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Two new species of mangrove Dolichopodidae from Bohol Island in the Philippines (Insecta: Diptera) and a checklist of the Dolichopodidae of the Philippines

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Abstract. During a recent survey of the insect fauna of the mangroves of the San Vicente Mangrove Forest Association (SAVIMA) Bohol, Philippines, many Diptera specimens were collected. They were pre-sorted into putative species (3% threshold) using COI sequences obtained via next-generation-sequencing ("NGS barcodes": 313bp). The sequences were then compared to a database with sequences for more than 15,000 Southeast Asian dolichopodid specimens belonging to >250 species. Sequences for two putative species were found to be new. Morphological study revealed that these species are new to science. Based on the presence of peculiar ventral bristles on the fore tibia and typical male terminalia, both belong to *Thinophilus* and are here newly described as *Thinophilus lungosetole* Ramos & Grootaert sp. nov. and *Thinophilus ronazeli* Ramos & Grootaert sp. nov. We provide extended diagnoses that are illustrated with stacked habitus photos, figures of the male terminalia and NGS barcodes. A checklist of all Dolichopodidae recorded in the Philippines is provided.

Key words. new *Thinophilus*, mangrove, Bohol, NGS barcodes, checklist Philippines

INTRODUCTION

About 82 dolichopodid species have been recorded from the Philippines so far (Dyte, 1975; Yang et al., 2006) which is very likely a huge underestimate of the true diversity; especially if one considers that only 36 species have their type locality in the Philippines. Four of the 82 species belong to *Thinophilus*: *T. diminuatus* (Becker, 1922); *T. indigenus* Becker 1902; *T. tesselatus (*Becker, 1922); and *T. aequalichaetus (*Parent, 1941). Of these, two species (*T. diminuatus* and *T. tesselatus*) are likely to also occur elsewhere because they have been recorded from Tainan (Taiwan). The third species (*T. indigenus*), however, has such a wide distribution that the currently available distributional information is unlikely to be correct. Becker (1922) described this species from Suez (Egypt; Palaearctic realm) but Frey (1925) also recorded it from the Philippines (Oriental realm). However, re-examination of the holotype (Egypt) indicated that this species is morphologically different from the specimens identified by Becker, the author of this species, as *T. indigenus* from Taiwan (Grootaert, in lit.). Unfortunately, we were unable to study the specimens from Manila, Port Bauge or San Theodoro that Frey (l.c.) identified as *T. indigenus* but we consider it unlikely that they belong to the same species described from Egypt. The fourth species of *Thinophilus* (*T. aequalichaetus*) that is known from the Philippines is also the only species described from the country. This species is known from Atimonan S.O. Luzon and may thus possibly be a marine species since this locality is situated near the sea. We studied the holotype and paratypes males of *T. aequalichaetus* which has a few diagnostic characters: the legs are yellow including fore coxa but the mid and hind coxae are black, a common feature of *Thinophilus*. Tarsomere 5 of the fore leg is brownish. The fore coxa is anteriorly set with yellowish bristles with a few brown bristles at tip. *Thinophilus aequalichaetus* differs from the species described here because the latter have black bristles on the fore coxa. Furthermore, the fore, mid and hind femora lack ventral bristles. In the *Thinophilus* species found during our study, males have ventral bristles on the femora in various length and density. *T. aequalichaetus* is now considered as a *species inquirenda* (Grootaert, in lit.).

The genus *Thinophilus* Wahlberg is a dominant genus in mangrove habitat. By now more than 40 species of *Thinophilus* are known from Southeast Asia (see overview of the marine species per region in Grootaert & Meuffels [2001a, b], Evenhuis & Grootaert [2002], Grootaert et al. [2015] and Samoh et al. [2017]) and a taxonomic overview of the terrestrial *Thinophilus* species was provided by Grootaert (2017). Past descriptions of new species in *Thinophilus* adopted traditional approaches; i.e., the descriptions were detailed and many characters found in all species of the genus or subfamily were repeated. Here, we limit our

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descriptions to a detailed or extended diagnosis consisting of a short description of what we consider to be the important differential characters illustrated by a habitus picture and drawings of the male terminalia. In addition, we include 313 bp-long NGS barcodes that were obtained with the techniques described in Meier et al. (2016) and Wang et al. (2018). A large number of specimens were barcoded using NGS barcoding and then compared to our database of ca. 15,000 sequences for Southeast Asian Dolichopodidae. The species of *Thinophilus* described here were found to differ considerably from all other species that were previously sequenced. In addition, they had distinct morphological features.

