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Stuebenius formaneki sp. nov. from the Republic of North Macedonia, with a key to all *Stuebenius* species (Coleoptera: Curculionidae: Entiminae: Trachyphloeini)

Stuebenius formaneki sp. nov. ze Severní Makedonie s klíčem k druhům rodu *Stuebenius* (Coleoptera: Curculionidae: Entiminae: Trachyphloeini)

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Taxonomy, new species, key, Coleoptera, Curculionidae, Entiminae, Trachyphloeini, *Stuebenius*, Republic of North Macedonia

Abstract. *Stuebenius formaneki* sp. nov. from the Republic of North Macedonia is described and illustrated. New faunistic records for the Republic of North Macedonia are presented for the species *Trachyphloeus laticollis* Boheman, 1842 and *Pelleterielus hellenicus* (Borovec, 1988). An identification key to all *Stuebenius* species is given.

INTRODUCTION

Our knowledge of the weevil fauna of the Republic of North Macedonia is very incomplete. Faunistic works are sporadic, for example Pešić (1996) described the weevil fauna of the Dojran Lake area in the southeastern part of the country. However, there has not been a comprehensive assessment, and no local check-list has been published. There have been only a few taxonomic papers with descriptions of individual species. Purkyně (1930) described two species of the genus *Trachyphloeus* Germar, 1817, and in recent decades, new taxa of Entiminae have been described by Yunakov (2005, 2006).

The genus *Stuebenius* Borovec, 2009 was proposed for a well-defined group of 13 species known from the Balkan Peninsula, the southern part of Central Europe, Italy, France, Tunisia, western Turkey and southern Russia (Borovec 2009). *Stuebenius* is easily recognizable by the connate claws, epifrons separated from the head by a shallow transverse sulcus, scrobes visible in dorsal view, apex of protibiae lacking lobes and indentations but rounded, and female sternite VIII with a very long and slender apodeme, a small plate with a narrow basal margin.

MATERIALS AND METHODS

Body length of all specimens was measured in dorsal view from the anterior border of the eyes to the apex of the elytra, excluding the rostrum. Width/length ratio of the rostrum was measured at the maximum width at base to maximum length to the base of the mandibles. Width/length ratios of pronotum, elytra, antennal segments and tarsomeres were taken at the maximum width and length of the respective parts in dorsal view; length of onychium refers to the part protruding beyond the outline of tarsal segment 3. Dissected male and female genitalia were studied in glycerine. Female genitalia were afterwards embedded in Solakryl BMX (Medika, Prague); male genitalia were mounted dry on the same card as the respective specimen, with tegmen and sternite IX embedded in Solakryl BMX. Photographs of adults were taken with Canon EOS 700D camera with an MP-E 65 mm macro lens, and combined using Zerene Stacker and GIMP2 software. Details of adult morphology (rostrum – dorsal and lateral view, protibia,

ventrites) and genitalia were photographed and enhanced using a HIROX RH-2000 digital microscope. Terminology of the rostrum, antenna and genitalia follows Oberprieler et al. (2014).

Exact label data of the type specimens are cited, with authors' remarks and comments are in square brackets.

The material is deposited in the National Museum, Prague, Czech Republic (NMPC), and private collections of Roman Borovec, Sloupno, Czech Republic (RBSC), Milan Putz, Řevnice, Czech Republic (MPRC) and Tibor Meszároš, České Budějovice, Czech Republic (TMCC).

TAXONOMY

Stuebenius formaneki sp. nov.
(Figs 1–8)

Type locality. Macedonia, Prilep reg., Vitolište env., Sv. Ilja.
Type material. Holotype, ♂: 'Macedonia (FYROM) [former Yugoslav Republic of Macedonia, now the Republic of North Macedonia], Prilep reg., Vitolište env., Sv. Ilja, 7.VIII.2018, M. Putz lgt., 41.116N, 21.787E, under *C. formanekiana*, marble deposit substrate (NMPC). Paratypes: 43 spec., the same data as holotype (39 spec. in MPRC, 4 spec. in RBSC).
Description. Body length 2.88–3.94 mm, holotype 3.39 mm.

