

## Revision of world species of the genus *Heptascelio* Kieffer (Hymenoptera: Platygastroidea, Platygastriidae)

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## Abstract

The world species of the genus *Heptascelio* Kieffer (Hymenoptera: Platygastroidea, Platygastriidae) are revised. The generic concept is expanded and the genus is redescribed. Eighteen species are recognized, of which only two were described previously: *H. lugens* Kieffer (Philippines) and *H. striatosternus* Narendran & Ramesh Babu (India, Sri Lanka, Nepal, Madagascar). Both species are redescribed, and *H. punctisternus* Narendran & Ramesh Babu is considered a junior synonym of *H. striatosternus* (**new synonymy**). The following species are described as new: *H. albipes* Masner, van Noort & Johnson, **n.sp.** (Cameroon, Gabon, Uganda); *H. anthonyi* Masner & Johnson, **n.sp.** (Zimbabwe); *H. aquilinus* Masner & Johnson, **n.sp.** (South Africa); *H. bivius* Johnson & Masner, **n.sp.** (Indonesia); *H. castor* Masner & Johnson, **n.sp.** (Indonesia, Malaysia); *H. dayi* Masner & Johnson, **n.sp.** (Indonesia); *H. dispar* Masner & Johnson, **n.sp.** (Botswana, Namibia, South Africa); *H. hamatus* Masner & Johnson, **n.sp.** (Thailand, Laos, Vietnam, Malaysia, Indonesia, Taiwan); *H. lateralis* Johnson, van Noort & Masner (Central African Republic, Gabon); *H. noyesi* Masner & Johnson, **n.sp.** (Madagascar); *H. orarius* Johnson & Masner, **n.sp.** (Madagascar); *H. paralugens* Masner & Johnson, **n.sp.** (Philippines); *H. sicarius* Johnson & Musetti, **n.sp.** (Madagascar), *H. strigatus* Masner, Johnson & van Noort, **n.sp.** (Gabon, Central African Republic); *H. teres* Johnson & Masner, **n.sp.** (Madagascar), and *H. watshami* Masner & Johnson, **n.sp.** (Democratic Republic of Congo, Kenya, Malawi, Zimbabwe). *Heptascelio watshami* has been reared from the eggs of *Plagiotriptus pinivorus* Descamps (Orthoptera: Thericleidae), a pest of pine. An electronic version of the identification key is available at WaspWeb at <http://www.waspweb.org/Platygastroidea/Keys/>. The electronic version of this document has been formatted with embedded links to additional resources available online via the internet both to enhance the content and as a demonstration of the utility of international standards for biodiversity informatics.

## Introduction

The genus *Heptascelio* (Hymenoptera: Platygastroidea, Platygastriidae) was described originally by J.-J. Kieffer (1916) from a single male specimen collected from Los Baños in the Philippines. Masner (1976) placed *Heptascelio* within the tribe Scelionini and included it in his key to world genera of Scelionidae. This assignment was primarily based on the reduction of the radial vein in the hind wing, the 1-1-1 tibial spur formula, and the 3-2 palpal formula. Masner considerably broadened the known distribution of species of *Heptascelio* within the Oriental region, including southeast Asia (Thailand, Laos, Vietnam) and Nepal, and extending into both the Australasian (New Guinea) and Afrotropical regions (Angola and South Africa). Twenty years later, Narendran & Ramesh Babu (1996) described two new species from the southern Indian state of Kerala, thus further increasing the known geographic distribution.

Sharkey (2007) recently synonymized the families Platygastriidae and Scelionidae, correctly noting that the former name has priority. This taxonomic action was based on two lines of reasoning. First, he cited the analysis of Murphy *et al.* (2007) as purportedly demonstrating the paraphyly of Scelionidae. The second justification was the “inadvisability of subdividing a morphologically homogeneous taxon.” In this paper we have accepted this synonymy, although it may be premature and is certainly not the only resolution of the issue consistent with the criterion of monophyly.

The tribe Scelionini *sensu* Masner (1976) comprises those genera with an incomplete radial vein (submarginal vein) in the hind wing; 3-2 palpal formula; 1-1-1 tibial spur formula; a single sex segment (A5) on the male antenna; an elongate, subequally-segmented metasoma with 6 tergites and sternites externally visible in the female, and 8 tergites and 7 sternites visible in the male. Host records are available for four of the ten genera included in this tribe: *Scelio* Latreille, *Pseudoheptascelio* Szabó, *Sceliocerdo* Muesebeck, and *Synoditella* Muesebeck. All are parasitoids of the eggs of Acrididae (Orthoptera), and adults of the last two are phoretic on their hosts. The only known host of *Heptascelio* is a species of the family Thericleidae (Orthoptera: Eumastacoidea; see under *H. watshami*).

Our taxonomic objective is to reassess the three known species of *Heptascelio* and to describe the new species discovered. The characters supporting the treatment of the genus as a monophyletic group and distinguishing it from other genera are also reviewed.

This work is a product of the Platygastridae Planetary Biodiversity Inventory, a project funded by the U.S. National Science Foundation (N.F. Johnson and A.D. Austin, University of Adelaide, principal investigators). One of the primary objectives of this project is to use biodiversity informatics tools to accelerate the taxonomic process and to make real-time collaboration possible among the narrow community of researchers with appropriate expertise. The number of authors of this paper reflects this collaborative environment. The contributions of the individual authors are: N.F. Johnson: project coordination, character definition, generic concept development, species concept development, imaging, key development, manuscript preparation; L. Masner: character definition, generic concept development, species concept development, development of collection; L. Musetti: species concept development, manuscript preparation, coordination of specimen preparation, coordination of label databasing; S. van Noort: species concept development, collection of new material, imaging, key development; electronic key preparation; Rajmohana K.: species concept development, contribution of distributional data; D.C. Darling: collection of new material, contribution of distributional data; A. Guidotti: species concept development, contribution of distributional data; A. Polaszek: manuscript preparation, contribution of host and distributional data. The authorship of the new taxa varies and reflects the relative contribution and priority of the individuals' contributions.

## Materials and Methods

This work is based upon specimens deposited in the following collections, with abbreviations used in the text: AEIC, American Entomological Institute, Gainesville, FL<sup>1</sup>; BMNH, Natural History Museum, London, UK<sup>2</sup>; BPBM, Bishop Museum, Honolulu, HI<sup>3</sup>; CASC, California Academy of Sciences, San Francisco, CA<sup>4</sup>; CNCI, Canadian National Collection of Insects, Ottawa, Canada<sup>5</sup>; EMEC, Essig Museum, University of California, Berkeley, CA<sup>6</sup>; OSUC, C.A. Triplehorn Insect Collection, Columbus, OH<sup>7</sup>; PPRI, Plant Protection Research Institute, Pretoria, South Africa<sup>8</sup>; QSBG, Queen Sirikit Botanical Gardens, Chiang Mai, Thailand<sup>9</sup>; ROME, Royal Ontario Museum, Toronto, Canada<sup>10</sup>; SAMC, Iziko Museums of Cape Town, South Africa<sup>11</sup>; USNM, National Museum of Natural History, Washington, DC<sup>12</sup>; WGRS, Zoological Survey of India, Western Ghats Regional Station, Calicut, Kerala, India<sup>13</sup>.

Abbreviations and morphological terms used in text: A1, A2, ... A12: antennomere 1, 2, ... 12; claval formula: distribution of the large, multiporous basiconic sensilla on the underside of apical antennomeres of the female, with the segment interval specified followed by the number of sensilla per segment (Bin 1981); OOL: ocular ocellar line (or ocellar ocular line), shortest distance from inner orbit and outer margin of lateral ocellus (Masner and Huggert 1989); S1, S2, ... S6: metasomal sternite 1, 2, ... 6; T1, T2, ... T7: metasomal tergite 1, 2, ... 7; T1 depression: sublateral impression on the first metasomal tergite into which the inner propodeal projection fits. Morphological terminology otherwise follows Masner (1980) and Mikó et al. (2007).

1. <http://biocol.org/urn:lsid:biocol.org:col:1008>
2. <http://biocol.org/urn:lsid:biocol.org:col:1009>
3. <http://biocol.org/urn:lsid:biocol.org:col:1010>
4. <http://biocol.org/urn:lsid:biocol.org:col:1011>
5. <http://biocol.org/urn:lsid:biocol.org:col:1012>
6. <http://biocol.org/urn:lsid:biocol.org:col:1013>
7. <http://biocol.org/urn:lsid:biocol.org:col:1014>
8. <http://biocol.org/urn:lsid:biocol.org:col:1015>
9. <http://biocol.org/urn:lsid:biocol.org:col:1016>
10. <http://biocol.org/urn:lsid:biocol.org:col:1017>
11. <http://biocol.org/urn:lsid:biocol.org:col:1018>
12. <http://biocol.org/urn:lsid:biocol.org:col:1019>
13. <http://biocol.org/urn:lsid:biocol.org:col:1020>

Under the Material Examined sections, the locality data reported for holotypes are not a literal transcription of the labels: abbreviations are expanded, additional data from the collectors are also included. The codens “OSUC”, “CASENT”, “ROMEnt”, “SAM-HYM”, “USNM” (each followed by a blank space), and “ZSI/WGRS/INV” combined with a number are unique identifiers for the individual specimens. Holotypes should be unambiguously identifiable by means of the unique identifier or the red holotype label. Full data associated with these specimens may be accessed at the following link, [purl.oclc.org/NET/hymenoptera/hol](http://purl.oclc.org/NET/hymenoptera/hol), and entering the identifier in the form.

In this article we have followed the precedent of Pyle *et al.* (2008) in the implementation of biodiversity informatics standards within a taxonomic publication. The electronic version of the paper contains hyperlinks to external resources and, within the paper, to the first mention or full treatment of the subject. Insofar as possible the external information conforms to standards developed and maintained through Biodiversity Information Standards (Taxonomic Database Working Group)<sup>14</sup>. All new species have been prospectively registered with Zoobank (Polaszek *et al.* 2005a, 2005b) and other taxonomic names, where required, have been retrospectively registered. The external hyperlinks are marked by endnote numbers and, in the electronic version, in blue color. The appendix specify the external URL for each of these hyperlinks so that users of the printed version of this article have access to the same resources. Life sciences identifiers, lsids, may be resolved at the specified URLs or at [lsid.tdwg.org](http://lsid.tdwg.org).

The species descriptions are generated by a database application, vSysLab ([purl.oclc.org/NET/hymenoptera/vSysLab](http://purl.oclc.org/NET/hymenoptera/vSysLab)), designed to facilitate the creation of taxon by character data matrices, to integrate these with the existing taxonomic and specimen-level database, and to export the data both as text and as input files for other applications. The output is in the format of “Character: Character state(s).” Images were captured using AutoMontage and Cartograph extended-focus software. Descriptive data are accessible in two additional formats at the Plazi depository ([plazi.org](http://plazi.org)): in the TDWG Structure of Descriptive Data (SDD) format and as individual treatments marked up using the TaxonX standard. The individual images are archived with Morphbank ([www.morphbank.net](http://www.morphbank.net)) and Specimage ([purl.oclc.org/NET/hymenoptera/specimage](http://purl.oclc.org/NET/hymenoptera/specimage)), an image database application developed for the Platygastridea PBI.

## ***Heptascelio* Kieffer**

*Heptascelio* Kieffer, 1916: 58. Original description. Type: *Heptascelio lugens* Kieffer, by monotypy and original designation. Kieffer, 1926: 266, 345 (description, keyed); Muesebeck & Walkley, 1956: 358 (citation of type species); Baltazar, 1966: 176 (catalog of species of the Philippines); Masner, 1976: 6, 15 (description, keyed); Mani & Sharma, 1982: 151 (keyed); Johnson, 1992: 400 (catalog of world species); Narendran & Ramesh Babu, 1996: 89, 90 (diagnosis, key to species); Lê, 2000: 32 (keyed); Rajmohana, 2006: 115, 124, 125 (description, keyed, key to species of India).

Zoobank registration:

Original concept: [urn:lsid:zoobank.org:act:8D9935C2-66D7-4A34-83D2-6F315945A951](http://urn:lsid:zoobank.org:act:8D9935C2-66D7-4A34-83D2-6F315945A951)

Current concept: [urn:lsid:zoobank.org:act:535EC4F7-E050-46F4-9658-16D8D9EF3267](http://urn:lsid:zoobank.org:act:535EC4F7-E050-46F4-9658-16D8D9EF3267)

**Diagnosis.** *Heptascelio* is distinguished from other genera of Scelionini *sensu* Masner (1976) by the elongate undivided spine of the metascutellum, the 12-merous male antenna, the presence of well-defined felt fields on the ventral metasoma, and, in comparison with *Oreiscelio* Kieffer, the elongate basal flagellomeres.

**Description.** Moderate-sized, length 2.3–4.8 mm; body moderately elongate, robust, antenna with well-developed clava, moderately elongate; body dark brown to black; macropterous.

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14. <http://www.tdwg.org>

*Head* in dorsal view weakly transverse to nearly quadrate; vertex punctate, rugulose, areolate rugose; hyperoccipital carina absent; occipital carina well-developed, continuous medially, crenulate; lateral ocellus nearly contiguous with inner orbit of compound eye or distinctly separated, OOL up to 2 times diameter of lateral ocellus; compound eye large, glabrous; frons narrow dorsally, shallowly concave, usually with transverse carina demarcating dorsal margin of frontal depression; interantennal process present, short, often excavate medially; submedian carina absent; orbital carina absent; lower frons, including cheek, without fanlike striae; interocular space distinctly shorter than eye height dorsally, inner orbits usually strongly diverging ventrally; clypeus very short, strongly transverse, flat, truncate apically, lateral corners not produced, not subequally divided by transverse carina into anteclypeus and postclypeus; malar sulcus present; gena strongly expanded, convex, deeply punctate, rugulose, areolate rugose; labrum external, visible below clypeus, transverse to semicircular, sometimes hidden behind closed mandibles; mandible moderate to elongate, apex with two apical, acute, subequal teeth; maxillary palpus 3-segmented, all segments cylindrical; labial palpus 2-segmented; antenna 12-merous in both sexes; radicle inserted apically into A1, nearly parallel to longitudinal axis of A1; A1 not distinctly flattened, more or less cylindrical; A3 distinctly subequal to or shorter longer than A2; gustatory sensilla on female antenna arranged in longitudinal pairs on apical antennomeres; claval formula A12–A7:1-2-2-2-2; male antenna with tyloid on A5.

*Mesosoma* in dorsal view longer than wide, in lateral view quadrate or longer than high; pronotum in dorsal view broad laterally, anterolateral corners angulate; transverse pronotal carina weakly indicated laterally, fading and mixed with coarse surface sculpture medially; vertical epomial carina present; dorsal epomial carina present; anterior face of pronotum vertical, not visible in dorsal view; lateral face of pronotum deeply concave below dorsal epomial carina, facing anterolaterally; netrion present, narrow to moderately wide, open ventrally; anterior margin of mesoscutum horizontal, not flexed ventrally to meet pronotum; mesoscutum pentagonal in outline, posterolateral corner rounded; parapsidal lines sometimes visible; notauli usually indistinguishable; skaphion absent; transscutal articulation well-developed, crenulate; mesoscutellum quadrate to trapezoidal, posterolateral area often angulate or produced into distinct spines, mesoscutellum weakly convex anteriorly, often depressed posteriorly, sometimes with medial longitudinal furrow; axilla small, dorsal margin sinuate; metanotum narrow, metascutellum clearly differentiated, produced into single median spine; dorsal surface of propodeum sparsely setose; keels, plicae of propodeum usually well-developed, inner propodeal projection well-developed, fairly short, outer propodeal projection moderately to strongly developed, often curved; posterior face of propodeum usually carinate or areolate rugose, sparsely setose; mesopleural depression well-developed; mesopleural carina absent or represented by 1–3 fine ridges; anteroventral portion of mesepisternum strongly sculptured, sternaulus, postacetabular foveae not distinguishable; mesopleural pit present, distinct; anterior margin of ventral portion of mesepisternum and acetabular carina transverse, not extended forward between fore coxae; mesepimeral sulcus indicated by dorsoventral line of strong foveae extending to lower margin of mesopleuron; dorsal corner of mesepimeron prominent, rounded or angulate, not produced into sharp posteriorly directed tooth; mesopleuron usually with a strong longitudinal ledge below subalar pit, dorsally delimiting mesopleural furrow; anteroventral portion of metapleuron continuous with lateral face, sparsely to moderately setose; metapleuron pit present, sometimes difficult to distinguish amid coarse sculpture; posterior margin of metapleuron narrowly lamellate; legs not unusually proportioned; posterior surface of hind coxa smooth, sparsely setose to glabrous; trochantellus absent; tibial spur formula 1-1-1; tarsal formula 5-5-5; tarsomeres tapering in width apically; pretarsal claws simple; apex of fore wing extending to or slightly beyond apex of metasoma, hyaline to infusate; R straight, extending at most through basal 0.5 of length of fore wing, with strong bristles at least basally, curved costad apically, bifurcating near apex before reaching costal margin, r-rs straight, R<sub>1</sub> ending at or near costal margin, postmarginal vein absent, in two species R ending in white to yellow apical cloud, apical details indistinguishable; bulla absent; basal vein sometimes indicated by broad, diffuse infuscation; no other tracheate veins in fore wing; hind wing with tracheate portion of R present only basally; three hamuli present.

*Metasoma* generally flattened dorsally, anterior sterna convex, becoming flatter posteriorly; subequally divided, second segment slightly longest; female with 6 terga, 6 sterna visible externally, male with 8 terga, 7 sterna visible externally; submarginal ridge well-developed, defined by narrow laterotergites to form deep submarginal rim; no spiracles visible; all terga with distinct longitudinal striae nearly throughout, basal rows of crenulae present on each segment, continuous with striae; base of T1 with submedial depressions into which inner propodeal angles fit, depressions shallow to deep; female T6 without median raised field of microsetae or secretion; S1 not laterally compressed; anterior margin of S2 straight; felt fields present on S2–S3 or S3–S4, distinct.

**Comments.** *Heptascelio* is very similar in its diagnostic characters to *Oreiscelio*. Both genera have the pronotum large, and the anterior apex of the mesoscutum does not flex downwards to meet the pronotum. The basal flagellomeres of the female antenna in *Oreiscelio* are strongly transverse and A7 is massive, giving the antenna an overall short and stout appearance. The female antenna of *Heptascelio* has A3 more elongate and A7 is not so distinctly larger than the following clavomeres. *Oreiscelio* lacks distinct felt fields on the metasomal sterna. Rarely, especially in specimens with less sculpture, a slight difference in sculpture and density of setae can be perceived in *Oreiscelio*. In contrast, the felt fields in *Heptascelio* species are distinct, having the setae both shorter than those in the surrounding area and much more densely packed. Both genera have species in which the scutellar corners are strongly produced, the apex of the mesoscutellum excavate, and have a median longitudinal furrow on the mesoscutellum. In neither genus are these characters found in all species. The primary distinguishing character in the key of Masner (1976) is the metascutellar spine: bifid in *Oreiscelio*, a single median spike in *Heptascelio*. Some specimens of *Oreiscelio* have only a shallow indentation at the apex of the spine, and on this character alone the two genera can be difficult to separate. But in combination with the length of the basal flagellomeres and the metasomal felt fields, we believe that the two genera are still sufficiently distinguishable that we can still treat them as separate taxa. A closer examination of the relationships among species of these two genera, and a better understanding of the diversity within other scelionine genera, will help to more definitively resolve this issue.

Details on *Heptascelio* taxonomy, distribution, and biology as well as images are available on-line at the data portal to the Platygastroidea PBI project (<http://purl.oclc.org/NET/hymenoptera/Platygastroidea>) and, for Afrotropical species, at WaspWeb (<http://www.waspweb.org/>).

**Link to Distribution Map**<sup>15</sup>. *Heptascelio* is found throughout the Old World tropics (excluding Australia), in continental Africa from Cameroon east to Kenya and south to South Africa; in Asia from India, Nepal, Sri Lanka and southeast Asia east to Taiwan, Philippines and Papua.

### Key to species of *Heptascelio*

An electronic version of this key is available on-line at WaspWeb (<http://www.waspweb.org/Platygastroidea/Keys>).

### Females (unknown for *H. aquilinus*)

1. Hind tibiae and often mid tibiae with long black bristles intermixed with normal setation (Fig. 77).....2
  - Hind tibiae with short light-colored setae only.....4
2. Female with head and mesosoma dark brown, metasoma yellow (Figs. 31–33); felt fields present on S3 and S4 (Fig. 31, *ff*); dorsal margin of frontal scrobe strongly developed, incised medially.....
  - ..... *Heptascelio dispar* Masner & Johnson, n.sp.
  - Body entirely black (except appendages); felt fields on S2 and S3 (as on Fig. 37); dorsal margin of frontal

15. <http://atbi.biosci.ohio-state.edu/HymOnline/map-large.html?id=491&view=all>

- scrobe with low carina, evenly arcuate.....3
3. S3 and S4 crenulate basally, elsewhere with scattered setigerous punctures, surface otherwise smooth; mesepisternum below mesopleural depression smooth (Fig. 60); outer propodeal projection significantly longer than inner propodeal projection (Fig. 61); netrion glabrous.....*Heptascelio orarius* Johnson & Masner, n.sp.
- S3 and S4 with strong longitudinal furrows over entire surface (Fig. 81); mesepisternum below mesopleural furrow strongly rugulose (Figs. 74, 80); outer and inner propodeal projections subequal in length (Fig. 78); Netrion densely setose ..... *Heptascelio striatosternus* Narendran & Ramesh Babu
4. Netrion glabrous (e.g., Figs. 54, 86, 90); T1 without raised sublateral longitudinal lamella, at most with low carina.....5
- netrion densely setose (e.g., Figs. 22, 38); T1 with strongly raised sublateral lamella (Figs. 25, 26).....12
5. Mesoscutellar spines absent, posterior margin of mesoscutellum with two rounded lobes (Figs. 45, 91)...6
- Mesoscutellar spines elongate, acute (Figs. 3, 9, 55, 87, 95) .....8
6. Mesoscutum areolate rugose (Fig. 45); all coxae dark brown to black (Fig. 43) .....*Heptascelio lateralis* Johnson, van Noort & Masner, n.sp.
- Mesoscutum sparsely punctate (Fig. 91); all coxae yellow (Fig. 90) .....7
7. Outer propodeal projection distinctly longer than inner, extending beyond basal half of T1 (Figs. 70, 71); propodeum with strong transverse carinae between longitudinal rugae (Fig. 70); parapsidal lines evanescent; metascutellar spine straight.....*Heptascelio sicarius* Johnson & Musetti, n.sp.
- Outer propodeal projection only slightly longer than inner, not reaching beyond basal half of T1 (Fig. 90); propodeum longitudinally carinate, without cross-striae; parapsidal lines distinct; metascutellar spine downturned at apex..... *Heptascelio teres* Johnson & Masner, n.sp.
8. Mesopleuron below depression entirely smooth (Fig. 54); frontal scrobe entirely smooth (Fig. 56); T3 and T4 smooth medially, with longitudinal sculpture effaced..... *Heptascelio noyesi* Masner & Johnson, n.sp.
- Mesopleuron below depression coarsely sculptured, rugose-punctate (Figs. 2, 8, 86, 94); frontal scrobe sculptured in lower half (Figs. 4, 10, 88, 96); T3 and T4 longitudinally striate medially.....9
9. Mesoscutellum with rough polygonal rugulosity (Figs. 9, 95); fore wing basally (below R) hyaline or weakly infusate .....10
- Mesoscutellum with strong longitudinal ridges (Figs. 3, 87); fore wing basally (below R) with darkly pigmented longitudinal streak.....11
10. Mesoscutum with dense transverse rugae and punctures between longitudinal ridges (Fig. 9); lower frontal scrobe with irregular rugulosity (Fig. 10); frons between anterior ocellus and margin of frontal depression coarsely areolate throughout.....*Heptascelio anthonyi* Masner & Johnson, n.sp.
- Mesoscutum with few transverse ridges between longitudinal ridges (3–4 through length of furrow between ridges, Fig. 95); lower scrobe with dense transverse striae (Fig. 96); frons between anterior ocellus and margin of frontal depression with sculpture effaced medially ..... *Heptascelio watshami* Masner & Johnson, n.sp.
11. Mesepisternum in posterior half of mesopleural depression areolate-rugose (Fig. 86); mesoscutum with 6–9 strong longitudinal ridges and wide, smooth interspaces (Fig. 87); T1 with strongly raised median keel; tibiae and basal flagellomeres dark brown (Fig. 85) .....*Heptascelio strigatus* Masner, Johnson & van Noort, n.sp.
- Mesepisternum in posterior half of mesopleural depression with distinct diagonal striae (Fig. 2); mesoscutum with numerous (16) fine longitudinal ridges and narrow interspaces (Fig. 3); T1 with at most low median keel; tibiae and basal flagellomeres pale in color (Fig. 1) ..... *Heptascelio albipes* Masner, van Noort & Johnson, n.sp.
12. Mesoscutum punctate, with broad smooth interspaces between punctures (Figs. 19, 29, 49, 67) .....13
- Mesoscutum areolate-rugose, sometimes with distinct longitudinal elements in sculpture (Figs. 23, 39) 16

13. Notauli indicated as percurrent furrows (Fig. 19), mesal margin well-developed; mesoscutum with large smooth area laterad of notaulus ..... *Heptascelio bivius* Johnson & Masner, n.sp.
- Notauli, at most, vaguely defined as a row of separated punctures (Figs. 29, 49, 67); mesoscutum uniformly sculptured throughout .....14
14. Mesoscutellum with widely separated setigerous punctures (Fig. 29); fore wing with dark longitudinal pigmented streak below R .....*Heptascelio dayi* Masner & Johnson, n.sp.
- Mesoscutellum areolate-rugose (Figs. 49, 67); fore wing without dark streak below R.....15
15. Posterolateral corners of mesoscutellum reduced to sharp points, distinctly shorter than spine of metascutellum (Fig. 66); mesoscutum without delicate longitudinal impressions (Fig. 67).....*Heptascelio paralugens* Masner & Johnson, n.sp.
- Posterolateral corners of mesoscutellum spikelike, spikes subequal in length to spine of metascutellum (Fig. 48); mesoscutum with delicate, shallow, longitudinal impressions (Fig. 49).....*Heptascelio lugens* Kieffer
16. Propodeum with distinct paramedian keels (Fig. 25); area between inner and outer propodeal projections smooth to striate; frontal depression completely sculptured (Fig. 24) .....*Heptascelio castor* Masner & Johnson, n.sp.
- Propodeum without distinct paramedian keels, with numerous longitudinal carinae (Fig. 41); area between inner and outer propodeal projections areolate rugose; sculpture of frontal depression variable, usually with a smooth area dorsally (Fig. 40)..... *Heptascelio hamatus* Masner & Johnson, n.sp.