MATERIALS AND METHODS

Insects were collected in the mangrove area of San Vicente Mangrove Forest Association (SAVIMA) Bohol, Philippines. After NGS barcoding the Diptera, dolichopodid specimens were identified and found to have been collected using Malaise traps at three sites: Malaise trap 1 (MT1) set along in a very wet mangrove area far from dry land (9.730240°N 123.853148°E); Malaise trap 2 (MT2) on the edge of a mangrove area western island side at the high-tide edge (9.727924°N 123.849759°E), and Malaise trap 3 (MT3) at the edge opposite the mangrove forest on the western side of a concrete bridge at the SAVIMA mangrove area (9.727948°N 123.849691°E). All individuals were preserved in 70% unmethylated ethanol in Sarstedt tubes and stored at –20°C.

Imaging of the specimens. Specimen images were taken using Dun Inc. Passport II imaging system (using a 65 mm MPE lens) and processed via Adobe Lightroom. Images at different focal lengths were taken, stacked into a fully resolved image using Zerene Stacker, and then digitally processed for publication using Adobe Photoshop CS5.

Direct PCR. Twenty-four mangrove Dolichopodidae specimens were processed using direct-PCR (Wong et al., 2014) without presorting to morpho-species (Meier et al., 2016; Wang et al., 2018). As DNA template, we used tissue from the specimens (see table 2). DNA leaching out from the tissue provided the starting template for further DNA amplification. PCR conditions were as follows: Initial denaturation at 95°C (3 min); 1 cycle of 94°C (1 min), 47°C (1 min), and 72°C (1.30 min), followed by 40 cycles of 94°C (1 min); Final extension at 72°C (5 min). PCR products were pooled with amplicons for many other specimens and then purified with Bioline's SureClean, according to the manufacturer's instructions.

Next-Generation Sequencing. The pooled PCR products were sent for library preparation and Next-Generation Sequencing, using the Illumina MiSeq and HiSeq 2500 sequencing platforms. Note that only a small number of reads were used for sequencing the specimens. Sequencing libraries were prepared by AITbiotech, using the TruSeq Nano DNA Library Preparation Kit (Illumina), according to the manufacturer's protocol. Illumina MiSeq runs were provided by AITbiotech with the use of MiSeq Reagent Kit v3 (2 × 300 bp read lengths) and HiSeq runs were provided by SCELSE with HiSeq 2500 System and Rapid SBS Kit v2 (2 × 250 bp read lengths).

NGS Barcoding Bioinformatics. We used the NGS Barcoding Pipeline as detailed by Meier et al. (2016). It consists of pair-end merging with PEAR 0.9.6 (Zhang et al., 2014) and subsequent demultiplexing and quality control as implemented in a Python script (Srivathsan, unpublished). The script carries out five tasks: (i) data demultiplexing; (ii) counting the number of reads per sample; (iii) identifying and grouping identical reads into sets; (iv) identifying the dominant set of reads and combining it with length-variants; and finally (v) comparing the number of reads in the dominant set with the count of the set with the second-highest number of reads (Meier et al., 2016).

As a means of quality control, barcoding of a particular sample was only considered to be successful if (i) the total read count was > 50×, (ii) the total barcode count was > 10×, and (iii) the most dominant read was at least five times that of the second most dominant read (Meier et al., 2016). In order to identify contaminated sequences that do not belong to Dolichopodidae, we used Basic Local Alignment Search Tool (BLAST) for searching for sequences that were matching (> 97% identity) to taxa other than Dolichopodidae.

Post-QC sequences were aligned to other *Thinophilus* sequences using the online version of MAFFT v7 which can be instructed to adjust the direction of nucleotide sequences according to the first sequence (Katoh & Standley, 2013). Alignment was also checked for stop codons in MEGA version 6 (Tamura et al., 2013), with appropriate gaps added at the beginning of the sequences to account for different sequence length. Another Python script (Srivathsan, in prep) was used to cluster sequences using uncorrected pairwise distances, at varying threshold levels from 0%–10% (Meier et al., 2008; Srivathsan & Meier, 2012).