Body (Fig. 1) dark brownish to blackish; legs and antennae dark brownish, except for reddish brown funicles with clubs and tarsi. Body dorsally and ventrally densely covered by oval, longitudinally striolate and slightly imbricated appressed scales, 5–6 across one interval. Elytra with one irregular row of short, inconspicuous semi-appressed setae; setae slender, subspatulate, shorter than half the width of one interval. Setae on pronotum and head with rostrum half the length of elytral ones, pronotal setae wider than those on head and rostrum, irregularly scattered. Semi-appressed setae on legs and antennae except of clubs inconspicuous, slender, nearly parallel-sided; clubs finely and densely setose. Vestiture of dorsal part of body light greyish, elytra densely scattered by small brownish black spots, pronotum with four slender longitudinal stripes, in some specimens reduced to two semicircular spots; in some species spots inconspicuously light to vanishing to monochromatic greyish vestiture.

Rostrum (Figs 2, 3) 1.21–1.29× longer than wide at base, from base conspicuously, evenly enlarged anteriad with slightly rounded sides, at apex 1.13–1.20× wider than at base; in lateral view distinctly and regularly vaulted, separated from head by transverse sulcus. Epifrons long and slender, 1.55–1.64× longer than wide at base, slightly regularly tapering anteriad with straight sides, distinctly longitudinally deepened, at base separated from head by arched transverse sulcus. Antennal scrobes in dorsal view slender, furrow-shaped; in profile well edged, slender, furrow-shaped, slightly curved and enlarged posteriad, separated from eyes by wide squamose stripe. Eyes in dorsal view slightly protruding from outline of head, in profile subcircular, placed in the middle of head. Vertex wide, slightly vaulted. Head short and wide, enlarged posteriad, behind eyes as long as half of the longitudinal diameter of eyes.

Antennae (Fig. 1) with robust scapes, 3.76–4.35× longer than wide at middle, 1.1× longer than funicle, basal half with slight S-shaped curve, at apical half evenly weakly enlarged apicad, at apex 1.1–1.2× wider than club; funicle with segment 1 short and wide, 1.1–1.2× longer than wide and 0.7–0.8× as long as slender conical segment 2, which is 2.0–2.1× longer than wide; segments 3 and 4 1.1–1.2× wider than long; segments 5 and 6 1.3–1.4× wider than long; segment 7 1.4× wider than long; clubs 1.4–1.5× longer than wide.



Fig. 1. *Stuebenius formaneki* sp. nov., male paratype, dorsal view (photograph by: Jiří Skuhrovec).
Obr. 1. *Stuebenius formaneki* sp. nov., samec, paratyp, pohled shora (fotografie: Jiří Skuhrovec).

Pronotum (Fig. 1) 1.37–1.42× wider than long, widest at midlength, at basal half subparallel-sided to slightly rounded at sides, distinctly constricted in apical half; disc regularly vaulted; in profile regularly distinctly vaulted flattened behind anterior margin. Base slightly arched.

Elytra (Fig. 1) 1.21–1.29× longer than wide, short oval, widest in apical third, with regularly rounded humeral calli and slightly rounded sides, apex broadly rounded; in profile vaulted, posterior slope overhanging apex. Base slightly arched. Striae very narrow, intervals slightly vaulted, very wide.