**Males** (unknown for *H. anthonyi*, *H. bivius*, *H. dayi*, *H. lateralis*, *H. sicarius*, *H. teres*.)

1. Hind tibia with long black bristles interspersed among short yellow setae (as in Fig. 77) .....2
- Hind tibia with only short yellow setae .....4
2. Netrion densely setose (Fig. 84); metasomal sternites longitudinally furrowed laterally (Fig. 82); felt fields on S2, S3 ..... *Heptascelio striatosternus* Narendran & Ramesh Babu
- Netrion glabrous (Figs. 12, 35); metasomal sternites smooth to punctate; felt fields on S3, S4.....3
3. Mesoscutum finely longitudinally striate throughout (Fig. 33); mandibles short, overlapping when closed, not protruding ventrally (Fig. 35) ..... *Heptascelio dispar* Masner & Johnson, n.sp.
- Mesoscutum nearly smooth, with weakly indicated microsculpture, setal bases punctate (Fig. 14); mandibles strongly protruding ventrally, apices meeting when closed, not overlapping (Figs. 12, 15, 16) .....*Heptascelio aquilinus* Masner & Johnson, n.sp.
4. Netrion densely setose (as in Figs. 22, 38, 52, 66); Asian species .....5
- Netrion glabrous (as in Figs. 5, 58, 64, 86, 94); African and Madagascar species .....8
5. Mesoscutum sparsely punctate, with wide smooth areas between punctures (Figs. 51, 67) .....6
- Mesoscutum coarsely areolate-rugose to longitudinally rugulose (Figs. 23, 39) .....7
6. Mesoscutum with delicate, shallow longitudinal impressions (Fig. 51); scutellar projections spikelike, distinct (Fig. 52).....*Heptascelio lugens* Kieffer
- Mesoscutum without longitudinal impressions, smooth between punctures (as in Fig. 67); scutellar projections short or absent (as in Fig. 66).....*Heptascelio paralugens* n.sp.
7. Posterior face of propodeum with distinct paramedian carinae extending from apex of inner propodeal projection directly to anterior margin of propodeum (Fig. 25); area between inner and outer propodeal projections smooth to striate.....*Heptascelio castor* Masner & Johnson, n.sp.
- Posterior face of propodeum without distinct paramedian carinae (Fig. 41), if carina visible arising from apex of inner propodeal projection, then it is sharply angled before reaching anterior margin of propodeum; area between inner and outer propodeal projections rugulose.....*Heptascelio hamatus* Masner & Johnson, n.sp.

8. Ventral portion of mesepisternum nearly entirely smooth, with only punctures at bases of setae; metapleuron with large medial smooth area (Figs. 58, 64) .....9
- Ventral portion of mesepisternum strongly rugulose; metapleuron entirely rugulose (Figs. 5, 86, 94) .....10
9. Mesosoma brick red (Figs. 63, 64); lateral margins of T3–4 densely punctate, margins of punctures coalescing; metapleuron "upright" in lateral view, appearing higher than long; A6–A10 strongly transverse, antenna appearing quite short..... *Heptascelio orarius* Johnson & Masner, n.sp.
- Mesosoma black (Figs. 57, 58); lateral margins of T3–T4 sparsely punctate, punctures widely separated; metapleuron anteriorly inclined so that in lateral view it appears longer than high; antenna elongate (although A6–A10 are still transverse)..... *Heptascelio noyesi* Masner & Johnson, n.sp.
10. Apical half of fore wing distinctly infusate; base of fore wing with strongly infuscated longitudinal streak below submarginal vein ..... 11
- Apical half of fore wing hyaline; base of fore wing with weakly indicated infusate line below submarginal cell..... *Heptascelio watshami* Masner & Johnson, n.sp.
11. Mesoscutellum areolate rugose, convex in lateral view; T2 and T3 evenly carinate across width .....  
.....*Heptascelio strigatus* Masner, Johnson & van Noort, n.sp.
- Mesoscutellum finely longitudinally carinate (Fig. 6); flat in lateral view (Fig. 5); T2 and T3 medially smooth..... *Heptascelio albipes* Masner, van Noort & Johnson, n.sp.

***Heptascelio albipes* Masner, van Noort & Johnson, new species**

urn:lsid:zoobank.org:act:B1E0E252-4038-4D6B-B633-B149677D7A08

urn:lsid:biosci.ohio-state.edu:osuc\_concepts:223418

Figures 1–6; Morphbank<sup>16</sup>

**Description.** Female body length: 3.2–3.3 mm (n=2). Male body length: 3.7 mm (n=1). Body color of female: entirely dark, dark brown to black. Color of female antenna: A1 dark brown, A2–A5 off-white, A6–A12 dark brown to black. Color of wing membrane: with faint brown infuscation throughout, with strong dark streak below submarginal vein. Color of legs: coxae dark brown to black, femora dark brown, legs otherwise very pale brown, nearly white. Body color of male: entirely black. Color of male antenna: brown to dark brown throughout.

Sculpture of occiput and posterior vertex: with strong transverse rugae. Sculpture of frons below ocellus in female: areolate rugose. Shape of dorsal margin of frontal scrobe: evenly arcuate, weakly produced. Sculpture of frontal depression in female: diagonally striate laterally, smooth medially. Sculpture of gena: with irregular dorsoventral rugae. Setation of gena: with short, uniform setae, with few short bristles interspersed. Shape of mandibles: normal length, crossed transversely below head when closed, tips overlapping.

Sculpture of dorsal pronotum: longitudinally strigose. Notaulus: absent or obscured by coarse surface sculpture. Sculpture of mesoscutum in female: longitudinally strigose with fine sculpture in interspaces. Sculpture of mesoscutum in male: longitudinally strigose, with strong transverse sculpture in interspaces. Parapsidal line: absent. Mesoscutellum shape: semicircular, posteriorly distinctly sloping ventrad, without distinct median longitudinal furrow. Sculpture of female mesoscutellum: longitudinally strigate. Scutellar points of female: narrow, elongate, acute. Sculpture of male mesoscutellum: longitudinally strigose. Scutellar points of male: broad, short, acute. Posterior surface of propodeum: with distinct straight longitudinal paramedian keel arising from apex of inner propodeal projection, with medial area with elongate areolae, bounded laterally by distinct paramedial carinae. Length of outer propodeal projection in female: elongate, extending near or beyond apex of T1, distinctly longer than inner propodeal projection. Sculpture of propodeum between

16. <http://www.morphbank.net/?id=224269>

inner and outer propodeal projections: largely smooth, with variably developed diagonal carinae. Netrion shape: strongly narrowed, nearly linear, foveae on surface nearly as high as wide. Netrion setation: glabrous. Sculpture of lateral pronotum posterior to epomial carina: with smooth field dorsally, elsewhere areolate rugose. Setation of posterior half of lateral pronotum: largely glabrous, setae limited to small patch near spiracle. Sculpture of mesopleural scrobe: smooth medially, elsewhere rugose. Sculpture of lower mesepisternum: rugulose to punctate. Sculpture of metapleuron: irregularly longitudinally rugose, with smooth field medially. Fore wing venation: well-developed, with R, r-rs clearly visible. Submarginal vein bristles: with dark bristles extending length of submarginal vein. Long dark bristles on legs: absent.

T1 depression: glabrous or sparsely setose. Sublateral lamella on T1: indicated as low carina. Sculpture of T2–T4: longitudinally striate, with fine cross striae, punctures, smooth or finely punctulate transverse band apically. Setation of laterotergites: very sparsely setose. Sculpture of S2, S3 of female: longitudinally rugulose laterally, nearly smooth medially, with scattered small punctures. Sculpture of S2, S3 of male: nearly smooth, with scattered setigerous punctures. Distribution of felt fields: present on S2–S3.

**Diagnosis.** *Heptascelio albipes* is similar to the cohort of African species *H. strigatus*, *H. anthonyi* and *H. watshami*. It may be distinguished from them immediately by the light-colored tarsi and fine longitudinal carinae on the mesoscutum (Figs. 1, 3).

**Etymology.** The epithet *albipes* refers to the light-colored tibiae.

**Link to Distribution Map.**<sup>17</sup>

**Material Examined.** Holotype female: **UGANDA**: Kabarole Dist., Mikana, Kibale National Park, 00°34.39'N 30°21.68'E, 1530 m, 25.V–11.VI.2004, yellow pan trap, L.F. Matos, OSUC 209195 (deposited in CNCI)<sup>18</sup>. *Paratypes*: (1 male, 2 females) **CAMEROON**: 2 females, OSUC 207747 (BMNH); OSUC 209194 (CNCI). **GABON**: 1 male, SAM-HYM-P0022499 (SAMC).

### *Heptascelio anthonyi* Masner & Johnson, new species

urn:lsid:zoobank.org:act:83D42DA4-01E5-4CA3-B145-1AFA66B045AA

urn:lsid:biosci.ohio-state.edu:osuc\_concepts:223409

Figures 7–10; Morphbank<sup>19</sup>

**Description.** Female body length: 3.4 mm (n=1). Male body length: unknown. Body color of female: entirely dark, dark brown to black. Color of female antenna: A1 brown, A2–A5 light brown, A6–A12 dark brown. Color of wing membrane: hyaline basally, infusate in apical two-thirds, streak below submarginal vein weak. Color of legs: coxae dark brown, femora largely brown, legs otherwise brownish yellow. Body color of male: unknown. Color of male antenna: unknown.

Sculpture of occiput and posterior vertex: with strong transverse rugae. Sculpture of frons below ocellus in female: areolate rugose. Shape of dorsal margin of frontal scrobe: evenly arcuate, weakly produced. Sculpture of frontal depression in female: irregularly areolate ventrally, smooth dorsally and medially. Sculpture of gena: with irregular dorsoventral rugae. Setation of gena: with short, uniform setae, with few short bristles interspersed. Shape of mandibles: normal length, crossed transversely below head when closed, tips overlapping.

Sculpture of dorsal pronotum: areolate rugose. Notaulus: absent or obscured by coarse surface sculpture. Sculpture of mesoscutum in female: longitudinally strigose, with strong transverse sculpture in interspaces. Sculpture of mesoscutum in male: unknown. Parapsidal line: absent. Mesoscutellum shape: distinctly nar-

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17. <http://atbi.biosci.ohio-state.edu/HymOnline/map-large.html?id=223418>

18. <http://zoobank.org/urn:lsid:zoobank.org:specimen:C0775940-4D04-4364-945F-10BD035D2B78>

19. <http://www.morphbank.net/?id=224268>

rowed apically, with median longitudinal depression. Sculpture of female mesoscutellum: areolate rugose. Scutellar points of female: narrow, elongate, acute. Sculpture of male mesoscutellum: unknown. Scutellar points of male: unknown. Posterior surface of propodeum: with distinct straight longitudinal paramedian keel arising from apex of inner propodeal projection. Length of outer propodeal projection in female: rather short, extending at most to midlength of T1, distinctly longer than inner propodeal projection. Sculpture of propodeum between inner and outer propodeal projections: areolate rugose. Netrion shape: strongly narrowed, nearly linear, foveae on surface nearly as high as wide. Netrion setation: glabrous. Sculpture of lateral pronotum posterior to epomial carina: with smooth field dorsally, elsewhere areolate rugose. Setation of posterior half of lateral pronotum: with numerous scattered setae, densest near spiracle. Sculpture of mesopleural scrobe: smooth. Sculpture of lower mesepisternum: rugulose to punctate. Sculpture of metapleuron: irregularly longitudinally rugose, with smooth field medially. Fore wing venation: well-developed, with R, r-rs clearly visible. Submarginal vein bristles: with dark bristles extending length of submarginal vein. Long dark bristles on legs: absent.

T1 depression: glabrous or sparsely setose. Sublateral lamella on T1: indicated as low carina. Sculpture of T2–T4: longitudinally striate, with fine cross striae, punctures, smooth or finely punctulate transverse band apically. Setation of laterotergites: very sparsely setose. Sculpture of S2, S3 of female: strongly longitudinally rugose. Sculpture of S2, S3 of male: unknown. Distribution of felt fields: present on S2–S3.

**Diagnosis.** Distinguished from the similar *H. watshami*, *H. albipes*, and *H. strigatus* by the areolate sculpture of the mesoscutum (Fig. 9).

**Etymology.** Named in recognition of the contributions to understanding of Hymenoptera diversity of the Rev. Anthony Watsham.

**Link to Distribution Map.**<sup>20</sup>

**Material Examined.** Holotype female: **ZIMBABWE**: Harare, III.1979, Malaise trap, A. Watsham, OSUC 192924 (deposited in CNCI)<sup>21</sup>.

### *Heptascelio aquilinus* Masner & Johnson, new species

urn:lsid:zoobank.org:act:8A269D1F-B707-42E7-A7E5-F23DFC62585B

urn:lsid:biosci.ohio-state.edu:osuc\_concepts:223410

Figures 11–16; Morphbank<sup>22</sup>

**Description.** Female body length: unknown. Male body length: 2.6 mm (n=1). Body color of female: unknown. Color of female antenna: unknown. Color of wing membrane: generally hyaline throughout. Color of legs: tarsi light brown, otherwise brown to dark brown throughout. Body color of male: entirely dark brown. Color of male antenna: brown to dark brown throughout.

Sculpture of occiput and posterior vertex: irregularly rugulose. Sculpture of frons below ocellus in male: transversely striate. Shape of dorsal margin of frontal scrobe: distinctly incised medially, strongly produced anteriorly. Sculpture of frontal depression in male: diagonally striate laterally, smooth medially. Sculpture of gena: with irregular, nearly longitudinal rugulae. Setation of gena: with numerous strong, erect, dark bristles amid shorter setation. Shape of mandibles: elongate, extending ventrally below head, tips meeting apically.

Sculpture of dorsal pronotum: coarsely reticulate. Notaulus: absent or obscured by coarse surface sculpture. Sculpture of mesoscutum in female: unknown. Sculpture of mesoscutum in male: sparsely punctate, largely smooth. Parapsidal line: present, clearly impressed. Mesoscutellum shape: broad, weakly convex,

20. <http://atbi.biosci.ohio-state.edu/HymOnline/map-large.html?id=223409>

21. <http://zoobank.org/urn:lsid:zoobank.org:specimen:0BE0B9B3-6E19-4F97-955E-DBAD054F2EAF>

22. <http://www.morphbank.net/?id=224267>

apex broadly rounded. Sculpture of female mesoscutellum: unknown. Scutellar points of female: unknown. Sculpture of male mesoscutellum: coarsely reticulate. Scutellar points of male: apex of mesoscutellum rounded, points entirely absent. Posterior surface of propodeum: with medial area covered by elongate areolae, bounded laterally by irregular carinae. Length of outer propodeal projection in female: unknown. Sculpture of propodeum between inner and outer propodeal projections: areolate rugose. Netrion shape: narrow, gradually widened ventrally, foveae on surface distinctly wider than high. Netrion setation: glabrous. Sculpture of lateral pronotum posterior to epomial carina: with small smooth field near posterior margin, elsewhere finely rugulose. Setation of posterior half of lateral pronotum: largely glabrous, setae limited to small patch near spiracle. Sculpture of mesopleural scrobe: finely microreticulate to smooth. Sculpture of lower mesepisternum: finely microreticulate, nearly smooth, sparsely punctate. Sculpture of metapleuron: areolate rugose. Fore wing venation: reduced to basal stub of R, with pale pseudostigma in wing disk. Submarginal vein bristles: with 1–2 dark bristles near base of fore wing. Long dark bristles on legs: present on all femora, tibiae.

T1 depression: glabrous or sparsely setose. Sublateral lamella on T1: indicated as low carina. Sculpture of T2–T4: longitudinally striate, with fine cross striae, punctures, smooth or finely punctulate transverse band apically. Setation of laterotergites: glabrous. Sculpture of S2, S3 of female: unknown. Sculpture of S2, S3 of male: irregularly longitudinally rugulose, apex of S3 nearly smooth. Distribution of felt fields: present on S3 only.

**Diagnosis.** This species is most similar to *Heptascelio dispar*. In the male sex, *H. aquilinus* may be recognized by the largely smooth mesoscutum (Fig. 14) and the tremendously elongate mandibles (Figs. 12, 15, 16).

**Etymology.** The epithet *aquilinus*, of eagles, refers to the beaklike mandibles.

**Link to Distribution Map.**<sup>23</sup>

**Material Examined.** Holotype male: **SOUTH AFRICA:** Western Cape Prov., 10 km S Clanwilliam, 32°13'39"S 18°50'50"E, 140 m, sandy hill, 5–25.X.2004, Malaise trap, M.E. Irwin, F.D. Parker, & M. Hauser, OSUC 209137 (deposited in SAMC)<sup>24</sup>.

### *Heptascelio bivius* Johnson & Masner, new species

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urn:lsid:biosci.ohio-state.edu:osuc\_concepts:223411

Figures 17–20; Morphbank<sup>25</sup>

**Description.** Female body length: 4.4 mm (n=1). Male body length: unknown. Body color of female: entirely dark, dark brown to black. Color of female antenna: brown to dark brown throughout. Color of wing membrane: with weak general brown infuscation, longitudinal dark streak below submarginal vein moderately developed. Color of legs: coxae, femora, tibiae dark brown, otherwise brown. Body color of male: unknown. Color of male antenna: unknown.

Sculpture of occiput and posterior vertex: coarsely punctate. Sculpture of frons below ocellus in female: coarsely punctate. Shape of dorsal margin of frontal scrobe: ecarinate, rounded onto dorsal portion of frons. Sculpture of frontal depression in female: entirely smooth. Sculpture of gena: coarsely punctate. Setation of gena: with short, uniform setae, with few short bristles interspersed. Shape of mandibles: normal length, crossed transversely below head when closed, tips overlapping.

Sculpture of dorsal pronotum: coarsely punctate. Notaulus: present. Sculpture of mesoscutum in female:

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23. <http://atbi.biosci.ohio-state.edu/HymOnline/map-large.html?id=223410>

24. <http://zoobank.org/urn:lsid:zoobank.org:specimen:2B536566-FE43-464F-AD69-A16430D7437B>

25. <http://www.morphbank.net/?id=224266>

midlobe coarsely punctate, lateral lobes with punctures sparser, separated by smooth areas. Sculpture of mesoscutum in male: unknown. Parapsidal line: absent. Mesoscutellum shape: broad, weakly convex, apex broadly rounded. Sculpture of female mesoscutellum: coarsely punctate. Scutellar points of female: forming short, sharp angles, not protruding. Sculpture of male mesoscutellum: unknown. Scutellar points of male: unknown. Posterior surface of propodeum: with central row of quadrate areolae above large smooth central area, bounded laterally by carinae. Length of outer propodeal projection in female: moderately elongate, not reaching midpoint of length of T1, subequal in length to inner propodeal projection. Sculpture of propodeum between inner and outer propodeal projections: areolate rugose. Netrion shape: moderately wide, weakly fusiform, with column of elongate foveae. Netrion setation: densely setose. Sculpture of lateral pronotum posterior to epomial carina: coarsely foveolate immediately behind epomial carina, elsewhere sparsely punctate. Setation of posterior half of lateral pronotum: with numerous scattered setae, densest near spiracle. Sculpture of mesopleural scrobe: coarsely punctate. Sculpture of lower mesepisternum: smooth. Sculpture of metapleuron: coarsely punctate. Fore wing venation: well-developed, with R, r-rs clearly visible. Submarginal vein bristles: absent. Long dark bristles on legs: absent.

T1 depression: moderately to densely setose. Sublateral lamella on T1: distinctly raised more or less perpendicular to T1. Sculpture of T2–T4: longitudinally striate, with fine cross striae, punctures, smooth or finely punctulate transverse band apically. Setation of laterotergites: setose. Sculpture of S2, S3 of female: longitudinally rugulose laterally, nearly smooth medially, with scattered small punctures. Sculpture of S2, S3 of male: unknown. Distribution of felt fields: present on S2–S3.

**Diagnosis.** This species is most similar to *H. dayi* with which it shares the punctate mesoscutellum. It may be distinguished by the distinct notauli on the mesoscutum (Fig. 19).

**Etymology.** The epithet *bivius*, two ways, refers to the notauli, unique for this species of *Heptascelio*.

**Link to Distribution Map.**<sup>26</sup>

**Material Examined.** Holotype female: **INDONESIA:** Papua, Nabire, S Cenderawasih Bay, 0–30 m, 2–9.VII.1962, Malaise trap, J. Sedlacek & J.L. Gressitt, OSUC 186467 (deposited in BPBM)<sup>27</sup>.

**Comments.** This specimen has been rather roughly handled over the years. When first examined, it was densely covered with moth scales which had to be removed. Therefore, we believe it possible that the absence of bristles on R is an artifact.

### *Heptascelio castor* Masner & Johnson, new species

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urn:lsid:biosci.ohio-state.edu:osuc\_concepts:223412

Figures 21–26; Morphbank<sup>28</sup>

**Description.** Female body length: 4.0–4.8 mm (n=18). Male body length: 4.2 mm (n=1). Body color of female: entirely dark, dark brown to black. Color of female antenna: dark brown to black throughout, extremities of A1, A2 lighter in color. Color of wing membrane: with weak general brown infuscation, longitudinal dark streak below submarginal vein moderately developed. Color of legs: coxae dark brown, femora largely brown, legs otherwise brownish yellow. Body color of male: head and mesosoma black, metasoma dark brown. Color of male antenna: brown.

Sculpture of occiput and posterior vertex: coarsely punctate. Sculpture of frons below ocellus in female: areolate rugose. Shape of dorsal margin of frontal scrobe: evenly arcuate, weakly produced. Sculpture of fron-

26. <http://atbi.biosci.ohio-state.edu/HymOnline/map-large.html?id=223411>

27. <http://zoobank.org/urn:lsid:zoobank.org:specimen:9A8D4ABD-AC2D-4D9B-BAA6-BF523C25637C>

28. <http://www.morphbank.net/?id=224265>

tal depression in female: transversely rugose throughout. Sculpture of gena: areolate rugose, with distinct dorsoventral tendency. Setation of gena: with short, uniform setae, with few short bristles interspersed. Shape of mandibles: normal length, crossed transversely below head when closed, tips overlapping.

