



A Curious Case of *Cuspicona*: A new species of *Cuspicona* (Pentatomidae: Pentatominae: Rhynchorini) from Eastern Australia

A.J. Maynard ^{1*}

¹ Department of Agriculture, Fisheries and Forestry, 42-44 Qantas Drive, Brisbane, Queensland, Australia

*Corresponding author: andrew.maynard@aff.gov.au

A.J. Maynard  <https://orcid.org/0000-0002-1311-8767>



© Copyright of this paper is retained by its authors, who, unless otherwise indicated, license its content under a CC BY 4.0 license

Abstract

A new species of *Cuspicona* Dallas, 1851 (Pentatomidae: Pentatominae: Rhynchorini) is described from eastern Australia. *Cuspicona luedkei* **sp. n.** is distinguished from congeners by the strongly produced mesosternal keel extending beneath the head, angulately produced laterotergite VII, spinose humeri, distinctive colour and punctuation patterns, and genitalic characters. Adults, eggs, and nymphal instars I–III are described. Diagnostic characters, host associations, behavioural notes, and distribution are also documented. Morphological and mitochondrial evidence (COI, 16S) supports placement of the new species within *Cuspicona* s. s. Phylogenetic analyses indicate that *Cuspicona* may not be monophyletic, with the *Cuspicona simplex* group forming a distinct, strongly supported lineage separate from *Cuspicona* s. s. (which contains the type species *Cuspicona thoracica* (Westwood, 1837)). The classification of *Cuspicona* spp. and related genera within Rhynchorini remains unresolved, requiring broader taxon sampling and additional loci in a comprehensive tribal revision.

Cite this paper as: Maynard AJ (2026). A Curious Case of *Cuspicona*: A new species of *Cuspicona* (Pentatomidae: Pentatominae: Rhynchorini) from Eastern Australia. *Australian Journal of Taxonomy* 139: 1–19. doi: <https://doi.org/10.54102/ajt.fadjr>

urn:lsid:zoobank.org:act:10F8F338-4E57-4EDF-974E-5B77EEE5F159

Introduction

The Rhynchorini (Hemiptera: Pentatomidae: Pentatominae) are a prominent and diverse tribe of stink bugs in the Australasian region. Members are typically characterised by a raised mesosternal keel extending anteriorly over the prosternum, and a raised metasternal keel that is posteriorly bifid and interdigitated with a basal spine or tubercle on the third abdominal sternite (Gross 1975, 1976; Rider et al. 2018). However, these

features are occasionally shared with members of other pentatomid subfamilies (e.g. Edessinae) and tribes (e.g. Nezarini, Pentatomini), and identification is best confirmed using a combination of characters and geographic context. This reflects broader challenges in the tribal and suprageneric classification of Pentatomidae, where many tribes have yet to be assessed systematically within a comprehensive phylogenetic framework (Rider et al. 2018).

This paper was submitted on 25 April 2026 and published on 30 October 2026 (2026-10-29T20:10:42.733Z). It was reviewed by Mike Elias and an anonymous reviewer, and edited by Subject Editor Nicole Gunter under the guidance of Associate Editor Erinn Fagan-Jeffries. *Australian Journal of Taxonomy*. ISSN: 2653-4649 (Online).

The genus *Cuspicona* Dallas, 1851 is one of the most speciose genera within Rhynchorini, currently comprising 32 described species distributed across Australia and parts of the Oriental and Melanesian regions. In addition to the typical rhynchorine sternal and abdominal features, *Cuspicona* spp. are generally characterised by their elongate-ovoid to broadly pentagonal ("kite-shaped"; Gross 1976: 466) body shape, dense punctation, often with distinctive patterns on the pronotum, scutellum, head and venter, subangulate to spinose humeri, and colouration that is typically green in life and yellow after death. Some species have pale bands or other distinct markings on the pronotum, scutellum and venter, whereas others are uniformly coloured. The genus is highly morphologically diverse, and some species resemble those of related genera such as *Avicenna* Distant, 1901, *Vitellus* Stål, 1865, *Ocirrhoe* Stål, 1867 and *Morna* Stål, 1867. Gross (1975, 1976) recognised this complexity within *Cuspicona*, proposing several groupings based on morphology and host plant associations: the *thoracica* group, characterised by spinose humeri, black punctation and pale markings near the scutellar apex and pronotal hind lobe, associated with Myrtaceae, Proteaceae, Cupressaceae and Asteraceae; the *simplex* group, characterised by subacute to spinose humeri and associated with Solanaceae and Rosaceae; and the *intacta* group, characterised by strongly triangular heads, associated with *Eremophila* (Scrophulariaceae) and Myrtaceae and inhabiting more arid regions; as well as several unassigned intermediate species. Existing identification keys to the genera of Rhynchorini (Gross 1975, 1976; Cassis et al. 2016) do not adequately reflect this intrageneric variation, making accurate identification to the genus and species level challenging in some cases. I use *Cuspicona* s.s. here for the *thoracica* group, which contains the type species, *Cuspicona thoracica* (Westwood, 1837), following the concept of Gross (1975: 92), who proposed that this group would retain the name *Cuspicona* s.s. if the other *Cuspicona* groups were subsequently recognised as separate genera.

Within this context, a series of *Cuspicona*-like specimens from southeastern and central Queensland were detected that could not be confidently assigned to the genus or any described species. These were first recognised through citizen science observations on iNaturalist and through sporadic captures during biosecurity surveillance. Early attempts at identification were hampered by limited material, but targeted collecting and incidental captures in traps deployed for surveillance for the exotic *Halyomorpha halys* (Stål, 1855), which is not established in Australia, subsequently yielded sufficient material for detailed examination.

Herein, a new species of *Cuspicona* is described. The morphology of adults, eggs, and early-instar nymphs is documented, along with diagnostic characters, host associations, behavioural observations and distribution. A preliminary molecular phylogeny of selected Rhyn-

chorini is presented to assess the placement of the new species within *Cuspicona* s. s. and to provide preliminary evidence relevant to the monophyly and taxonomic limits of *Cuspicona*.

Methods

Collection Methods and Materials

Specimens were predominantly collected using cross-vane panel traps or sticky traps baited with a *H. halys* lure (Pherocon® BMSB Dual Lure High Load; Trécé Inc., USA), containing the *H. halys* aggregation pheromone (murgantiol) and synergist methyl (2E,4E,6Z)-decatrienoate (MDT) from Queensland and New South Wales, Australia, between 2024–2026. Traps were typically suspended in trees or attached to man-made structures and checked weekly. iNaturalist records of Rhynchorini were reviewed to supplement distribution and host association data, and informed targeted field collections. Field sampling included sweep-netting, shake-netting (where a net is placed around higher vegetation and shaken vigorously), and beating of *Melaleuca* spp. (Myrtaceae) or surrounding vegetation near previous detections, in addition to targeted visual searches and hand collecting, particularly of inflorescences and foliage of *Melaleuca* spp. Additional Rhynchorini were collected under permit P-PTUKI-100128508 issued by Queensland Department of Environment and Science using beating and light sheets (Table S1).

Live specimens of the new species were collected or observed in the field to document colouration in life and behaviour, as well as life-history traits including nymphal and egg morphology. Wild-caught adults and first-instar nymphs were maintained in captivity on inflorescences of *Melaleuca quinquenervia* and supplemented with moist cotton.

Searches of institutional collections (QM, QDPC, AM, ANIC), along with curator-assisted enquiries to SAMA based on supplied photographs, revealed only two additional specimens (both from QDPC). Types are deposited in QM and QDPC as indicated. Additional material will be deposited in ANIC. Where multiple specimens are listed consecutively from the same collection, the collection abbreviation given at the end of the series applies to all preceding specimens in that series.

AM – Australian Museum (Sydney, NSW)

ANIC – Australian National Insect Collection (Black Mountain, Canberra, ACT)

DAFF – Department of Agriculture, Fisheries and Forestry (Brisbane Airport, QLD)

SAMA – South Australian Museum, Australia (Adelaide, SA)

QDPC – Queensland Primary Industries Insect Collection (Dutton Park, QLD)

QM – Queensland Museum Kurilpa (South Bank, QLD)

Morphometrics

Specimens of the undescribed species were examined under a stereo microscope (Leica M205C) and measured using LAS X v5.2.2.28326 (Leica Microsystems, Wetzlar, Germany). Measurements (mean $\pm$ standard deviation (minimum-maximum)) are in millimetres. Antennal measurements are based on the average from the specimen. Nineteen morphological characters were measured from 28 adult specimens (14 males, 14 females) including: body length (from apex of head to apex of hemelytral membrane); body width (maximum width across abdominal segment III); head length; head width (across eyes); anteocular length (from anterior margin of eye to apex of head); interocular distance (between inner margins of eyes); pronotal length (medially, from anterior to posterior margin); pronotal width (maximum width between humeri); scutellum length (medially, from base to apex); scutellum width (maximum width at base); length of each antennomere; and length of each labial segment. Morphometric measurements of eggs ($n = 5$) included height and width. Measurements of first instar ($n = 6$) and third instar ($n = 9$) nymphs included body length and width and head width (across eyes). Raw measurement data for the new species is provided in Table S2. Body length was also measured for adults of *Cuspicona phi* Gross, 1975 (9 males, 5 females) to provide comparative data for the identification key.

Terminology

General terminology follows Cassis et al. (2016) and genitalia primarily Gross (1975). Colour terminology primarily follows the Royal Horticultural Society Colour Chart (Royal Horticultural Society 2015), though terms are used broadly to encompass natural variation across the range of each character. Punctuation density was estimated from the average distance between punctures relative to puncture diameter. Dense: interspaces approximately equal to or less than puncture diameter. Moderate: interspaces approximately 1.5–2 puncture diameters. Sparse: interspaces >2 puncture diameters. Categories refer to the predominant spacing within an area despite local irregular variation. Morphological abbreviations include: labial segment (L), antennomere (A), sternite (S), laterotergite (Lt), gonocoxae (Gc).

Genitalia preparation

For genitalia examination, the pygophore was extracted from pinned specimens with a hooked pin after immersion in boiled water or was easily removed without this step from freshly collected specimens. Pygophores were cleared using 10% KOH at 70 °C for approximately 20–30 minutes before cleaning in distilled water using forceps and fine brushes to remove any tissue; sometimes this step occurred after DNA was extracted from the pygophore (see Molecular Analysis). The entire female abdomen was removed to examine internal gen-

italia. It was cleared using the same method. The aedeagus was inflated following Ahmad (1986), particularly by pulling on either the vesica, lappet processes, medial penial plates or conjunctival lobes to encourage inflation. Pygophores (in 100% glycerol in microvials) and carded female abdomens were pinned with their respective specimens.

Imaging

Images were captured using a photo-stacking setup with a Canon EOS R5, a Canon MP-E 65mm f/2.8 1–5 $\times$ Macro Photo, and Mitutoyo M Plan Apo 5 $\times$, 10 $\times$ and 20 $\times$ Objectives, mounted on a Cognisys StackShot. Image stacks were combined using Zerene Stacker v1.04 and edited using Adobe Photoshop 2025 (v26.10.0). Scanning electron micrographs (SEM) were obtained using a Phenom Pure desktop SEM (Thermo Fisher Scientific, Eindhoven, The Netherlands).

Statistical Analysis

Basic morphological analysis was performed in R v4.3.2 (R Core Team 2024) using RStudio (Posit Team 2024) with the package MorphoTools2 v1.0.2.1 (Šlenker et al. 2022). Character variability was assessed using the coefficient of variation, with lower values indicating greater consistency and higher values indicating greater variation among specimens. Sexual dimorphism was assessed using Mann-Whitney U tests with Benjamini-Hochberg correction for multiple comparisons; effect sizes were calculated as $r = |Z|/\sqrt{N}$, where $r \geq 0.5$ is considered a large effect. Stepwise discriminant analysis (forward selection by F-criterion) was used to identify the minimum measured character subset best discriminating males from females. Missing data (for antennomeres) were imputed using population means as required for multivariate analyses.