TAXONOMY

Family Dolichopodidae Latreille, 1809
Subfamily Hydrophorinae Lioy, 1864

Genus *Thinophilus* Wahlberg, 1844

Thinophilus Wahlberg, 1844: 37. Type species: *Rhaphium flavipalpe* Zetterstedt, 1843 (monotypy).
Parathinophilus Parent, 1932: 161. Type species: *Parathinophilus expolitus* Parent, 1932 (monotypy).

Thinophilus lungosetole Ramos & Grootaert sp. nov.
(Figs. 1–3)

Type material. Holotype male: PHILIPPINES, Bohol, SAVIMA mangrove**.** MT1 1♂, 9.727948°N, 123.849755°E; 2 July 2016; (BohSW1T5_F32_R61).

Fig. 1. *Thinophilus lungosetole* Ramos & Grootaert sp. nov. Holotype male. Habitus, lateral view.

Paratype: 1♀, same locality as holotype but different date: 25 June 2016; (BohSW1T4_ F32_R64) (kp_PHI_doli_C22_ R64_000064_Z4.0_65mm_L).

Etymology. The name of this species derives from the Italian lungo, long and setole, bristles, referring to the long ventral bristles on the fore tibia.

Extended diagnosis. Small species (body 3.2 mm; wing 2.7 mm) with yellow antenna, postpedicel rounded, higher than long. Thorax with 4 long dorsocentrals (dc), all equally long. Propleurals pale brown, not very long. Legs yellow including all tarsomeres. Fore coxa yellow, but posterior four coxae black. Fore femur with only minute ventral bristles. Fore tibia with a single row of at least 12 very long ventral bristles, longest near middle, there they are four times as long as the tibia is wide, becoming shorter toward apex (Fig. 1). A row of long posteroventral bristles on tarsomere 1, 2, 3 and 4. Longest on tarsomere 1, twice as long as tarsomere is wide. Tarsomere 2, 3 and 4 with a fine, subapical bristle. Mid femur with a double row of short ventral bristles, a few bristles in basal third longer but hardly half as long as femur is wide. Hind femur with a row of short ventral bristles, hardly half as long as femur is wide except for about 3 bristles in second basal quarter that are nearly as long as femur is wide. Wing brownish tinged with brown veins. Hypopygium and cercus small, pale yellow (Fig. 3). Cerci separated (Fig. 3C) with long yellow apical bristles. Phallus long (Fig. 3B).

Female similar to male but lacking the long ventral bristles on the fore tibia (Fig. 2).

Remarks. The present new species is unique in having only short ventral bristles on the fore femur combined with long ventral bristles on the fore tibia, that are nearly four times as long as tibia is wide. No other *Thinophilus* from Southeast Asia combine these characters.

Fig. 2. *Thinophilus lungosetole* Ramos & Grootaert sp. nov. Paratype female. Habitus, lateral view.

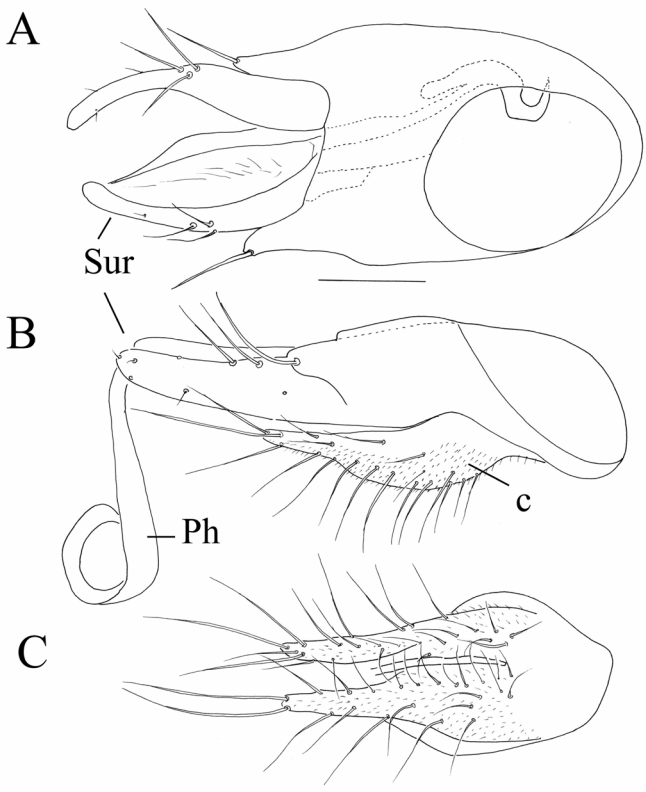

Fig. 3. *Thinophilus lungosetole* Ramos & Grootaert sp. nov. Holotype male terminalia. A. genital capsule, ventral view; B. genital capsule, lateral view; C. genital capsule, dorsal view. C: cercus; Ph: phallus; Sur: surstylus.

