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3902

A supplement to the revision of the *Scirtes flavoguttatus* species-group (Coleoptera: Scirtidae: Scirtinae)

RAFAŁ RUTA¹, AGATA KIAŁKA¹ & HIROYUKI YOSHITOMI²

¹Department of Biodiversity and Evolutionary Taxonomy, University of Wrocław, Przybyszewskiego 63/77, 51-148 Wrocław, Poland.
E-mail: scirtes@biol.uni.wroc.pl, agata.kialka@gmail.com

²Ehime University Museum, Bunkyo 3, Matsuyama, 790-8577 Japan. E-mail: hymushi@agr.ehime-u.ac.jp



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Abstract

New species of the *Scirtes flavoguttatus* species-group are described from SE Asia. Altogether 34 species are newly described, including *Scirtes beccus* sp. nov. (Malaysia), *S. bocakorum* sp. nov. (Indonesia), *S. crockerensis* sp. nov. (Malaysia), *S. decorus* sp. nov. (Malaysia), *S. dumogensis* sp. nov. (Indonesia), *S. gunongmulensis* sp. nov. (Malaysia), *S. ishikawai* sp. nov. (Vietnam), *S. kinabalensis* sp. nov. (Malaysia), *S. kudasangensis* sp. nov. (Malaysia), *S. lambriensis* sp. nov. (Indonesia), *S. leuserensis* sp. nov. (Indonesia), *S. luteus* sp. nov. (Malaysia), *S. malaisei* sp. nov. (Myanmar), *S. melinauensis* sp. nov. (Malaysia), *S. noonadan* sp. nov. (Philippines), *S. pallicolor* sp. nov. (Malaysia), *S. penampangensis* sp. nov. (Malaysia), *S. phoupanensis* sp. nov. (Laos), *S. prodigosus* sp. nov. (Malaysia), *S. punctatus* sp. nov. (Philippines), *S. quasibalehensis* sp. nov. (Malaysia), *S. ranauensis* sp. nov. (Malaysia), *S. sarawakensis* sp. nov. (Malaysia), *S. seblatensis* sp. nov. (Indonesia), *S. sibayensis* sp. nov. (Indonesia), *S. sibolangitensis* sp. nov. (Indonesia), *S. sulawesicus* sp. nov. (Indonesia), *S. sulcigeroides* sp. nov. (Malaysia), *S. talinensis* sp. nov. (Philippines), *S. ulukimanisensis* sp. nov. (Malaysia), *S. velutinus* sp. nov. (Malaysia), *S. vietamicus* sp. nov. (Vietnam), *S. wallacei* sp. nov. (Indonesia), *S. yangsinensis* sp. nov. (Vietnam). New localities of six species are provided. An updated identification key, checklist and a summary of distributional data are included. Probability of the occurrence of the *Scirtes flavoguttatus* species-group was evaluated with an analysis in MaxEnt software. It is highly plausible that members of the group occur in most mountainous rainforests of SE Asia.

Key words: Marsh beetles, new species, identification key, checklist, distribution modeling

Introduction

The *flavoguttatus* group is a diverse species group of the genus *Scirtes* restricted to SE Asia. The best character defining the *flavoguttatus* group is a derived aedeagus consisting of penis (narrow, often club-like) fused with apical portion of U-shaped tegmen, which can be either symmetrical or asymmetrical, often with large, hook-like or spine-like parameres. Members of the *Scirtes flavoguttatus* species-group are often brightly colored, and elytral excitators are present in females of numerous species. Sexes can differ considerably in coloration (e.g. males of *Scirtes laosensis* Yoshitomi & Ruta have contrasting yellow and black elytral pattern, whereas females have uniformly brownish-black elytra).

The *flavoguttatus* group of *Scirtes* was revised by Yoshitomi & Ruta (2010), and three new species were described by Klausnitzer (2013). Since publication of the revision numerous unidentified specimens were found in several collections which included a considerable number of undescribed species. In the present paper we describe new species, report new localities of previously described taxa, and provide an updated checklist and identification key. Records are mapped and distribution is discussed.