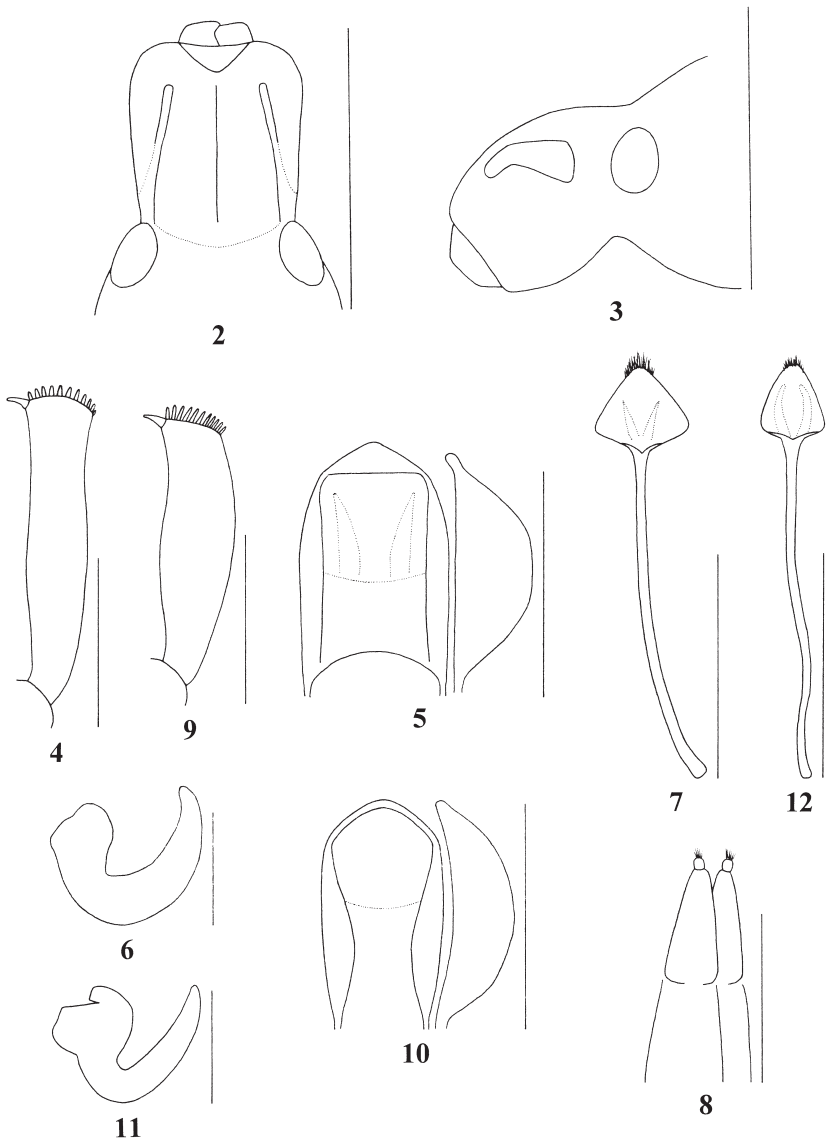
Femora unarmed. Tibiae short, robust, 4.8–5.2× longer than wide at midlength, apex of protibiae rounded (Fig. 4), weakly enlarged laterally and mesally, armed with 10–11 short but stout blackish spines and short brownish mucro at inner portion. Metatibiae lacking corbels, with apical surface glabrous in bottom half, squamose in upper half, laterally armed with blackish spines, mesally fringed by blackish bristles. Tarsi moderately slender, with segment 2 1.3–1.4× wider than long; segment 3 1.4–1.5× wider than long and 1.4–1.5× wider than segment 2; onychium 1.5–1.6× longer than segment 3; claws fused at basal part, then weakly divaricate.

Abdominal ventrites isodiametric to 1.1× wider than long; segment 1 of equal length as segment 2, behind metacoxa distinctly shorter than segment 2; ventrite 2 at middle 1.5× longer than the combined length of the short ventrites 3 and 4; ventrite 5 in males subtrapezoidal, in females subtriangular. Suture between ventrites 1 and 2 sinuous, the others straight. Metaventral process obtuse, distinctly shorter than transverse diameter of metacoxa.

Male terminalia. Penis (Fig. 5) short and wide, 1.6× longer than wide, about equally wide in dorsal view, with slightly rounded sides, apex dully pointed without separated tip; in lateral view wide with ventral side straight and dorsal side distinctly vaulted, tip regularly pointed; temones 2.6–2.8× longer than body of penis; endophallus long, devoid of sclerotisations, with asperities. Tegmen with complete slender ring lacking parameres, apodeme 1.5–1.7× longer than diameter of the ring. Sternite IX with spiculum gastrale anteriorly curved without apical plate, posteriorly with fused basal arms, hemisternites of sternite IX subtriangular.

Female terminalia. Sternite VIII (Fig. 7) with long and slender apodeme, 4.0–4.2× longer than plate; plate small, 1.1–1.2× longer than wide, oval, with short basal margin and dense tuft of apical setae, arms V-shaped. Spermatheca (Fig. 6) with slender and regularly curved cornu; corpus rounded; ramus and collum hardly visible, indicated. Gonocoxites (Fig. 8) with distal part slightly more sclerotised than proximal part, subtriangular, apically with short, about isodiametric, slightly rounded styli with fine setae at apex.