NGS barcodes. The NGS Barcodes of the male and female specimens with codes BohSW1T4_F32_R64 clustered with BohSW2T5_F32_R61 are shown in Table 3.

Table 1. List of reagents (and quantities) for one specimen PCR reaction.

Reagents	**Volume/reaction (µl)**
Molecule grade water (H_2O)	1.3
10X BioReadyrTaq buffer (Bioer)	2.0
2 nM dNTP mixture (Bioer)	1.5
BioReadyrTaq DNA polymerase (Bioer)	0.25
1.0 mg/mL BSA (ACROS Organics)	1.25
5mM Forward primers (Integrated DNA Technologies)	1.0
5mM Reverse primers (Integrated DNA Technologies)	1.0
Extracted DNA	1.0

Table 2. Size selection of the flies for DNA Extraction.

Specimen	**Size (mm)**	**Category**
Small	<2mm	complete specimen
Medium	2–3mm	femur and tibia
Large	>3mm	piece of femur

Table 3. NGS Barcodes of *Thinophilus lungosetole* sp. nov.

Specimen	**DNA Sequence (313bp)**
kp_doli_ *Thinophilus lungosetole* sp. nov._COI_PHI_BohSW1T4_Mangrove_P1_25Jun16_F32_R64	actttcagcaggaatcgctcacggaggggcatcagtagacttagctatttttttcacttcatctagctggagtttcatcaattcttgga gctgtaaacttttattaccacagtaattaatatacggtctacaggtattacctttgaccgaataccccttttttgtatgatctgtagtaatc acagcaattcttcttttattatctttacccgttctagccggagcaattactatattattaacagatcgaaatttaaatacctcattctttga ccccgcaggaggtggagatcctattctttatcaacacttattc---
kp_doli_*Thinophilus Thinophilus lungosetole* sp. nov. _COI_PHI_BohSW2T5_Mangrove_P1_02Jul16_F32_R61	actttcagcaggaatcgctcacggaggggcatcagtagacttagctatttttttcacttcatctagctggagtttcatcaattcttgga gctgtaaacttttattaccacagtaattaatatacggtctacaggtattacctttgaccgaataccccttttttgtatgatctgtagtaatc acagcaattcttcttttattatctttacccgttctagccggagcaattactatattattaacagatcgaaatttaaatacctcattctttga ccccgcaggaggtggagatcctattctttatcaacacttattc--

Table 4. DNA Barcodes of *Thinophilus ronazeli* Ramos & Grootaert sp. nov.

Specimen	**DNA Sequence (313bp)**
kp_doli_*Thinophilus ronazeli* sp. nov. _COI_PHI_BohSW11T1_Mangrove_P1_03Sep16_F32_R79	tctatcctcaggaattgcccatggaggagcctctgtagatttagcaatttttttctcttcatttagcaggagtatcctcaattctaggg gcagttaatttttattacaactgttattaatatgcgttcaacaggaattacatttgaccgaataccttttatttgtatgatcagttgtaatta cagcaattctattattattatctctaccagtactagcaggagcaatcactatactactaaccgatcgaaaccttaatacttcatttttc gacccagccggaggtggagaccctatcttatatcaacacctattt--
kp_doli_*Thinophilus ronazeli* sp. nov. _COI_PHI_BohSW1T4_Mangrove_P1_25Jun16_F32_R62	tctatcctcaggaattgcccatggaggagcctctgtagatttagcaatttttttctcttcatttagcaggagtatcctcaattctagggg cagttaattttattacaactgttattaatatgcgttcaacaggaattacatttgaccgaataccttttatttgtatgatcagttgtaattaca gcaattctattattattatctctaccagtactagcaggagcaatcactatactactaaccgatcgaaaccttaatacttcatttttcgac ccagccggaggtggagaccctatcttatatcaacacctattt---
kp_doli_*Thinophilus ronazeli* sp. nov. _COI_PHI_BohSW3T5_Mangrove_P1_09Jul16_F32_R71	tctatcctcaggaattgcccatggaggagcctctgtagatttagcaatttttttctcttcatttagcaggagtatcctcaattctagggg cagttaattttattacaactgttattaatatgcgttcaacaggaattacatttgaccgaataccttttatttgtatgatcagttgtaattaca gcaattctattattattatctctaccagtactagcaggagcaatcactatactactaaccgatcgaaaccttaatacttcatttttcgac ccagccggaggtggagaccctatcttatatcaacacctattt---