Molecular Analysis

DNA was extracted from either legs, muscle tissue, whole abdomens (♀) or pygophores (♂) using a DNeasy Blood and Tissue kit (QIAGEN) and either destructive or non-destructive methods with lysis time ranging from 2 hours to overnight. In destructive extractions, tissues were homogenised using 2–4 mm glass beads in 2 mL Eppendorf tubes. The mitochondrial genes cytochrome c oxidase subunit I (COI) and 16S rRNA (16S) were amplified using a cocktail of COI primers (Lep-F 5'-ATTCAACCAATCATAAAGATATTGG-3', Lep-R 5'-TAAACTTCTGGATGTCCAAAAATCA-3', LCO1490 5'-GGTCAACAAATCATAAAGATATTGG-3', HCO2198 5'-TAAACTTCAGGGTGACCAAAAAATCA-3') and 16S primers (LR-J-12961 5'-TTTAATCCAACATCGAGG-3', LR-N-13398 5'-CGCCTGTTTAACAAAAACAT-3'). Each 20 μ L reaction consisted of 3 μ L H₂O, 10 μ L 1 $\times$ KAPA2G Fast Master Mix (Roche, Switzerland), 1 μ L 10 μ M forward primer, 1 μ L 10 μ M reverse primer, 1 μ L 10 mg/ml BSA and 2 μ L 1:10 DNA template. PCR used an initial denaturation of 95 °C for 2 min, 35 cycles of denaturation at 95 °C for 15 sec, primer annealing at 45 °C for 15 sec, primer exten-

sion at 72 °C for 15 sec, and final elongation for 5 min at 72 °C prior to cooling to 12 °C for 3 min. Amplification was confirmed using the QIAxcel Advanced System with the QIAxcel DNA Screening Kit (QIAGEN, Hilden, Germany). In cases where amplification of COI was difficult, primers designed for degraded DNA (Mitchell 2015) were used with more relaxed PCR conditions (95 °C for 2 min; 40 cycles of 95 °C for 30 s, 47 °C for 30 s, 72 °C for 1 min; final extension at 72 °C for 7 min). PCR products were prepared for sequencing using the Rapid Barcoding Kit (SQK-RBK114.24) following the manufacturer's protocol (Oxford Nanopore Technologies). Libraries were sequenced on an Oxford Nanopore MinION using a Flongle Flow Cell (R10.4.1). Raw reads were basecalled and demultiplexed using Dorado (Oxford Nanopore Technologies).

Reads were assembled in Geneious Prime v.2023.0.4 (Biomatters Ltd., Auckland, New Zealand; Kearse et al. 2012), where they were assembled de novo to generate consensus sequences; reads were mapped to reference sequences when necessary to assist assembly. Additional COI and 16S sequences of Rhynchorini and outgroup taxa were obtained from GenBank and Barcode of Life Data System (BOLD). Some unidentified Rhynchorini records from BOLD were identified based on available specimen images (e.g. BOLD: SICOD921-19 corresponding to *Cuspicona obesula* Gross, 1975, NSWHB1646-24 to *Biprorulus bibax* Breddin, 1900a, etc.). Where images were available, identifications were independently verified by the author. Outgroup selection was guided by the phylogeny of Roca-Cusachs et al. (2022) and sequence availability. Preliminary analyses assessed multiple candidates, including Edessinae and representatives of Tessaratomidae, Dinidoridae, and Cydnidae, with those from the latter three families retained as outgroups in the final analyses.

A total of 25 species representing 10 genera of Rhynchorini were included across the molecular datasets. This included 39 sequences generated in this study, comprising two individuals of *Cuspicona* **sp. n.** All newly generated sequences were deposited in GenBank (COI: PZ295860–PZ295878; 16S: PZ298054–PZ298073; Table S1). Sequences were edited and aligned using the MAFFT alignment in Geneious Prime. The final alignments were trimmed (COI: 627 bp; 16S: 470 bp) to incorporate other sequences available from GenBank and BOLD. The 16S alignment was refined using Gblocks 0.91b (Castresana, 2000) in Phylogeny.fr (Dereeper et al., 2008) to remove poorly aligned and ambiguously homologous regions, with 414 bp retained (88% conserved positions) for analyses. The COI dataset comprised 49 sequences in total, including 17 newly generated sequences (*Cuspicona apothoracica* Gross, 1975 was excluded due to short sequence length, and one of the two *Avicenna auricornis* (Walker, 1867) sequences was excluded as redundant). The 16S dataset included 28 sequences, of which 20 were newly generated. For concatenated analyses, a reduced dataset of

19 sequences representing 18 species and 8 genera of Rhynchorini was used.

Phylogenetic trees were inferred in IQ-TREE v.2.3.5 (Minh et al. 2020) using maximum likelihood analysis of the COI and 16S datasets separately, as well as the concatenated alignment. The best-fit substitution model was selected automatically under the Bayesian Information Criterion (BIC) via ModelFinder (Kalyaanamoorthy et al. 2017). To assess alternative tree topologies, codon partitioning in various schemes as well as RY-coding of the 3rd codon position was explored for the COI region. Branch support was assessed with 1,000 ultrafast bootstrap replicates (UFBS) and the SH-aLRT test. Nodes with UFBS $\geq 95\%$ and SH-aLRT $\geq 80\%$ were considered strongly supported, following IQ-TREE recommendations (Minh et al. 2020).

Results

Morphological analysis

Intraspecific character variability in the undescribed species, assessed using coefficients of variation, was generally low across most characters (pooled across sexes: 3.1–9.2%). The highest variability was observed in LI (9.2%), LIII (8.9%), AIII (8.0%) and pronotal length (6.9%), while the remaining characters were below 6%. Variability differed between sexes for some characters, notably LI (6.5% in females, 11.8% in males) and AIII (9.2% in females, 6.7% in males). Sexual dimorphism testing using Mann-Whitney U tests with Benjamini-Hochberg correction detected significant differences in antennal segments AIV and AV only, which were longer in males; all other characters were non-significant. Effect size calculations indicated large effects ($r \geq 0.5$) for AIV and AV. Stepwise discriminant analysis identified AIV as the primary discriminatory character between sexes (partial $R^2 = 0.59$, $p < 0.001$).

Molecular Analysis

The concatenated analysis of COI+16S (1041 bp, 25 taxa (including outgroups)) used a 4-partition scheme with optimised substitution models: TIM2+F+G4 for COI position 1, TPM3u+F+I for COI position 2, TPM3u+F+R3 for COI position 3, and TVM+F+I+R2 for 16S. The partition-specific rate varied substantially, with COI third codon positions showing the highest rate (4.503), while COI second positions showed the lowest rate (0.014). Analyses using RY-coding of the third codon position yielded comparable support for the clades of *Cuspicona* and *Pegala* Stål, 1867, however, relationships among the remaining taxa were inconsistent and generally poorly resolved. RY-coding was therefore not used in the final analyses. The single-gene analyses used TVM+F+I+R2 for 16S (414 bp, 28 taxa) and a 3-partition scheme for COI (627 bp, 49 taxa) with TIM2e+I+G4, TPM3u+F+I, and TPM3u+F+R3 for positions 1, 2, and 3 respectively. As in the concatenated dataset, COI partition-specific rates (1st: 0.207, 2nd: 0.016, 3rd: 2.777) indicate codon saturation at third positions.

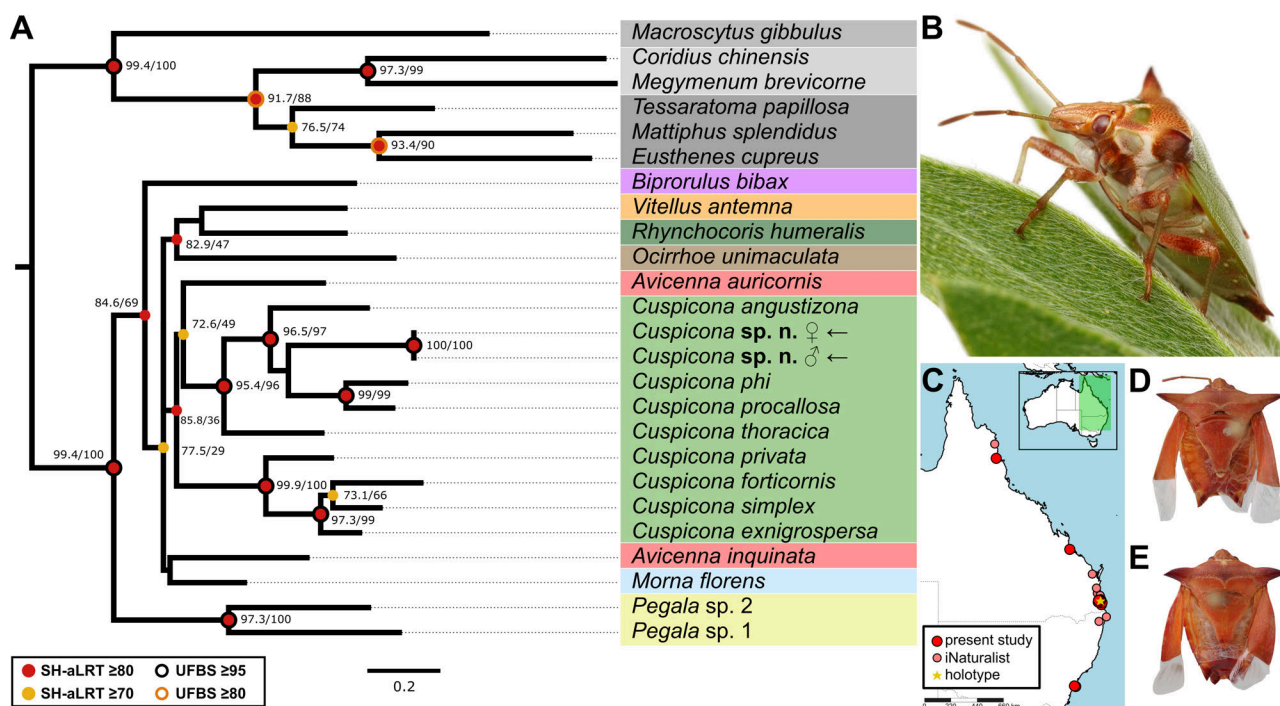


Figure 1. Maximum likelihood phylogeny inferred from concatenated COI and 16S sequences for 18 species of Rhynchorini using IQ-TREE 2. Node support values are indicated by circles representing SH-aLRT and ultrafast bootstrap (UFBS; 1000 replicates) support above threshold values specified in the legend; exact support values are also shown above or adjacent to these nodes. Tip labels are coloured by outgroup family (grey shading) and Rhynchorini genus. Inset images show: (B) habitus, lateral view of *Cuspicona luedkei* sp. n.; (C) map of eastern Australia showing the distribution of *C. luedkei* sp. n., with a star indicating the holotype locality, small red circles representing iNaturalist records, and larger red circles indicating specimens examined in the present study. Paratypes corresponding to the two sequenced specimens of *C. luedkei* sp. n. are also shown, collected from (D) Brisbane (♂; COI: PZ295870, 16S: PZ298061) and (E) Sydney (♀; COI: PZ295877; 16S: PZ298059).

The concatenated COI+16S analysis (Figure 1) produced a more resolved and better-supported topology of *Cuspicona* clades than the single-gene analyses (Figure 2), although comparisons are constrained by differences in taxon sampling and some relationships were inconsistent among datasets. *Cuspicona luedkei* sp. n. was nested within the major clade containing the *Cuspicona* type species, *C. thoracica*, with both NSW and QLD specimens forming a strongly supported monophyletic group (SH-aLRT/UFBS = 100/100; Figure 1). Both single-gene trees also placed *C. luedkei* sp. n. within the broader clade containing *C. thoracica*, although support was only partial (SH-aLRT >80, UFBS <95; Figure 2).

In the concatenated analysis, *Cuspicona* was near-monophyletic, with *A. auricornis* rendering the genus paraphyletic, although this relationship received only partial support (SH-aLRT/UFBS = 85.8/36). *Cuspicona* formed two strongly supported lineages: (1) a clade containing *C. thoracica*, *C. luedkei* sp. n., *Cuspicona angustizona* Gross, 1975, *C. phi*, and *Cuspicona procallosa* Gross, 1975 (SH-aLRT/UFBS = 95.4/96), and (2) a clade comprising *Cuspicona privata* Walker, 1867, *Cuspicona simplex* Walker, 1867, *Cuspicona forticornis* Breddin, 1900b and *Cuspicona exnigrospersa* Gross, 1975 (SH-aLRT/UFBS = 99.9/100). However, the single-gene analyses included substantially broader taxon sampling and did not consistently recover *Cuspicona* as monophyletic, with sev-

eral morphologically distinct taxa occurring within or between *Cuspicona* lineages. Thus, although the concatenated analysis provides greater overall resolution and support, the broader sampling of the single-gene analyses provides additional evidence against treating *Cuspicona* as unequivocally monophyletic.

