Pilaria sarawakiensis n. sp. (Diptera, Limoniidae) from Borneo (Malaysia, Sarawak)

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Abstract. A new recent species Pilaria sarawakiensis n. sp. (Diptera, Limoniidae, Limnophilinae) from the Oriental region (Borneo, Malaysia) is described and compared to the congers.

Key words: Diptera, Limoniidae, Pilaria, taxonomy, new species.

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I. INTRODUCTION

The genus Pilaria SINTENIS, 1889 (Limoniidae, Limnophilinae) is distributed worldwide with the exception of Antarctica and comprises 47 extant species and two subspecies mainly from the Palearctic (17 species) and Nearctic (15 species) regions. From Australia and Oceania only one species of the genus is known, and from the Neotropic only two species (OOSTERBROEK 2014). From the Oriental region seven species have been described (OOSTERBROEK 2014), and from Borneo (Malaysia) EDWARDS (1926) indicated only one species Pilaria melanota ALEXANDER (1922), originally described from Japan.

In terms of fossil species, five are known from the Eocene Baltic amber (ALEXANDER 1931), one species as an imprint from Isle of Wight, England (Late Eocene) (COCKEREL &
CLARK 1918) and one species from Italy (also an imprint; Miocene) (KRZEMIŃSKI 

In the collection of the Natural History Museum in London (BMNH) we 
found three specimens from Borneo belonging to the genus Pilaria, which 
distinctly differ from Pilaria melanota and represent a new species.

II. MATERIAL AND METHODS

The study was based on material from the collection of the Natural History Museum 
(BMNH) in London (three specimens). The specimens were studied using a Nikon SMZ 
1500 stereomicroscope. The microphotographs were taken with a Nikon DS-Fi1 camera 
equipped with a stereomicroscope. The drawings were based on photographs, and supple-
mented during direct observation under a binocular microscope. The measurements were 
taken with NIS-Elements D 3.0 software. The male genitalia were prepared using KOH 
and preserved in glycerol housed with the rest of the specimen in the Natural History Mu-
seum (BMNH) in London. The comparison (Table 1) was based on ALEXANDER publica-
tions (1922, 1931, 1963) and the species described from the same and other regions.

The term “d-cell base” for the section of M3+4 within the d cell is used after KRZEMIŃ-

III. SYSTEMATIC PALAEONTOLOGY

Order: **Diptera** LINNAEUS 1758

Family: **Limoniidae** SPEISER 1909

Genus: **Pilaria** SINTENIS 1889

Type-species: Limnobia pilicornis ZETTERSTEDT 1851 (designation: SHARP 1890) [= meridiana (STAEGER 1840)].

*Pilaria sarawakiensis* n. sp.

(Figs 1-4)

Diagnosis. The new species differs from all known representatives of the genus Pilaria from the Oriental region especially by wing venation (the length of vein Sc and R1). In Pilaria sarawakiensis n. sp. the vein Sc terminates just behind half the length of vein Rs; vein R1 ending opposite the bifurcation of vein R2+3+4.

Etymology. Genitive of Sarawak, province of Malaysia; Borneo.
Pilaria sarawakensis n. sp. from Borneo

Fig. 1. *Pilaria sarawakensis* n. sp., holotype (male): A—head; B—antenna; C—palpus (ant—antenna, pl—palpus).

Fig. 2. *Pilaria sarawakensis* n. sp., holotype (male): A—wing (photo); B—wing (drawing).
Fig. 3. *Pilaria sarawakensis* n. sp., holotype (male): A—aedagus, dorsal view (drawing); B-C—hypopygium (part, dorsal view), drawing and photograph (gx—gonocoxite, ing—inner gonostyle, oug—outer gonostylys, p—pennacereus).

Fig. 4. *Pilaria sarawakensis* n. sp., holotype (male): A—tibial spurs (female); B—ovipositor (ts—tibial spurs, cerc— cercus, hyp vlv—hypogynial valve, tg X—tergite X).

Description. Body: pale brown, wing 4.3 mm long, 1.0 mm wide.