Sculpture of dorsal pronotum: areolate rugose, with distinct longitudinal tendency. Notaulus: absent or obscured by coarse surface sculpture. Sculpture of mesoscutum in female: longitudinally strigose, with strong transverse sculpture in interspaces. Sculpture of mesoscutum in male: longitudinally strigose, with strong transverse sculpture in interspaces. Parapsidal line: absent. Mesoscutellum shape: nearly parallel-sided, apex weakly excavate, with weak median longitudinal impression. Sculpture of female mesoscutellum: areolate rugose. Scutellar points of female: forming short, acute teeth. Sculpture of male mesoscutellum: areolate rugose. Scutellar points of male: narrow, short, acute. Posterior surface of propodeum: with distinct straight longitudinal paramedian keel arising from apex of inner propodeal projection. Length of outer propodeal projection in female: moderately elongate, not reaching midpoint of length of T1, subequal in length to inner propodeal projection. Sculpture of propodeum between inner and outer propodeal projections: largely smooth, with variably developed diagonal carinae. Netrion shape: moderately wide, nearly parallel-sided, weakly widened ventrally, with single column of large foveae. Netrion setation: densely setose. Sculpture of lateral pronotum posterior to epomial carina: coarsely rugulose throughout. Setation of posterior half of lateral pronotum: with numerous scattered setae, densest near spiracle. Sculpture of mesopleural scrobe: smooth. Sculpture of lower mesepisternum: rugulose to punctate. Sculpture of metapleuron: with smooth field in posteroventral quadrant, elsewhere areolate rugose. Fore wing venation: well-developed, with R, r-rs clearly visible. Submarginal vein bristles: with dark bristles extending length of submarginal vein. Long dark bristles on legs: absent.

T1 depression: moderately to densely setose. Sublateral lamella on T1: distinctly raised more or less perpendicular to T1. Sculpture of T2–T4: longitudinally striate, with fine cross striae, punctures, smooth or finely punctulate transverse band apically. Setation of laterotergites: setose. Sculpture of S2, S3 of female: strongly longitudinally rugose. Sculpture of S2, S3 of male: Distribution of felt fields: present on S2–S3.

**Diagnosis.** Most similar to specimens of *Heptascelio hamatus* having the frontal depression entirely sculptured (as in Fig. 42). *Heptascelio castor* may be distinguished by the well-developed and straight paramedial carinae on the propodeum and the striate sculpture between the medial and outer propodeal projections (Fig. 25).

**Etymology.** Named for one of the classical twins, because of its similarity to some specimens now placed in *H. hamatus*.

**Link to Distribution Map.**<sup>29</sup>

**Material Examined.** Holotype female: **MALAYSIA:** SE Sabah, nr. Danum Valley Field Centre, ~150 m, W0N0 / MT 5, 19.III–19.IV.1988, Malaise trap, C. van Achterberg & T. Burghouts, OSUC 186273 (deposited in CNCI)<sup>30</sup>. *Paratypes* (1 male, 24 females): **INDONESIA:** 3 females, OSUC 186278, 186279 (CNCI); OSUC 210352 (ROME). **MALAYSIA:** 1 male, 21 females, OSUC 202796 (AEIC); OSUC 207738–207742 (BMNH); OSUC 210296 (BPBM); OSUC 186269–186273, 186274–186277, 209032, 209203–209207 (CNCI).

### *Heptascelio dayi* Masner & Johnson, new species

urn:lsid:zoobank.org:act:40CC8C9E-FF3D-451C-801B-B4473BF2ED15

urn:lsid:biosci.ohio-state.edu:osuc\_concepts:223413

Figures 27–30; Morphbank<sup>31</sup>

29. <http://atbi.biosci.ohio-state.edu/HymOnline/map-large.html?id=223412>

30. <http://zoobank.org/urn:lsid:zoobank.org:specimen:530D4302-EE0D-4017-A5B3-7CB8F369AA3C>

**Description.** Female body length: 4.1 mm (n=1). Male body length: unknown. Body color of female: entirely dark, dark brown to black. Color of female antenna: dark brown to black throughout. Color of wing membrane: with faint brown infuscation throughout, with strong dark streak below submarginal vein. Color of legs: coxae dark brown to black, legs otherwise brown to dark brown. Body color of male: unknown. Color of male antenna: unknown. Sculpture of occiput and posterior vertex: coarsely punctate. Sculpture of frons below ocellus in female: coarsely punctate. Shape of dorsal margin of frontal scrobe: ecarinate, rounded onto dorsal portion of frons. Sculpture of frontal depression in female: coarsely punctate ventrally and laterally, otherwise smooth. Sculpture of gena: coarsely punctate. Setation of gena: with short, uniform setae, without bristles. Shape of mandibles: normal length, crossed transversely below head when closed, tips overlapping.

Sculpture of dorsal pronotum: coarsely punctate. Notaulus: absent or obscured by coarse surface sculpture. Sculpture of mesoscutum in female: sparsely punctate, with broad smooth areas between punctures. Sculpture of mesoscutum in male: unknown. Parapsidal line: absent. Mesoscutellum shape: nearly parallel-sided, apex weakly excavate, with weak median longitudinal impression. Sculpture of female mesoscutellum: coarsely punctate. Scutellar points of female: forming short, sharp angles, not protruding. Sculpture of male mesoscutellum: unknown. Scutellar points of male: unknown. Posterior surface of propodeum: irregularly areolate, without distinct paramedian keel. Length of outer propodeal projection in female: moderately elongate, not reaching midpoint of length of T1, subequal in length to inner propodeal projection. Sculpture of propodeum between inner and outer propodeal projections: coarsely punctate. Netrion shape: moderately wide, nearly parallel-sided, with two columns of large punctures. Netrion setation: densely setose. Sculpture of lateral pronotum posterior to epomial carina: coarsely punctate. Setation of posterior half of lateral pronotum: with numerous scattered setae, densest near spiracle. Sculpture of mesopleural scrobe: smooth. Sculpture of lower mesepisternum: with distinctly separated, coarse punctures. Sculpture of metapleuron: coarsely punctate. Fore wing venation: well-developed, with R, r-rs clearly visible. Submarginal vein bristles: with dark bristles in basal half of submarginal vein. Long dark bristles on legs: absent.

T1 depression: moderately to densely setose. Sublateral lamella on T1: distinctly raised more or less perpendicular to T1. Sculpture of T2–T4: longitudinally striate, with fine cross striae, punctures, smooth or finely punctulate transverse band apically. Setation of laterotergites: setose. Sculpture of S2, S3 of female: strongly longitudinally rugose. Sculpture of S2, S3 of male: unknown. Distribution of felt fields: present on S2–S3.

**Diagnosis.** *Heptascelio dayi* is most similar to the cluster of species *H. bivius*, *H. lugens* and *H. paralu-gens*. It is distinguished by the lack of notauli and the punctured, not areolate, mesoscutellum (Fig. 29).

**Etymology.** Named for the collector, Mick Day.

**Link to Distribution Map.**<sup>32</sup>

**Material Examined.** Holotype female: **INDONESIA**: Seram, Maluku, Solea, *Uncaria*, VIII.1987, Mal-aise trap, M.C. Day, OSUC 209138 (deposited in BMNH)<sup>33</sup>.

### ***Heptascelio dispar* Masner & Johnson, new species**

urn:lsid:zoobank.org:act:788F2AC2-1C41-4763-89FB-7440C5594986

urn:lsid:biosci.ohio-state.edu:osuc\_concepts:223414

Figures 31–36; Morphbank<sup>34</sup>

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31. <http://www.morphbank.net/?id=224264>

32. <http://atbi.biosci.ohio-state.edu/HymOnline/map-large.html?id=223413>

33. <http://zoobank.org/urn:lsid:zoobank.org:specimen:95727A55-C5E5-4607-B828-124F5C982E96>

34. <http://www.morphbank.net/?id=224263>

**Description.** Female body length: 2.4–3.0 mm (n=20). Male body length: 2.4–2.9 mm (n=20). Body color of female: bicolored: head and mesosoma dark brown, metasoma yellow. Color of female antenna: A1–A2 pale brown, A3–A6 brown, A7–A12 dark brown. Color of wing membrane: generally hyaline throughout. Color of legs: coxae and femora dark brown, tibiae and tarsi yellow. Body color of male: entirely dark brown. Color of male antenna: light brown throughout.

Sculpture of occiput and posterior vertex: with strong transverse rugae. Sculpture of frons below ocellus in female: dorsoventrally striate. Shape of dorsal margin of frontal scrobe: distinctly incised medially, strongly produced anteriorly. Sculpture of frontal depression in female: transversely striate ventrally, with smooth field dorsomedially. Sculpture of gena: with irregular dorsoventral rugae. Setation of gena: with numerous strong, erect, dark bristles amid shorter setation. Shape of mandibles: normal length, crossed transversely below head when closed, tips overlapping.

Sculpture of dorsal pronotum: longitudinally aciculate, with smooth interspaces. Notaulus: absent or obscured by coarse surface sculpture. Sculpture of mesoscutum in female: finely longitudinally aciculate with smooth interspaces. Sculpture of mesoscutum in male: finely longitudinally aciculate. Parapsidal line: absent. Mesoscutellum shape: Sculpture of female mesoscutellum: coarsely reticulate, with distinct longitudinal elements. Scutellar points of female: flattened, broadly rounded apically. Sculpture of male mesoscutellum: coarsely reticulate, with distinct longitudinal elements. Scutellar points of male: apex of mesoscutellum transverse, posterolateral corners very weakly produced. Posterior surface of propodeum: with distinct straight longitudinal paramedian keel arising from apex of inner propodeal projection. Length of outer propodeal projection in female: rather short, extending at most to midlength of T1, distinctly longer than inner propodeal projection. Sculpture of propodeum between inner and outer propodeal projections: areolate rugose. Netrion shape: strongly narrowed, nearly linear, foveae on surface nearly as high as wide. Netrion setation: glabrous. Sculpture of lateral pronotum posterior to epomial carina: with large smooth field dorsally, elsewhere finely rugulose. Setation of posterior half of lateral pronotum: largely glabrous, setae limited to small patch near spiracle. Sculpture of mesopleural scrobe: finely microreticulate to smooth. Sculpture of lower mesepisternum: rugulose to punctate. Sculpture of metapleuron: areolate rugose above, with smooth or finely sculptured field ventrally. Fore wing venation: reduced to basal stub of R, with pale pseudostigma in wing disk. Submarginal vein bristles: with 1–2 dark bristles near base of fore wing. Long dark bristles on legs: present on all femora, tibiae.

T1 depression: glabrous or sparsely setose. Sublateral lamella on T1: absent. Sculpture of T2–T4: longitudinally striate, with fine cross striae, punctures, smooth or finely punctulate transverse band apically. Setation of laterotergites: glabrous. Sculpture of S2, S3 of female: nearly smooth, with scattered small punctures. Sculpture of S2, S3 of male: nearly smooth, with scattered setigerous punctures. Distribution of felt fields: present on S3–S4.

**Diagnosis.** *Heptascelio dispar* shares the strongly notched dorsal margin of the scrobe only with *H. aquilinus*, a species known so far only from the male sex. Males of the former may be distinguished by the finely striate mesoscutum (Fig. 36) and the short, normal mandibles (Fig. 35). Females of *H. dispar* may be distinguished from all other *Heptascelio* by the bicolored body (Figs. 31–33).

**Etymology.** The epithet *dispar*, meaning unlike or different, is meant to stress the many characters in which this species differs from our previous concept of the genus based on the type species *H. lugens*.

**Link to Distribution Map.**<sup>35</sup>

**Material Examined.** Holotype female: **BOTSWANA:** Serowe, Farmer's Brigade, V.1989, Malaise trap, P. Forchhammer, OSUC 164363 (deposited in USNM)<sup>36</sup>. *Paratypes* (54 males, 57 females): **BOTSWANA:** 11 males, 22 females, OSUC 209126–209136 (CNCI); OSUC 156981, 156982 (EMEC); OSUC 164247–

35. <http://atbi.biosci.ohio-state.edu/HymOnline/map-large.html?id=223414>

36. <http://zoobank.org/urn:lsid:zoobank.org:specimen:4CF3C43D-C431-4B53-A270-E59C87331D2C>

164250, 164267, 164364–164370, 164430, 185691, 210366 (OSUC); OSUC 186111–186114 (USNM). **NAMIBIA:** 2 males, OSUC 207745–207746 (BMNH). **SOUTH AFRICA:** 41 males, 36 females, OSUC 209053–209096, 209098–209125 (CNCI); OSUC 179110, 59558, 59559 (OSUC); OSUC 174727, 210365 (PPRI).

**Comments.** This species and the closely related *H. aquilinus*, are very unusual in many respects. *Heptascelio dispar* is the only known species in which the female is bicolored, having a dark brown head and mesosoma, and a yellow metasoma (Figs. 31–33). The male, in contrast, is uniformly dark brown (Figs. 35, 36). In both species the dorsal margin of the frontal depression is deeply indented. Some other species, particularly among the males, have a suggestion of this condition in that the dorsolateral portions of the margin of the depression are produced anteriorly. The felt fields in these two species are well developed, but are found on S3 and S4, one segment posterior to the condition in all other species of the genus. The fore wing venation is abbreviated, and the number of dark bristles on R are similarly reduced. The presence of long dark bristles on the legs is shared with a two other species, *H. striatosternus* (Fig. 77) and *H. orarius*. These characters, along with the very different general habitus of these species suggests that they are not particularly closely related to the remaining *Heptascelio* species.

***Heptascelio hamatus* Masner & Johnson, new species**

urn:lsid:zoobank.org:act:950F63A6-7258-448D-8905-6A7A9C4594D6

urn:lsid:biosci.ohio-state.edu:osuc\_concepts:223416

Figures 37–42; Morphbank<sup>37</sup>

**Description.** Length: 3.5–4.8 mm (n=20). Male body length: 3.7–4.6 mm (n=16). Body color of female: entirely dark, dark brown to black. Color of female antenna: dark brown to black throughout, extremities of A1, A2 lighter in color. Color of wing membrane: with weak general brown infuscation, longitudinal dark streak below submarginal vein moderately developed. Color of legs: tarsi light brown, otherwise brown to dark brown throughout, or coxae dark brown, otherwise yellowish brown throughout. Body color of male: entirely black, or with head and mesosoma black, metasoma dark brown. Color of male antenna: brown to dark brown throughout.

Sculpture of occiput and posterior vertex: areolate-rugose. Sculpture of frons below ocellus in female: areolate rugose. Shape of dorsal margin of frontal scrobe: evenly arcuate, weakly produced. Sculpture of frontal depression in female: variable, transversely striate ventrally, with smooth field dorsomedially, or entirely smooth, or irregularly areolate ventrally, smooth dorsally and medially, or coarsely punctate. Sculpture of gena: with irregular dorsoventral rugae. Setation of gena: with short, uniform setae, with few short bristles interspersed. Shape of mandibles: normal length, crossed transversely below head when closed, tips overlapping.

Sculpture of dorsal pronotum: areolate rugose. Notaulus: absent or obscured by coarse surface sculpture. Sculpture of mesoscutum in female: coarsely areolate-rugose. Sculpture of mesoscutum in male: coarsely areolate rugose. Parapsidal line: absent. Mesoscutellum shape: roughly trapezoidal, sides weakly converging apically, apex excavate, with distinct median longitudinal furrow. Sculpture of female mesoscutellum: areolate rugose. Scutellar points of female: broad, short, acute, or forming short, acute teeth. Sculpture of male mesoscutellum: areolate rugose. Scutellar points of male: narrow to broad, short, acute. Posterior surface of propodeum: irregularly areolate, without distinct paramedian keel. Length of outer propodeal projection in female: moderately elongate, not reaching midpoint of length of T1, subequal in length to inner propodeal projection. Sculpture of propodeum between inner and outer propodeal projections: areolate rugose or coarsely punctate.

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37. <http://www.morphbank.net/?id=224262>

Netrion shape: moderately wide, nearly parallel-sided, weakly widened ventrally, with single column of large foveae. Netrion setation: densely setose. Sculpture of lateral pronotum posterior to epomial carina: coarsely punctate or coarsely rugulose throughout. Setation of posterior half of lateral pronotum: with numerous scattered setae, densest near spiracle. Sculpture of mesopleural scrobe: smooth or coarsely areolate to rugose. Sculpture of lower mesepisternum: rugulose to punctate. Sculpture of metapleuron: areolate rugose, sometimes with smooth or finely sculptured field ventrally. Fore wing venation: well-developed, with R, r-rs clearly visible. Submarginal vein bristles: with dark bristles extending length of submarginal vein. Long dark bristles on legs: absent, or present on hind femur only.

T1 depression: moderately to densely setose. Sublateral lamella on T1: distinctly raised more or less perpendicular to T1. Sculpture of T2–T4: longitudinally striate, with fine cross striae, punctures, smooth or finely punctulate transverse band apically. Setation of laterotergites: setose. Sculpture of S2, S3 of female: strongly longitudinally rugose. Sculpture of S2, S3 of male: longitudinal rugulae largely effaced, strongest laterally, otherwise smooth with scattered setigerous punctures, or S2, S3 strongly longitudinally rugose throughout. Distribution of felt fields: present on S2–S3.

**Diagnosis.** *Heptascelio hamatus* is most similar to *H. castor* and may be distinguished from it by the coarsely areolate sculpture of the dorsal surface of the propodeum and the absence of straight paramedian carina on the propodeum extending from the apex of the inner propodeal projection to the metanotum (Fig. 41). Additionally, most female specimens of *H. hamatus* may be distinguished by the presence of a small smooth field in the dorsal portion of the frontal depression (Fig. 40).

**Etymology.** The epithet *hamatus*, meaning “furnished with a hook”, refers to the outer propodeal projections.

#### Link to Distribution Map.<sup>38</sup>

**Material Examined.** Holotype female: **THAILAND:** Phetchabun Prov., Nam Nao National Park, 16°43.156'N 101°35.118'E, 890 m, T272, helicopter landing ground, 10–17.VII.2006, Malaise trap, N. Hongyothi & L. Janteab, OSUC 179129 (deposited in QSBG)<sup>39</sup>. **Paratypes** (29 males, 226 females): **INDONESIA:** 1 male, 38 females, OSUC 186280–186289, 209025–209030, 209033, 209052 (CNCI); OSUC 186290–186293, 186149, 188472, 207583–207584, 207694, 209020–209024, 215535–215540, ROMEnt 234, ROMEnt 112076 (ROME). **LAOS:** 5 males, 5 females, OSUC 210308–210317 (BPBM). **MALAYSIA:** 4 females, OSUC 210295 (BPBM); OSUC 209031, 209034, 209036 (CNCI). **TAIWAN:** 1 female, OSUC 209035 (CNCI). **THAILAND:** 23 males, 158 females, OSUC 210297–210300 (BPBM); OSUC 209014–209019, 209038–209051 (CNCI); OSUC 179103, 179104, 179106, 179108, 179126–179128, 179464–179466, 179473–179475, 186115, 186137, 186140, 186143, 186147, 186148, 186463–186465, 192412, 207587, 207682–207689, 207692, 207695–207703, 207724–207732, 210324–210333, 210372–210385, 210390–210400, 58009 (OSUC); OSUC 179097, 179105, 179107, 179467–179472, 179476–179480, 186116, 186138, 186139, 186141, 186142, 186144–186146, 207585, 207586, 207661–207680, 207704–207723, 210319–210323, 218876 (QSBG). **VIETNAM:** 20 females, OSUC 186468, 186469, 210301–210303, 210305–210307 (BPBM); OSUC 209037 (CNCI); OSUC 210334–210335, ROMEnt 20274–20282 (ROME).

**Comments.** This species is widespread in southeast Asia, extending east to Sulawesi and north to Taiwan. Some specimens have the frons completely sculptured, similar to *H. castor*. Initially, we had separated this as a distinct species, but the sculpture of the mainland specimens and of the males is quite variable and the limits of the sculpture (when there is a smooth area) are poorly defined. Therefore, we are here grouping all of those specimens into the single species *H. hamatus*. Specimens from western Thailand (Chiang Mai) are generally more gracile than those from other regions. Additional variability is seen in the development of the longitudinal furrow on the mesoscutellum and the setation of the postgena.

38. <http://atbi.biosci.ohio-state.edu/HymOnline/map-large.html?id=223416>

39. <http://zoobank.org/urn:lsid:zoobank.org:specimen:14B4903E-F828-4E8F-949E-76319E4C5E6D>

***Heptascelio lateralis* Johnson, van Noort & Masner, new species**

urn:lsid:zoobank.org:act:1E8B4F99-C2A4-4F03-A30D-6C7B5B39DFF5

urn:lsid:biosci.ohio-state.edu:osuc\_concepts:223417

Figures 43–46; Morphbank<sup>40</sup>

**Description.** Female body length: 3.9–4.0 mm (n=2). Male body length: unknown. Body color of female: entirely dark, dark brown to black. Color of female antenna: A1 brownish yellow, A2–A5 yellow, A6–A12 dark brown to black. Color of wing membrane: hyaline basally, infusate in apical two-thirds, streak below submarginal vein weak. Color of legs: coxae dark brown, femora largely brown, legs otherwise brownish yellow. Body color of male: unknown. Color of male antenna: unknown. Sculpture of occiput and posterior vertex: areolate-rugose. Sculpture of frons below ocellus in female: areolate rugose. Shape of dorsal margin of frontal scrobe: evenly arcuate, weakly produced. Sculpture of frontal depression in female: with short transverse striae on sides, medially entirely smooth. Sculpture of gena: areolate rugose, with distinct dorsoventral tendency. Setation of gena: with short, uniform setae, with few short bristles interspersed. Shape of mandibles: normal length, crossed transversely below head when closed, tips overlapping.

Sculpture of dorsal pronotum: areolate rugose, with distinct longitudinal tendency. Notaulus: absent or obscured by coarse surface sculpture. Sculpture of mesoscutum in female: coarsely areolate-rugose. Sculpture of mesoscutum in male: unknown. Parapsidal line: absent. Mesoscutellum shape: roughly semicircular, with distinct median longitudinal impression in apical half. Sculpture of female mesoscutellum: areolate rugose. Scutellar points of female: absent, mesoscutellum with rounded lobes laterally. Sculpture of male mesoscutellum: unknown. Scutellar points of male: unknown. Posterior surface of propodeum: with medial area covered by elongate areolae, bounded laterally by irregular carinae, with sinuous paramedian keel arising from apex of inner propodeal projection. Length of outer propodeal projection in female: moderately elongate, extending to midpoint of length of T1, distinctly longer than inner propodeal projection. Sculpture of propodeum between inner and outer propodeal projections: areolate rugose. Netrion shape: moderately wide, nearly parallel-sided, weakly widened ventrally, with single column of large foveae. Netrion setation: glabrous. Sculpture of lateral pronotum posterior to epomial carina: with smooth field dorsally, elsewhere areolate rugose. Setation of posterior half of lateral pronotum: with numerous scattered setae, densest near spiracle. Sculpture of mesopleural scrobe: finely microreticulate to smooth. Sculpture of lower mesepisternum: rugulose to punctate. Sculpture of metapleuron: areolate rugose. Fore wing venation: well-developed, with R, r-rs clearly visible. Submarginal vein bristles: with dark bristles extending length of submarginal vein. Long dark bristles on legs: absent.

T1 depression: glabrous or sparsely setose. Sublateral lamella on T1: absent. Sculpture of T2–T4: longitudinally striate, with fine cross striae, punctures, smooth or finely punctulate transverse band apically. Setation of laterotergites: setose. Sculpture of S2, S3 of female: longitudinally rugulose laterally, nearly smooth medially, with scattered small punctures. Sculpture of S2, S3 of male: unknown. Distribution of felt fields: present on S2–S3.

**Diagnosis.** This species is similar to *H. sicarius*, *H. teres* and the males of *H. aquilinus* and *H. dispar* in having the posterior scutellum with two broadly rounded lobes, i.e., without spines (Fig. 45). It may be distinguished from *H. aquilinus* and *H. dispar* by the rounded dorsal margin of the frontal depression (Fig. 46), the lack of black bristles on the legs (Fig. 43), and the well-developed fore wing venation. *Heptascelio lateralis* may be separated from *H. sicarius* and *H. teres* by the coarse areolate rugose sculpture of the mesoscutum (Fig. 45) and the dark-colored legs (Figs. 43, 44).

**Etymology.** The epithet *lateralis*, Latin for “of the side” is intended to draw attention to the lack of a lamella on the side of T1.

**Link to Distribution Map.**<sup>41</sup>

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40. <http://www.morphbank.net/?id=224261>

**Material Examined.** Holotype female: **CENTRAL AFRICAN REPUBLIC:** Sangha-Mbaéré Préf., Dzanga-Ndoki National Park, 02°21.60'N 16°03.20'E, 350 m, CAR01-M179, lowland rainforest, 38.6 km 173E S Lidjombo, 22–23.V.2001, Malaise trap, S. van Noort, OSUC 186117 (deposited in SAMC)<sup>42</sup>. *Paratype:* **GABON:** 1 female, SAM-HYM-P0022706 (SAMC).