Among the other Rhynchorini included in the analyses, these results provide some indication of relationships among the sampled taxa, but are insufficient to draw broader conclusions about relationships among genera (Figure 2). *Ocirrhoe unimaculata* (Westwood, 1837) was not monophyletic in the COI analysis, although identifications of BOLD voucher specimens could not be verified, so this may reflect misidentification (Figure 2: COI). *Pegala* was recovered as a well-supported clade in the concatenated and 16S trees, but not in COI, and its position varied among analyses.

Discussion

Both morphological and molecular data support placement of *C. luedkei* sp. n. within *Cuspicona* s. s. In the phylogenetic analyses, the species consistently falls within the broader *Cuspicona* s. s. clade rather than with other rhynchorine genera. *Cuspicona* was not recovered as monophyletic in either the concatenated or single-gene analyses. Instead, species of the *simplex* group and *thoracica* group were each recovered as well-supported,

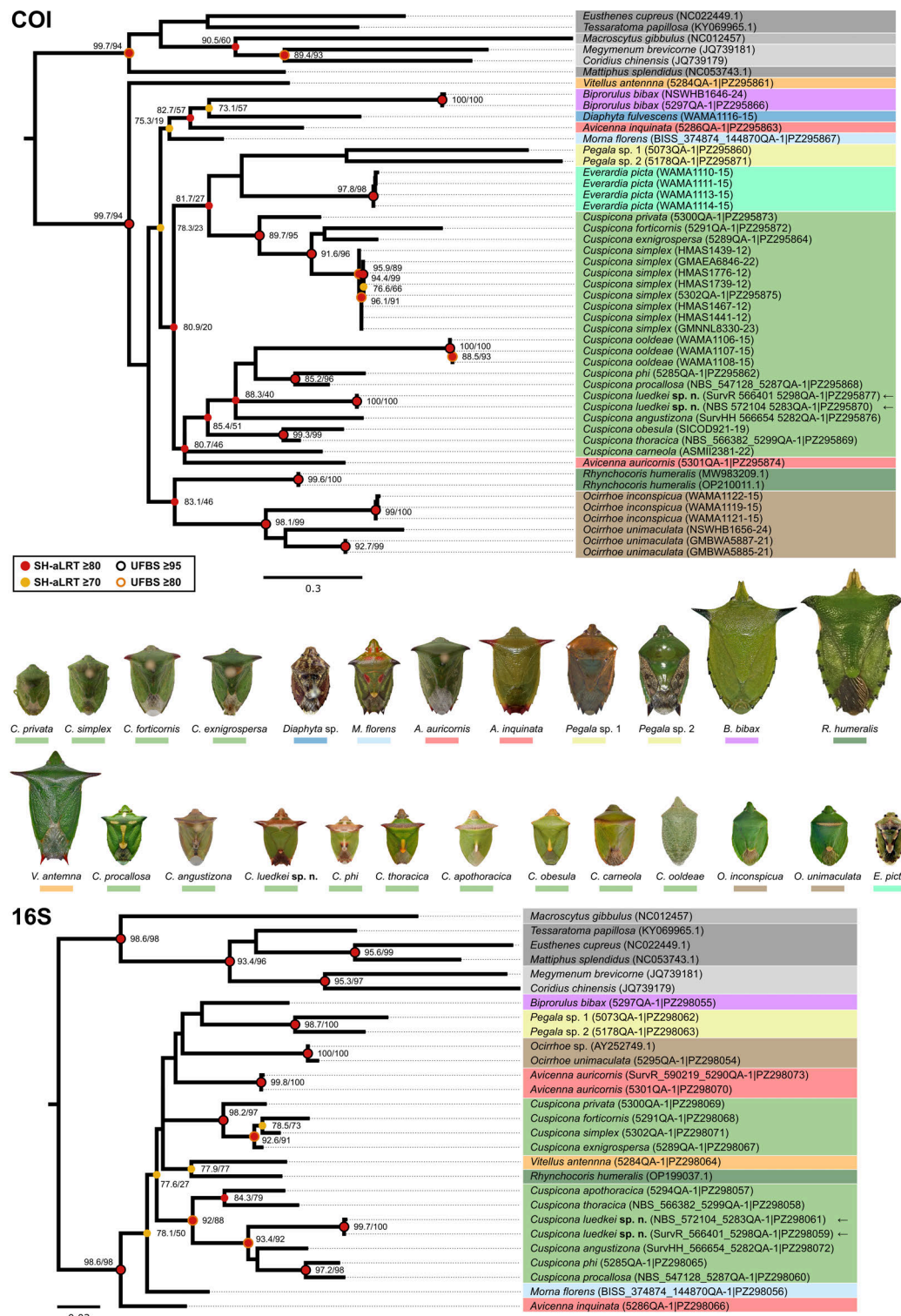


Figure 2. Maximum likelihood phylogenies of Rhynchorini inferred separately from COI (49 sequences) and 16S (28 sequences) using IQ-TREE 2. Taxon sampling differs between trees. Node support values are indicated by circles representing SH-aLRT and ultrafast bootstrap support (UFBS; 1000 replicates) above threshold values specified in the legend; exact support values are also shown above or adjacent to these nodes. Tip labels are coloured by Rhynchorini genus and outgroup family (grey shading). Representative dorsal habitus images of each species are shown between trees, approximately to scale, with coloured bars beneath species names indicating genus and corresponding to tip label colours. Photographs: G. Maywald (*C. procallosa*, *C. eremophilae*, *C. thoracica*, *C. obesa*, *O. unimaculata*, *O. inconspicua*); C. Burwell (*C. carneola*); A. Idham (*R. humeralis*); J. Wright (*V. antennna*); R. Standen (*C. ooldeae*); R. Stroud (*Avicenna inquinata*); R. Richter (*C. apothoracica*); Western Australian Museum (*Everardia picta*, *Diaphyta* sp.) CC BY 4.0.

distinct clades. This is consistent with Gross's (1975) discussion of the possibility that the species groups within *Cuspicona* may eventually warrant recognition as separate subgenera or genera, although he considered such changes premature pending further examination of the aedeagus and additional material (Gross 1975: 92, 135).

Relationships among other species and Gross's (1975) groups of *Cuspicona* (e.g. *intacta* group) remain poorly resolved and could not be properly assessed here due to a lack of available specimens. *Cuspicona obesula* (unplaced by Gross) was recovered within *Cuspicona* s. s., forming a sister relationship with *C. thoracica* in the COI analysis. This relationship could not be assessed in the 16S dataset due to missing data for *C. obesula*, where *C. apothoracica* was instead recovered as sister to *C. thoracica*. Similarly, *Cuspicona ooldeae* Gross, 1975 (*intacta* group) was nested within the *thoracica* clade in the COI analysis.

Morphologically, *C. luedkei* **sp. n.** shares several characters typical of the genus's type species (*C. thoracica*) and other members of the clade. These include the pentagonal, "kite-shaped" body form, spinose humeri, green-and-pale patterning with dense localised punctation, a well-developed sternal keel, as well as an association with Myrtaceae. However, this species is also distinctive within *Cuspicona* in having an elongate mesosternal keel extending well beneath the head and the absence of black punctation. These features extend the known morphological range of *Cuspicona* and overlap with conditions seen in genera such as *Avicenna*. However, *Avicenna* was not recovered as monophyletic in our analyses, with *A. auricornis* excluded from the genus and of uncertain placement.

Variation was observed in the structure of the penial plates and, more so, in the spermathecal bulb of *C. luedkei* **sp. n.**, highlighting the importance of assessing multiple individuals when evaluating genital characters and the limited diagnostic value of the spermatheca in *Cuspicona*. The distal antennal segments (AIV–AV) were significantly longer in males of *C. luedkei* **sp. n.**, likely associated with mate detection. In contrast, elevated variability in the length of labial segments LI and LIII, antennal segment AIII, and the pronotum is interpreted cautiously, as it likely reflects difficulty in accurately measuring these characters rather than true biological variation.

Field observations indicate that *C. luedkei* **sp. n.** is associated with *M. quinquenervia* and other *Melaleuca* spp., where adults and nymphs were observed feeding on the inflorescences and woody capsules. Adults were frequently found aggregated on flowering branchlets, and mating pairs were observed repeatedly among developing capsules, sometimes remaining coupled for extended periods. Similar host associations with Myrtaceae are known in several members of the *thoracica* group (Gross 1975), suggesting that host use may represent an important ecological trait within the group. However,

host association should not be considered evidence of phylogenetic relationships, as similar plant associations may arise independently. Host records may nevertheless provide useful supplementary information for taxonomic and field studies. Platforms such as iNaturalist can provide additional observations from photographic records that may help document host associations and locate species in the field.

While the molecular results are consistent with Gross's (1975: 92) suggestion that some of the species groups within *Cuspicona* may warrant recognition as separate genera, no formal taxonomic changes are proposed here. Relationships among other Rhynchocorini genera also remain unclear. The phylogenetic results should be considered preliminary given limited taxon sampling and reliance on mitochondrial markers, and a comprehensive revision of Rhynchocorini will be required to resolve generic boundaries.

Key to *Cuspicona* species (part)

Adapted from Gross (1975: 93) with modifications to couplet 15 and the addition of a new couplet 15a. Modifications to the original wording made for clarity are indicated by square brackets.

- | | | |
|---------|---|--|
| 15(14) | Abdomen laterally broadly green in life; ventrally broadly luteous [medially and strongly contrasting] | 16 |
| — | Abdomen apparently unicolorous below [more diffuse laterally], or with small red maculations | 15a |
| 15a(15) | Mesosternal keel not reaching under head, at most to the anterior prosternum margin; scutellar macula larger, occupying apical third, with triangular to quadrate patches of black punctations laterally and some medially in the apical fifth of the scutellum; body length smaller (approximately 5.8–7.7 mm) | <i>Cuspicona phi</i> |
| — | Mesosternal keel produced forward beneath head; apical scutellar macula small (approximately 0.07–0.13× scutellum length) and devoid of black punctation; body length generally larger (approximately 8.6–10.5 mm) | <i>Cuspicona luedkei</i> sp. n. |

Taxonomy

Family: Pentatomidae Leach, 1815

Subfamily: Pentatominae Leach, 1815

Tribe: Rhynchocorini Stål, 1871

Genus: *Cuspicona* Dallas, 1851 s. s. (note: in this paper, *Cuspicona* s. s. is used for the *thoracica* group, which contains the type species, *Cuspicona thoracica* (Westwood, 1837), following the concept of Gross (1975: 92))

Cuspicona luedkei sp. n.

Figures 1–6

urn:lsid:zoobank.org:act:10F8F338-4E57-4EDF-974E-5B77EE5F159

Holotype (Figure 4): ♂, AUSTRALIA, Queensland, Lytton, -27.426704, 153.148049, 29.i.2025, J. Summerhayes, sweep-netting *Callistemon*, NBS 512334, QM Reg. No. T262774 (QM).