Bionomy. The type series of the new species was collected together with *Trachyphloeus laticollis* Boheman, 1842, *T. spinimanus* Germar, 1823, *Pelletierellus neglectus* (Borovec, 1992), *Hypera arator* (Linnaeus, 1758), *Tychius* sp., *Sitona humeralis* Stephens, 1831 and remains of *Brachycerus* sp. in a single leaf rosette of bellflower *Campanula formanekiana* Degen & Dörfl. (Fig. 14) at the locality Sveti Ilja near Vitolište village (Fig. 13). This *Campanula* species creates numerous large flat leaf rosettes (diameter 30 cm) on vertical cliffs, which are composed of marble conglomerates. The substrate at the base of the cliffs consists of fine eroded marble powder. The co-author (M.P.) found only a single plant growing on the partially shaded base of the cliff. These specific conditions probably created an optimal microhabitat in the totally dry xerothermic slope in August. The weevils were primarily collected under the plant on the soil surface, but the majority of individuals was found in the basal part of the rosette among old dry leaves.



Figs 2–12. *Stuebenius formaneki* sp. nov.: 2 – head with rostrum, dorsal view; 3 – head with rostrum, lateral view; 4 – right protibia; 5 – penis, dorsal and lateral view; 6 – spermatheca; 7 – sternite VIII of female, dorsal view; 8 – ovipositor, dorsal view. *Stuebenius frivaldszkyi* (Kuthy): 9 – right protibia; 10 – penis, dorsal and lateral view; 11 – spermatheca; 12 – sternite VIII of female, dorsal view. Scale bars 1.0 mm for 2–3, 7, 12; 0.5 mm for 4–5, 8–10; 0.25 mm for 6, 11.
Obr. 2–12. *Stuebenius formaneki* sp. nov.: 2 – hlava s noscem, pohled shora; 3 – hlava s noscem, pohled zboku; 4 – špice pravé přední holeně; 5 – penis, pohled shora a zboku; 6 – spermatéka; 7 – sternit VIII samice, pohled shora; 8 – ovipositor, pohled shora. *Stuebenius frivaldszkyi* (Kuthy, 1887): 9 – špice pravé přední holeně; 10 – penis, pohled shora a zboku; 11 – spermatéka; 12 – sternit VIII samice, pohled shora. Měřítko 1,0 mm u obrázků 2–3, 7, 12; 0,5 mm u obrázků 4–5, 8–10; 0,25 mm u obrázků 6 a 11.



Fig. 13. Habitat of *Stuebenius formaneki* sp. nov., Sveti Ilja near Vitolište, Republic of North Macedonia (photograph by: Milan Putz).
Obr. 13. Lokalita *Stuebenius formaneki* sp. nov., Sveti Ilja u Vitolište, Severní Makedonie (fotografie: Milan Putz).

Etymology. Named after Romuald Formánek (1857–1927), esteemed Czech specialist on Curculionidae and younger brother of Eduard Formánek (1845–1900), botanist and specialist on the Macedonian flora, after whom the bellflower *Campanula formanekiana* was named. Although the work of both brothers is well known to recent specialists, their family relationship has been rediscovered and confirmed by the study of archive materials (L. Smitka, pers. com.).
Differential diagnosis. *Stuebenius formaneki* sp. nov. is very similar to *S. frivaldszkyi* (Kuthy, 1887) in the long rostrum distinctly enlarged from base to apex and narrow and long epifrons, but it is easily distinguishable from it by elytra with short raised setae, shorter than half the width of one interval, greyish on all intervals (vs. long raised setae, as long as half the width of one interval, greyish on odd, dark brownish on even intervals in *S. frivaldszkyi*); protibiae at apex laterally enlarged (Fig. 4) (vs. laterally rounded (Fig. 9)); onychium 1.5–1.6× longer than segment 3 (vs. the same length as segment 3) and spermatheca with undeveloped ramus and collum (Fig. 6) (vs. with well-developed ramus as well as collum (Fig. 11)). *S. formaneki* sp. nov., and *S. zitae* (Borovec, 1986), are the only two *Stuebenius* species with the apical portion of protibiae weakly enlarged laterally, armed apically with short blackish spines. The two species can be identified from each other by pronotum laterally regularly rounded in *S. formaneki* sp. nov. (vs. laterally lobe-shaped prominent in *S. zitae*), protibiae armed with 10–11 spines (vs. armed with 8 spines), and rostrum 1.21–1.29× longer than width at base (vs. as long as width at base).

Key to identification of *Stuebenius* species

Since Formánek (1907), who included three species currently in *Stuebenius* into his overall key to *Trachyphloeus*, no key to the genus has been produced. The genus has gradually expanded with the descriptions of several species, and the first complete key to all species is proposed below.