***Heptascelio lugens* Kieffer**

urn:lsid:zoobank.org:act:8D9935C2-66D7-4A34-83D2-6F315945A951

urn:lsid:biosci.ohio-state.edu:osuc\_concepts:4542

Figures 47–52; Morphbank<sup>43</sup>

*Heptascelio lugens* Kieffer, 1916: 58 (original description); Kieffer, 1926: 345 (description); Masner, 1976: 16 (type information); Narendran & Ramesh Babu, 1996: 89, 90 (description, keyed).

**Description.** Female body length: 4.4–4.6 mm (n=4). Male body length: 4.1 mm (n=1). Body color of female: entirely dark, dark brown to black. Color of female antenna: dark brown to black throughout, extremities of A1, A2 lighter in color. Color of wing membrane: with weak general brown infuscation, longitudinal streak below submarginal vein weak. Color of legs: coxae dark brown, femora largely brown, legs otherwise brownish yellow. Body color of male: entirely black. Color of male antenna: brown to dark brown throughout.

Sculpture of occiput and posterior vertex: coarsely punctate. Sculpture of frons below ocellus in female: coarsely punctate. Shape of dorsal margin of frontal scrobe: evenly arcuate, weakly produced. Sculpture of frontal depression in female: coarsely punctate ventrally and laterally, otherwise smooth. Sculpture of gena: areolate rugose, with distinct dorsoventral tendency. Setation of gena: with short, uniform setae, with few short bristles interspersed. Shape of mandibles: normal length, crossed transversely below head when closed, tips overlapping.

Sculpture of dorsal pronotum: longitudinally strigose. Notaulus: absent or obscured by coarse surface sculpture. Sculpture of mesoscutum in female: sparsely punctate, with broad smooth areas between punctures, with weak indications of longitudinal rugulae. Sculpture of mesoscutum in male: sparsely punctate, with broad smooth areas between punctures, with weak indications of longitudinal rugulae. Parapsidal line: present, clearly impressed. Mesoscutellum shape: nearly parallel-sided, apex weakly excavate, with weak median longitudinal impression. Sculpture of female mesoscutellum: areolate rugose. Scutellar points of female: moderately elongate, narrow, acute, curving medially. Sculpture of male mesoscutellum: areolate rugose. Scutellar points of male: narrow, short, acute. Posterior surface of propodeum: irregularly areolate, without distinct paramedian keel. Length of outer propodeal projection in female: moderately elongate, extending to midpoint of length of T1, distinctly longer than inner propodeal projection. Sculpture of propodeum between inner and outer propodeal projections: areolate rugose. Netrion shape: moderately wide, parallel-sided in ventral half, open, moderately wide, weakly fusiform, with column of elongate foveae. Netrion setation: densely setose. Sculpture of lateral pronotum posterior to epomial carina: coarsely sculptured, coarsely rugulose throughout. Setation of posterior half of lateral pronotum: with numerous scattered setae, densest near spiracle. Sculpture of mesopleural scrobe: smooth. Sculpture of lower mesepisternum: rugulose to punctate. Sculpture of metapleuron: areolate rugose above, with smooth or finely sculptured field ventrally. Fore wing venation: well-developed, with R, r-rs clearly visible. Submarginal vein bristles: with dark bristles extending length of submarginal vein. Long dark bristles on legs: absent.

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41. <http://atbi.biosci.ohio-state.edu/HymOnline/map-large.html?id=223417>

42. <http://zoobank.org/urn:lsid:zoobank.org:specimen:C5B27CC2-B26A-45EA-A18B-38B1DB8E34A2>

43. <http://www.morphbank.net/?id=224260>

T1 depression: moderately to densely setose. Sublateral lamella on T1: distinctly raised more or less perpendicular to T1. Sculpture of T2–T4: longitudinally striate, with fine cross striae, punctures, smooth or finely punctulate transverse band apically. Setation of laterotergites: setose. Sculpture of S2, S3 of female: strongly longitudinally rugose. Sculpture of S2, S3 of male: strongly longitudinally rugose. Distribution of felt fields: present on S2–S3.

**Diagnosis.** *Heptascelio lugens* is similar to *H. paralugens*, *H. dayi*, and *H. bivius*, and may be distinguished by the sparsely punctate and weakly rugulose mesoscutum, absence of notauli, and punctate mesoscutellum (Figs. 49, 51).

**Link to Distribution Map.**<sup>44</sup>

**Material Examined.** Holotype male: **PHILIPPINES:** Luzon, Mt. Makiling, Baker, Type No. 70486 (USNM)<sup>45</sup>. *Other material.* **PHILIPPINES:** 4 females, OSUC 209008–209011 (CNCI).

**Comments.** Masner (1976) noted that the holotype (Figs. 51, 52) is a male, not a female as reported in the original description (Kieffer 1916).

### *Heptascelio noyesi* Masner & Johnson, new species

urn:lsid:zoobank.org:act:297F3094-2321-47DF-804A-89E582AE6B50

urn:lsid:biosci.ohio-state.edu:osuc\_concepts:223419

Figures 53–58; Morphbank<sup>46</sup>

**Description.** Female body length: 3.6–4.3 mm (n=13). Male body length: 3.3–3.8 mm (n=14). Body color of female: entirely dark, dark brown to black. Color of female antenna: dark brown to black throughout. Color of wing membrane: moderately infusate throughout, streak below submarginal vein darkly pigmented. Color of legs: coxae dark brown, femora largely brown, legs otherwise brownish yellow. Body color of male: entirely black, head and mesosoma black, metasoma dark brown. Color of male antenna: brown.

Sculpture of occiput and posterior vertex: areolate-rugose, with strong arched rugae. Sculpture of frons below ocellus in female: dorsoventrally striate. Shape of dorsal margin of frontal scrobe: evenly arcuate, weakly produced. Sculpture of frontal depression in female: entirely smooth. Sculpture of gena: with irregular dorsoventral rugae. Setation of gena: with short, uniform setae, with few short bristles interspersed. Shape of mandibles: normal length, crossed transversely below head when closed, tips overlapping.

Sculpture of dorsal pronotum: longitudinally strigose. Notaulus: absent or obscured by coarse surface sculpture. Sculpture of mesoscutum in female: coarsely longitudinally strigose with smooth interspaces. Sculpture of mesoscutum in male: coarsely areolate rugose with distinct longitudinal tendency. Parapsidal line: present, clearly impressed. Mesoscutellum shape: roughly trapezoidal, sides converging apically, apex weakly excavate, without distinct median longitudinal impression. Sculpture of female mesoscutellum: coarsely reticulate, with distinct longitudinal elements. Scutellar points of female: forming short, acute teeth. Sculpture of male mesoscutellum: areolate rugose. Scutellar points of male: narrow, short, acute. Posterior surface of propodeum: with distinct straight longitudinal paramedian keel arising from apex of inner propodeal projection. Length of outer propodeal projection in female: elongate, extending near or beyond apex of T1, distinctly longer than inner propodeal projection. Sculpture of propodeum between inner and outer propodeal projections: areolate rugose, with distinct longitudinal tendency. Netrion shape: strongly narrowed, nearly linear, foveae on surface nearly as high as wide. Netrion setation: glabrous. Sculpture of lateral pronotum posterior to epomial carina: smooth. Setation of posterior half of lateral pronotum: largely glabrous, setae

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44. <http://atbi.biosci.ohio-state.edu/HymOnline/map-large.html?id=4542>

45. <http://zoobank.org/urn:lsid:zoobank.org:specimen:1779B27F-F144-4A32-9494-2B9C3DBB6E7C>

46. <http://www.morphbank.net/?id=224259>

limited to small patch near spiracle. Sculpture of mesopleural scrobe: smooth. Sculpture of lower mesepisternum: smooth. Sculpture of metapleuron: largely smooth. Fore wing venation: well-developed, with R, r-rs clearly visible. Submarginal vein bristles: with dark bristles extending length of submarginal vein. Long dark bristles on legs: absent.

T1 depression: glabrous or sparsely setose. Sublateral lamella on T1: indicated as low carina. Sculpture of T2–T4: longitudinally striate with cross striae laterally, sculpture effaced medially. Setation of laterotergites: setose. Sculpture of S2, S3 of female: nearly smooth, with scattered small punctures. Sculpture of S2, S3 of male: nearly smooth, with scattered setigerous punctures. Distribution of felt fields: present on S2–S3.

**Diagnosis.** *Heptascelio noyesi* is restricted to Madagascar. In that fauna it is most similar to *H. orarius*, from which it may be distinguished by the strigose sculpture of the mesonotum (Figs. 55, 57). From the mainland species *H. watshami*, *H. anthonyi*, *H. albipes* and *H. strigatus* it may be distinguished by the loss of the coarse sculpture on the ventral portion of the mesopleuron, large parts of the metapleuron (Figs. 54, 58), and the frontal depression (Fig. 56).

**Etymology.** This species is named after John S. Noyes in recognition of his contributions to understanding the diversity of Hymenoptera.

**Link to Distribution Map.**<sup>47</sup>

**Material Examined.** Holotype female: **MADAGASCAR:** Fianarantsoa Auto. Prov., Ranomafana National Park, 21.2554°S 47.4552°E, 1150 m, near river in tropical forest, 12–21.XII.1999, Malaise trap, M.E. Irwin & E.I. Schlinger, OSUC 146658 (deposited in CASC)<sup>48</sup>. *Paratypes:* **MADAGASCAR:** 15 males, 13 females, CASENT 2042822, 2042823, 2042825, 2042834, 2042838, 2042858, 2042859, 2042863, 2042869, 2042995, 2043700, 2043722, 2132740 (CASC); OSUC 179098, 209196–209202 (CNCI); CASENT 2042835, OSUC 186118–186123, CASENT 2133392–2133393 (OSUC).

### ***Heptascelio orarius* Johnson & Masner, new species**

urn:lsid:zoobank.org:act:9D61BC46-BCF0-4477-8E1F-39E057C7CB78

urn:lsid:biosci.ohio-state.edu:osuc\_concepts:223420

Figures 59–64; Morphbank<sup>49</sup>

**Description.** Female body length: 3.2–3.3 mm (n=2). Male body length: 2.3–2.7 mm (n=2). Body color of female: entirely dark, dark brown to black. Color of female antenna: brown to dark brown throughout. Color of wing membrane: with weak general brown infuscation, longitudinal dark streak below submarginal vein moderately developed. Color of legs: coxae and femora brown, elsewhere light brown. Body color of male: head and metasoma black, mesosoma reddish brown. Color of male antenna: A1–A5 brown, A6–A12 pale brown.

Sculpture of occiput and posterior vertex: areolate-rugose. Sculpture of frons below ocellus in female: areolate rugose. Shape of dorsal margin of frontal scrobe: evenly arcuate, weakly produced. Sculpture of frontal depression in female: entirely smooth. Sculpture of gena: with irregular dorsoventral rugae. Setation of gena: with short, uniform setae, with few short bristles interspersed. Shape of mandibles: normal length, crossed transversely below head when closed, tips overlapping.

Sculpture of dorsal pronotum: areolate rugose. Notaulus: absent or obscured by coarse surface sculpture. Sculpture of mesoscutum in female: coarsely areolate-rugose. Sculpture of mesoscutum in male: unknown. Parapsidal line: absent. Mesoscutellum shape: roughly trapezoidal, sides converging apically, apex weakly

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47. <http://atbi.biosci.ohio-state.edu/HymOnline/map-large.html?id=223419>

48. <http://zoobank.org/urn:lsid:zoobank.org:specimen:46D64E74-A434-4C59-AC42-8A34BBF4A8C1>

49. <http://www.morphbank.net/?id=224258>

excavate, without distinct median longitudinal impression. Sculpture of female mesoscutellum: coarsely punctate. Scutellar points of female: forming short, acute teeth. Sculpture of male mesoscutellum: areolate rugose. Scutellar points of male: flattened, broadly rounded apically. Posterior surface of propodeum: irregularly areolate, without distinct paramedian keel. Length of outer propodeal projection in female: elongate, extending near or beyond apex of T1, distinctly longer than inner propodeal projection. Sculpture of propodeum between inner and outer propodeal projections: areolate rugose. Netrion shape: moderately wide, nearly parallel-sided, weakly widened ventrally, with single column of large foveae. Netrion setation: glabrous. Sculpture of lateral pronotum posterior to epomial carina: smooth. Setation of posterior half of lateral pronotum: largely glabrous, setae limited to small patch near spiracle. Sculpture of mesopleural scrobe: smooth. Sculpture of lower mesepisternum: smooth. Sculpture of metapleuron: largely smooth. Fore wing venation: well-developed, with R, r-rs clearly visible. Submarginal vein bristles: with dark bristles extending length of submarginal vein. Long dark bristles on legs: present on all femora, tibiae.

T1 depression: glabrous or sparsely setose. Sublateral lamella on T1: indicated as low carina. Sculpture of T2–T4: longitudinally striate with cross striae laterally, sculpture effaced medially. Setation of laterotergites: setose. Sculpture of S2, S3 of female: unknown. Sculpture of S2, S3 of male: nearly smooth, with scattered setigerous punctures. Distribution of felt fields: present on S2–S3.

**Diagnosis.** *Heptascelio orarius* is most similar to *H. noyesi*. In the male sex, the two are immediately distinguishable on the basis of the red color of the mesosoma of *H. orarius* (Figs. 63, 64). In the female, the mesonotum of *H. orarius* is areolate rugose (Fig. 61) and the legs bear long dark bristles (Fig. 59).

**Etymology.** The epithet *orarius*, Latin for “belonging to the seacoast” refers to the beach collecting locality of one of the paratypes.

#### **Link to Distribution Map.**<sup>50</sup>

**Material Examined.** Holotype female: **MADAGASCAR:** Antsiranana Auto. Prov., Montagne d’Ambre National Park, 12°31'13"S 49°10'45"E, 1125 m, MA-01-01D-04, 11.II–4.III.2001, Malaise trap, Harin’Hala, CASENT 2043723 (deposited in CASC)<sup>51</sup>. *Paratypes:* **MADAGASCAR:** 3 males, 1 female, CASENT 2042917, 2043724, 2132025 (CASENT); OSUC 186126 (OSUC).

**Comments.** Among the five species known from Madagascar – *H. striatosternus*, *H. noyesi*, *H. orarius*, *H. sicarius* and *H. teres* – only *H. striatosternus* also has the distinct black bristles on the legs (Fig. 77). The males that we have assigned to *H. orarius* do have black bristles on the mid and hind tibiae, but they are shorter and fewer than are found in the females of either *H. orarius* or *H. striatosternus*. Our association of the sexes in this species is based on a combination of the rather elongate outer propodeal projections, the round profile of the head in lateral view, and the overall small body size.

#### ***Heptascelio paralugens* Masner & Johnson, new species**

urn:lsid:zoobank.org:act:17A32F5B-4BCF-40CC-8A08-FD638657322B

urn:lsid:biosci.ohio-state.edu:osuc\_concepts:223421

Figures 65–68; Morphbank<sup>52</sup>

**Description.** Female body length: 4.2–4.3 (n=2). Male body length: 4.3 mm (n=1). Body color of female: entirely dark, dark brown to black. Color of female antenna: dark brown to black throughout. Color of wing membrane: with weak general brown infuscation, longitudinal streak below submarginal vein weak. Color of legs: coxae dark brown, otherwise yellowish brown throughout. Body color of male: entirely black. Color of male antenna: brown.

50. <http://atbi.biosci.ohio-state.edu/HymOnline/map-large.html?id=223420>

51. <http://zoobank.org/urn:lsid:zoobank.org:specimen:8DA2086B-7642-4A7F-9C87-EDB33486B126>

52. <http://www.morphbank.net/?id=224257>

Sculpture of occiput and posterior vertex: coarsely punctate. Sculpture of frons below ocellus in female: coarsely punctate. Shape of dorsal margin of frontal scrobe: ecarinate, rounded onto dorsal portion of frons. Sculpture of frontal depression in female: punctate, with broad smooth spaces between punctures. Sculpture of gena: coarsely punctate. Setation of gena: with short, uniform setae, with few short bristles interspersed. Shape of mandibles: normal length, crossed transversely below head when closed, tips overlapping.

Sculpture of dorsal pronotum: areolate rugose, with distinct longitudinal tendency. Notaulus: absent or obscured by coarse surface sculpture. Sculpture of mesoscutum in female: sparsely punctate, with broad smooth areas between punctures. Sculpture of mesoscutum in male: sparsely punctate, largely smooth. Parapsidal line: absent. Mesoscutellum shape: nearly parallel-sided, apex weakly excavate, with weak median longitudinal impression. Sculpture of female mesoscutellum: areolate rugose. Scutellar points of female: broad, short, acute. Sculpture of male mesoscutellum: areolate rugose. Scutellar points of male: apex of mesoscutellum rounded, points entirely absent. Posterior surface of propodeum: irregularly areolate, without distinct paramedian keel. Length of outer propodeal projection in female: moderately elongate, extending to midpoint of length of T1, distinctly longer than inner propodeal projection. Sculpture of propodeum between inner and outer propodeal projections: coarsely punctate. Netrion shape: moderately wide, weakly fusiform, anterior margin foveate. Netrion setation: densely setose. Sculpture of lateral pronotum posterior to epomial carina: coarsely punctate. Setation of posterior half of lateral pronotum: with numerous scattered setae, densest near spiracle. Sculpture of mesopleural scrobe: smooth. Sculpture of lower mesepisternum: with distinctly separated, coarse punctures. Sculpture of metapleuron: coarsely areolate to rugose throughout. Fore wing venation: well-developed, with R, r-rs clearly visible. Submarginal vein bristles: with dark bristles extending length of submarginal vein. Long dark bristles on legs: absent.

T1 depression: moderately to densely setose. Sublateral lamella on T1: distinctly raised more or less perpendicular to T1. Sculpture of T2–T4: longitudinally striate, with fine cross striae, punctures, smooth or finely punctulate transverse band apically. Setation of laterotergites: setose. Sculpture of S2, S3 of female: longitudinally rugulose laterally, nearly smooth medially, with scattered small punctures. Sculpture of S2, S3 of male: strongly longitudinally rugose. Distribution of felt fields: present on S2–S3.

**Diagnosis.** This species is most similar to *H. lugens*, from which it may be distinguished by the very short mesoscutellar spines (Fig. 66) and the lack of longitudinal rugulae on the mesoscutum (Fig. 67).

**Etymology.** The epithet *paralugens* refers to the similarity of this species with *Heptascelio lugens*, the type species of the genus.

**Link to Distribution Map.**<sup>53</sup>

**Material Examined.** Holotype female: **PHILIPPINES**: Negros Oriental, 7 km W Valencia, Cuernos de Negros, 700 m, ROM 873061, 1E forest edge, 29.VI–8.VII.1987, Malaise trap w/ pans, D.C. Darling, OSUC 209012 (deposited in ROME)<sup>54</sup>. *Paratypes*: **PHILIPPINES**, 5 males, 2 females, OSUC 59556, ROMEnt 112071–112075 (ROME), OSUC 209013 (CNCI).

**Comments.** The diagnostic characters for this species are, overall, rather weak. Further collections in the Philippines may help to determine if *H. paralugens* is consistently separable from *H. lugens*, or if the characters that distinguish them are variable and independently distributed.

### ***Heptascelio sicarius* Johnson & Musetti, new species**

urn:lsid:zoobank.org:act:C01F1E40-9113-4227-8BEB-8B0D2EE9056F

urn:lsid:biosci.ohio-state.edu:osuc\_concepts:233774

Figures 69–72; Morphbank<sup>55</sup>

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53. <http://atbi.biosci.ohio-state.edu/HymOnline/map-large.html?id=223421>

54. <http://zoobank.org/urn:lsid:zoobank.org:specimen:442015F0-A3E3-4767-A473-61C0F921AF8B>

**Description.** Female body length: 4.0 mm (n=1). Male body length: unknown. Body color of female: entirely dark, dark brown to black. Color of female antenna: A1 brown, A2-A5 yellow, A6-A12 dark brown. Color of wing membrane: infusate in apical two thirds, streak below submarginal vein strongly pigmented. Color of legs: entirely yellow. Body color of male: unknown. Color of male antenna: unknown.

Sculpture of occiput and posterior vertex: coarsely punctate. Sculpture of frons below ocellus in female: dorsoventrally striate. Shape of dorsal margin of frontal scrobe: evenly arcuate, weakly produced. Sculpture of frontal depression in female: entirely smooth. Sculpture of gena: coarsely punctate. Setation of gena: with short, uniform setae, without bristles. Shape of mandibles: normal length, crossed transversely below head when closed, tips overlapping.

Sculpture of dorsal pronotum: coarsely punctate. Notaulus: absent or obscured by coarse surface sculpture. Sculpture of mesoscutum in female: sparsely punctate, with broad smooth areas between punctures. Sculpture of mesoscutum in male: unknown. Parapsidal line: present, evanescent. Mesoscutellum shape: nearly parallel-sided, apex weakly excavate, with weak median longitudinal impression. Sculpture of female mesoscutellum: coarsely punctate. Mesoscutellar points of female: absent, scutellum with rounded lobes laterally. Sculpture of male mesoscutellum: unknown. Mesoscutellar points of male: unknown. Posterior surface of propodeum: longitudinally carinate with well-developed transverse striae, without distinct paramedian keel. Length of outer propodeal projection in female: elongate, extending near or beyond apex of T1, distinctly longer than inner propodeal projection. Sculpture of propodeum between inner and outer propodeal projections: areolate rugose. Netrion shape: moderately wide, nearly parallel-sided, with two columns of large punctures. Netrion setation: glabrous. Sculpture of lateral pronotum posterior to epomial carina: with smooth field dorsally, elsewhere areolate rugose. Setation of posterior half of lateral pronotum: largely glabrous, setae limited to small patch near spiracle. Sculpture of mesopleural scrobe: smooth. Sculpture of lower mesepisternum: largely smooth, with 2-3 longitudinal lines of punctures. Sculpture of metapleuron: with smooth field medially, elsewhere coarsely punctate. Fore wing venation: well-developed, with R, r-rs clearly visible. Submarginal vein bristles: with dark bristles extending length of submarginal vein. Long dark bristles on legs: absent.

T1 depression: glabrous or sparsely setose. Sublateral lamella on T1: indicated as low carina. Sculpture of T2-T4: longitudinally striate, with fine cross striae, punctures, smooth or finely punctulate transverse band apically. Setation of laterotergites: very sparsely setose. Sculpture of S2, S3 of female: irregularly longitudinally rugulose, apex of S3 nearly smooth. Sculpture of S2, S3 of male: unknown. Distribution of felt fields: present on S2-S3.

**Diagnosis.** *Heptascelio sicarus* is most similar to *H. teres* from which it may be distinguished by the elongate outer propodeal projection and the strongly developed transverse carinae on the propodeum.

**Etymology.** The epithet *sicarius*, meaning one who murders with a sica or curved dagger, refers to elongate outer propodeal projections.

**Link to Distribution Map.**<sup>56</sup>

**Material Examined.** Holotype female: **MADAGASCAR:** Prov. Fianarantsoa, PN Ranomafana, 21°51.05'S 47°24.43'E, radio tower, forest edge, 1130 m, 14-21.I.2002, Harin'Hala, Malaise trap MA02-09812, CASENT 2134081 (deposited in CASC).<sup>57</sup>

### ***Heptascelio striatosternus* Narendran & Ramesh Babu**

urn:lsid:zoobank.org:act:95BFFD3C-DC91-4C56-A11D-EE31019A4B91

urn:lsid:biosci.ohio-state.edu:osuc\_concepts:30148

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55. <http://www.morphbank.net/?id=224256>

56. <http://atbi.biosci.ohio-state.edu/HymOnline/map-large.html?id=233774>

57. <http://zoobank.org/urn:lsid:zoobank.org:specimen:F7949E10-CC80-4831-8AAF-60A9363AC10B>

*Heptascelio striatosternus* Narendran & Ramesh Babu, 1996: 90, 92 (original description, keyed); Rajmohana, 2006: 125 (description, keyed).

*Heptascelio punctisternus* Narendran & Ramesh Babu, 1996: 90, 91 (original description, keyed); Rajmohana, 2006: 125 (description, keyed). **New synonymy.**

urn:lsid:zoobank.org:act: A0EF0D9C-5314-40AE-B14F-9AF89C08C712

urn:lsid:biosci.ohio-state.edu:osuc\_concepts:30149

**Description.** Female body length: 3.6–4.3 mm (n=20). Male body length: 3.4–4.2 mm (n=19). Body color of female: entirely dark, dark brown to black. Color of female antenna: brown to dark brown throughout. Color of wing membrane: with weak general brown infuscation, longitudinal dark streak below submarginal vein moderately developed. Color of legs: coxae and femora dark brown, otherwise brown. Body color of male: entirely black. Color of male antenna: A1–A5 brown, A6–A12 pale brown.