Material and methods

In order to study genitalia, dried specimens were placed in water for ca. 6–12 hours; then abdomens were removed and transferred to 10% NaOH solution. After 2–4 hours, genitalia were removed, washed in distilled water and transferred into glycerin (female genitalia) or gum-chloral (Swann's) medium (male genitalia). Female genitalia were additionally placed in a glycerin solution of chlorazol black to stain membranous structures. Genitalia were observed, measured and photographed on slides under a Nikon Eclipse Ni compound microscope. After taking photographs, genitalia were removed from slides, washed in distilled water and glued on cardboards with a water solution of polyvinyl alcohol. Photographs were executed on a Nikon D5100 digital camera in combination with a compound or dissecting microscope (Nikon SMZ 1500). Images were generated using Helicon Focus 5.3.14 software and enhanced using Photoshop® CS4.

Total length was measured from above and extends from the anterior edge of pronotum to the apex of elytra. Head length was measured from the anterior edge of clypeus to the posterior edge of head. Elytra length was measured along the suture from the base of the scutellum to the apex. The shape of the pronotum is described when observed in perpendicular view. The following abbreviations are employed: L—length, W—width, TL—total length, EW—elytral width, EL—elytral length, PW—pronotal width, PL—pronotal length.

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APPENDIX 1. Localities of species of *Scirtes flavoguttatus* species-group. Approximate coordinates (not reported in the references) are given in parentheses, coordinates of type localities are marked with asterisks. Abbreviations: NP—National Park, NR—Nature Reserve, Mt.—Mountain, Mts—Mountains, Y & R 2010—Yoshitomi & Ruta 2010.

	Species	Localities	Coordinates	References
1	<i>Scirtes balehensis</i>	Borneo: Balleh river	(1.87 N, 113.28E)*	Y & R 2010
2	<i>Scirtes basifasciatus</i>	Pahang: Fraser's Hill	(3.7 N, 101.72E)*	Pic 1936b
3	<i>Scirtes beccus</i> sp. nov.	Borneo: Sabah: Kinabalu Park	(5.97 N, 116.68 E)*	present paper
4	<i>Scirtes bidentatus</i>	Borneo: Sabah: Kinabalu Mt.	(6.08 N, 116.55 E)*	Y & R 2010
		Borneo: Kinabalu Park, Ranau	(5.96 N, 116.68 E)	Y & R 2010
5	<i>Scirtes bocakorum</i> sp. nov.	Sumatra: Seblat NP	2.08 S, 101.25 E*	present paper
		Sumatra: Gunung Sinabung	(3.17 N, 98.38E)	present paper