1 Base of elytra slightly wider than base of pronotum. Frons glabrous. Abdominal ventrites covered by piliform or slender long oval appressed scales, not fully covering integument. 2
– Base of elytra equally wide as base of pronotum. Frons squamose. Abdominal ventrites covered by wide, short oval to oval appressed scales, entirely covering integument. 6
2 Epifrons parallel-sided. Funicle segment 2 short, 1.3–1.6× longer than wide. Body length 2.68–2.94 mm. Italy. ..... ***S. apuanus*** (A. Solari et F. Solari, 1905)
– Epifrons slightly tapered anteriad. Funicle segment 2 long, 1.8–2.1× longer than wide, only in *S. skopljensis* 1.5× longer than wide. 3
3 Setae on elytra wider and longer, subspatulate. Larger species, at least 2.75 mm in length. 4
– Setae on elytra fine, short, piliform or slender, parallel-sided. Smaller species, at most 2.63 mm in length. ... 5
4 Rostrum shorter, 1.21–1.25× wider than long. Antennal scape narrower, at apex equally wide as club. Pronotum narrower, 1.10–1.16× wider than long. Body length 2.75–2.81 mm. France, Italy. ..... ***S. granulatus*** (Seidlitz, 1868)
– Rostrum longer, 1.11–1.14× wider than long. Antennal scape wider, at apex 1.2 as wide as club. Pronotum wider, 1.21–1.24× wider than long. Body length 2.94–2.99 mm. Italy. ..... ***S. mamillosus*** (Formánek, 1909)
5 Elytra short oval, 1.18× longer than wide. Rostrum 1.07× wider than long. Funicle segment 2 short, 1.5× longer than wide. Body length 2.30 mm. North Macedonia. ..... ***S. skopljensis*** (Purkyně, 1930)
– Elytra long oval, 1.28–1.32× longer than wide. Rostrum as long as wide. Funicle segment 2 long, 1.8–1.9× longer than wide. Body length 2.6–2.9 mm. North Macedonia. ..... ***S. rambouseki*** (Purkyně, 1930)
6 Head behind eyes long, 1.5× as long as longitudinal diameter of eye. Body length 2.62 mm. Turkey. ..... ***S. caenopsiformis*** (Formánek, 1908)
– Head behind eyes short, conspicuously shorter than longitudinal diameter of eye. 7
7 Rostrum long, 1.10–1.29× longer than at base wide. Epifrons long and slender, 1.55–1.78× longer than at base wide. 8
– Rostrum short, 1.04–1.31× wider than long. Epifrons short and wide, isodiametric to 1.23× at base wider than long. 9
8 Elytra with long raised setae, as long as half the width of one interval, greyish on odd, dark brownish on even, intervals. Protibiae at apex laterally rounded. Onychium as long as segment 3. Body length 2.97–3.38 mm. Serbia, Romania, Hungary. ..... ***S. frivaldszkyi*** (Kuthy, 1887)
– Elytra with short raised setae, shorter than half the width of one interval, greyish on all intervals. Protibiae at apex laterally enlarged. Onychium 1.5–1.6× longer than segment 3. Body length 2.88–3.94 mm. North Macedonia. ..... ***S. formaneki*** sp. nov.
9 Pronotum slender, 1.23–1.29× wider than long. Antennal scape very short and robust, 2.5× longer than wide at midlength. Antennal scrobes dorsally not visible. Body length 2.6–3.4 mm. North Macedonia. ..... ***S. mirabilis*** (Borovec, 1992)
– Pronotum wide, 1.38–1.49× wider than long. Antennal scape long, slender to robust, 3.2–3.9× longer than wide at midlength. Antennal scrobes dorsally visible. 10
10 Protibiae at apex widened laterally, armed with 8 short, sparse, brownish-black spines. Pronotum with prominent lobe-like extensions laterally. Rostrum evenly enlarged apicad. Body length 3.50 mm. Turkey. ..... ***S. zitae*** (Borovec, 1986)
– Protibiae at apex rounded laterally, fringed with fine setae. Pronotum regularly rounded laterally. Rostrum at base abruptly enlarged apicad. 11
11 Tarsi long, onychium 1.4× length of segment 3. Claws distinctly divaricate. Penis at apex with separated tip, sides before tip concave. Body length 2.0–2.8 mm. Romania, Russia. ..... ***S. amplithorax*** (Formánek, 1907)
– Tarsi short, onychium at most 1.1× length of segment 3. Claws weakly divaricate. Penis apically rounded or regularly pointed, without subapical concavity. 12