Sculpture of occiput and posterior vertex: areolate rugose, with distinct transverse tendency. Sculpture of frons below ocellus in female: areolate rugose. Shape of dorsal margin of frontal scrobe: evenly arcuate, weakly produced. Sculpture of frontal depression in female: transversely striate ventrally, with smooth field dorsomedially. Sculpture of gena: with irregular dorsoventral rugae. Setation of gena: with numerous strong, erect, dark bristles amid shorter setation. Shape of mandibles: normal length, crossed transversely below head when closed, tips overlapping.

Sculpture of dorsal pronotum: areolate rugose, with distinct longitudinal tendency. Notaulus: absent or obscured by coarse surface sculpture. Sculpture of mesoscutum in female: longitudinally strigose, with strong transverse sculpture in interspaces. Sculpture of mesoscutum in male: longitudinally strigose, with strong transverse sculpture in interspaces. Parapsidal line: absent. Mesoscutellum shape: roughly trapezoidal, sides weakly converging apically, apex excavate, with distinct median longitudinal furrow. Sculpture of female mesoscutellum: areolate rugose. Scutellar points of female: forming short, acute teeth. Sculpture of male mesoscutellum: areolate rugose. Scutellar points of male: flattened, broadly rounded apically. Posterior surface of propodeum: with distinct straight longitudinal paramedian keel arising from apex of inner propodeal projection. Length of outer propodeal projection in female: moderately elongate, not reaching midpoint of length of T1, subequal in length to inner propodeal projection. Sculpture of propodeum between inner and outer propodeal projections: coarsely punctate. Netrion shape: narrow, gradually widened ventrally, foveae on surface distinctly wider than high. Netrion setation: densely setose. Sculpture of lateral pronotum posterior to epomial carina: with large smooth field dorsally, elsewhere finely rugulose. Setation of posterior half of lateral pronotum: with numerous scattered setae, densest near spiracle. Sculpture of mesopleural scrobe: smooth. Sculpture of lower mesepisternum: rugulose to punctate. Sculpture of metapleuron: with smooth field medially, elsewhere coarsely punctate. Fore wing venation: well-developed, with R, r-rs clearly visible. Submarginal vein bristles: with dark bristles extending length of submarginal vein. Long dark bristles on legs: present on all femora, tibiae.

T1 depression: moderately to densely setose. Sublateral lamella on T1: distinctly raised more or less perpendicular to T1. Sculpture of T2–T4: longitudinally striate, with fine cross striae, punctures, smooth or finely punctulate transverse band apically. Setation of laterotergites: setose. Sculpture of S2, S3 of female: strongly longitudinally rugose. Sculpture of S2, S3 of male: longitudinal rugulae largely effaced, strongest laterally, otherwise smooth with scattered setigerous punctures. Distribution of felt fields: present on S2–S3.

**Diagnosis.** The other species of *Heptascelio* with the long dark bristles on the legs are *H. orarius*, *H. aquilinus* and *H. dispar*. *Heptascelio striatosternus*, in the female sex, may be distinguished by the strong longitudinal rugae on the metasomal sternites (Fig. 81) and, in the male sex, by the densely setose netrion (Figs.

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58. <http://www.morphbank.net/?id=224255>

74, 80, 84).

**Link to Distribution Map.**<sup>59</sup>

**Material Examined.** Holotype female, *H. striatosternus*: **INDIA**: Kerala, Kuriarkutty, 1989, Narendran T.C. (USNM)<sup>60</sup>. Holotype male, *H. punctisternus*: **INDIA**: Kerala, Calicut, University campus, 1988, Narendran T.C. (USNM)<sup>61</sup>. *Other material*: **INDIA**: 5 specimens, OSUC 207743 (BMNH); ZSI/WGRS/INV.1816–1819 (WGRS). **MADAGASCAR**: 1 female, OSUC 170972 (USNM). **NEPAL**: 1 female, OSUC 210318 (BPBM). **SRI LANKA**: 18 males, 17 females, OSUC 207744 (BMNH); OSUC 209170, 209171 (CNCI); OSUC 209147, 186124 (OSUC); OSUC 186125, 209139–209146, 209148–209169 (USNM).

**Comments.** The two species described by Narendran & Ramesh Babu (1996) were both based upon single specimens, one a male (*H. punctisternus*, Figs. 82–84) and the other a female (*H. striatosternus*, Figs. 79–81). The original description of *H. punctisternus* has a small typographical error: it states that the holotype is a female. Elsewhere in the paper it is clear that, in fact, it is a male. The identification key distinguishes between the two, first, on the basis of the sculpture of the metasomal sternites, distinctly striate in *H. striatosternus* (Fig. 81) and “with distinct small setigerous pits, not distinctly striate” in *H. punctisternus* (Fig. 82). This difference is quite easily appreciated when the two specimens are examined. The next character in the couplet, the length of the longest hair on the distal end of the pedicel (A2, Fig. 84) is a significant observation. In *H. punctisternus* there is an extremely elongate, relatively thick, and distinctively curved seta arising from the ventral side of A2. This structure has not before been reported in Platygastriidae. However, it is present in all male specimens of *Heptascelio* and only in males. Thus, this distinction serves only to separate sexes and not species. The remaining quantitative characters, the ratio of the lengths of A1 and A2 and the distance between the ocellus and scrobal margin are also significant only in distinguishing sexes.

The sculpture of the metasomal sternites is the only significant feature distinguishing the two nominal species. The USNM has a relatively long series of *Heptascelio* collected in Sri Lanka. Among these, the difference in sternal sculpture is well developed, but, again, it is perfectly correlated with the sex of the specimens: striate in females, punctate in males. Thus, we conclude, first, that this too is a sexually dimorphic character and, second, that the two concepts, *H. striatosternus* and *H. punctisternus*, are synonymous. Since both were described in the same paper, we have arbitrarily selected the name *H. striatosternus* to be the valid name for this species.

The distribution of known specimens of *H. striatosternus* is concentrated in south India (Kerala) and Sri Lanka. However, there are two additional specimens that significantly expand its “known” distribution. One is from Madagascar, and the specimen is extremely similar to freshly mounted specimens from Sri Lanka. These have erect body bristles and make a striking impression. The remaining specimens from Sri Lanka have these bristles semi-decumbent. However, this material is fairly dirty and it appears that it may also be thinly covered with some sort of residue. Thus, we decided not to emphasize the bristles, but in the future this character should be examined. The second geographical extreme is a specimen from Nepal. In comparison to the other material, this specimen is rather less robust and a bit more elongate. We judged the difference to be insignificant given the tremendous distance between Kerala and Nepal. Further collections in India, though, may help to determine if there is a gradual or an abrupt change in body form across the subcontinent.

***Heptascelio strigatus* Masner, Johnson & van Noort, new species**

urn:lsid:zoobank.org:act:A30B036A-32F2-4A9B-AF11-0A69EEEC9B8C

urn:lsid:biosci.ohio-state.edu:osuc\_concepts:223422

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59. <http://atbi.biosci.ohio-state.edu/HymOnline/map-large.html?id=30148>

60. <http://zoobank.org/urn:lsid:zoobank.org:specimen:A70B52CB-4C8A-42B4-B979-BAE3C0A08014>

61. <http://zoobank.org/urn:lsid:zoobank.org:specimen:A4267409-D599-4347-9A91-81761A38F0A3>

**Description.** Female body length: 2.9–3.1 mm (n=8). Male body length: 2.8–3.0 mm (n=10). Body color of female: entirely dark, dark brown to black. Color of female antenna: A1 dark brown, A2–A4 brownish yellow, A5–A12 dark brown to black. Color of wing membrane: infusate in apical two thirds, streak below submarginal vein strongly pigmented. Color of legs: coxae, femora, tibiae dark brown, otherwise brown. Body color of male: entirely black. Color of male antenna: brown.

Sculpture of occiput and posterior vertex: with strong transverse rugae. Sculpture of frons below ocellus in female: areolate rugose. Shape of dorsal margin of frontal scrobe: evenly arcuate, weakly produced. Sculpture of frontal depression in female: transversely striate ventrally, with smooth field dorsomedially. Sculpture of gena: with irregular dorsoventral rugae. Setation of gena: with short, uniform setae, with few short bristles interspersed. Shape of mandibles: normal length, crossed transversely below head when closed, tips overlapping.

Sculpture of dorsal pronotum: longitudinally strigose. Notaulus: absent or obscured by coarse surface sculpture. Sculpture of mesoscutum in female: coarsely longitudinally strigose with smooth interspaces. Sculpture of mesoscutum in male: coarsely areolate rugose, coarsely longitudinally areolate rugose. Parapsidal line: absent. Mesoscutellum shape: semicircular, posteriorly distinctly sloping ventrad, without distinct median longitudinal furrow. Sculpture of female mesoscutellum: longitudinally strigate. Scutellar points of female: narrow, elongate, acute. Sculpture of male mesoscutellum: coarsely longitudinally areolate rugose. Scutellar points of male: flattened, broadly rounded apically. Posterior surface of propodeum: with distinct straight longitudinal paramedian keel arising from apex of inner propodeal projection. Length of outer propodeal projection in female: elongate, extending near or beyond apex of T1, distinctly longer than inner propodeal projection. Sculpture of propodeum between inner and outer propodeal projections: areolate rugose. Netrion shape: narrow, gradually widened ventrally, foveae on surface distinctly wider than high. Netrion setation: glabrous. Sculpture of lateral pronotum posterior to epomial carina: with large smooth field dorsally, elsewhere finely rugulose. Setation of posterior half of lateral pronotum: with numerous scattered setae, densest near spiracle. Sculpture of mesopleural scrobe: coarsely areolate to rugose. Sculpture of lower mesepisternum: rugulose to punctate. Sculpture of metapleuron: coarsely areolate to rugose throughout. Fore wing venation: well-developed, with R, r-rs clearly visible. Submarginal vein bristles: with dark bristles extending length of submarginal vein. Long dark bristles on legs: absent.

T1 depression: glabrous or sparsely setose. Sublateral lamella on T1: absent. Sculpture of T2–T4: longitudinally striate, with fine cross striae, punctures, smooth or finely punctulate transverse band apically. Setation of laterotergites: very sparsely setose. Sculpture of S2, S3 of female: nearly smooth, with scattered small punctures. Sculpture of S2, S3 of male: nearly smooth, with scattered setigerous punctures. Distribution of felt fields: present on S2–S3.

**Diagnosis.** *Heptascelio strigatus* is most similar to *H. watshami*, *H. albipes* and *H. anthonyi*. It may be distinguished by the combination of the longitudinally carinate mesoscutellum (Fig. 87) and areolate rugose sculpture of the mesopleural depression (Fig. 86).

**Etymology.** The epithet *strigatus* refers to the sculpture of the mesonotum.

**Link to Distribution Map.**<sup>63</sup>

**Material Examined.** Holotype female: **CENTRAL AFRICAN REPUBLIC:** Sangha-Mbaéré Préf., Dzanga-Ndoki National Park, 02°21.60'N 16°03.20'E, 350 m, CAR01-M184, lowland rainforest, 38.6km 173E S Ladjombo, 22–23.V.2001, Malaise trap, S. van Noort, OSUC 186133 (deposited in SAMC)<sup>64</sup>.

62. <http://www.morphbank.net/?id=224253>

63. <http://atbi.biosci.ohio-state.edu/HymOnline/map-large.html?id=223422>

64. <http://zoobank.org/urn:lsid:zoobank.org:specimen:0DD2B5A5-D24F-4437-B4E4-C8159AB864F3>

*Paratypes*: **CENTRAL AFRICAN REPUBLIC**: 15 males, 7 females, OSUC 180746, 207580 (CNCI); OSUC 176089, 176099, 186132, 207579, 207693 (OSUC); OSUC 176098, 179109, 179130, 186127, 186129–186131, 186134–186136, 186294, 186301, 211046, SAM-HYM-P025040, P025042, P025043, P025044 (SAMC).

***Heptascelio teres* Johnson & Masner, new species**

urn:lsid:zoobank.org:act:27C97038-DD6B-43AE-BEB4-5F6702F0E62C

urn:lsid:biosci.ohio-state.edu:osuc\_concepts:223423

Figures 89–92; Morphbank<sup>65</sup>

**Description.** Female body length: 3.8–4.1 mm (n=2). Male body length: unknown. Body color of female: entirely dark, dark brown to black. Color of female antenna: A1 brown, A2–A5 yellow, A6–A12 generally brown to dark brown, A12 lighter. Color of wing membrane: moderately infusate throughout, streak below submarginal vein darkly pigmented. Color of legs: entirely yellow. Body color of male: unknown. Color of male antenna: unknown.

Sculpture of occiput and posterior vertex: areolate rugose, with distinct transverse tendency. Sculpture of frons below ocellus in female: dorsoventrally striate. Shape of dorsal margin of frontal scrobe: evenly arcuate, weakly produced. Sculpture of frontal depression in female: entirely smooth. Sculpture of gena: with irregular dorsoventral rugae. Setation of gena: with short, uniform setae, with few short bristles interspersed. Shape of mandibles: normal length, crossed transversely below head when closed, tips overlapping.

Sculpture of dorsal pronotum: coarsely punctate. Notaulus: absent or obscured by coarse surface sculpture. Sculpture of mesoscutum in female: sparsely punctate, with broad smooth areas between punctures. Sculpture of mesoscutum in male: unknown. Parapsidal line: present, clearly impressed. Mesoscutellum shape: roughly trapezoidal, sides converging apically, apex weakly excavate, without distinct median longitudinal impression. Sculpture of female mesoscutellum: coarsely punctate. Scutellar points of female: absent, mesoscutellum with rounded lobes laterally. Sculpture of male mesoscutellum: unknown. Scutellar points of male: unknown. Posterior surface of propodeum: . Length of outer propodeal projection in female: rather short, extending at most to midlength of T1, slightly longer than inner propodeal projection. Sculpture of propodeum between inner and outer propodeal projections: areolate rugose, with distinct longitudinal tendency. Netrion shape: moderately wide, weakly fusiform, with column of elongate foveae. Netrion setation: glabrous. Sculpture of lateral pronotum posterior to epomial carina: smooth. Setation of posterior half of lateral pronotum: largely glabrous, setae limited to small patch near spiracle. Sculpture of mesopleural scrobe: smooth. Sculpture of lower mesepisternum: smooth. Sculpture of metapleuron: largely smooth. Fore wing venation: well-developed, with R, r-rs clearly visible. Submarginal vein bristles: with dark bristles in basal half of submarginal vein. Long dark bristles on legs: absent.

T1 depression: glabrous or sparsely setose. Sublateral lamella on T1: indicated as low carina. Sculpture of T2–T4: longitudinally striate, with fine cross striae, punctures, smooth or finely punctulate transverse band apically. Setation of laterotergites: setose. Sculpture of S2, S3 of female: strongly longitudinally rugose. Sculpture of S2, S3 of male: unknown. Distribution of felt fields: present on S2–S3.

**Diagnosis.** *Heptascelio teres* is very similar to the sympatric species *H. sicarius*. The former may be distinguished by the shorter outer propodeal projection, the downturned metascutellar spine, the well-defined parapsidal lines, and the longitudinally carinate propodeum. The punctate sculpture of the mesoscutum is found in several species from Asia, *H. dayi*, *H. lugens*, *H. paralugens*, and *H. bivius*. *Heptascelio teres* may be distinguished by the yellow coxae and glabrous netrion (Fig. 90).

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65. <http://www.morphbank.net/?id=224252>

**Etymology.** The epithet *teres*, meaning polished, smooth, refers to the sculpture of the lateral portions of the mesoscutum.

**Link to Distribution Map.**<sup>66</sup>

**Material Examined.** Holotype female: **MADAGASCAR:** Antsiranana, Montagne d'Ambre National Park, 12°30'52"S 49°10'53"E, 960m, MA-01-01A-01; 21–26.I.2001, Irwin, Schlinger & Harin'Hala, malaise trap, OSUC 179099 (deposited in CASC)<sup>67</sup>. Paratype (1 female): **MADAGASCAR:** CASENT 2132732 (OSUC).

***Heptascelio watshami* Masner & Johnson, new species**

urn:lsid:zoobank.org:act:816CC3B9-53C2-4D3A-9664-4DF1E5D1AD28

urn:lsid:biosci.ohio-state.edu:osuc\_concepts:223424

Figures 93–96; Morphbank<sup>68</sup>

**Description.** Female body length: 2.8–3.4 mm (n=8). Male body length: 2.3–3.0 mm (n=15). Body color of female: entirely dark, dark brown to black. Color of female antenna: A1 brown, A2–A5 yellow, A6–A12 dark brown. Color of wing membrane: hyaline basally, infusate in apical two-thirds, streak below submarginal vein weak. Color of legs: coxae, femora, tibiae dark brown, otherwise brown. Body color of male: entirely black. Color of male antenna: light brown throughout.

Sculpture of occiput and posterior vertex: areolate-rugose. Sculpture of frons below ocellus in female: areolate rugose. Shape of dorsal margin of frontal scrobe: evenly arcuate, weakly produced. Sculpture of frontal depression in female: transversely striate ventrally, with smooth field dorsomedially. Sculpture of gena: with irregular dorsoventral rugae. Setation of gena: with short, uniform setae, with few short bristles interspersed. Shape of mandibles: normal length, crossed transversely below head when closed, tips overlapping.

Sculpture of dorsal pronotum: areolate rugose. Notaulus: absent or obscured by coarse surface sculpture. Sculpture of mesoscutum in female: longitudinally strigose, with strong transverse sculpture in interspaces. Sculpture of mesoscutum in male: coarsely areolate rugose. Parapsidal line: absent. Mesoscutellum shape: roughly trapezoidal, sides converging apically, apex weakly excavate, without distinct median longitudinal impression. Sculpture of female mesoscutellum: areolate rugose. Scutellar points of female: forming short, acute teeth. Sculpture of male mesoscutellum: areolate rugose. Scutellar points of male: flattened, broadly rounded apically. Posterior surface of propodeum: with distinct straight longitudinal paramedian keel arising from apex of inner propodeal projection. Length of outer propodeal projection in female: elongate, extending near or beyond apex of T1, distinctly longer than inner propodeal projection. Sculpture of propodeum between inner and outer propodeal projections: areolate rugose. Netrion shape: strongly narrowed, nearly linear, foveae on surface nearly as high as wide. Netrion setation: glabrous. Sculpture of lateral pronotum posterior to epomial carina: with large smooth field dorsally, elsewhere finely rugulose. Setation of posterior half of lateral pronotum: largely glabrous, setae limited to small patch near spiracle. Sculpture of mesopleural scrobe: smooth. Sculpture of lower mesepisternum: rugulose to punctate. Sculpture of metapleuron: coarsely areolate to rugose throughout. Fore wing venation: well-developed, with R, r-rs clearly visible. Submarginal vein bristles: with dark bristles extending length of submarginal vein. Long dark bristles on legs: present on hind femur only.

T1 depression: glabrous or sparsely setose. Sublateral lamella on T1: indicated as low carina. Sculpture of T2–T4: longitudinally striate, with fine cross striae, punctures, smooth or finely punctulate transverse band

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66. <http://atbi.biosci.ohio-state.edu/HymOnline/map-large.html?id=223423>

67. <http://zoobank.org/urn:lsid:zoobank.org:specimen:6EBBEE9A-5399-48A6-8224-E89674C02D1E>

68. <http://www.morphbank.net/?id=224251>

apically. Setation of laterotergites: setose. Sculpture of S2, S3 of female: strongly longitudinally rugose. Sculpture of S2, S3 of male: nearly smooth, with scattered setigerous punctures. Distribution of felt fields: present on S2–S3.

**Diagnosis.** This species is most similar to *H. albipes*, *H. anthonyi*, and *H. strigatus* from which it may be distinguished by the paucity of transverse bridges between the longitudinal striae on the mesoscutum and the areolate sculpture of the mesoscutellum (Fig. 94).

**Etymology.** Named after Rev. Anthony Watsham (Harare, Zimbabwe), whose collections have significantly contributed to our knowledge of African Hymenoptera.

**Biology.** Reared from the eggs of *Plagiotriptus pinivorus*<sup>69</sup> Descamps (Orthoptera: Thericleidae). This polyphagous species is a pest in introduced pine plantations in East Africa (Schabel 2006).

**Link to Distribution Map.**<sup>70</sup>

**Material Examined.** Holotype female. **ZIMBABWE:** Harare (Salisbury), VI.1982, A. Watsham, pan trap, OSUC 209184 (deposited in CNCI)<sup>71</sup>. *Paratypes* (18 males, 10 females): **DEMOCRATIC REPUBLIC OF THE CONGO:** 1 female, OSUC 209191 (CNCI). **KENYA:** 1 female, OSUC 209190 (CNCI). **MALAWI:** 4 males, 3 females, OSUC 207733–207738 (BMNH); OSUC 209192–209193 (CNCI). **ZIMBABWE:** 14 males, 5 females, OSUC 59555 (OSUC), OSUC 209172–209183, 209185–209189 (CNCI).