***Thinophilus ronazeli* Ramos & Grootaert sp. nov.**
(Figs. 4–7)

Type material. PHILIPPINES, Bohol, SAVIMA Mangrove. Holotype 1♂, MT19.730240°N, 123.853148°E; 3 September 2016, (BohSW11T1_F32_R79); Paratype 1♂, MT49.727948°N, 123.849691°E, 25 June 2016, (BohSW1T4_F32_R62); Paratype 1♀, MT5 9.727738°N, 123.849755°E; 9 June 2016; and (BohSW3T5_F32_R71).

Etymology. The present species is dedicated to Ronald Hazel, an inspiration to the author and who contributed with significant help in the research of Diptera in the Philippines. The species name is a contraction of his name in genitive.

Extended diagnosis. A small species (body 4 mm, wing 3 mm) with brownish antenna; postpedicel nearly as long as high, yellowish brown below. Postocular bristles uniseriate throughout; black above, whitish below and as long as above. Mesonotum with 6 dorsocentrals (dc); anterior 4 dc equally long, posterior 2 dc longer. Upper and lower propleural bristles pale. Legs yellowish brown. Fore coxa brownish, only tip yellowish. Posterior four coxae black. Fore femur dorsally brownish, all tibiae brownish while apical tarsomere of all legs dark brown. Fore coxa with long black bristles nearly as long as coxa is long. Fore femur with a double row of long black bristles. The bristles in the posterior row very long, the longest at base at least 3 times as long as femur is wide, the bristles become gradually shorter toward tip; the bristles in the anterior row half as long as those in the posterior row (Fig. 4). Fore tibia with a double row of fine bristles, those near the middle twice as long as tibia is wide. Tarsomere 1 with long posteroventrals. Mid femur with a double row of ventral bristles. The bristles in the posterior row minute, those in the anterior row, longer; the longest bristles near base nearly as long as femur is wide. Mid femur has a double row of ventral bristles that are nearly as long as femur is wide near the base, gradually becoming shorter toward the tip of the femur. Hind femur with short ventral bristles, hardly half as long as femur is wide. Sternites densely set with black bristles. Wing brownish tinged with black veins. Squama, ciliation and halter white. Male terminalia (Fig. 7). Cerci pale yellowish brown (Fig. 4), dorsally fused (Fig. 7C).

Female (Fig. 6) similar to male but lacking the long bristling on the fore and mid leg.

Remarks. The new species superficially resembles *T. longicilia* Evenhuis & Grootaert, 2002, known from Singapore, in having long ventral bristles on the fore femur. In *Thinophilus ronazeli* Ramos & Grootaert sp. nov. the longest ventral bristles on the fore tibia are hardly twice as long as tibia is wide. In *T. longicilia* the ventral bristles on the fore tibia are at least 3 to 4 times as long as tibia is wide. The ventral bristles on the mid femur in *T. longicilia* are at least 2 to 2.5 times as long as femur is wide. In the new species the ventral bristles on the mid femur are at most as long as femur is wide.

Fig. 4. *Thinophilus ronazeli* Ramos & Grootaert sp. nov. Holotype male. Habitus, lateral view.

Fig. 5. *Thinophilus ronazeli* Ramos & Grootaert sp. nov. Holotype male. Habitus, dorsal view.

NGS BARCODES

The DNA Barcodes of *Thinophilus ronazeli* Ramos & Grootaert sp. nov., two males with codes BohSW11T1_F32_R79, BohSW1T4_F32_R62 and a female with code BohSW3T5_F32_R71 are shown in Table 4.