Paratypes: AUSTRALIA, QLD: 3 ♂ 2 ♀ Kedron, Bradbury Park, -27.39625, 153.02714, 27.ix.2025, A. J. Maynard & J.H. Thurman, gumnuts of *Melaleuca quinquenervia*, QM Reg. No. T65024, T65025, T65036–T65038; 1 ♂ 1 ♀ Kedron, Bradbury Park, -27.39639, 153.02741, 4.iii.2026, A. J. Maynard, beating *Melaleuca quinquenervia* inflorescences, QM Reg. No. T265034, T265046; 1 ♀ Brisbane Airport, Viola Pl. -27.42077, 153.09438, 11.iii.2026, A. J. Maynard, beating *Melaleuca quinquenervia* inflorescences, QM Reg. No. T265035; 2 ♂ Belli Park. -26.4867, 152.8666, 27.viii.2025, C. Pease, *Melaleuca quinquenervia*, QM Reg. No. T265047, T265048 (QM); 1 ♂ Port of Brisbane, -27.382569, 153.168904, 5.iii.2025, J. Summerhayes, cross-vane panel trap, NBS 512478, QM Reg. No. T265044; 1 ♂ Port of Brisbane, Port Drive, -27.382569, 153.168904, 1.iv.2025, cross-vane panel trap, NBS 512672, QM Reg. No. T265040; 1 ♂ Port of Brisbane, -27.3721942, 153.1870321, 24.ix.2025, J. Summerhayes, cross-vane panel trap, NBS 572104 5283QA-1, QM Reg. No. T265039, GenBank Accession No. COI: PZ295870, 16S: PZ298061 (Figure 1D); 2 ♀ Port of Brisbane, -27.378292, 153.170759, 20.i.2026, K. Hill, cross-vane panel trap, NBS 592882, QM Reg. No. T265028, T265029; 1 ♀ Port of Brisbane, -27.362510, 153.184025, 3.ii.2026, D. Carruthers, cross-vane panel trap, NBS 592914, QM Reg. No. T265030; 1 ♀ Lytton, -27.426490, 153.137569, 2.ii.2026, A. Shilov, cross-vane panel trap, NBS 565656, QM Reg. No. T265031; 1 ♂ Lytton, -27.430020, 153.148589, 27.i.2026, K. Hill, cross-vane panel trap, NBS 590408, QM Reg. No. T265043; 1 ♀ Lytton, -27.429277, 153.1401267, 4.ii.2026, R. Hoffman, cross-vane panel trap, TRT 509322, QM Reg. No. T265026; 1 ♂ Eagle Farm, -27.43385638, 153.09780011, 24.ii.2026, K. Hill, cross-vane panel trap, NBS 563071, QM Reg. No. T265042; 1 ♂ Stapylton, -27.733905, 153.23602, 21.i.2026, A. Shilov, cross-vane panel trap, HH 566742, QM Reg. No. T265041; 1 ♀ Port Alma, -23.5843421, 150.8615599, 17.xii.2024, E. Buckingham, sticky trap, TRT 512202, QM Reg. No. T265027 (DAFF – deposited in the QM); 1 ♀ Redland Bay, Erapah Creek, 22.x.1974, M. DeBaar & M. Hockey, to UV light, Acc. No. E2/2, QDPC 0-180961; 1 ♀ Southedge via Mareeba, 10.ix.1982, I. J. Titmarsh, on tobacco, QDPC 0-180960 (QDPC). NSW: 1 ♀ Banksmeadow, -33.947534, 151.212907, 11.ii.2026, P. Newsome, cross-vane panel trap in *Prunus* sp., TRT 566401 5298QA-1, QM Reg. No. T265032, GenBank Accession No.: COI: PZ295877; 16S: PZ298059 (Figure 1E); 1 ♀ Banksmeadow, -33.947534, 151.212907, 11.ii.2026, P. Newsome, cross-vane panel trap in *Prunus* sp., TRT 566401 5298QA, QM Reg. No. T265033, DNA accessory specimen; 1 ♂ Banksmeadow, -33.947534, 151.212907, 10.iii.2026, P. Newsome & D. Escalante, cross-vane panel trap, TRT 563723, QM Reg. No. T265045 (DAFF – deposited in the QM).

Diagnosis

Cuspicona luedkei sp. n. is distinguished from all other known *Cuspicona* by the well-developed mesosternal keel, which extends anteriorly under the head, a character unique within the genus, though shared with sev-

eral other rhynchocorine genera from which *C. luedkei* sp. n. can be separated by the transverse pronotal band and scutellar macula. The pale apical scutellar macula (~0.07–0.13× scutellum length) is one of the most readily visible diagnostic characters and is distinctly smaller than in other members of *Cuspicona*, where it is typically larger and accompanied by black punctation. Laterotergites VII are more angulately produced than in most *Cuspicona*, though similar to some species such as *C. phi* and *Cuspicona cygniterrae* Gross, 1975 as well as several other rhynchocorine genera. The morphology of the male and female genitalia is also diagnostic and readily distinguishable from other species, particularly the broad pygophore with diverging lateral lobes and deeply incised ventral rim, broad upper ramus of the parameres, and female terminalia, particularly LtVIII, which is acutely produced beyond LtVII.

It is difficult to provide a key to the genera of Australian Rhynchocorini or species of *Cuspicona* at this time, as both groups are in need of revision and subject to change. This species will not reliably key to the genus *Cuspicona* in the “Key to part of Rhynchocoris group” by Gross (1975, p 54) or in the “Stinkbugs of Australia” Lucid key (Cassis et al. 2016). In the former it runs either to “genera not covered” at couplet 8, or to couplet 10, but does not conform to the diagnoses of *Cuspicona* or *Avicenna* as it exhibits an intermediate condition. In the Lucid key (Cassis et al. 2016) it may run to *Avicenna*, *Morna* or *Petalaspis* Bergroth, 1916 depending on character selection and misinterpretation of characters. In the “Key to *Cuspicona* species” by Gross (1975: 92–94), it runs to couplet 15 and to *C. phi*, from which it may be separated by the following additional couplet (15a) in the key provided.

Molecular diagnosis

Based on the aligned datasets used for phylogenetic analyses, *C. luedkei* sp. n. is distinguished from other examined species of *Cuspicona* and Rhynchocorini by fixed nucleotide substitutions in COI at positions (using reference PZ295877) 79 (C), 592 (C) and 655 (C), and in 16S (using reference PZ298061) at positions 104 (C), 206 (C) and 263 (A). The two sequenced specimens show low intraspecific divergence (0.44% for COI; 0.22% for 16S). COI and 16S sequences are deposited in GenBank (Accession Nos. COI: PZ295870, PZ295877; 16S: PZ298061, PZ298059).

Measurements

Measurements of the holotype and of adult males and females are given in Table 1. All measurements are in mm and provided in Table S2. The holotype is a male and is included in the male sample. **Eggs** (n = 5). Egg height: 0.97 ± 0.03 (0.93–1); Egg width: 0.87 ± 0.04 (0.83–0.91). **Nymphs. First instar** (n = 6). Body length: 1.14 ± 0.03 (1.11–1.17); Body width: 1.10 ± 0.03 (1.04–1.14); Head width: 0.66 ± 0.01 (0.64–0.66). **Third instar** (n = 9). Body length: 2.92 ± 0.19 (2.59–3.20); Body

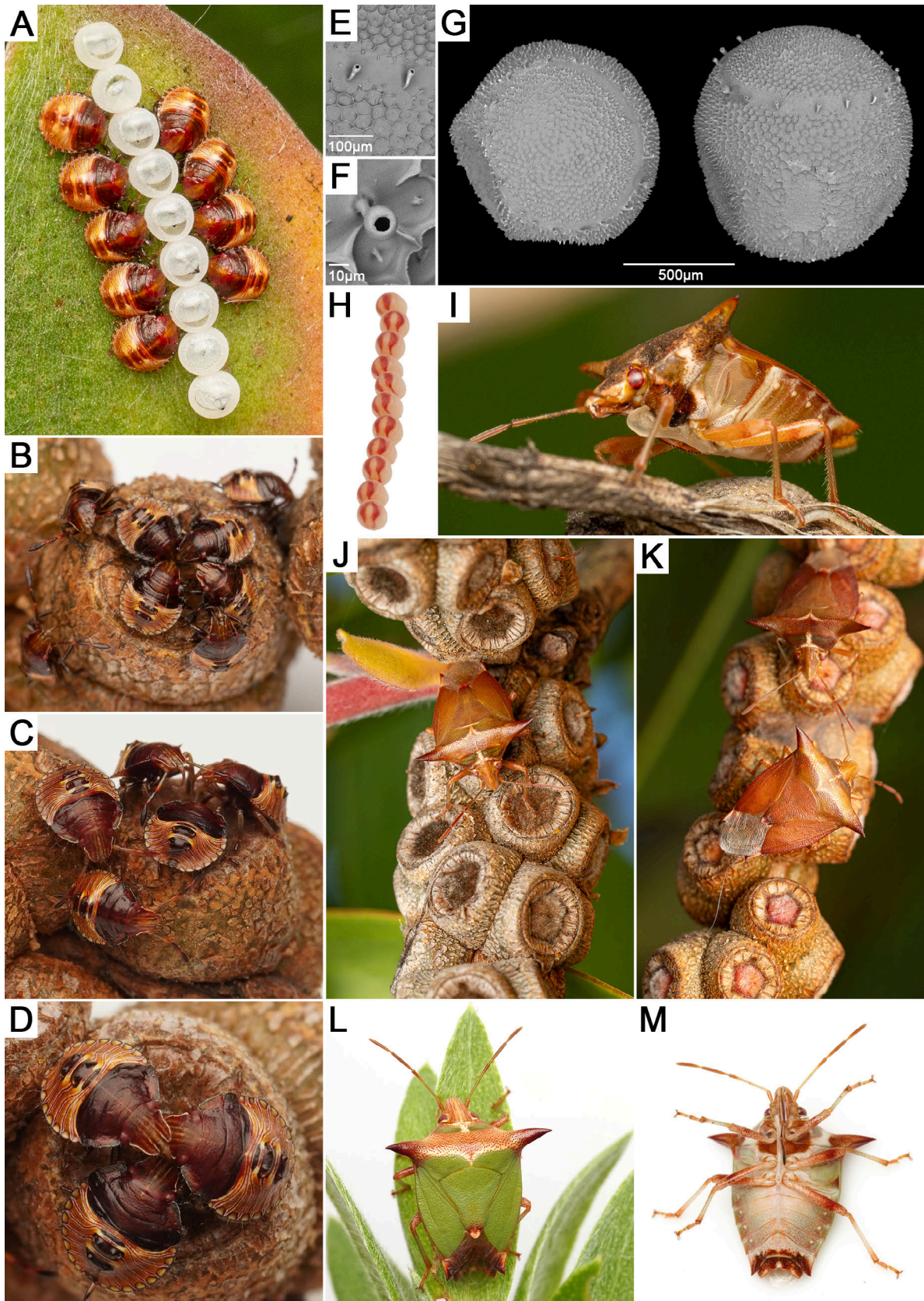


Figure 3. *Cuspicona luedkei* sp. n. life stages and egg morphology. (A) First-instar nymphs and hatched eggs; (B) Second instar; (C, D) Third instars. (B–D) Feeding on gumnuts of *Melaleuca quinquenervia* in captivity. SEM details of (E–F) egg aero-micropylar processes; (G) Egg, dorsal and lateral views. (H) Unhatched eggs with developing embryo. Adults: (I) Lateral view; (J) On host plant (*M. quinquenervia*); (K) Two individuals on host plant; (L) Dorsal view; (M) Ventral view. Photographs: Jessa Thurman (A, I–K).