6	<i>Scirtes brancuccii</i>	Laos: Phu Phan Mt.	20.20 N, 104.02 E*	Y & R 2010, Klausnitzer 2013
		Laos: 5km W of Ban Saleui	(20.22 N, 103.98 E)	Y & R 2010
7	<i>Scirtes cameroni</i>	Malaysia: Tanah Rata	4.47 N, 101.38 E*	Y & R 2010
8	<i>Scirtes Chiangmaiensis</i>	Thailand: Ban San Pakia	(19.32 N, 98.83 E)*	Y & R 2010
		Laos: Phongsaly env.	21.68 N, 102.1 E	Klausnitzer 2013
		Laos: Ban Na Lam --> Phou Sane Mt.	19.62 N, 103.33 E	Klausnitzer 2013
9	<i>Scirtes coleobasiliensis</i>	Laos: Nakai env.	17.72 N, 105.15 E*	Klausnitzer 2013
10	<i>Scirtes crassicornis</i>	Malaysia: Penang	(5.33 N, 100.45 E)*	Champion 1918
11	<i>Scirtes crockerensis</i> sp. nov.	Borneo: Sabah: Crocker Range	(5.57 N, 116.07 E)*	present paper
12	<i>Scirtes curtelineatus</i>	Malaysia: Cameron Highlands	(4.50 N, 101.47 E)*	Pic 1936a
13	<i>Scirtes curvans</i>	Philippines: Mindanao: Maitum South Cotabato	(8.48 N, 123.3 E)*	Y & R 2010
14	<i>Scirtes decemnotatus</i>	Malaysia: Perak	(4.78 N, 100.72 E)*	Champion 1918
		Malaysia: Penang	(2.42 N, 103.25 E)*	Champion 1918
		Malaysia: Fraser Hill	(3.70 N, 101.72 E)	Y & R 2010
		Malaysia: Endau - Rompin NP	(5.37 N, 100.23 E)	Y & R 2010
15	<i>Scirtes decorus</i> sp. nov.	Borneo: Gunung Mulu NP	(3.95 N, 114.77 E)*	present paper
16	<i>Scirtes dichrous</i>	Borneo: Matang Mt.	(1.60 N, 110.18 E)*	Champion 1918
17	<i>Scirtes dumogensis</i>	N Sulawesi: Dumoga-Bone NP	(0.56 N, 123.68 E)*	present paper
18	<i>Scirtes flavocinctus</i>	Borneo: Quop	(1.42745 N, 110.3822 E)*	Champion 1918
		Borneo: Sabah: Maliau Basin	4.82 N, 116.9 E	present paper
19	<i>Scirtes flavoguttatus</i>	Borneo: Matang Mt.	(1.60 N, 110.18 E)*	Champion 1918
		Borneo: Penrissen Mt.	(1.10 N, 110.2 E)	Y & R 2010
		Borneo: Gunung Alab	(5.82 N, 116.37 E)	Y & R 2010
		Borneo: Tambunan Ranau	(5.93 N, 116.67 E)	Y & R 2010
		Borneo: Croker Range Park, Gunung Emas	(5.82 N, 116.33 E)	Y & R 2010
20	<i>Scirtes flavonotatus</i>	Borneo: Kuching	1.56 N, 110.345 E	Champion 1918
21	<i>Scirtes flavotinctus</i>	Laos: Oudom Xai	20.75 N, 102.15 E*	Klausnitzer 2013
		Laos: Phongsaly env.	21.68 N, 102.1 E*	Klausnitzer 2013
22	<i>Scirtes gunongmulensis</i> sp. nov.	Borneo: Gunung Mulu NP	(3.95 N, 114.77 E)*	present paper
23	<i>Scirtes ishikawai</i> sp. nov.	Vietnam: Lai Chau Prov.	22.37 N, 103.75 E*	present paper
24	<i>Scirtes kinabalensis</i> sp. nov.	Borneo: Kinabalu Mt.	(6.08 N, 116.55 E)*	present paper