Head (Fig 1A): pale brown with large dark eyes; antenna (Figs 1A, B) 16-segmented, dark, brown or yellow-brown in female; scape tubular, short; pedicel oval, second segment of flagellum with elongated setae reaching approximately half the length of segment bearing them, flagellomeres 3-6 in male and 2-8 in female with two additional elongated setae (verticils), which are 2-3x as long as segments bearing them. Palpus (Fig. 1A, C) dark brown, almost black, the last segment a little shorter than the penultimate one.

Thorax: pale brown; legs yellow at base, femur dark at distal part, tibia dark brown, tarsus pale brown; tibial spurs (Fig. 4A) very short and thin; wing (Figs 2A, B) transparent with dark brown veins, vein Sc short, ending just behind half the length of Rs; sc-r at one its length before the tip of Sc; R1 long, ending opposite the fork of R2-3-4 into R2-3 and R4; Rs long, 3.5x as long as R3; R3(r-r) between distal part of R1 and vein R3; R2,3-4 2x as long as R3; R4 2.5x as long as R3; only three medial veins present; d-cell rectangular, almost equal in length to vein M3; cross-vein mc-u behind half the base of d-cell; A2 elongated and straight, strongly arcuated at the end to the edge of wing.

Abdomen dark brown, darker in the female.

Genitalia, male (Figs 3B, C): hypopygium dark brown, outer gonostylus arched and strongly sclerotized, sharply ended; inner gonostylus pale brown, curved, pointy and a little longer than outer gonostylus; aedeagus short (Fig. 3A), straight and narrow, parameres small, narrow, curved.

Genitalia, female (Fig. 4B): ovipositor pale brown, very narrow and elongated; hypogynial valvae only slightly shorter than cerci.

IV. COMPARISON TO OTHER CONGENERS

Pilaria sarawakiensis n. sp. distinctly differs from most species known from Oriental region by the presence of only three medial veins. Only two species from this region have three medial veins, Pilaria alboposticata (ALEXANDER 1931) and Pilaria coorgensis (ALEXANDER 1963). The newly described species distinctly differs from P. alboposticata and P. coorgensis by the proportion of subcostal vein (Sc) and radial veins (R). The list of differences of this species from Oriental region is given in Table. 1.

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Table 1

List of differences between *Pilaria alboposticata*, *P. coorgensis* and *P. sarawakensis* n. sp.

<table>
<thead>
<tr>
<th></th>
<th><em>P. sarawakensis</em> n. sp.</th>
<th><em>P. alboposticata</em></th>
<th><em>P. coorgensis</em></th>
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<tbody>
<tr>
<td>Sc ending just behind half of Rs</td>
<td>Sc ending just before fork of Rs</td>
<td>Sc ending far behind half length of Rs</td>
<td></td>
</tr>
<tr>
<td>R1 ending opposite the fork of R2,3,4 into R2,3 and R4</td>
<td>R1 ending far behind the fork of R2,3,4 into R2,3 and R4</td>
<td>R1 ending far behind the fork</td>
<td></td>
</tr>
<tr>
<td>R2 (r-r) between distal part of R1 and vein R3</td>
<td>R2 (r-r) between distal part of R1 and vein R3</td>
<td>R2 (r-r) between vein R1 and the fork of R2,3,4</td>
<td></td>
</tr>
<tr>
<td>R2,3,4 2x R3</td>
<td>R2,3,4 0.5x R3</td>
<td>R2,3,4 equal R3</td>
<td></td>
</tr>
<tr>
<td>R4 2.5x R3</td>
<td>R4 3x R3</td>
<td>R4 1.5x R3</td>
<td></td>
</tr>
<tr>
<td>Rs 3.5x R3</td>
<td>Rs appr. 1.5x R3</td>
<td>Rs over 1.5x R3</td>
<td></td>
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<tr>
<td>mo-u far behind half of d-cell base</td>
<td>mo-u almost in 1/3 of d-cell base</td>
<td>mo-u far behind half of d-cell base</td>
<td></td>
</tr>
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</table>

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