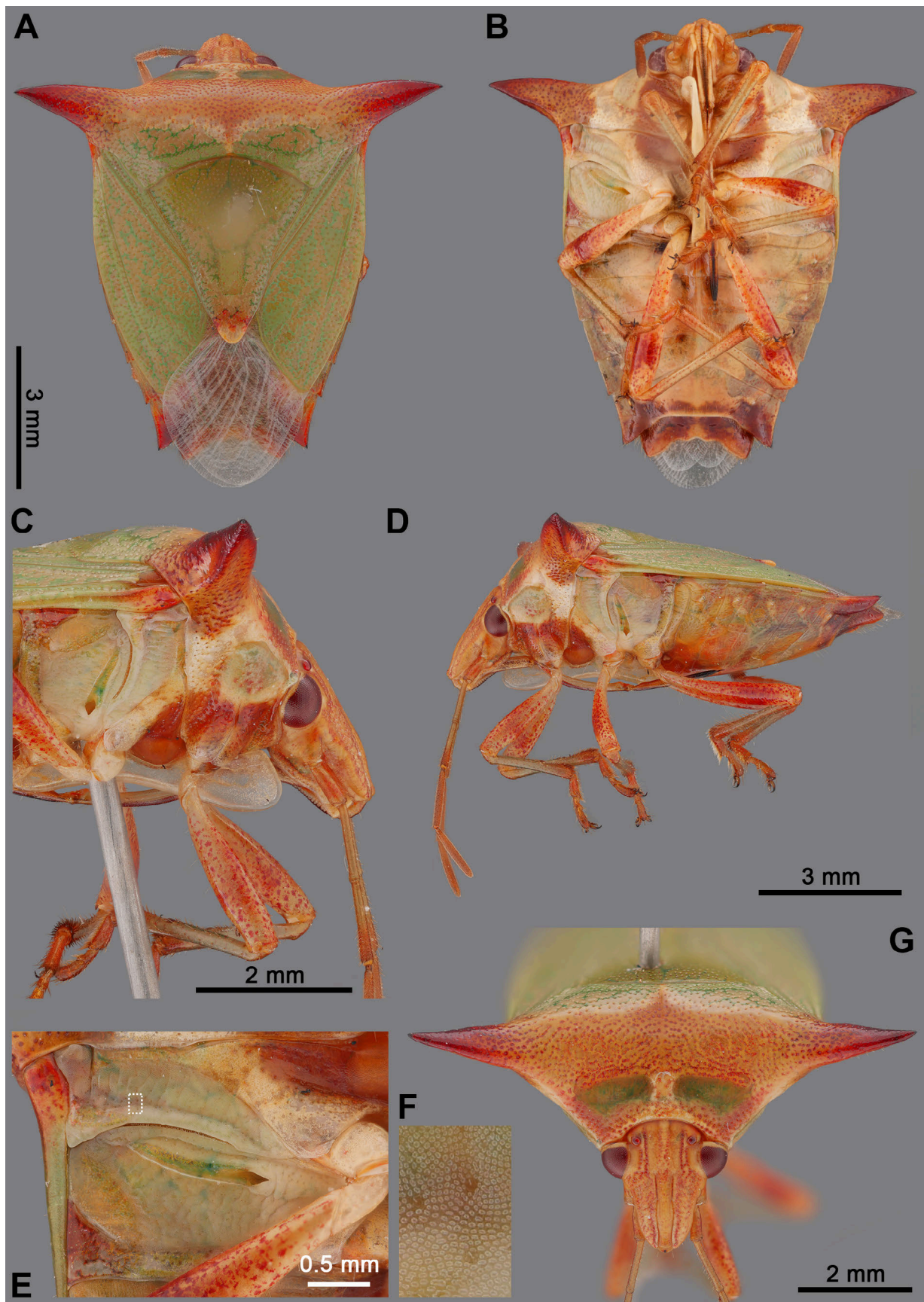


Figure 4. Holotype of *Cuspicona luedkei* sp. n., ♂. (A) Dorsal; (B) Ventral; (C) Right lateral, showing mesosternal keel; (D) Left lateral; (E) External efferent system (dashed rectangle indicating evaporative area enlarged in F); (F) Detail of evaporative area showing mushroom bodies; (G) Anterior view of head and pronotum. Scale bars as indicated. Photographs: Mark Ayers (A, C–G).

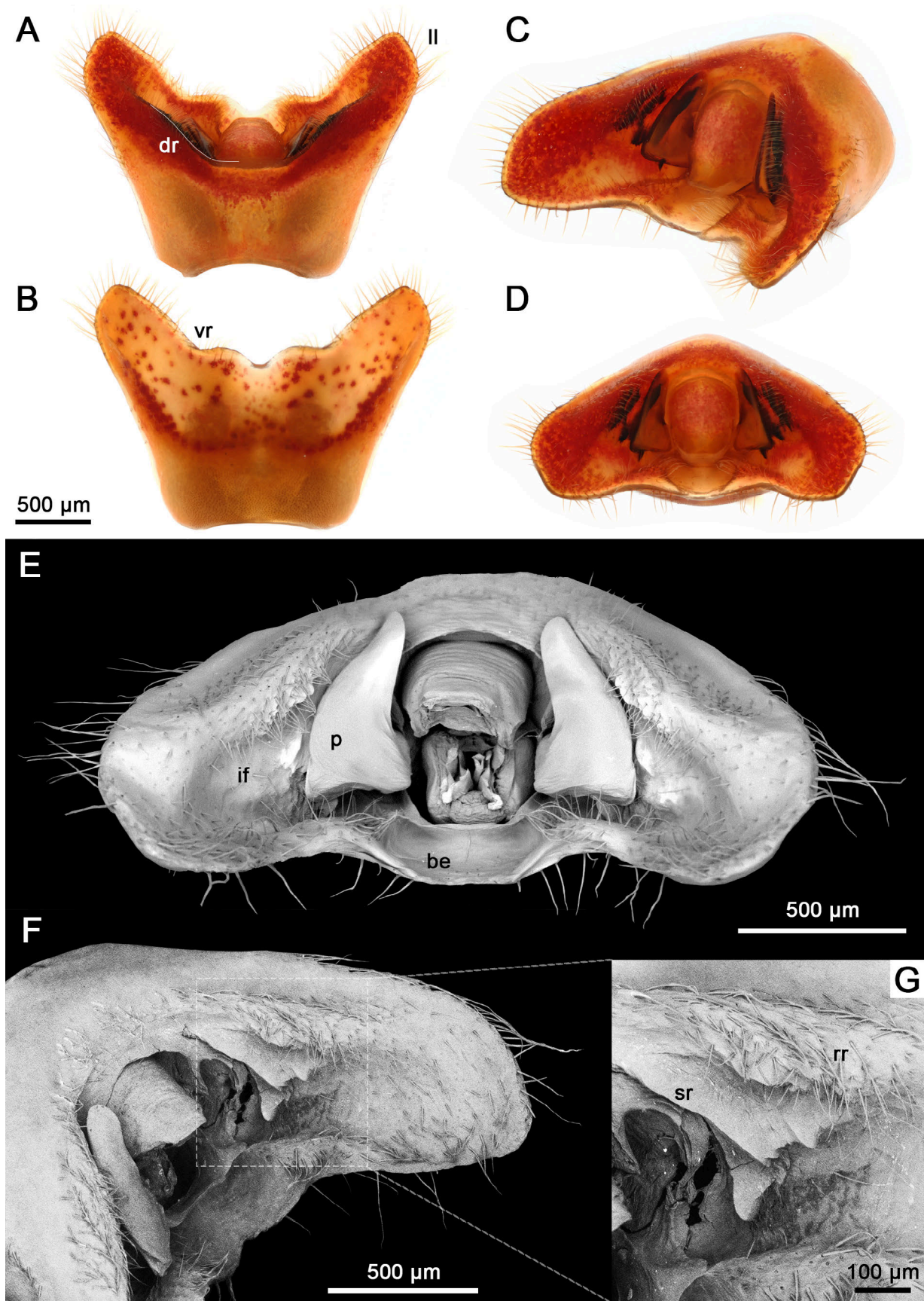


Figure 5. Pygophore of *Cuspicona luedkei* sp. n. (A–D) and SEM images (E–G). (A) Dorsal view; (B) Ventral view; (C) Dorsolateral view, slightly caudal; (D) Caudal view. SEM (E) Caudal view; (F) Inner face of pygophore (right paramere removed), caudodorsolateral view; (G) Detail of the sclerotised ridge. Abbreviations: be, bilobed excavation; dr, dorsal rim (outline highlighted by white line in A); if, inner face of lateral lobe; ll, lateral lobe; p, paramere; rr, rugose ridge; sr, secondary ridge; vr, ventral rim.

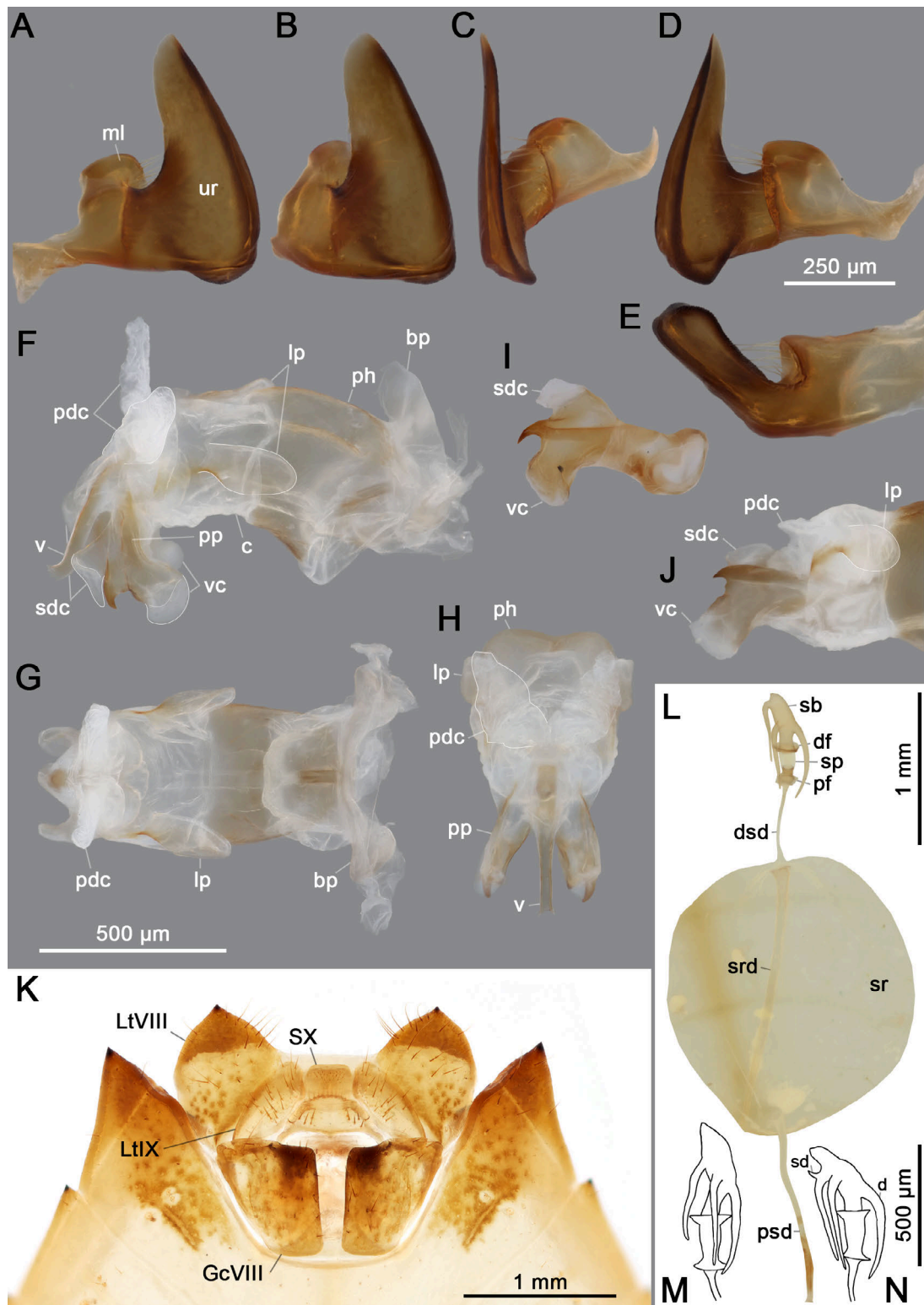


Figure 6. Male and female genitalia of *Cuspicona luedkei* sp. n. (A–E) Right paramere: (A, B) Outer face from two angles; (C) Lateral; (D) Inner face; (E) Ventral. (F–H) Inflated aedeagus: (F) Lateral; (G) Dorsal; (H) Caudal. (I, J) Variation in medial penial plate morphology: (I) Dissected penial plate; (J) Partially inflated aedeagus. (K–N) Female genitalia: (K) Terminalia; (L) Spermatheca; (M, N) Illustrations showing variation in spermathecal bulb morphology. Scale bars as indicated; (M, N) = 500 µm. Outlines of poorly visible structures have been enhanced by manual tracing with a white outline in F, H, and J. bp, basal plates; c, conjunctiva; d, diverticula; df, distal flange; dsd, distal spermathecal duct; Gc, gonocoxae; lp, lappet processes; Lt, laterotergite; ml, median lobe; pdc, primary dorsal conjunctiva; pf, proximal flange; ph, phallosoma; pp, medial penial plate; psd, proximal spermathecal duct; S, sternite; sb, spermathecal bulb; sd, secondary diverticula; sdc, secondary dorsal conjunctiva; sp, spermathecal pump; sr, spermathecal reservoir; srd, sclerotised rod; ur, upper ramus; v, vesica; vc, ventral conjunctiva.