DISCUSSION

Flies belonging to the genus *Thinophilus* are generally found on mudflats of mangroves, on rocky shores and sandy

Table 5. GenBank accession numbers of *Thinophilus lungosetole* sp. nov. and *T. ronazeli* sp. nov.

Taxon	Haplotype Code	Sex	Life Stage	Accession Number
Thinophilus lungosetole sp. nov	F32_R61	♂	Adult	kp_COI_PHI_BohSW2T5_M_P1_02Jul16
Thinophilus lungosetole sp. nov	F32_R64	♀	Adult	kp_COI_PHI_BohSW1T4_M_P1_25Jun16
Thinophilus ronazeli sp. nov	F32_R79**	♂	Adult	kp_COI_PHI_BohSW11T1_M_P1_3Sep16
Thinophilus ronazeli sp. nov.	F32_R62*	♂	Adult	kp_COI_PHI_BohSW1T4_M_P1_25Jun16
Thinophilus ronazeli sp. nov.	F32_R71	♀	Adult	kp_COI_PHI_BohSW3T5_M_P1_09Jul16

Fig. 6. *Thinophilus ronazeli* Ramos & Grootaert sp. nov. Paratype female. Habitus, lateral view.

beaches (Grootaert & Meuffels, 2001a, b). As can be seen in the checklist of all the Dolichopodidae in the Philippines (Annex 1) only four *Thinophilus* species were known from the Philippines prior to our study. They were *T. diminuatus* (Becker, 1922); *T. indigenus* Becker 1902; *T. tesselatus (*Becker, 1922); and *T. aequalichaetus* (Parent, 1941). In the present study we add two more species: *T. lungosetole* Ramos & Grootaert sp. nov. and *T. ronazeli* Ramos & Grootaert sp. nov. bringing the number of *Thinophilus* to six.

We evaluated the utility of NGS barcoding for species discovery. Five mangrove specimens of *Thinophilus* were successfully sequenced and the sequences were compared to the database of NGS barcodes for Oriental dolichopodid species including *Thinophilus* (Kutty et al., 2018). Two sets of sequences/specimens were found to differ significantly from the sequences of all other species (12.1% and 11.9% divergence). Specimens in these clusters were then morphologically examined and found to belong to new species that not only have distinct DNA barcodes but are also morphologically distinct from all other described *Thinophilus* species. Given that the species are genetically and morphologically very distinct, they would constitute different species under all species concepts (see discussions in Ang & Meier, 2010; 2013; 2017; Rohner et al., 2014; Tan et al., 2010). The NGS-barcodes also allowed for the matching of females with males (Yeo et al., 2018) which is difficult based on morphology for *Thinophilus* species.

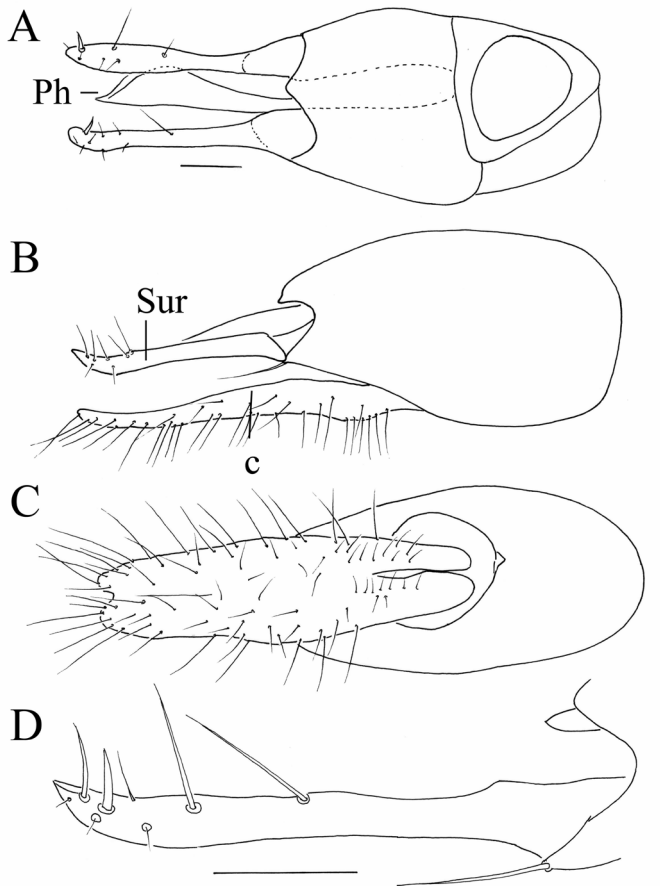

Fig. 7. *Thinophilus lungosetole* Ramos & Grootaert sp. nov. Holotype male terminalia. A. genital capsule, ventral view; B. genital capsule, lateral view; C. genital capsule, dorsal view; D: detail surstylus. C: cercus; Ph: phallus; Sur: surstylus.