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APPENDIX 1. (Continued)

Species	Localities	Coordinates	References
25 <i>Scirtes kodadai</i>	Borneo: Gunung Emas	(5.82 N, 116.33 E)*	Y & R 2010
	Borneo: Crocker Range NP	(5.57 N, 116.07 E)	Y & R 2010
	Borneo: Gunung Alab peak	(5.82 N, 116.37 E)	Y & R 2010
	Borneo: Sabah: Kundasang	(5.98 N, 116.57 E)	Y & R 2010
	Borneo: Kinabalu Park, Ranau	(5.97 N, 116.68 E)	Y & R 2010
	Borneo: Kelabit highland	(3.75 N, 115.5 E)	Y & R 2010
26 <i>Scirtes kundasangensis</i> sp. nov.	Borneo: Sabah: Kundasang	(5.98 N, 116.57 E)*	present paper
27 <i>Scirtes lambriensis</i> sp. nov.	Sumatra: Sibolangit	(3.32 N, 98.60 E)*	present paper
28 <i>Scirtes lanexangi</i>	Laos: Ban Nape	18.35 N, 105.13 E*	Klausnitzer 2013
	Vietnam: Huong Hoa NR	16.9375 N, 106.5811 E	present paper
29 <i>Scirtes laosensis</i>	Laos: Phu Phan Mt.	(20.20 N, 104.02 E)*	Y & R 2010
30 <i>Scirtes leuserensis</i> sp. nov.	Sumatra: Leuser NP	(3.78 N, 97.87 E)*	present paper
31 <i>Scirtes luteomaculatus</i>	Borneo: Mt. Kinabalu	(6.08 N, 116.55 E)*	Pic, 1935
	Borneo: Gunung Alab peak	(5.82 N, 116.37 E)	Y & R 2010
	Borneo: Gunung Emas	(5.82 N, 116.33 E)	Y & R 2010
	Borneo: Kinabalu Park, Ranau	(5.97 N, 116.68 E)	Y & R 2010
32 <i>Scirtes luteus</i> sp. nov.	Borneo: Gunung Alab peak	(5.82 N, 116.37 E)*	present paper
	Borneo: Crocker Range NP	(5.57 N, 116.07 E)	present paper
33 <i>Scirtes malaccanus</i>	Malaysia: Malacca	(2.20 N, 102.28 E)*	Y & R 2010
34 <i>Scirtes malaisei</i> sp. nov.	Burma: Kambaiti	(25.4 N, 98.12 E)*	present paper
35 <i>Scirtes malayanus</i>	Malaysia: Perak	(4.8 N, 100.78 E)*	Champion 1918
36 <i>Scirtes malcolmi</i>	Borneo: Kuala Belalong	4.57 N, 115.12 E*	Y & R 2010
37 <i>Scirtes maramagensis</i>	Philippines: W of Maramag	(7.92 N, 125.27 E)*	Klausnitzer 2006
	Philippines: Mount Apo	(6.98 N, 125.27 E)	Y & R 2010
	Philippines: Bislig	(8.20 N, 126.30 E)	Y & R 2010
38 <i>Scirtes maxi</i>	Borneo: Mount Dulit	(3.33 N, 114.15 E)*	Y & R 2010
39 <i>Scirtes melinauensis</i> sp. nov.	Borneo: Sarawak: Gunung Mulu NP	(3.95 N, 114.77 E)*	present paper
40 <i>Scirtes nigrofasciatus</i>	Sumatra: Sibolangit	(3.32 N, 98.60 E)*	Y & R 2010
41 <i>Scirtes niisatoi</i>	Laos: Phu Pan Mt.	20.20 N, 104.02 E*	Y & R 2010, present paper
42 <i>Scirtes noonadan</i> sp. nov.	Philippines: Mantalingajan Mt. (Philippines, Palawan)	(8.82 N, 117.67 E)*	present paper
43 <i>Scirtes pallicolor</i> sp. nov.	Borneo: Sabah: Maliau Basin	4.7435 N, 116.9726 E*	present paper
44 <i>Scirtes patkainus</i>	India: Patkai Mts	(26.22 N, 94.37 E)*	Champion 1918
45 <i>Scirtes penampangensis</i> sp. nov.	Borneo: Penampang	(5.91 N, 116.11 E)*	present paper
46 <i>Scirtes philippinensis</i>	Philippines: Mt. Talemo	(7.67 N, 125.32 E)*	Y & R 2010
47 <i>Scirtes phoupanensis</i> sp. nov.	Laos: Phou Pan Mt.	20.20 N, 104.02 E*	present paper
48 <i>Scirtes prodigiosus</i> sp. nov.	Borneo: Sabah: Kundasang	(5.98 N, 116.57 E)*	present paper
49 <i>Scirtes punctatus</i> sp. nov.	Philippines: Mantalingajan Mt.	(8.82 N, 117.67 E)*	present paper
50 <i>Scirtes quasibalehensis</i> sp. nov.	Borneo: Penampang	(5.91 N, 116.11 E)*	present paper
51 <i>Scirtes ranauensis</i> sp. nov.	Borneo: Sabah: Kinabalu Park	(5.97 N, 116.68 E)*	present paper

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APPENDIX 1. (Continued)