Table 1. Measurements (mm) of the holotype male and of adult males (n = 14) and females (n = 14) of *Cuspicona luedkei* sp. n. Males and females are given as mean $\pm$ standard deviation (minimum-maximum). AI-AV = antennal segments I-V; LI-LIV = labial segments I-IV.

Character	Holotype ♂	Males (n = 14)	Females (n = 14)
Body length	9.64	9.52 $\pm$ 0.50 (8.64–10.54)	9.47 $\pm$ 0.44 (8.64–10.31)
Body width	5.30	5.50 $\pm$ 0.16 (5.25–5.71)	5.50 $\pm$ 0.30 (5.05–5.94)
Head length	2.22	2.23 $\pm$ 0.07 (2.09–2.36)	2.22 $\pm$ 0.08 (2.10–2.34)
Head width	2.18	2.19 $\pm$ 0.03 (2.13–2.23)	2.19 $\pm$ 0.10 (2.03–2.36)
Anteocular length	1.20	1.22 $\pm$ 0.04 (1.16–1.29)	1.23 $\pm$ 0.05 (1.15–1.32)
Interocular distance	1.25	1.22 $\pm$ 0.04 (1.18–1.30)	1.25 $\pm$ 0.05 (1.14–1.33)
Pronotal length	2.09	2.28 $\pm$ 0.13 (2.03–2.50)	2.36 $\pm$ 0.19 (2.04–2.70)
Pronotal width	8.70	8.33 $\pm$ 0.30 (7.66–8.70)	8.27 $\pm$ 0.51 (7.52–9.37)
Scutellum length	3.74	3.89 $\pm$ 0.13 (3.71–4.05)	3.88 $\pm$ 0.19 (3.45–4.16)
Scutellum width	3.35	3.25 $\pm$ 0.11 (3.05–3.48)	3.26 $\pm$ 0.13 (3.06–3.45)
AI	0.58	0.58 $\pm$ 0.03 (0.55–0.64)	0.57 $\pm$ 0.03 (0.53–0.63)
AII	0.98	1.07 $\pm$ 0.06 (0.98–1.19)	1.04 $\pm$ 0.07 (0.91–1.15)
AIII	1.10	1.06 $\pm$ 0.07 (0.90–1.23)	0.98 $\pm$ 0.09 (0.86–1.16)
AIV	1.35	1.36 $\pm$ 0.07 (1.24–1.50)	1.20 $\pm$ 0.06 (1.12–1.31)
AV	1.29	1.31 $\pm$ 0.07 (1.20–1.41)	1.20 $\pm$ 0.04 (1.12–1.28)
LI	1.22	1.20 $\pm$ 0.14 (0.92–1.39)	1.21 $\pm$ 0.08 (1.06–1.34)
LII	2.09	2.00 $\pm$ 0.11 (1.82–2.20)	2.01 $\pm$ 0.12 (1.78–2.21)
LIII	0.84	0.87 $\pm$ 0.09 (0.74–1.09)	0.87 $\pm$ 0.06 (0.78–1.00)
LIV	0.99	1.02 $\pm$ 0.05 (0.96–1.12)	1.02 $\pm$ 0.06 (0.94–1.11)

width: 2.31 $\pm$ 0.13 (2.14–2.51); Head width: 1.06 $\pm$ 0.05 (0.98–1.13).

Description

General appearance. Body roughly pentagonal in outline, rather broad, ~ 1.7 – $1.9\times$ as long as broad, dorsally convex. **Head.** Subtriangular, moderately dorsoventrally inclined, $\sim$ equal in length to pronotum, longer or about as long as wide (width across eyes); anteocular distance $\sim$ equal to interocular distance; mandibular plates subequal in length to clypeus, apically subacute, lateral edges weakly carinate; antenniferous processes absent; antennal insertion below mid-height of eyes but above ventral margin; antennae five-segmented, AI shorter than interocular distance, AIV $\approx$ AV>AII $\approx$ AIII>AI; vertex flattened, basal vertex not swollen; eyes not stylate, directed laterally; jugae not expanded into spines; ocelli paired, posterior to rear margin of eyes, notably closer to eyes than to each other. **Labium.** Not thickened, reaching $\sim$ mid-SIV, LII>LI>LIII $\approx$ LIV, LI longer than bucculae, reaching near posterior margin of head, LII slightly arched; bucculae elongate, parallel-sided, slightly sinuate, convex to straight in lateral view, with weak to moderate anterior triangular processes. **Pronotum.** Humeral angles acute, greatly expanded as elongate, slightly recurved spines, subtrihedral in cross-section, with prominent ventral carina and more rounded anterior and posterior carinae; anterolateral margins concave; posterolateral margins sinuate; posterior margin

concave; anterior lobe shallowly excavate; pronotal collar absent (may be confused with anterior lobe excavation). **Scutellum.** Triangular, apex narrowly rounded, not reflexed, with very shallow subapical depression; lateral calli and medial callus absent; Y-shaped elevation faint to obsolete. **Hemelytra.** Macropterous, exceeding abdomen; veins linear; frenum slightly more than half length of scutellum. **Legs.** Fore tibiae rounded dorsally; tarsi three-segmented. **Thoracic sterna.** Prosternum shallowly sulcate, with low flat keel (beneath projected mesosternal keel); mesosternal keel raised, closely adpressed to prosternum, extending beyond anterior margin of prosternum to $\sim$, or just posterior to, midpoint of bucculae, laminate distally, deflected right; metasternum with high medial keel, posteriorly bifid, receiving short abdominal spine from AIII. **External efferent system.** Evaporative area covering most of mesepimeron and metepisternum; peritreme elongate, gradually curved-tapering, apex subacute, slightly elevated with glabrous channel; composed of dense mushroom bodies with sparse, minute setae; overall weakly wrinkled texture. **Abdomen.** LtIII–VII bearing short spines; connexiva visible dorsally; LtVII angulately produced, slightly curved dorsolaterally; SIII with elongate process (abdominal spine) reaching hind coxal posterior margin; abdominal spine forming continuous longitudinal medial carina along SIII–VII (most prominent SIII–VI); stridulatory vitta absent. **Male genitalia.** **Pygophore** (Figure 5). Broader than long, lateral lobes diverging,

apices subacute, broadly rounded laterally; dorsal rim broadly arcuate, lateral margins weakly sinuate; along dorsal rim, mesad of each posterolateral lobe, black sclerotised rugose ridge; slight furrow posterior to lateral margin of dorsal rim; ventral rim deeply incised; lateral margins straight, oblique; median margin bisinuate; beneath median ventral margin, paired shallow concavities on ventral surface; above median ventral margin, bilobed excavation with subtruncate dorsal edge present; inner faces of lateral lobes elongately concave, deeply incised medially, remaining distinct from median bilobed excavation; each concavity with oblique, dark, heavily sclerotised, angulate secondary ridge, ventrad of and roughly parallel to dorsal rugose ridge; outer edge of each secondary ridge irregularly denticulate, adjacent short ridges and surfaces bearing spinose microsculpture; these structures roughly align with produced basal margin of paramere upper ramus, suggesting clasping interaction during copulation. **Parameres (Figure 6A–E).** Upper ramus large, curved, broad, blade-like; in situ more than half height of pygophore, usually reaching level of dorsal rim or slightly above, median lobe obscured behind upper ramus; outer margin thickened, carinate, gradually tapering, thinner apically; basal margin slightly produced; inner margin thin; outer face smooth, weakly striated basally; inner face shallowly concave, imbricated; when dissected with median lobe visible, parameres roughly F-shaped (stem pointing ventrally); median lobe inner margin convex, outer margin forming platform bearing numerous setae. **Aedeagus (Figure 6F–J).** Variable in shape of membranous conjunctival lobes and lateral outline of penial plates; phallosoma, basal plates, penial plates, vesica weakly sclerotised; dorsal primary conjunctiva bilobed; each medial penial plate with secondary dorsal conjunctiva and ventral conjunctiva; upper region of conjunctiva with pair of broadly rounded, flap-like lappet processes, lightly sclerotised, facing backward when everted; medial penial plates paired, elongate, basal and upper arms truncately produced, integrated with ventral secondary dorsal conjunctiva respectively, apex attenuate, moderately to strongly falcate (hooked), ventral margin concave; vesica positioned between penial plates, slightly upturned at apex. **Female genitalia. Terminalia (Figure 6K).** GcVIII posterior margin transversely subtruncate, slightly sinuate medially, inner margins straight, inner posterolateral angles dark; LtVIII acute, produced beyond LtVII; LtIX narrow, elongate, apically rounded; SX small, transverse plate. **Spermatheca (Figure 6L–N).** Spermathecal reservoir with sclerotised rod; spermathecal duct tubular, widening toward sclerotised rod and proximal pump flange; apical spermathecal bulb elongate-ovoid, oblique to axis of spermathecal pump, with three long, spiniform processes (diverticula), weakly curved, gradually tapering, all reaching beyond distal pump flange, usually >1 reaching beyond or to level of proximal pump flange, variable in length and overall position; diverticula sometimes with short spiniform secondary diverticula (variable; Figure 6N). **Eggs (Figure**

3A, E–H). Chorion strongly, uniformly microreticulate, spinose; cells polygonal (mostly hexagonal), shallowly foveate, bounded by raised walls; cell junctions acutely produced into spinose processes. Each cell usually with small spinose central process. Apical band below operculum lacking sculpture; bearing along ventral margin crown of ~15–19 short, clavate aero-micropylar processes, inwardly directed, gradually expanding to inflated apex with circular terminal opening. **Nymphs. First instar (Figure 3A).** Subglobular. Labium 4-segmented, extending beyond hind legs to ~middle of abdomen. Antennae 4-segmented; $AI < AIII < AII < AIV$. Tarsi 2-segmented. **Second instar (Figure 3B).** Body subcircular, with broad, long, subtriangular head. Anterolateral thoracic margin laminate, convex, weakly crenulate; anterolateral pronotal angles slightly produced as subacute lobes. Labium 4-segmented, extending well beyond posterior margin of abdomen. Antennae 4-segmented; $AI < AIII < AIV < AII$; $AII-IV$ with sparse long pilosity. Tarsi 2-segmented. **Third instar (Figure 3C–D).** As in second instar but $AI < AIII \leq AIV < AII$. **Other instars.** Unknown.