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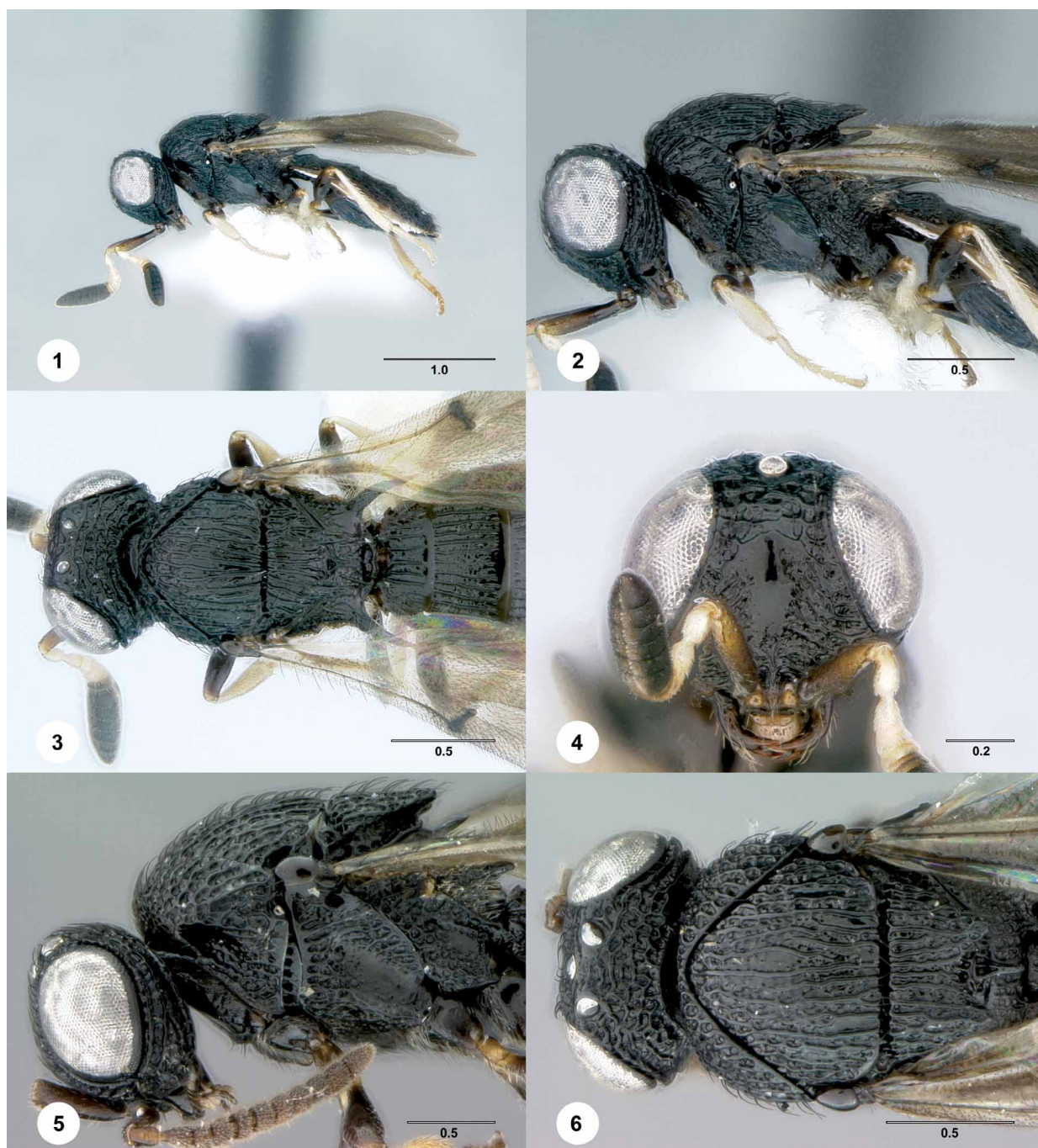
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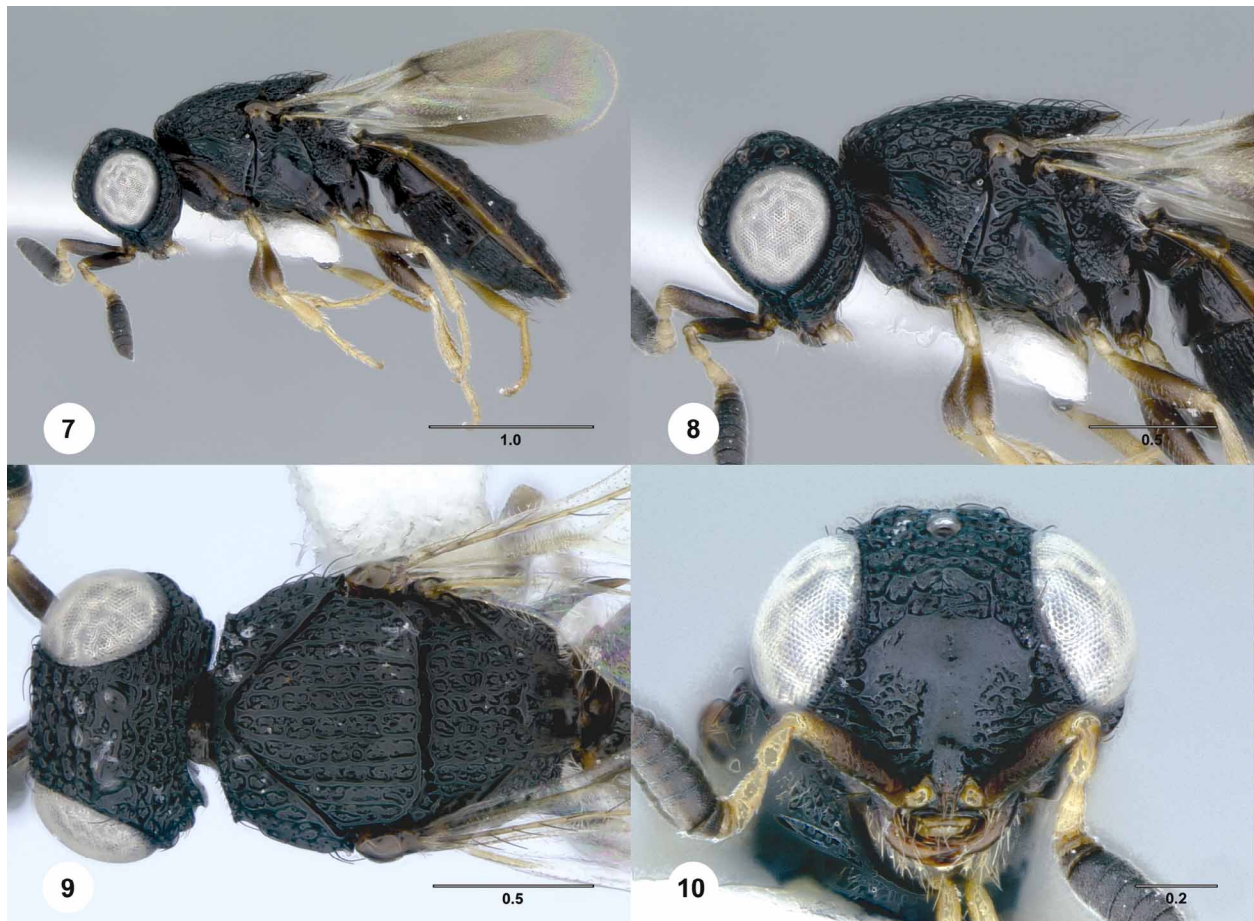
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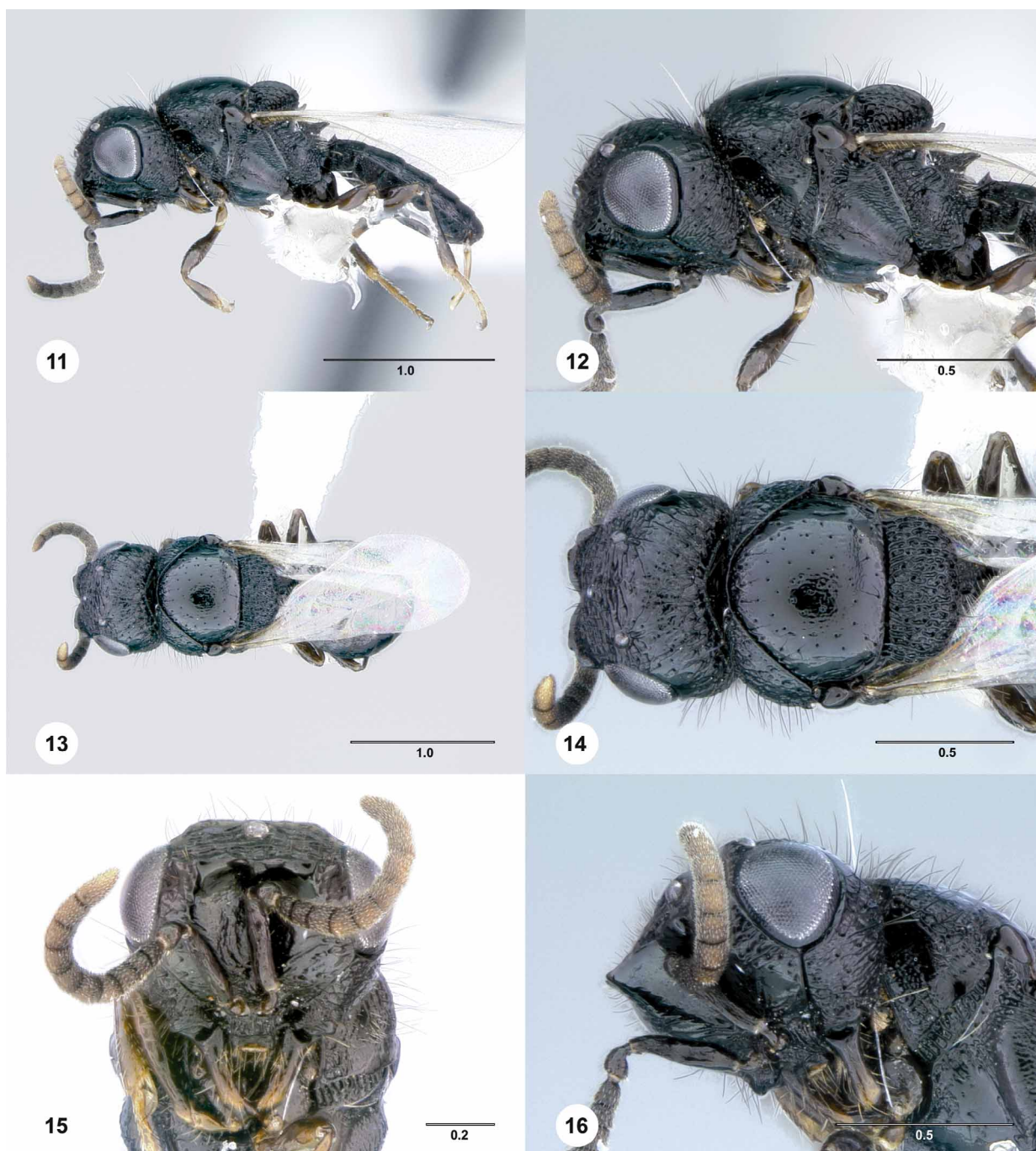
**FIGURES 1–6.**<sup>92</sup> *Heptascelio albipes*, n.sp. 1–4, Female holotype (OSUC 209195). 1, Lateral habitus; 2, Head and mesosoma, lateral view; 3, Head and mesosoma, dorsal view; 4, Head, anterior view. 5–6, Male (SAM-HYM-P0022499). 5, Head and mesosoma, lateral view; 6, Head and mesosoma, dorsal view. Scale bars in millimeters.

92. <http://www.morphbank.net/?id=224269>



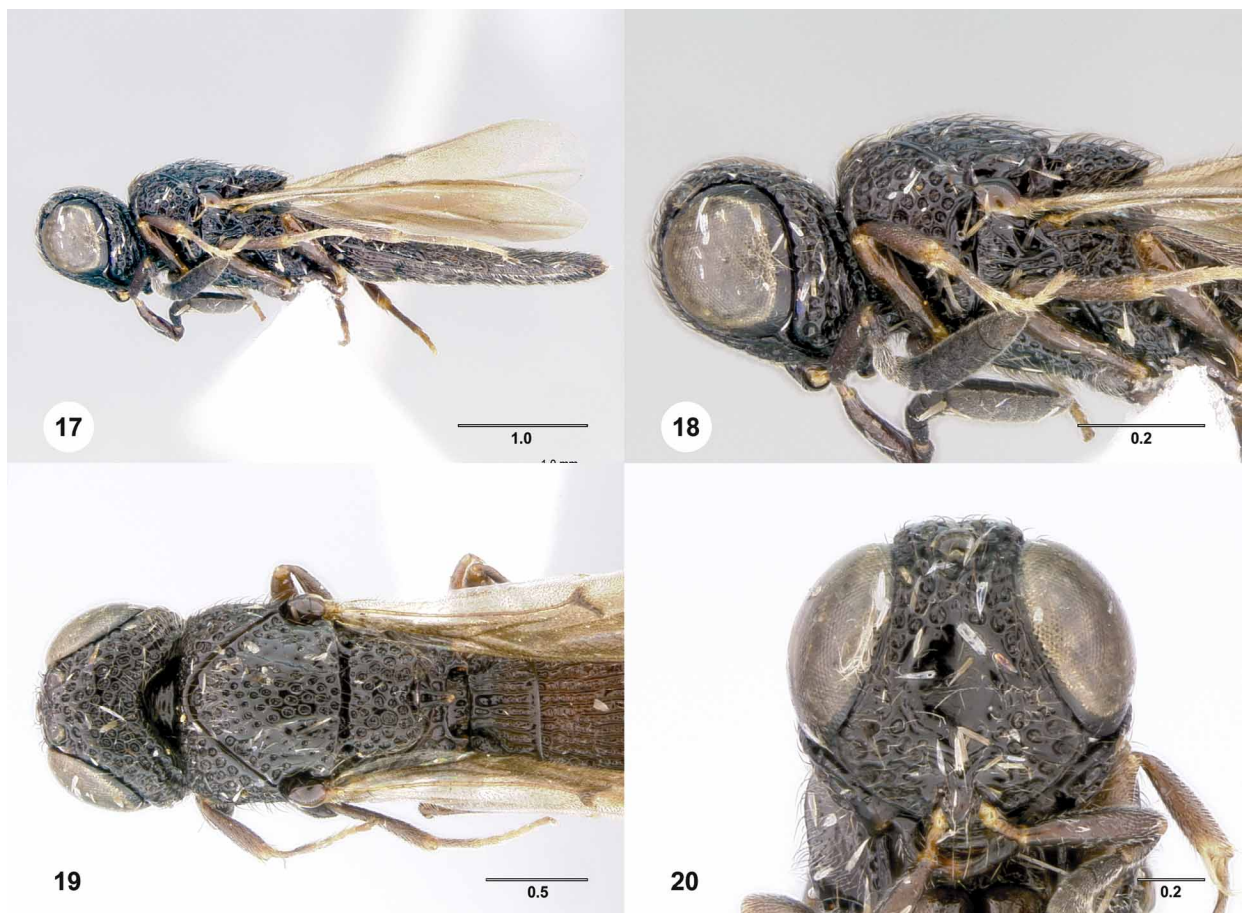
**FIGURES 7–10.**<sup>93</sup> *Heptascelio anthonyi*, n.sp, female holotype (OSUC 192924). 7, Lateral habitus; 8, Head and mesosoma, lateral view; 9, Head and mesosoma, dorsal view; 10, Head, anterior view. Scale bars in millimeters.

93. <http://www.morphbank.net/?id=224268>



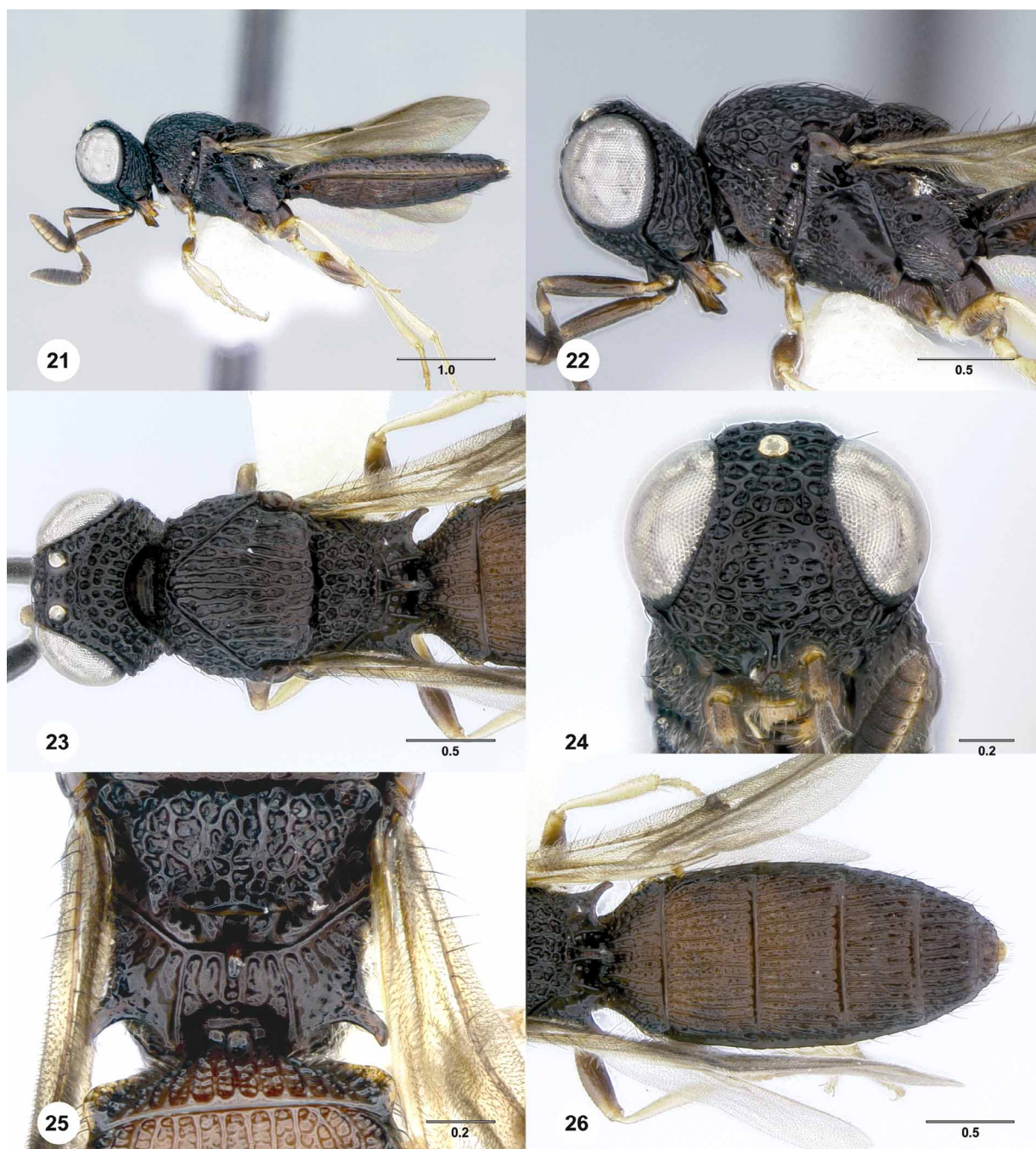
**FIGURES 11–16.**<sup>94</sup> *Heptascelio aquilinus*, n.sp., male holotype (OSUC 209137). 11, Lateral habitus; 12, Head and mesosoma, lateral view; 13, Dorsal habitus; 14, Head and mesosoma, dorsal view; 15, Head, anterior view; 16, Head, anterior oblique view. Scale bars in millimeters.

94. <http://www.morphbank.net/?id=224267>



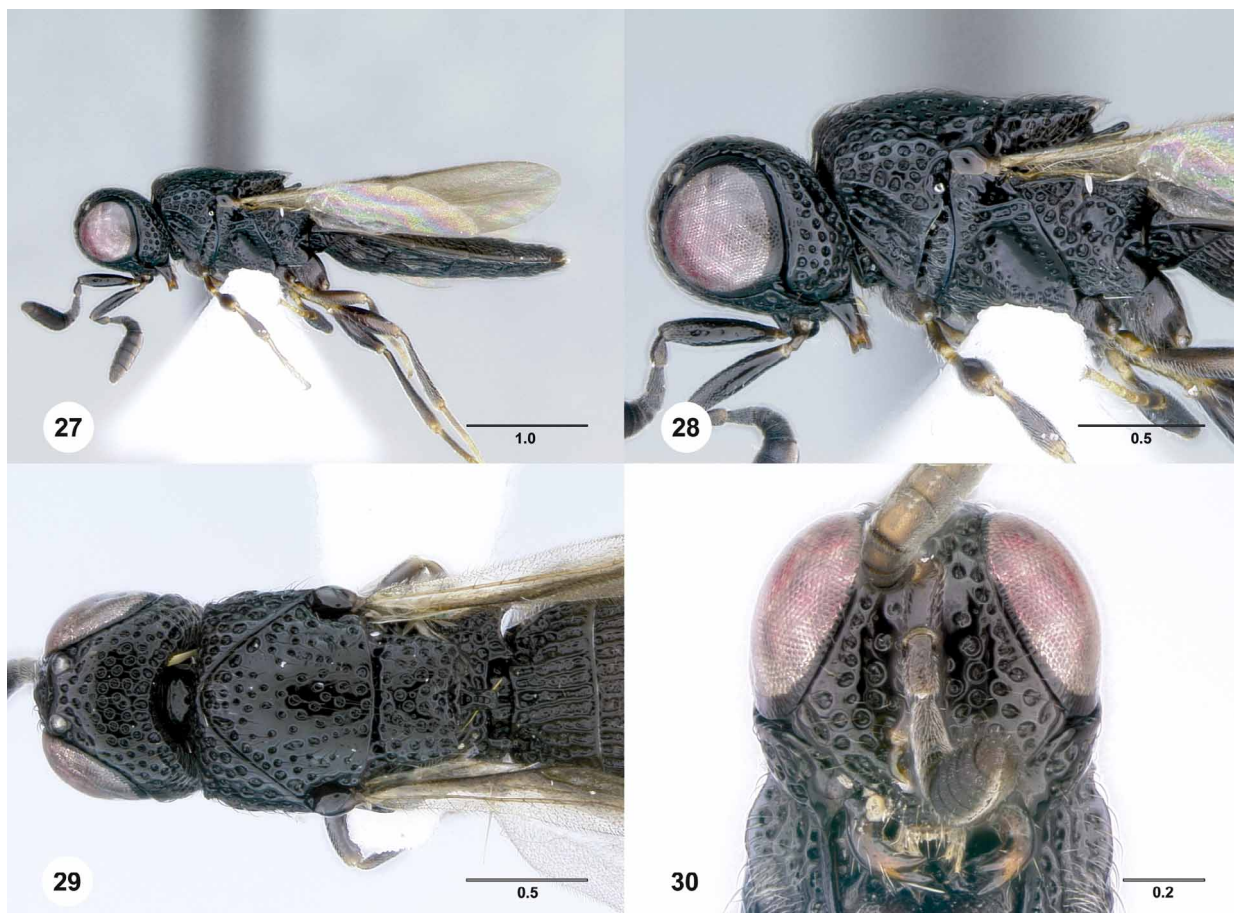
**FIGURES 17–20.**<sup>95</sup> *Heptascelio bivius*, n.sp., female holotype (OSUC 186467). 17, Lateral habitus; 18, Head and mesosoma, lateral view; 19, Head and mesosoma, dorsal view; 20, Head, anterior view. Scale bars in millimeters.

95. <http://www.morphbank.net/?id=224266>



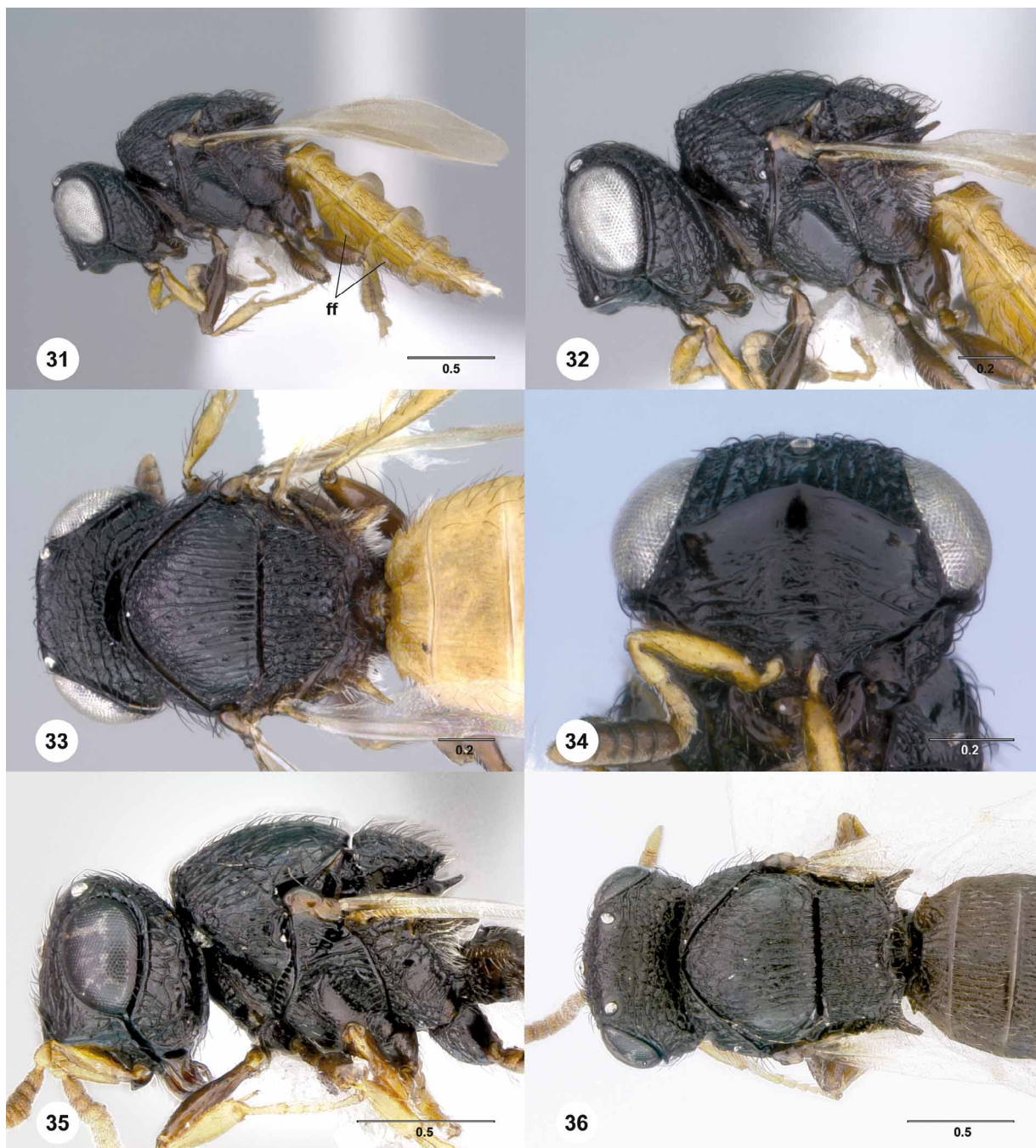
**FIGURES 21–26.**<sup>96</sup> *Heptascelio castor*, n.sp., female holotype (OSUC 186273). 21, Lateral habitus; 22, Head and mesosoma, lateral view; 23, Head and mesosoma, dorsal view; 24, Head, anterior view; 25, Mesoscutellum and propodeum, posterodorsal view; 26, Metasoma, dorsal view. Scale bars in millimeters.