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Annex 1. Checklist of the Dolichopodidae of the Philippines adapted from Yang et al., 2006.

No.	Taxa	Distribution
1	*Amblypsilopus flagellaris* Frey 1925	Philippines
2	*Amblypsilopus flaviappendiculatus* de Meijere 1910	Indonesia, Philippines, China, Vietnam
3	*Amblypsilopus gracilitarsis* de Meijere 1914	Indonesia, Malaysia, Philippines
4	*Amblypsilopus grallator* Frey 1924	Philippines
5	*Amblypsilopus humilis* Becker, 1922	Nepal, India, Malaysia, Philippines, China
6	*Amblypsilopus trahens* Frey 1925	Philippines.
7	*Amblypsilopus variipes* Frey 1925	Philippines
8	*Asyndetus latifrons* Loew 1857	China, Thailand, Pakistan, India, Bangladesh, Philippines
9	*Campsicnemus rufinus* Frey 1925	Philippines
10	*Chaetogonopteron laetum* Becker 1922	Nepal, China (Taiwan), Singapore, Indonesia, Philippines
11	*Chaetogonopteron mutatus* Becker 1922	Singapore, Philippines
12	*Chaetogonopteron rutilum* Becker 1922	China (Taiwan), Philippines
13	*Chaetogonopteron setigerum* Becker 1922	Philippines
14	*Chrysosoma annuliferum* Frey 1924	Philippines, Malaysia
15	*Chrysosoma chrysoleucum* Frey 1924	Philippines.
16	*Chrysosoma crinicorne* Wiedemann 1824	Sri Lanka, India, Nepal, Indonesia, Philippines, Japan, China
17	*Chrysosoma excitatum* Frey 1924	Philippines
18	*Chrysosoma fistulatum* Frey 1924	Philippines
19	*Chrysosoma fusiforme* Frey 1924	Philippines
20	*Chrysosoma pelagica* Bickel 1994	Philippines, Guam
21	*Chrysosoma philippinense* Frey 1924	Philippines
22	*Chrysosoma proliciens* Walker 1856	India, Malaysia, Singapore, Philippines
23	*Chrysosoma schistellum* Frey 1924	Philippines, Malaysia
24	*Chrysosoma terminatum* Becker 1922	Philippines
25	*Chrysosoma vittatum* Wiedemann 1819	Sri Lanka, India, Indochina, Vietnam, Indonesia, Philippines, Singapore
26	*Chrysotus excretus* Becker 1922	China, Taiwan, Indonesia, Philippines
27	*Condylostylus brunnicosus* Frey 1925	Philippines
28	*Condylostylus longicornis* Fabricius 1775	Sri Lanka, India, China (Taiwan),Indonesia, Philippines
29	*Condylostylus nebulosus* Matsumura 1916	India, Sri Lanka, Nepal, China, Philippines, Indonesia
30	*Diaphorus aptatus* Becker 1922	India, Laos, China (Taiwan), Philippines
31	*Diaphorus detectus* Becker 1922	Sri Lanka, India, Indonesia, Philippines
32	*Diaphorus intactus* Becker 1922	China, (Taiwan), Indonesia, Philippines
33	*Diaphorus mandarinus* Wiedemann 1830	Pakistan, India, Myanmar, Nepal, China, Malaysia, Indonesia, Philippines
34	*Diaphorus maurus* OstenSacken 1882	India, Sri Lanka, Indonesia, Philippines
35	*Diaphorus ochripes* Becker 1924.	India, China (Taiwan), Malaysia, Indonesia, Philippines
36	*Diaphorus plumicornis* de Meijere 1913	Philippines, Indonesia
37	*Hercostomoides indonesianus* Hollis 1964	China, Thailand, Vietnam, Malaysia, Singapore, Indonesia, Philippines
38	*Hercostomus bakeri* Frey 1928	Philippines
39	*Hercostomus gymnopygus* Frey 1925	Philippines
40	*Hercostomus humeralis* Frey 1925	Philippines
41	*Hercostomus zygolipes* Grootaert *et* Meuffels 2001	Philippines
42	*Krakatauia platychira* Frey 1924	Philippines
43	*Lichtwardtia ziczac* Wiedemann 1824	Pakistan, India, Sri Lanka, China, Thailand, Laos, Myanmar, Indonesia, Malaysia, Singapore, Philippines
44	*Medetera austroapicalis* Bickel 1987	India, Nepal, Sri Lanka, China, Philippines
45	*Medetera liwo* Bickel 1987	Philippines
46	*Medetera luzonensis* Bickel 1987	Philippines
47	*Medetera mindanensis* Bickel 1987	Philippines
48	*Medetera olivacea* de Meijere 1916	Indonesia, Malaysia, Philippines
49	*Medetera phlippinensis* Bickel 1987	Philippines
50	*Medetera salomonis* Parent 1941	Philippines
51	*Medetera sandakanensis* Bickel 1987	Malaysia, Philippines, Laos
52	*Medetera vegrandis* Frey 1925	Philippines
53	*Micromorphus vegrandis* Frey 1925	Philippines
54	*Paraclius fuscinervis* Frey 1925	Philippines