Colouration, punctuation and vestiture

General. Colouration highly variable (Figure 1B, D, E, Figure 3I–M, Figure 4); holotype retaining some green pigmentation, likely to yellow. In life, dorsum predominantly green to yellowish green, occasionally dark greenish yellow, brownish orange, or with faint pinkish hue. In pinned or ethanol-preserved specimens, green areas fade to yellow, red tones may become accentuated, pale areas generally become duller. Overall dorsal pattern characterised by contrast between green to yellowish green ground colour of scutellum and hemelytra (or brownish orange in specimens lacking green pigmentation) and brownish orange to orangish yellow transverse pronotal band; head similarly coloured to this band. Additional conspicuous markings include dark red humeri and small pale orangish yellow or off-white apical scutellar macula. Colours outlined below refer primarily to live specimens. Punctuation ranges from concolourous to light to dark red. Integument immediately around each puncture often matches its colour. Punctuation also prone to fading with preservation. **Head.** Orangish yellow to brownish orange, with paler medial longitudinal area, usually joining pronotal line extending between calli. Eyes moderate to dark red. Antennae $AI-AII$ brownish orange to dark greenish yellow, $AIII$ similar on basal half, apical half darkening to reddish orange or dark red, $AIV-AV$ reddish orange or dark red, distal segments densely, finely pilose. Mandibular plates with concolourous to dark punctures, denser medio-laterally and posteriorly, tending to form two longitudinal rows on either side of head: outer row passing adjacent to each ocellus, inner row mesad of ocelli, both extending to posterior margin of head. Ventral surface of head pale orangish yellow, irregularly sparsely to moderately punctate; bucculae with dense, dark punctate longitudinal rows. Labium pale orangish yellow to off-white, segments progressively darker dis-

tally, apical half of LIV dark red to black. **Pronotum.** Ground colour green to yellowish green, concolourous with general dorsal colour; moderately punctate. Calli polished, impunctate. Broad, densely punctate, brownish orange to orangish yellow transverse band extends posterior to calli to posterior bases of humeri; posterior margin of this band broadly arcuate to weakly bisinuate, with acute median posterior projection, bordered posteriorly by thin, pale orangish yellow to off-white, sparsely punctate area. Similarly coloured, slightly raised, longitudinal marking extends anteriorly between calli to anterior margin, bordering anterior margin of pronotum. Subtle, impunctate, concolourous longitudinal medial line present, most visible in anterior two-thirds of pronotum. Humeri moderate to dark red apically. **Scutellum.** Punctuation moderate, usually denser in lateral impressed areas. Apex bearing small impunctate pale orangish yellow, off-white or reddish macula ($\sim 0.07\text{--}0.13\times$ scutellum length), preceded by small reddish transverse band weakly produced along midline and/or laterally. **Hemelytra.** Coriaceous parts concolourous with ground colour, sometimes slightly darker; moderately to sparsely punctate, with one or two additional dense rows present: submarginally on calvus, and longitudinally, adjacent to claval suture and medial fracture. Membrane hyaline, occasionally slightly fuscous between veins. **Dorsal abdomen.** Mediotergites yellowish green to brownish orange; terminal segments visible through hemelytral membrane dark red. Laterotergites yellowish green, often reddish at posterior angles; LtVII orangish yellow basally, darkening to dark red on posterior half. **Legs.** Overall off-white to pale orangish yellow to brownish orange, variably mottled dark red from pigmented punctures forming diffuse bands: subapically on femora, basally and apically on tibiae. Coxae pale, usually with reddish markings. Tibiae typically greenish through middle. Tarsi pale orangish yellow to brownish orange. **Venter.** Overall paler than dorsum; off-white to pale orangish yellow, with reddish orange to dark red maculations. Laterally suffused yellowish green or reddish orange, including evaporative area and small anterolateral prosternal patch bordered by whitish integument. Dark maculations present as median sternal macula surrounding procoxae, on ventral humeral spines, along lateral edges of mesepimeron and metepimeron near evaporatorium, and on terminal abdominal segments (SVII and genitalia). Punctuation density closely associated with colour pattern: dark areas correspond to dense punctate fields, pale areas sparsely to moderately punctate with small impunctate zones, including around spiracles and trichobothria and between anterolateral prosternal patch and humeri. Sternites finely, sparsely punctate medially, becoming coarser, denser laterally. Punctures pink to reddish brown, surrounding suffusion varying from faint to extensive. Sternal keel off-white to pale orangish yellow, semi-translucent. Mesosternum with small median glabrous area within sternal macula. SII usually paler across its width than SIII–VII. Small pale

lateral macula usually present between each sternite (SIII–VI), with adjacent reddish suffusion in posterior angles. SVII with dark red suffusion across posterior region from $\sim$ level of spiracles toward apical angles, with moderate to dense dark red punctuation and subtle pale posterior margin between acute angles. **Pygophore.** Margins bearing moderate, long, golden setae. Finer, denser setae along inner ventral margin and along dorsal sclerotised rugose ridges. Ventral surface (visible portion in situ) whitish; punctures dark red, with surrounding pigmentation making pygophore appear mostly dark red, density variable; pale median and lateral areas usually discernible. Transverse dense row of punctures demarking punctate posterior zone of ventral pygophore from impunctate, less pigmented anterior region. Dorsal margins and inner faces of lateral lobes reddish orange to dark red. **Female genitalia.** Inner angle of GcVIII and posterior half of LtVIII dark red. Punctuation moderate on gcVIII, more concentrated anterolaterally on LtIX. Sparsely to moderately pilose, with fine dense pilosity on SX. **Eggs.** Broadly oval, pale orangish yellow or pearlescent depending on development – developing embryo typically pale orangish yellow, with red eyes and head features visible through semitranslucent chorion prior to hatching (Figure 3H). **Nymphs. First instar.** Head, pronotum, appendages, and median and lateral tergites reddish orange to dark red. Abdomen and tarsi orangish yellow. Head usually with lighter orangish yellow medial suffusion and distinct median stripe extending from head onto pronotum. Eyes red. **Second instar.** Head, pronotum, appendages, and median tergites reddish orange to dark red. Abdomen orangish yellow with reddish brown tinge sublaterally, reddish along segmental margins, flanked by thin off-white borders. Laterotergites usually yellow-brown with dark margins. Head and dorsal thorax usually with reddish orange medial suffusion, thin orangish yellow border anterior to eyes, and distinct median stripe extending onto pronotum. Eyes dark red. Antennal segments I–IV with lighter reddish orange apices. **Third instar.** Colour as in second instar, but antennae usually paler basally (AI–AII), with thin off-white, lateral and anterolateral pronotal margins. AI orangish yellow; AII orangish yellow with reddish orange apex; AIII reddish brown, darker on basal two-thirds; AIV dark red apically, slightly reddish orange basally. **Other instars.** Unknown.

Material examined (measured)

Adults. The holotype and all paratypes (collection details above). **Eggs and nymphs.** 5 eggs, 6 first instar nymphs, 9 third instar nymphs, Kedron, Bradbury Park, -27.39625, 153.02714, 27.ix.2025, A. J. Maynard & J.H. Thurman, gumnuts of *Melaleuca quinquenervia*. (DAFF).

Other material examined (not measured)

AUSTRALIA, QLD: 1 ♀ Brisbane, 16.x.2025; Port of Brisbane: 1 ♀ -27.377735, 153.181696, 6.i.2026, K. Hill, cross-vane panel trap, NBS 592955; 1 ♀ -27.375753,

153.182255, 6.i.2026, D. Curruthers, cross-vane panel trap, NBS 592966; 1 ♂ 1 ♀ -27.374157, 153.174738, 9.i.2024, D. Carruthers, cross-vane panel trap, NBS 493762; 1 ♂ -27.382569, 153.168904, 1.x.2024, D. Carruthers, cross-vane panel trap, NBS 510747; 1 ♀ -27.376797, 153.168891, 3.xii.2024, D. Carruthers, cross-vane panel trap, NBS 511648; 1 ♀ -27.378276, 153.170785, 2.i.2025, R. Hoffman, cross-vane panel trap, NBS 511553; 1 ♂ -27.369693, 153.17754, 12.iv.2024, cross-vane panel trap on *Eucalyptus robusta*, TRT 530398; 1 ♂ -27.371404, 153.17676, 5.iv.2024, J. Eldridge, cross-vane panel trap on *Hibiscus tiliaceus*, TRT 476087; 2 ♂ -27.378276, 153.170785, 18.iii.2025, D. Carruthers, cross-vane panel trap, NBS 512546; 1 ♀ 1 ♂ -27.37577321, 153.1821191, 3.iii.2026, K. Hill, cross-vane panel trap, NBS 563006; 1 ♀ -27.39113, 153.168442, 18.xi.2018, s358290 4736QA; Hamilton: 1 ♂ -27.438974, 153.073752, 22.xii.2025, E. Carsburg, cross-vane panel trap, HH 590261; 1 ♂ -27.438628, 153.074702, 31.xii.2025, R. Hoffman, cross-vane panel trap, TRT 592929; 1 ♂ -27.438929, 153.073871, 2.ii.2026, A. Shilov, cross-vane panel trap, HH 565664; 1 ♀ Arundel, -27.936827, 153.381617, 1.x.2025, E. Carsburg, cross-vane panel trap, HH 566727; Hemmant: 1 ♀ 28 Wyuna Ct, 28.x.2025, D. Carruthers, cross-vane panel trap, NBS 572197; 1 ♀ -27.4335744, 153.1308321, 24.ii.2026, D. Carruthers, cross-vane panel trap, NBS 563114; 1 ♂ Lytton, -27.430020, 153.148571, 13.i.2025, D. Curruthers, cross-vane panel trap, NBS 571971; 1 ♂ Pinkenba, -27.431967, 153.105318, 2.ii.2026, A. Shilov, cross-vane panel trap, HH 565654; Rocklea: 1 ♀ -27.538456, 153.000184, 10.i.2025, D. Contarini, cross-vane panel trap, HH 541651; 1 ♀ -27.539366, 153.000644, 10.i.2025, D. Contarini, cross-vane panel trap, HH 541651; Lytton: 1 ♂ 1 ♀ -27.427341, 153.140079, 3.ii.2025, R. Smith, cross-vane panel trap, HH 541342; 1 ♂ -27.42654643, 153.1375793, 5.iii.2026, E. Carsburg, cross-vane panel trap, HH 592599; 1 ♂ Stafford, -27.414971, 153.018695, 17.ii.2025, R. Smith, cross-vane panel trap, HH 541424; Eagle Farm: 1 ♀ -27.433900, 153.097736, 28.x.2025, K. Hill, cross-vane panel trap, NBS 572235; 1 ♀ -27.420329, 153.094018, 28.x.2025, K. Hill, cross-vane panel trap, NBS 572234; 2 ♀ 13.i.2026, cross-vane panel trap, NBS 571487; 1 ♀ -27.424959, 153.093438, 21.x.2024, D. Contarini, cross-vane panel trap, HH 512069. (DAFF).

Records retrieved from iNaturalist

AUSTRALIA, QLD: Duckinwilla, -25.436919, 152.550827, 7.iii.2019, inaturalist.org/observations/21143306; Boondall, -27.3405943, 153.0785773, 13.xii.2019, inaturalist.org/observations/105256670; Beerwah, -26.86849071, 152.928594, 14.vi.2020, inaturalist.org/observations/49562763; Rossville, -15.67504133, 145.2298134, 7.ii.2022, inaturalist.org/observations/106679140; Banksia Beach, -27.04172973, 153.1449172, 28.iii.2023, inaturalist.org/observations/152690783; Taringa, -27.49079444, 152.9738306, 4.i.2024, inaturalist.org/observations/195713998; Port of Brisbane, -27.369693, 153.17754, 12.iv.2024, inaturalist.org/

observations/206741322; Chelmer, -27.5176669, 152.9745799, 9.x.2024, inaturalist.org/observations/247360875; Belli Park, -26.48671428, 152.8666897, 21.iv.2025, inaturalist.org/observations/271904882; Belli Park, -26.48671337, 152.8665927, 7.vii.2025, inaturalist.org/observations/295879251; Belli Park, -26.48673075, 152.8665454, 10.vii.2025, inaturalist.org/observations/296712100; Belli Park, -26.48674695, 152.8665794, 26.viii.2025, inaturalist.org/observations/309183834; Kedron, Bradbury Park, -27.39632493, 153.02713406, 27.ix.2025, inaturalist.org/observations/317751091; Kedron, Bradbury Park, 27.ix.2025, -27.39625927, 153.02714091, inaturalist.org/observations/317751488; Coorparoo, -27.51043431, 153.0700088, 25.xii.2025, inaturalist.org/observations/332405590; Belli Park, -26.48674572, 152.86657198, 5.v.2026, inaturalist.org/observations/358526600; Belli Park, -26.48674277, 152.86660422, 22.v.2026, inaturalist.org/observations/363888821; **NSW:** Centennial Park, -33.90108, 151.23036, 2.ix.2017, inaturalist.org/observations/7759849; Ellangowan, -28.98643974, 153.0528877, 22.x.2018, inaturalist.org/observations/17767107; Byron Bay, -28.64806333, 153.6091467, 10.iii.2024, inaturalist.org/observations/201907859; Stanmore, -33.89031861, 151.1720744, 18.xii.2025, inaturalist.org/observations/331246812; Centennial Park, -33.90369, 151.22891, 23.viii.2026, inaturalist.org/observations/393996819, 393699527.

Distribution

Eastern Australia. Known from Far North Queensland to southeastern New South Wales, and inhabiting a range of climates from tropical in the north, through subtropical regions, to temperate areas in the south (Figure 1C).

Host plants

Myrtaceae including *Melaleuca quinquenervia* and *Melaleuca* spp. (referred to as *Callistemon* by some collectors, as in the holotype).