96. <http://www.morphbank.net/?id=224265>



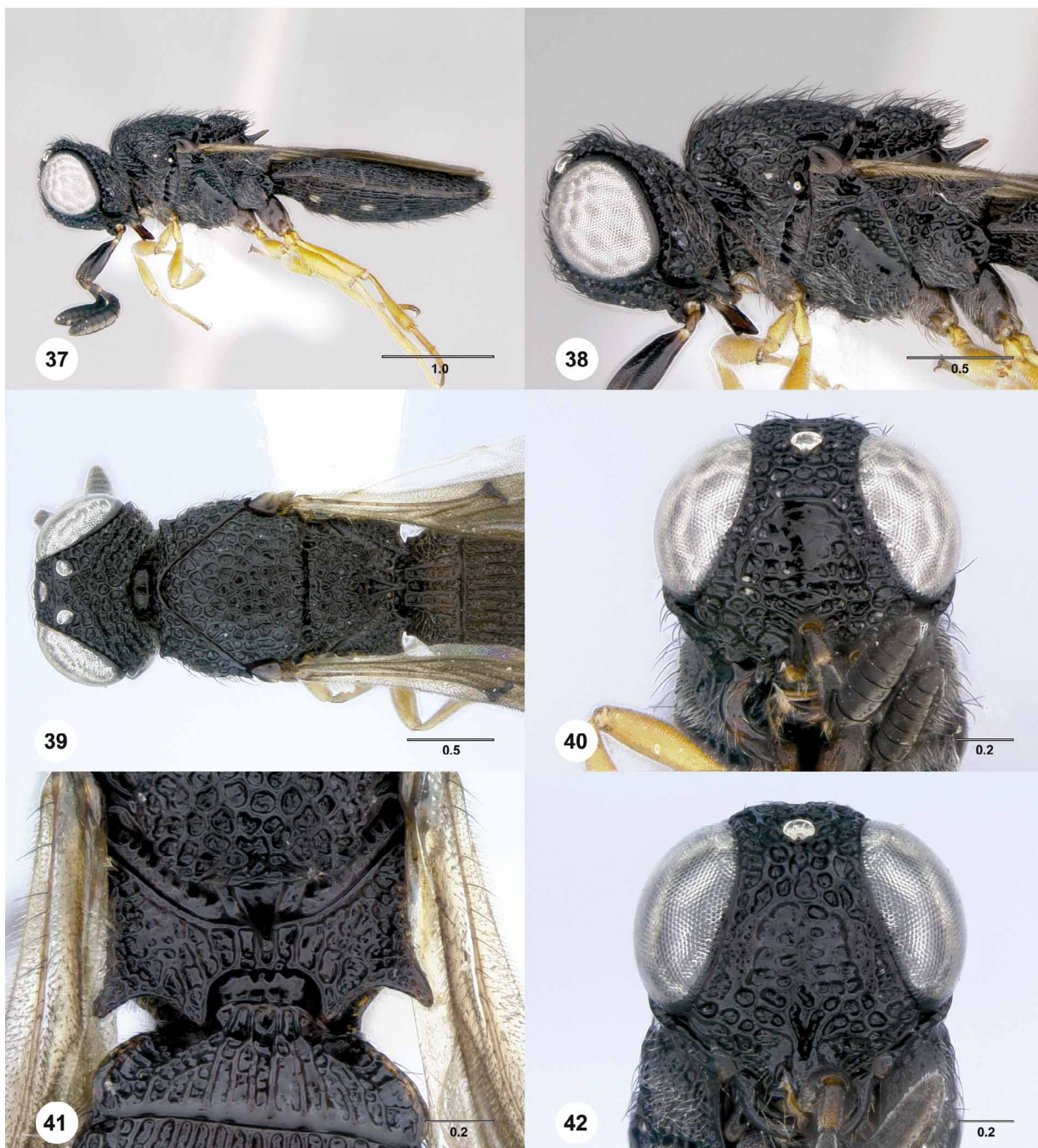
**FIGURES 27–30.**<sup>97</sup> *Heptascelio dayi*, n.sp., female holotype (OSUC 209138). 27, Lateral habitus; 28, Head and mesosoma, lateral view; 29, Head and mesosoma, dorsal view; 30, Head, anterior view. Scale bars in millimeters.

97. <http://www.morphbank.net/?id=224264>



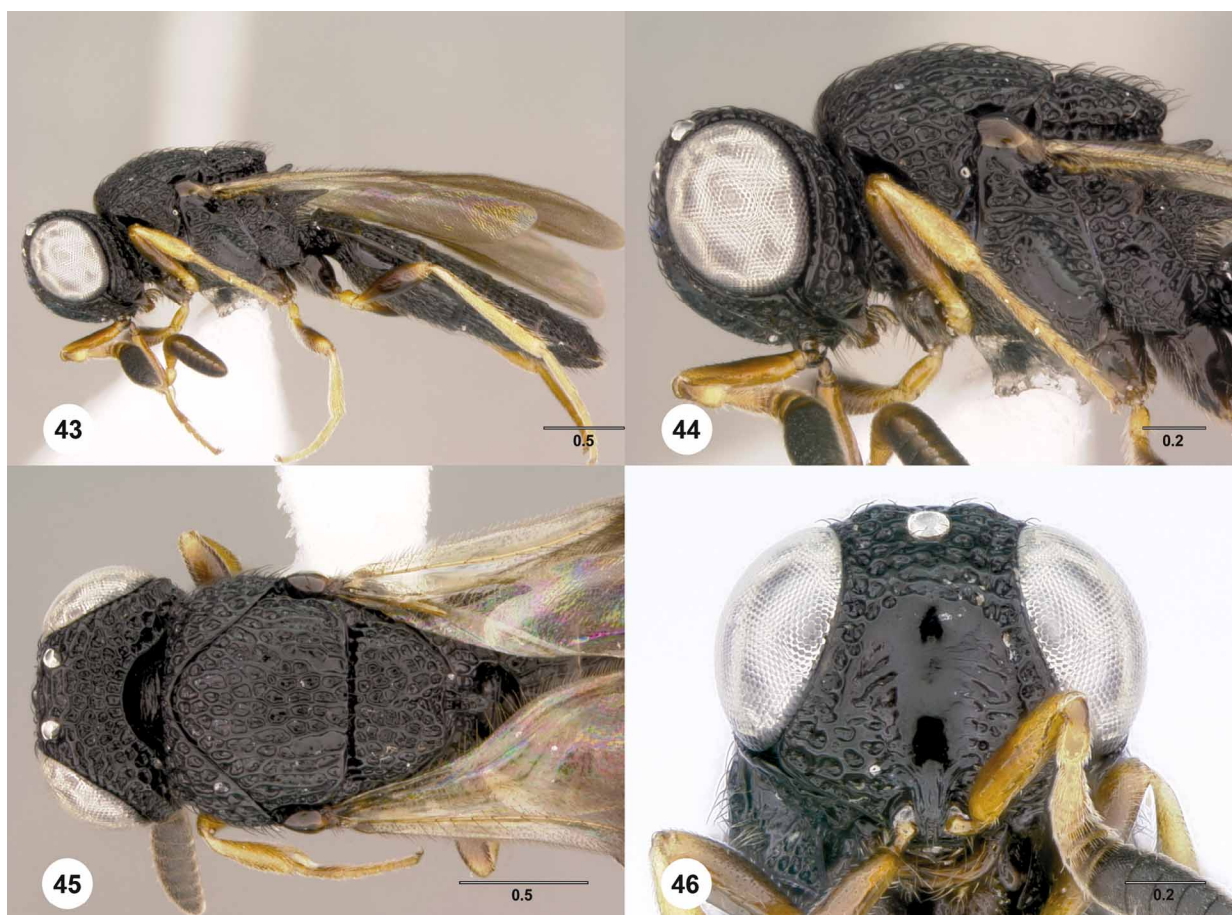
**FIGURES 31–36.**<sup>98</sup> *Heptascelio dispar*, n.sp. 31, Lateral habitus, female holotype (OSUC 164363), *ff*, felt fields; 32, Head and mesosoma, lateral view, holotype female; 33, Head and mesosoma, dorsal view (OSUC 164249); 34, Head, anterior view, holotype female; 35, Head and mesosoma, lateral view, male (OSUC 209101); 36, Head and mesosoma, dorsal view, male (OSUC 209101). Scale bars in millimeters.

98. <http://www.morphbank.net/?id=224263>



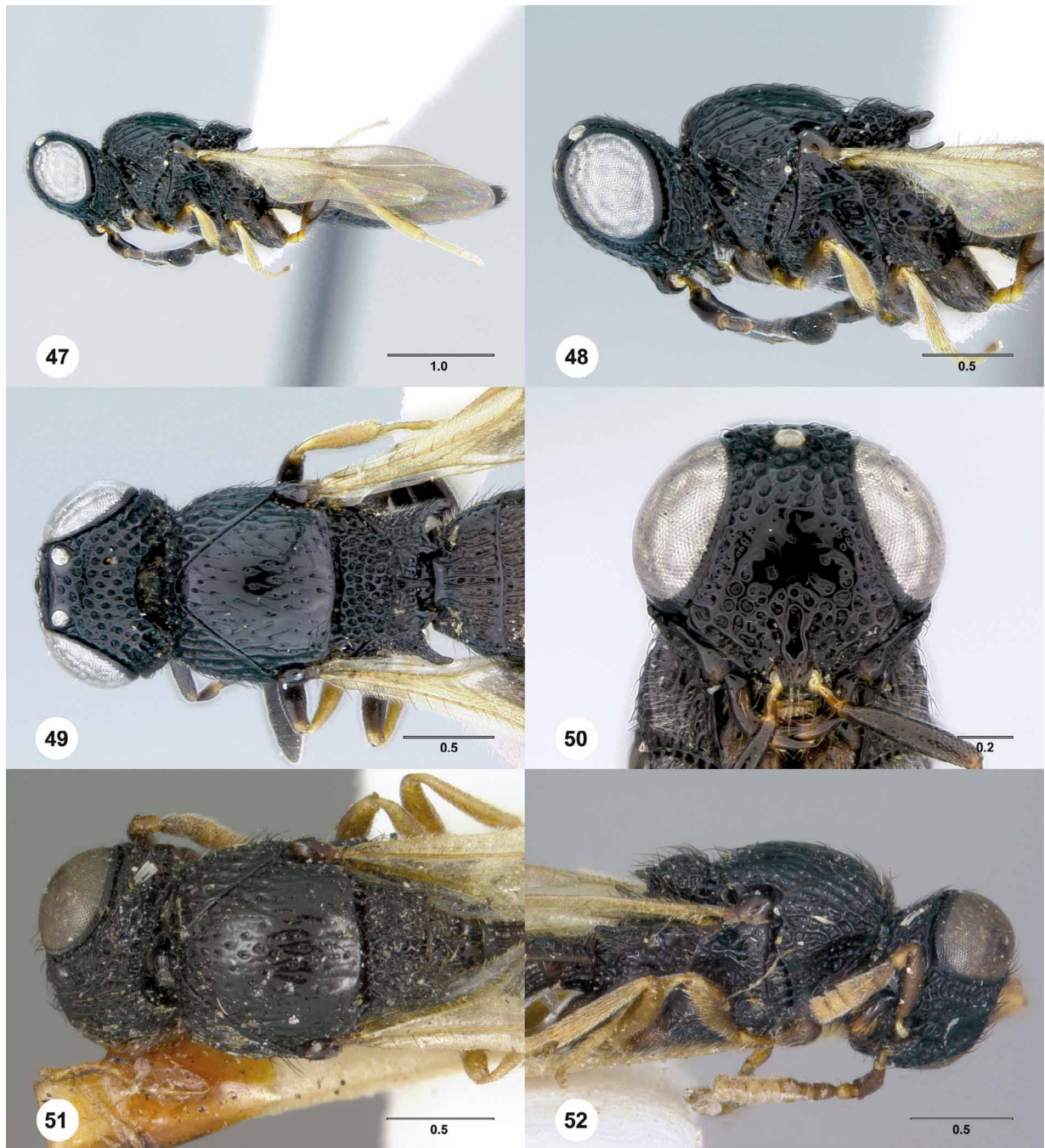
**FIGURES 37–42.**<sup>99</sup> *Heptascelio hamatus*, n.sp. 37, Lateral habitus, female holotype (OSUC 179129); 38, Head and mesosoma, lateral view, female holotype; 39, Head and mesosoma, dorsal view, female (OSUC 209023); 40, Head, anterior view, female holotype; 41, Mesoscutellum and propodeum, posterodorsal view, female (OSUC 186283); 42, Head, anterior view, female (OSUC 186283). Scale bars in millimeters.

99. <http://www.morphbank.net/?id=224262>



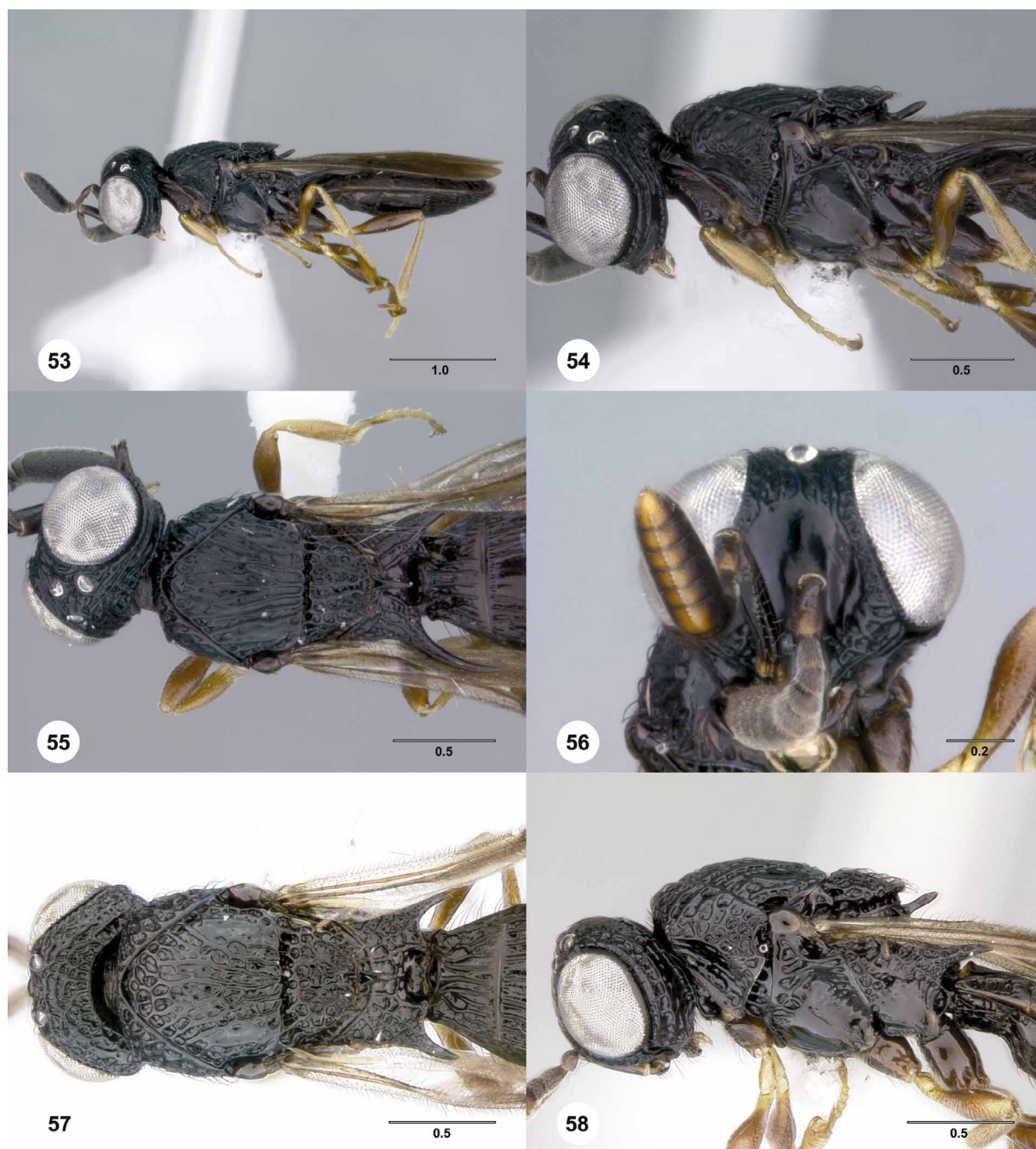
**FIGURES 43–46.**<sup>100</sup> *Heptascelio lateralis*, n.sp., female holotype (OSUC 186117). 43, Lateral habitus; 44, Head and mesosoma, lateral view; 45, Head and mesosoma, dorsal view; 46, Head, anterior view. Scale bars in millimeters.

100. <http://www.morphbank.net/?id=224261>



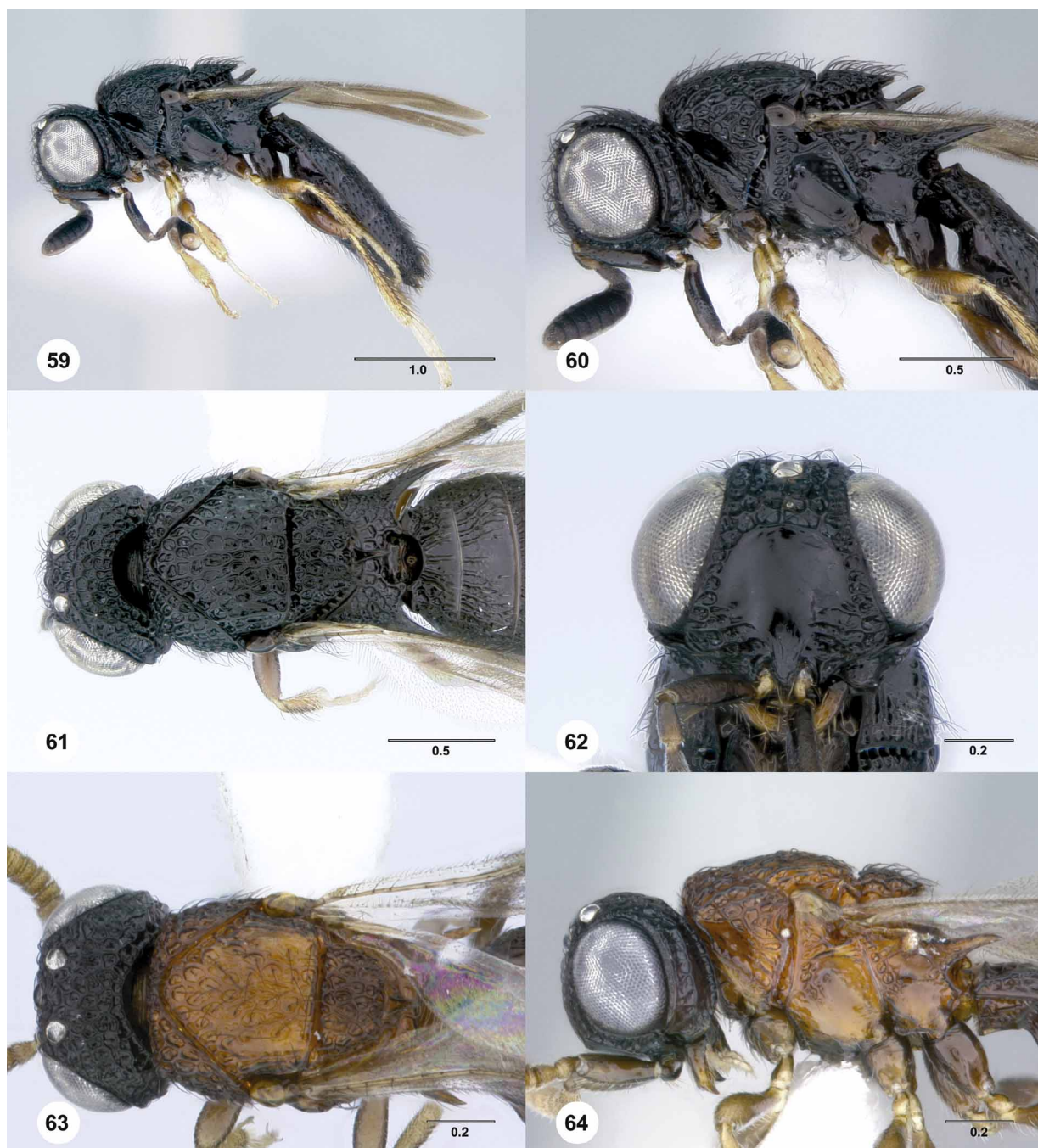
**FIGURES 47–52.**<sup>101</sup> *Heptascelio lugens* Kieffer. 47, Lateral habitus, female (OSUC 209010); 48, Head and mesosoma, lateral view (OSUC 209010); 49, Head and mesosoma, dorsal view (OSUC 209010); 50, Head, anterior view (OSUC 209010); 51, Head and mesosoma, dorsal view, male holotype (USNM 70486); 52, Head and mesosoma, lateral view, male holotype. Scale bars in millimeters.

101. <http://www.morphbank.net/?id=224260>



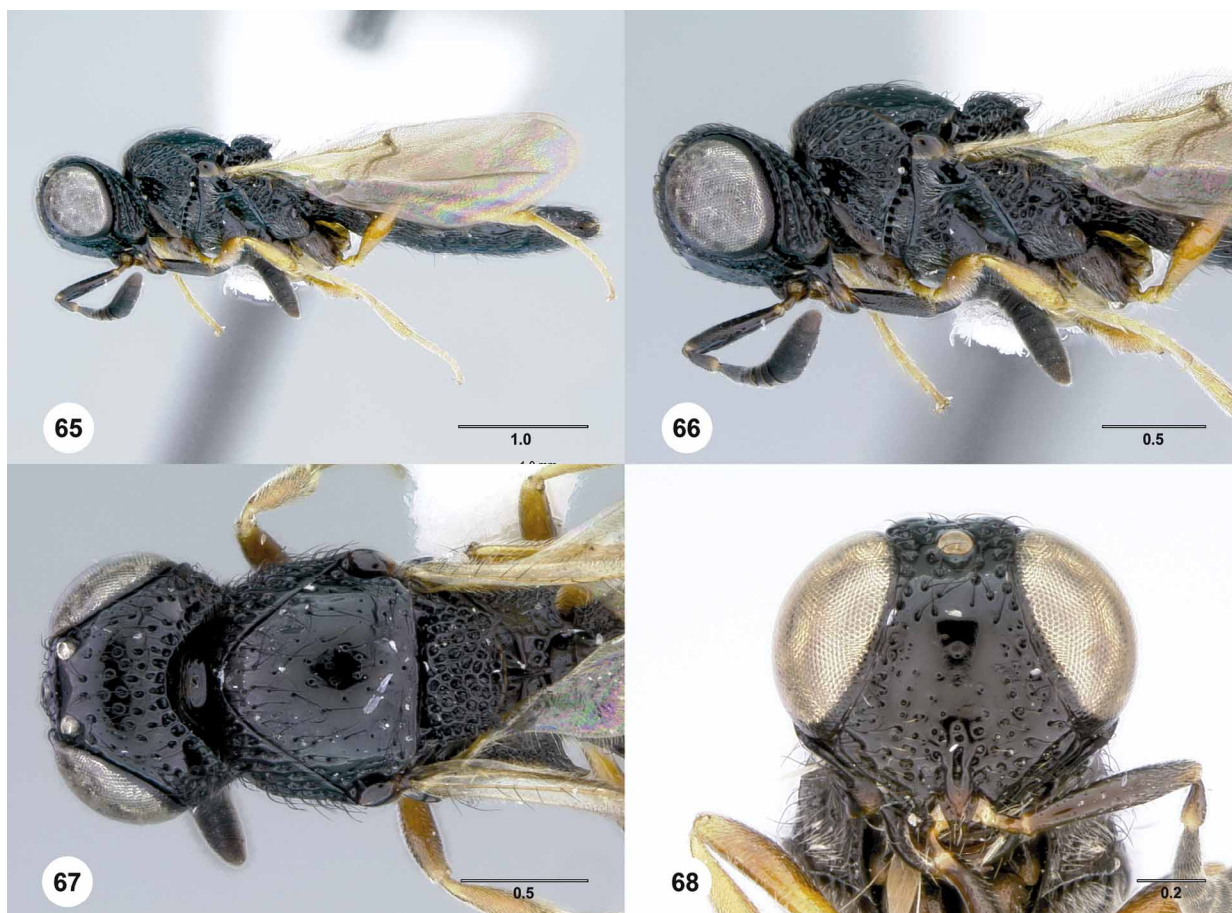
**FIGURES 53–58.**<sup>102</sup> *Heptascelio noyesi*, n.sp. 53, Lateral habitus, female holotype (OSUC 146658); 54, Head and mesosoma, lateral view, female holotype; 55, Head and mesosoma, dorsal view, female holotype; 56, Head, anterior view, female holotype; 57, Head and mesosoma, dorsal view, male (OSUC 186123); 58, Head and mesosoma, lateral view, male (OSUC 186123). Scale bars in millimeters.