12 Raised elytral setae very short, distinctly shorter than half the width of one interval. Scrobes in dorsal view wide. Rostrum anteriorly gradually enlarged. Penis short and wide, apex slightly pointed. Body length 2.3–2.4 mm. Turkey. ..... ***S. magnanoi*** (Borovec, 1994)

– Raised elytral setae long, at least as long as half the width of one interval. Scrobes in dorsal view narrow, especially in anterior part. Rostrum anteriorly enlarged mainly in a short distance before eyes. Penis longer, apically rounded or slightly pointed. 13

13 Antennal funicle shorter and wider, 2nd segment 1.5× longer than wide, segments 3–5 distinctly wider than long. Eyes almost flat, in dorsal view hardly prominent from outline of head. Raised setae on elytra shorter, about as long as half the width of one interval. Body length 2.0–2.4 mm. Bulgaria, Greece, Turkey. .... ***S. romani*** (Fremuth, 1992)

– Antennal funicle longer and more slender, 2nd segment 1.5–2× longer than wide, segments 3–5 hardly wider than long. Eyes convex, in dorsal view well prominent from outline of head. Raised setae on elytra longer, longer than half the width of one interval. Body length 1.9–2.7 mm. Italy, Tunisia. .... ***S. amicalis*** (Borovec et Osella, 1993)

FAUNISTICS

Pelletierellus hellenicus (Borovec, 1988)
Material examined. Macedonia: Bitola, Capari, 18.v.2011, T. Mészáros lgt., 2 ♂♂ (TMCC).
Distribution. Species known only from Greece, new species for the Republic of North Macedonia.

Trachyphloeus laticollis Boheman, 1842
Material examined. Macedonia: Prilep reg., Vitolište env., Sv. Ilja, 41.116°N, 21.787°E, 7.viii.2018, M. Putz lgt., under *C. formanekiana*, marble deposit substrate, 14 ♀♀ (MPRC).
Distribution. Species known from southern Europe, northwest Africa and Asia Minor, new species for the Republic of North Macedonia.

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Fig. 14. Leaf rosettes of *Campanula formanekiana* at the type locality (photograph by: Milan Putz).
Obr. 14. Listová růžice *Campanula formanekiana* na typové lokalitě (fotografie: Milan Putz).

SOUHRN

Nový druh *Stuebenius formaneki* sp. nov. je popsán z území Severní Makedonie. Typový materiál byl sbírán druhým autorem (M. P.) pod přízemními růžicemi zvonku *Campanula formanekiana*. Nový druh nosatce byl pojmenován po významném znalci nosatců podčeledi Entiminae a autorovi mnoha zásadních článků o jejich taxonomii, Romualdovi Formánkovi (1857–1927), zatímco živná rostlina, pod kterou byl sbírán, byla před sto lety pojmenována na počest jeho bratra Eduarda Formánka (1845–1900), botanika a významného znalce flóry Makedonie.

Rod *Stuebenius* Borovec, 2009 byl popsán nedávno v revizi palearktických taxonů tribu Trachyphloeini (Borovec 2009), ale od dob, kdy Formánek (1907) zařadil do celkového klíče rodu *Trachyphloeus* tři tehdy známé druhy dnešního rodu *Stuebenius*, nebyl nikdy podrobně celkově zpracován na druhové úrovni. Práce je tedy doplněna klíčem pro všech dosud známých 14 druhů.

Nově popsaný druh je podobný druhu *S. frivaldszkyi* (Kuthy, 1887) vzhledem k dlouhému nosci výrazně rozšířenému od base po apikální část, úzké a dlouhé vrchní ploše nosce a také podobné velikosti těla. Výrazně se ale od něho odlišuje krovkami s krátkými odstávajícími sétami, kratšími než polovina šířky mezirýží, na všech mezirýžích šedivé barvy, předními

holeněmi rozšířenými na špici na vnější stranu, posledním článkem chodidel delším než je článek třetí a spermatékou s nevyvinutým ramus a collum. *Stuebenius frivaldszkyi* má dlouhé odstávající krovkové séty, stejně dlouhé jako polovinu šířky mezirýží, šedé na lichých a tmavě hnědé na sudých mezirýžích, přední holeně na špici zaokrouhlené, poslední článek chodidel stejně dlouhý jako je článek třetí a spermatéku s vyvinutým ramus a collum.