Common Name

Long-keeled Paperbark Stink Bug.

Etymology

This species is dedicated to Danilo Lüdke, in acknowledgement of his role in recognising this taxon as new and for his sustained and significant contributions to Australian Pentatomoidea identification on iNaturalist. The specific epithet *luedkei* is a Latinised patronym formed from the surname Lüdke and treated as a noun in the genitive case.

Conservation status

Likely of least concern, but data deficient. *Cuspicona luedkei* sp. n. has a broad distribution and is frequently detected in cross-vane panel traps paired with *H. halys* lures. Its broad distribution would make it unlikely to meet the criteria for listing in a threatened IUCN Red List category, while the absence of data on population

sizes currently prevents assessment against population-based criteria. Despite this, the species is poorly represented in collections and is not always reliably found in field surveys, even on seemingly suitable host plants. However, this could also be due to a combination of factors, including the species' cryptic habits, dispersive behaviours and its likely dependence on host plants at specific reproductive stages (e.g. flowering or fruit development), which are temporally and spatially variable.

Life history

From early July to mid-September 2025, multiple adults were repeatedly observed on a single *M. quinquenervia* tree, at Belli Park, Sunshine Coast Region, Queensland, consistently associated with terminal inflorescences at the ends of small branchlets at approximately eye height. Individuals were recorded among fresh flowers and were later found among the dried stamens and developing capsules of the inflorescence. In early July, three adults were initially documented and remained in place for at least eight days. By late July, six adults were present in two groups of three occupying separate inflorescences. In early September, two adults were observed on another inflorescence, with a third individual located nearby. Mating pairs were observed on several occasions from early August to early September, with copulation occurring among developing capsules, and in one instance the pair remained coupled overnight (for at least 18 hrs) on the same branchlet. Despite repeated inspections of the tree throughout the observation period, no nymphs or eggs were detected. Apparent abundance fluctuated through August: some small aggregations persisted on the same inflorescence for several weeks, shifting only ~40 cm to a nearby inflorescence, while other individuals appeared to come and go, with new individuals occasionally observed nearby. Certain individuals were no longer detected on subsequent visits after mating, and by mid-September, no adults remained (C. Pease, pers. obs.). These patterns may indicate post-mating dispersal. At the same site, an adult was observed on 5 May 2026 while inspecting *M. quinquenervia*, although the source tree could not be confirmed. On 22 May, three adults were observed on the same *M. quinquenervia* tree as in 2025, amongst senescing flowers (C. Pease, pers. obs.).

At Bradbury Park, Kedron, on 27 September 2025, several adults and freshly hatched first instar nymphs were found on two *M. quinquenervia* (Figure 3A, I–K). Adults were found on woody capsules of the inflorescences, while a single row of nine eggs and first instars were found on the underside of leaves (Figure 3A). First instars (assumed to have hatched that day) were recorded on 27 September (Figure 3A), second instars on 30 September (Figure 3B), and third instars (Figure 3C, D) on 6 October 2025 although nymphs did not survive past this stage. One female laid a single row of 11 eggs several days after capture (Figure 3H). Dissected trap-

caught females ($n = 4$) contained 8–12 developed eggs internally.

The same trees at Bradbury Park were checked visually and by beating on 4 March 2026; however, no adults or nymphs were detected despite the presence of abundant developing flowers and fruit. A nearby *M. quinquenervia* with more abundant flowers and fruit (~25 m away) was sampled by beating, yielding three adult *C. luedkei* **sp. n.** (2 males, 1 female), some of which were still clinging to flowering inflorescences that had snapped off during sampling. These individuals were kept alive in a zip-lock bag with host material for several days, where adults were observed continuing to feed on the flowering inflorescences. Males and females were observed positioned facing each other very closely, occasionally touching antennae, for several hours at a time.

In life, the species exhibits relatively conspicuous colouration, but is well camouflaged among host inflorescences, both flowering and senescent. Individuals vary in colour, with green and more brownish orange forms commonly observed. This variation may be associated with host condition, with greener individuals more closely matching fresh inflorescences and browner individuals resembling senescing material, although this requires further study. One of the hosts, *M. quinquenervia*, typically bears white to cream inflorescences, but the species has also been recorded on red-flowering *Melaleuca* (e.g. *Callistemon*).

Behaviour

Adults are strong flyers, similar to other rhynchocorines (e.g. *C. phi* and *C. angustizona*), producing an audible buzzing in flight. When disturbed, individuals may either remain motionless (thanatosis) or become highly active and readily take flight; some individuals also produce an audible wing buzz while stationary by rapidly beating their wings. This appears to result from wing vibration rather than stridulation, as no associated stridulatory structure was observed.

The species was frequently collected in cross-vane panel traps paired with *H. halys* lures, suggesting a possible attraction to its components (murgantiol and MDT; see Methods). The holotype male was collected in association with moderate numbers of *C. angustizona*. At sites where specimens were trapped, *C. phi* and *C. angustizona* were also commonly present on nearby *Melaleuca* spp. (Myrtaceae), based on beating or shake netting samples.

Feeding was observed in both captive adults and nymphs. Individuals inserted the stylets primarily into the central region or lateral walls of woody capsules and flower bases of *Melaleuca*. First instar nymphs did not feed and remained aggregated near the egg mass before moulting (Figure 3A), consistent with typical pentatomid behaviour after hatching. Second and third instar nymphs fed gregariously, generally clustered on the capsules (Figure 3B, D).

Acknowledgments

I thank iNaturalist users who uploaded observations, particularly Chris Pease for field observations and specimens, and Danilo Lüdke for initially identifying and curating records of this species and other pentatomids. I also thank the NBS/surveillance teams from DAFF for their trapping efforts and for locating live specimens and other *Cuspicona* spp. used in this study, especially Jamie Summerhayes, Daryl Carruthers, and Kate Hill. I am grateful to Komal Gurdasani and Jess Gray for sequencing and Grace Sun (DAFF) for PCR optimisation. I thank my DAFF entomology colleagues for retaining specimens and providing loans or photographs, particularly Mizuki Uemura, Samantha Barnett, and Max Beatson for specimens, Mark Ayers for photographing the holotype and Ned Fisher for photographs of relevant species. I further acknowledge collection curators from QM, QDPC, AM, SAMA, and ANIC for their assistance. Lastly, thanks to Jessa Thurman for in situ photographs, general support, and assistance with fieldwork.

Supplementary Data

<https://figshare.com/s/014f5d871bd897af20a0>

Table S1. Sample and collection information of Rhynchocorini sequenced for this study.

Table S2. Raw measurement data (in mm) and collection details of measured adults, eggs and nymphs of *Cuspicona luedkei* sp. n.

References

- Ahmad, I. (1986). A fool-proof technique for inflation of male genitalia in Hemiptera (Insecta). *Pakistan Journal of Entomology*, 1(2), 111–112.
- Bergroth, E. (1916). Heteropterous Hemiptera collected by Professor W. Baldwin Spencer during the Horn Expedition into Central Australia. *Proceedings of the Royal Society of Victoria*, 29, 19–39.
- Breddie, G. (1900a). Hemiptera nonnulla regionis australicae. *Entomologische Nachrichten*, 26(2–3), 17–46.
- Breddie, G. (1900b). Nova studia Hemipterologica. *Deutsche Entomologische Zeitschrift*, 1900, 161–185.
- Castresana, J. (2000). Selection of conserved blocks from multiple alignments for their use in phylogenetic analysis. *Molecular Biology and Evolution*, 17(4), 540–552. <https://doi.org/10.1093/oxfordjournals.molbev.a026334>
- Cassis, G., Betts, E., & Elliott, M. (2016). *Stink bugs of Australia* [Interactive identification key]. Australian Museum. https://keys.lucidcentral.org/keys/v3/aus_museum/stink_bugs/key/Stinkbugs%20of%20Australia/Media/Html/key.htm
- Dallas, W. S. (1851). *List of the specimens of hemipterous insects in the collection of the British Museum. Part I.* British Museum.
- Dereeper, A., Guignon, V., Blanc, G., Audic, S., Buffet, S., Chevenet, F., Dufayard, J. F., Guindon, S., Lefort, V., Lescot, M., Claverie, J. M., & Gascuel, O. (2008). Phylogeny.fr: Robust phylogenetic analysis for the non-specialist. *Nucleic Acids Research*, 36(Web Server issue), W465–W469. <https://doi.org/10.1093/nar/gkn180>
- Distant, W. L. (1901). Revision of the Rhynchota belonging to the family Pentatomidae in the Hope Collection at Oxford. *Proceedings of the Zoological Society of London*, 1900, 807–825.
- Gross, G. F. (1975). A revision of the Pentatomidae (Hemiptera: Heteroptera) of the Rhynchocoris group from Australia and adjacent areas. *Records of the South Australian Museum*, 17(6), 51–167.
- Gross, G. F. (1976). *Plant-feeding and other bugs (Hemiptera) of South Australia. Heteroptera – Part II.* Handbooks Committee, South Australian Government.
- Kalyaanamoorthy, S., Minh, B. Q., Wong, T. K., Von Haeseler, A., & Jermini, L. S. (2017). ModelFinder: fast model selection for accurate phylogenetic estimates. *Nature methods*, 14(6), 587–589.
- Kearse, M., Moir, R., Wilson, A., Stones-Havas, S., Cheung, M., Sturrock, S., Buxton, S., Cooper, A., Markowitz, S., Duran, C., Thierer, T., Ashton, B., Meintjes, P., & Drummond, A. (2012). Geneious Basic: An integrated and extendable desktop software platform for the organization and analysis of sequence data. *Bioinformatics*, 28(12), 1647–1649. <https://doi.org/10.1093/bioinformatics/bts199>
- Minh, B. Q., Schmidt, H. A., Chernomor, O., Schrempf, D., Woodhams, M. D., Von Haeseler, A., & Lanfear, R. (2020). IQ-TREE 2: New models and efficient methods for phylogenetic inference in the genomic era. *Molecular Biology and Evolution*, 37(5), 1530–1534.
- Mitchell, A. (2015). Collecting in collections: A PCR strategy and primer set for DNA barcoding of decades-old dried museum specimens. *Molecular Ecology Resources*, 15(5), 1102–1111.
- Posit team (2024). RStudio: Integrated Development Environment for R. Posit Software, PBC, Boston, MA. <http://www.posit.co/>
- R Core Team. (2024). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. <https://www.R-project.org/>
- Rider, D. A., Schwertner, C. F., Vilímová, J., Rédei, D., Kment, P., & Thomas, D. B. (2018). Higher systematics of the Pentatomoidea. In J. E. McPherson (Ed.), *Invasive stink bugs and related species (Pentatomoidea): Biology, higher systematics, semiochemistry, and management* (pp. 25–201). CRC Press.
- Roca-Cusachs, M., Schwertner, C. F., Kim, J., Eger, J., Grazia, J., & Jung, S. (2022). Opening Pandora's box: molecular phylogeny of the stink bugs (Hemiptera: Heteroptera: Pentatomidae) reveals great incongruences in

the current classification. *Systematic Entomology*, 47(1), 36–51.

Royal Horticultural Society. (2015). RHS Colour Chart. 6th edition. Royal Horticultural Society, London.

Šlenker, M., Koutecký, P., & Marhold, K. (2022). MorphoTools2: An R package for multivariate morphometric analysis. *Bioinformatics*, 38(10), 2954–2955. <https://doi.org/10.1093/bioinformatics/btac173>

Stål, C. (1855). Entomologiska Notiser. *Öfversigt af Kongliga Svenska Vetenskaps-Akademiens Förhandlingar*, 12(7), 343–353.

Stål, C. (1865). Hemiptera nova vel minus cognita. *Annales de la Société Entomologique de France*, 4(5), 163–188.

Stål, C. (1867). Bidrag till Hemipterernas systematik. *Öfversigt af Kongliga Vetenskaps-Akademiens Förhandlingar*, 24(7), 491–560.

Westwood, J. O. (1837). *A catalogue of Hemiptera in the collection of the Rev. F. W. Hope and descriptions of the new species of Scutelleridae. Part I.* J. C. Bridgewater.



This paper was typeset using Prince

www.princexml.com