Species	Localities	Coordinates	References
	Borneo: Sabah: Kundasang	(5.98 N, 116.57 E)	present paper
52 <i>Scirtes rufotinctus</i>	Borneo: Matang Mt.	(1.60 N, 110.18 E)*	Champion 1918
53 <i>Scirtes sabahensis</i>	Borneo: Gunung Alab peak	(5.82 N, 116.37 E)*	Y & R 2010
54 <i>Scirtes sakaii</i>	Thailand: Doi Pui	(18.80 N, 98.88 E)*	Y & R 2010
55 <i>Scirtes sarawakensis</i> sp. nov.	Borneo: Gunung Mulu NP	(3.95 N, 114.77 E)*	present paper
	Borneo: Kota Klias	(5.44 N, 115.63 E)	present paper
	Borneo: Penampang	(5.91 N, 116.11 E)	present paper
56 <i>Scirtes satoi</i>	Malaysia: Bringchang	(4.50 N, 101.38 E)*	Y & R 2010
	Malaysia: Cameron Highlands	(4.50 N, 101.47 E)	Y & R 2010
57 <i>Scirtes schawalleri</i>	Sumatra: Kabanjahe	(3.08 N, 98.48 E)*	Y & R 2010
	Sumatra: Dairy Mt.	(2.82 N, 98.25 E)	Y & R 2010
58 <i>Scirtes schawalleroides</i>	Sumatra: Seblat NP	(2.08 S, 101.25 E)*	Y & R 2010
59 <i>Scirtes seblatensis</i> sp. nov.	Sumatra: Seblat NP	2.08 S, 101.25 E*	present paper
60 <i>Scirtes septemmaculatus</i>	Borneo: Gunung Alab peak	(5.82 N, 116.37 E)*	Y & R 2010
	Borneo: Gunung Emas	(5.82 N, 116.33 E)	Y & R 2010
61 <i>Scirtes sibayensis</i> sp. nov.	Sumatra: Mt. Sibaya	(3.23 N, 98.50 E)*	present paper
62 <i>Scirtes sibolangitensis</i> sp. nov.	Sumatra: Sibolangit	(3.32 N, 98.60 E)*	present paper
63 <i>Scirtes sulawesicus</i> sp. nov.	Sulawesi: Bogani Nani Wartabone NP	(0.57 N, 123.73 E)*	present paper
64 <i>Scirtes sulcigeroides</i>	Borneo: Poring Park	(6.04 N, 116.71 E)*	present paper
65 <i>Scirtes sulcigerus</i>	Borneo: Matang Mt.	(1.60 N, 110.18 E)*	Champion 1918
66 <i>Scirtes talinisensis</i> sp. nov.	Philippines: Mt. Talin	(9.25 N, 123.17 E)*	present paper
67 <i>Scirtes tamdaoensis</i>	Vietnam: Tam Dao NP	(21.52 N, 105.65 E)*	Y & R 2010
68 <i>Scirtes tanahratensis</i>	Malaysia: Pahang: Tanah Rata	(4.47 N, 101.37 E)*	Y & R 2010
	Malaysia: Cameron Highlands	(4.50 N, 101.47 E)	present paper
69 <i>Scirtes teruhisai</i>	Borneo: Kundasan	(5.98 N, 116.57 E)*	Y & R 2010
	Borneo: Sepilok, Sandakan Sabah	(5.87 N, 117.95 E)	Y & R 2010
	Borneo: Keningau, Sabah	(5.25 N, 116.32 E)	Y & R 2010
	Borneo: Mt. Kinabalu	(6.08 N, 116.55 E)	Y & R 2010
	Borneo: Crocker Range NP	(5.57 N, 116.07 E)	Y & R 2010
	Borneo: Gunung Alab	(5.82 N, 116.37 E)	Y & R 2010
	Borneo: Gunung Emas	(5.82 N, 116.33 E)	Y & R 2010
70 <i>Scirtes ulukimanisensis</i> sp. nov.	Borneo: Ulu Kimanis	(5.57 N, 115.95 E)*	present paper
71 <i>Scirtes velutinus</i> sp. nov.	Borneo: Palau Gaya	(6.01 N, 116.02 E)	present paper
72 <i>Scirtes vietlaosensis</i>	Laos: Louang Namtha env.	21.1183 N, 101.35 E*	Klausnitzer 2013
	Vietnam: Tam Dao	21.45 N, 105.65 E*	Klausnitzer 2013
73 <i>Scirtes vietnamicus</i> sp. nov.	Vietnam: Huong Hoa NR	16.9375 N, 106.55811 E*	present paper
74 <i>Scirtes wallacei</i> sp. nov.	N Sulawesi: Bogani Nani Wartabone NP	(0.57 N, 123.73 E)*	present paper
75 <i>Scirtes warchalowskii</i>	India: Meghalaya: SW of Cherrapunjee	25.23 N, 91.67 E*	Ruta 2007
76 <i>Scirtes yangsinensis</i> sp. nov.	Vietnam: Yang Sin NP	12.44064 N, 108.3329 E*	present paper