exped. (1 ♂ TMSA). Blouberg, 23°05'S 29°01'E, 1480 m, 4–7.xii.1990, Chown, Steekamp and M^oGeoch (1 ♂ SANC). Nylstroom 24°40'S 28°15'E, 22.iii.1997, D.G. van Eeden (1 ♀ UPSA). Nylsvlei, Smith Farm 24°40'S 28°42'E, cattle dung, 5 days, 17.ix.1975, Endrödy-Younga, E-Y 920 (1 ♂ TMSA). Pietersburg, 24°14'40"S 29°15'30"E, 22.x.1989, R.C. Lutchman (1 ♀ UPSA). Same locality, 18.ii.1989, L. Dekker (1 ♂ UPSA). Same locality, 17.ii.1989, R. Jansen (1 ♀ UPSA). Rhenosterpoort Farm, (?)25°43'S 28°56'E (24°45'S 28°23'E), horse dung, 27.xii.1975, L. Schulze, E-Y 999 (1 ♀ TMSA). Same locality, 15.ii.1980, L. Schulze (1 ♀ TMSA). Vic. Mmafete 24°11'S 30°06'E, 28.xi.1985, A.V.Evans and C.L. Bellamy (1 ♂ UPSA). Warmbad, SE 24,28 cb (24°50'S 28°20'E), April 1979, P. Koelance (1 ♂ UPSA). **North West Province:** Rustenberg Nature Reserve 25°40'S 27°12'E, 17–20.iii.1980, C. G. E. Moolman (1 ♀ SANC). Rustenberg Nature Reserve 25°40'S 27°12'E, 17.xii.2000, millipede baited p/f trap (1hr @ 0900h), S. A. Forgie (1 ♂, 1 ♀ SANC, 1 ♂, 8 ♀ UPSA). Tonguani Gorge, Pretoria, 81 km W (25°50'S 27°30'E), 2.xii.1972, Bornemissza and Insley, ex. coll. CSIRO (1 ♂ SANC). Retiefskloof, Rustenberg, 15 km SE (25°49'S 27°16'E), 25–26.x.1975, I.D. Temby, ex. coll. CSIRO (1 ♀ SANC). Thambazimbi, 30 km W, SE 24 27 da (24°35'S 27°20'E), 26.v.1979, E. Holm, (1 ♂ UPSA). **Gauteng:** Johannesburg (26°12'S 28°05'E), February 1932, G. Kobrow (1 ♂ TMSA). Same locality, December 1905, G. Kobrow (2 ♂ TMSA). Same locality, 'Ross.' (1 ♂ SAMC). Kameeldrift, Pretoria, 24 km NE (25°39'S 28°21'E), 29.i.1975, H.H. Aschenborn, ex. coll. CSIRO (1 ♂ SANC). nr Johannesburg A.J. Chomley, (1 ♂ BMNH, 1906–29). Roodeplaat Farm, Pretoria, 20 km NE (25°34'S 28°22'E), 15.xii.1984, A.L.V. Davis (1 ♀ SANC). Hennopsriver, Pretoria, 32 km W (25°50'S 27°58'E),

22.xii.1971, H.P. Insley, ex. coll. CSIRO (1 ♂ SANC). Pretoria, 25°45'S 28°12'E, 'Collected at dying millipede, 11h00 after rain. Later breaking millipede up into pieces, burrowing those', October 1982, R. Oberprieler (1 ♂ SANC). Same locality, 10.ii.1936, E.C.G. Bedford (1 ♂ SANC). Same locality, November 1972, R. Strydom (1 ♀ UPSA). Same locality, 25°47'S 28°20'E, 11.xii.1998, A. Shongwe (1 ♂ UPSA). Pretoria District (1 ♂ SANC). Pretoria (1 ♂ SAMC). Swartkops, nr Jhb (26°05'S 27°45'E), 10.xii.1967, M.I.Russell (1 ♂ BMNH). Welgedacht, Pretoria, 50 km N (25°20'S 28°20'E), 22.x.1977, J. Boomker (1 ♂ UPSA).