102. <http://www.morphbank.net/?id=224259>



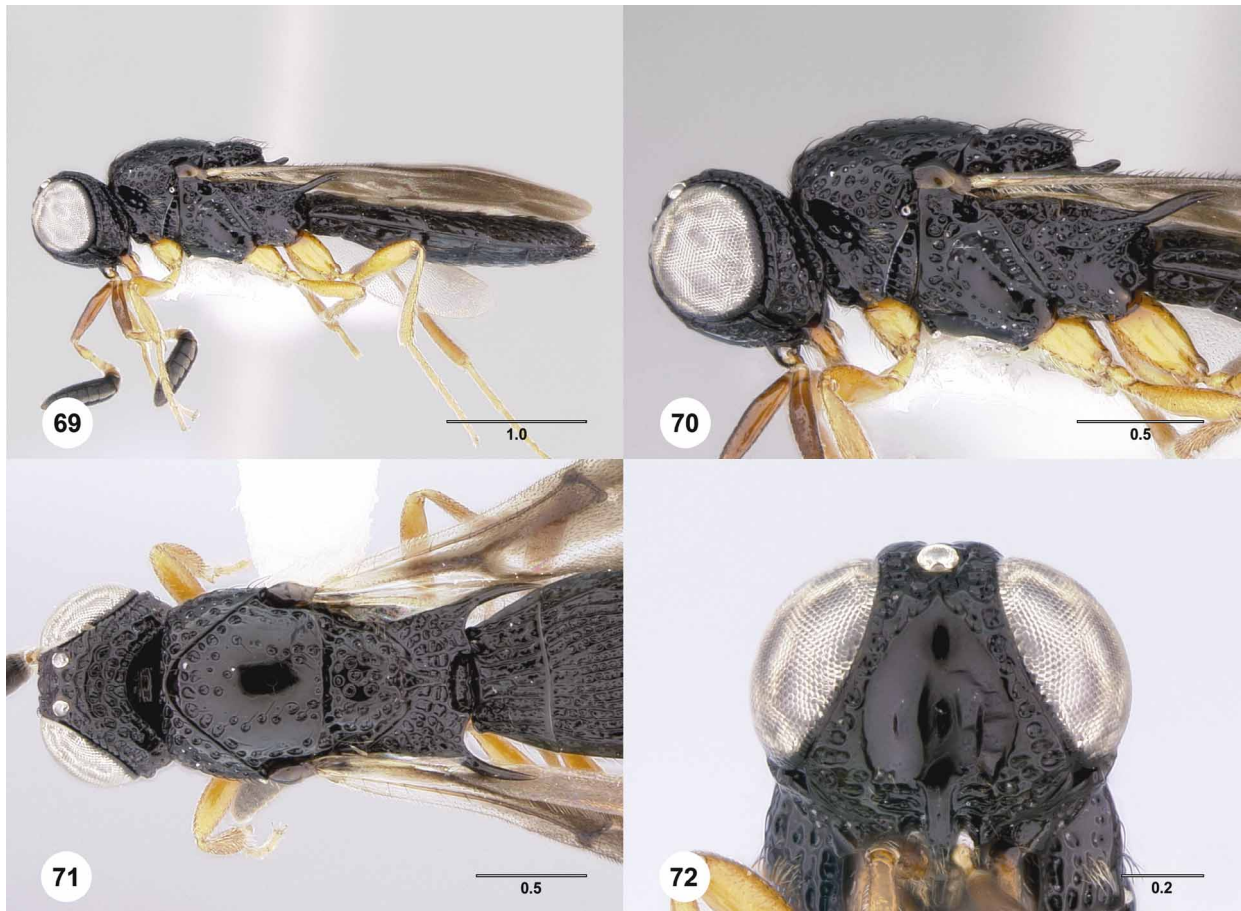
**FIGURES 59–64.**<sup>103</sup> *Heptascelio orarius*, n.sp. 59, Lateral habitus, female holotype (CASENT 2043723); 60, Head and mesosoma, lateral view, female holotype; 61, Head and mesosoma, dorsal view, female holotype; 62, Head, anterior view, female holotype; 63, Head and mesosoma, dorsal view, male (OSUC 186126); 64, Head and mesosoma, lateral view, male (OSUC 186126). Scale bars in millimeters.

103. <http://www.morphbank.net/?id=224258>



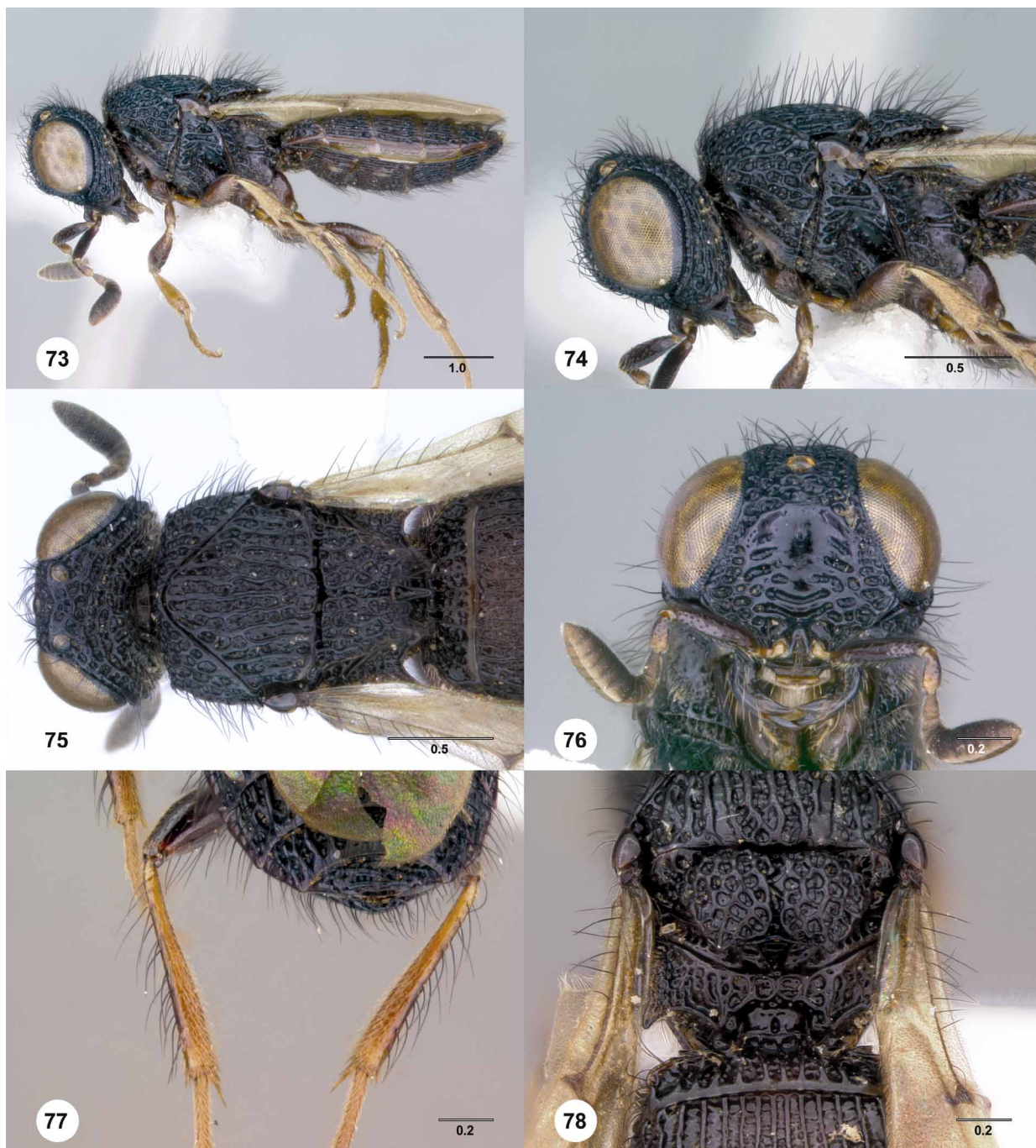
**FIGURES 65–68.**<sup>104</sup> *Heptascelio paralugens*, n.sp., female holotype (OSUC 209012). 65, Lateral habitus; 66, Head and mesosoma, lateral view; 67, Head and mesosoma, dorsal view; 68, Head, anterior view. Scale bars in millimeters.

104. <http://www.morphbank.net/?id=224257>



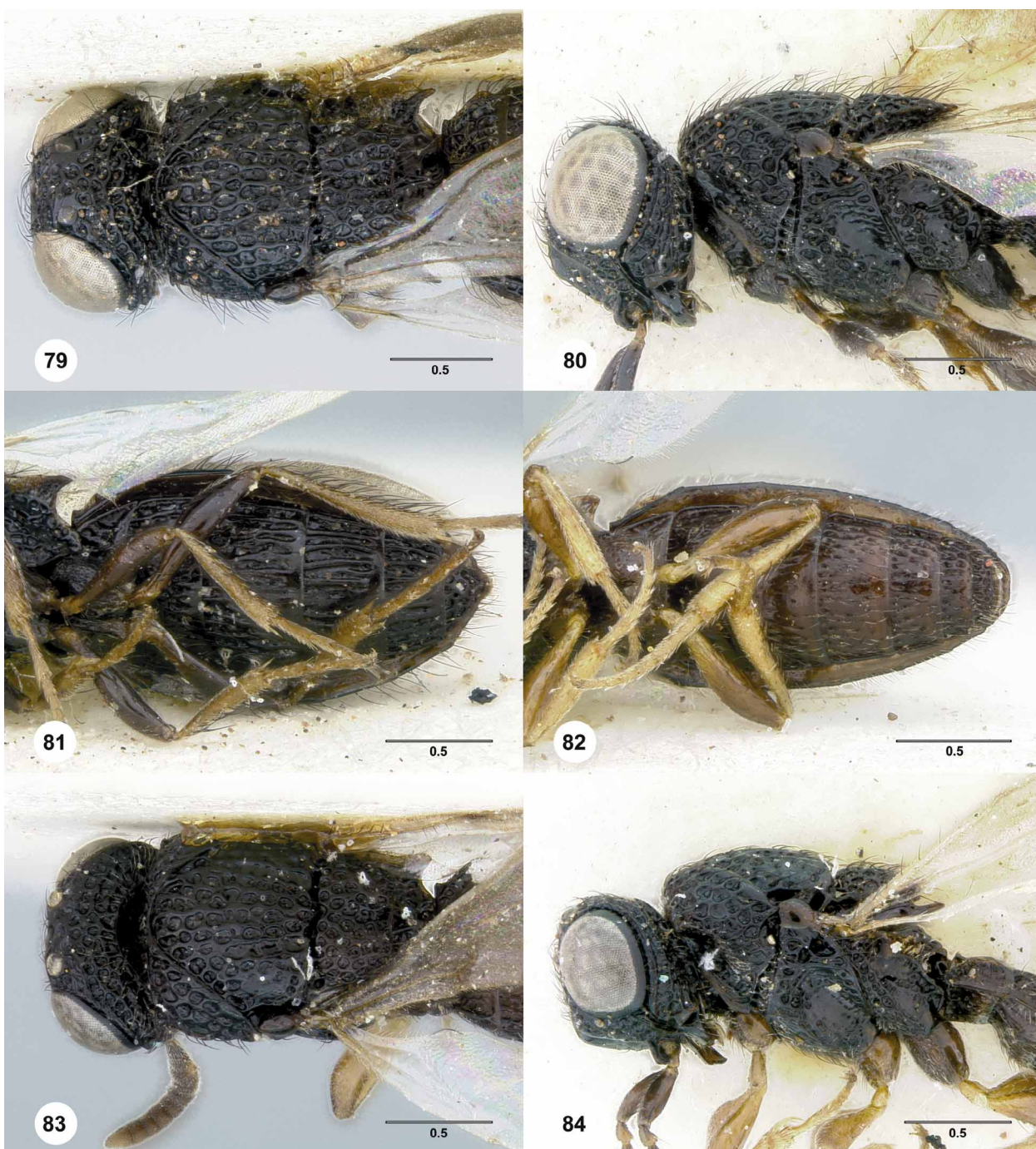
**FIGURES 69–72.**<sup>105</sup> *Heptascelio sicarius* n.sp., female holotype (CASENT 2134081). 69, Lateral habitus; 70, Head and mesosoma, lateral view; 71, Head and mesosoma, dorsal view; 72, Head, anterior view. Scale bars in millimeters.

105. <http://www.morphbank.net/?id=224256>



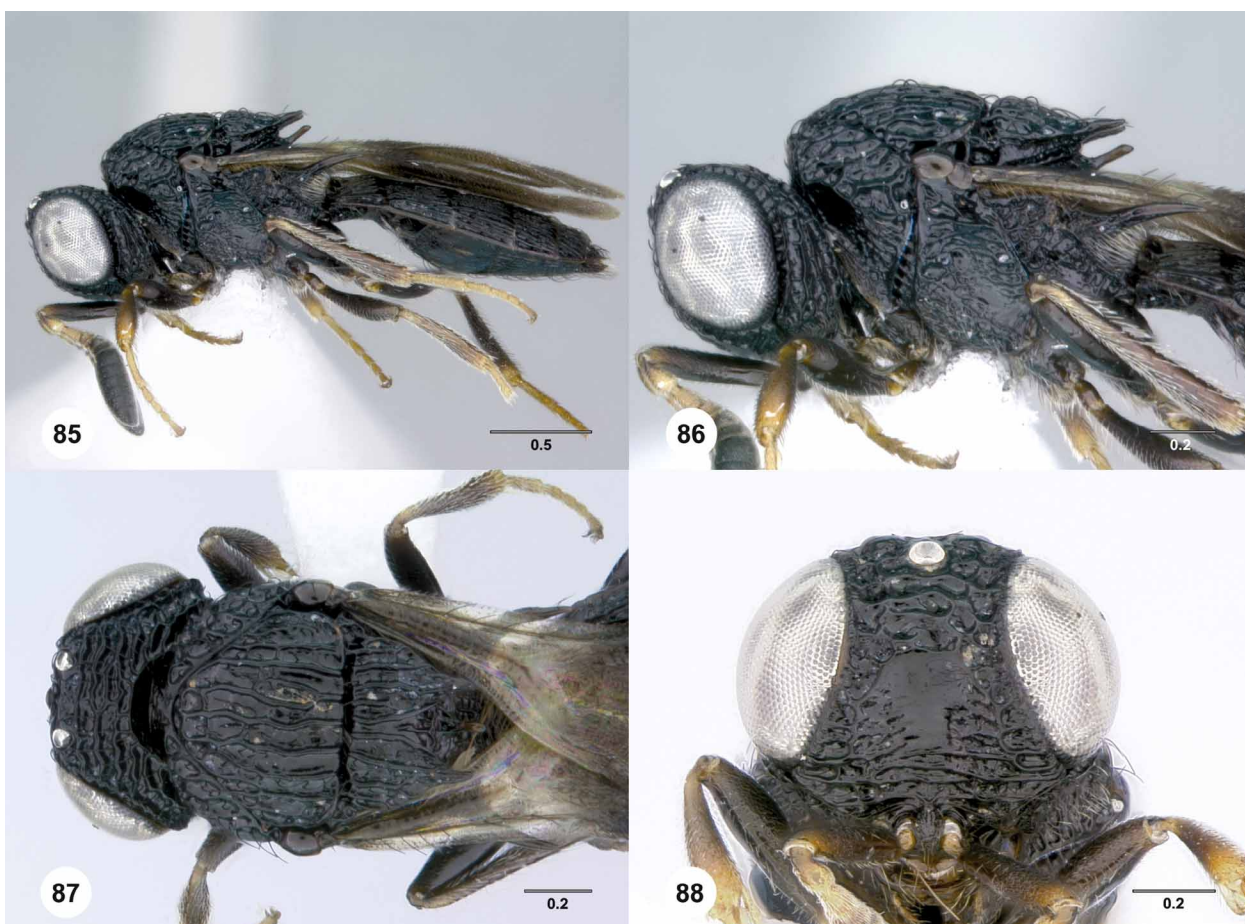
**FIGURES 73–78.**<sup>106</sup> *Heptascelio striatosternus* Narendran & Ramesh Babu. 73, Lateral habitus, female (OSUC 186124); 74, Head and mesosoma, lateral view (OSUC 186124); 75, Head and mesosoma, dorsal view (OSUC 186124); 76, Head, anterior view (OSUC 186124); 77, Hind tibiae, female (OSUC 186125); 78, Mesoscutellum and propodeum, posterodorsal view (OSUC 186125). Scale bars in millimeters.

106. <http://www.morphbank.net/?id=224255>



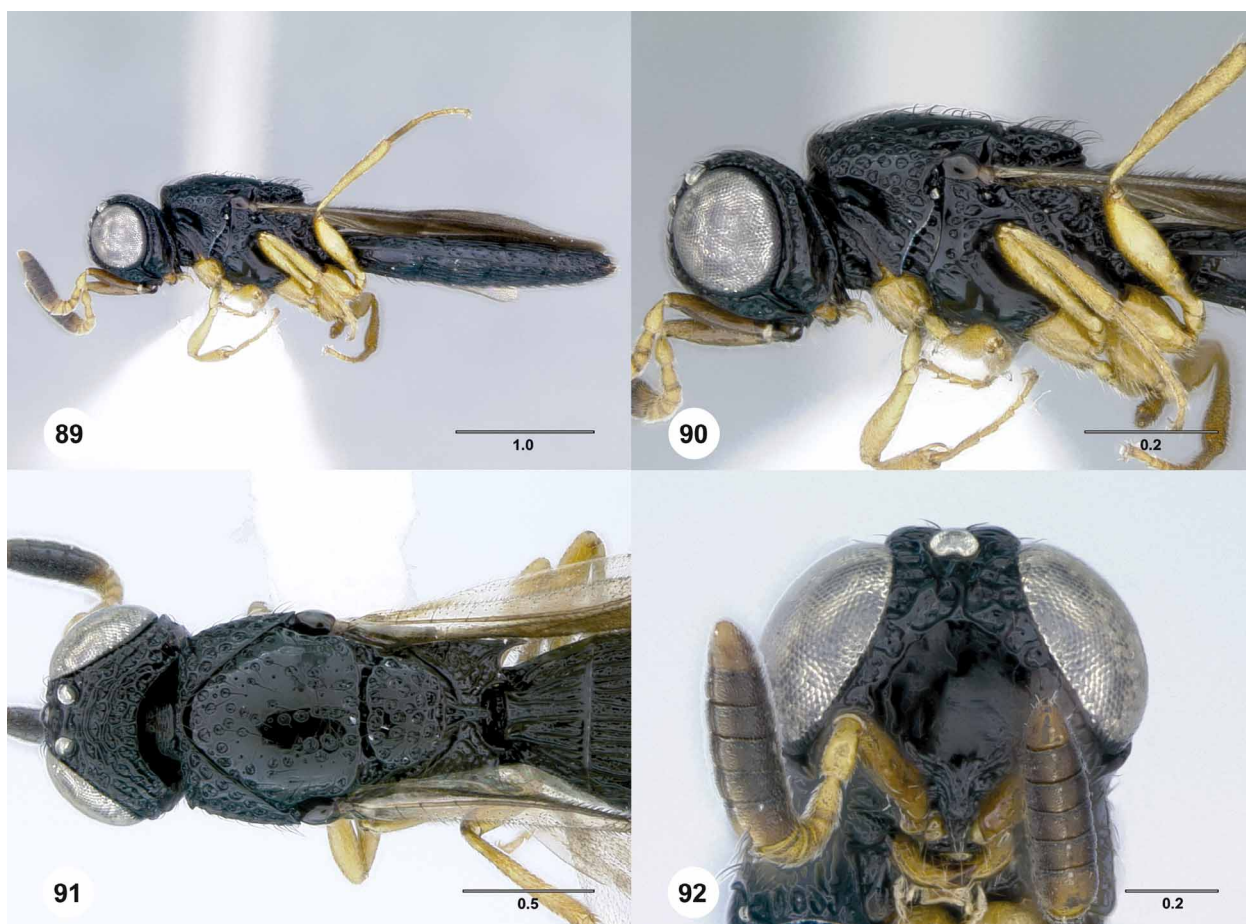
**FIGURES 79–84.**<sup>107</sup> 79–81, *Heptascelio striatosternus* Narendran & Ramesh Babu, holotype female. 79, Head and mesosoma, dorsal view; 80, Head and mesosoma, lateral view; 81, Metasoma, ventral view. 82–84, *Heptascelio punctisternus* Narendran & Ramesh Babu, holotype male. 82, Metasoma, ventral view; 83, Head and mesosoma, dorsal view; 84, Head and mesosoma, lateral view. Scale bars in millimeters.

107. <http://www.morphbank.net/?id=224254>



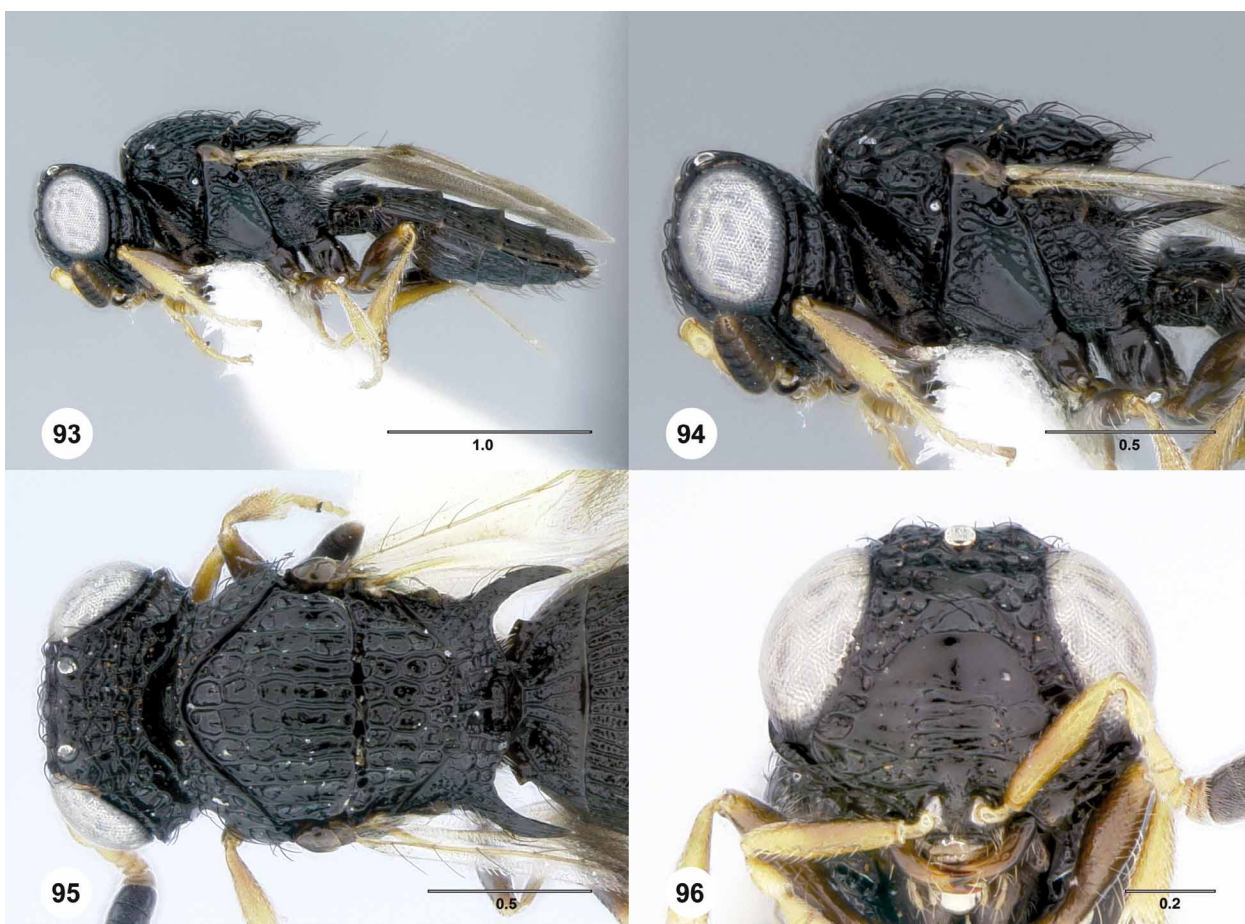
**FIGURES 85–88.**<sup>108</sup> *Heptascelio strigatus*, n.sp., holotype female (OSUC 186133). 85, Lateral habitus; 86, Head and mesosoma, lateral view; 87, Head and mesosoma, dorsal view; 88, Head, anterior view. Scale bars in millimeters.

108. <http://www.morphbank.net/?id=224253>



**FIGURES 89–92.**<sup>109</sup> *Heptascelio teres*, n.sp., female holotype (OSUC 179099). 89, Lateral habitus; 90, Head and mesosoma, lateral view; 91, Head and mesosoma, dorsal view; 92, Head, anterior view. Scale bars in millimeters.

109. <http://www.morphbank.net/?id=224252>



**FIGURES 93–96.**<sup>110</sup> *Heptascelio watshami*, n.sp., female holotype (OSUC 209184). 93, Lateral habitus; 94, Head and mesosoma, lateral view; 95, Head and mesosoma, dorsal view; 96, Head, anterior view. Scale bars in millimeters.

110. <http://www.morphbank.net/?id=224251>