No.	Taxa	Distribution
55	*Paraclius pilosellus* Becker 1922	China, India, Laos, Indonesia, Philippines
56	*Paracliusa dligatus* Becker 1922	China, Myanmar, Sri Lanka, Thailand, Pakistan, Malaysia, Philippines
57	*Pelastoneurus flavicornis* de Meijere 1916	Indonesia, Philippines
58	*Pelastoneurus vegetus* Frey 1925	Philippines.
59	*Plagiozopelma allectans* Walker 1856	Malaysia, Philippines
60	*Plagiozopelma discophorum* Frey 1924	Philippines
61	*Plagiozopelma flavipodex* Becker 1922	China, Philippines, Indonesia, Nepal, Thailand
62	*Plagiozopelma niveoapicale* Frey 1924	Philippines
63	*Psilopus dolichocnemis* Frey 1925	Philippines
64	*Saccopheron taluzonensis* Bickel 1987	Philippines
65	*Saccopheron tamindanensis* Bickel 1987	Philippines
66	*Saccopheronta platychira* de Meijere, 1916	Pakistan, India, Nepal, Thailand, Bangladesh, Sri Lanka, China, Indonesia, Malaysia, Philippines
67	*Sciapus trahens* Frey 1925	Philippines
68	*Sympycnus acuticornis* Frey 1928	Philippines
69	*Sympycnus apicalis* de Meijere, 1916	China (Taiwan), Pakistan, Indonesia, Philippines
70	*Sympycnus bisulcus* Becker 1922	Myanmar, India, China (Taiwan), Philippines
71	*Sympycnus cinctellus* Frey 1928	Philippines
72	*Sympycnus formosinus* Becker 1922	China (Taiwan), Philippines
73	*Sympycnus gloriosus* Frey 1925	Philippines
74	*Sympycnus residuus* Becker 1922	China (Taiwan), Philippines
75	*Sympycnus strenuous* Becker 1922	Sri Lanka, Philippines
76	*Sympycnus thrypticiformis* Frey 1925	Philippines
77	*Sympycnus turbidus* Becker 1922	India, Nepal, Philippines, Flores
78	*Tachytrechus tessellatus* (Macquart 1842)	Sri Lanka, China (Taiwan), India, Malaysia, Indonesia, Philippines, Japan
79	*Thinophilus aequalichaetus* Parent 1941	Philippines
80	*Thinophilus diminuatus* Becker 1922	India, China (Taiwan), Philippines.
81	*Thinophilus indigenus* Becker 1902	India, Nepal, China, Malaysia, Philippines
82	*Thinophilus lungosetole* Ramos & Grootaert sp. nov.	Philippines
83	*Thinophilus ronazeli* Ramos & Grootaert sp. nov.	Philippines
84	*Thinophilus tesselatus* Becker 1922	India, China (Taiwan), Philippines