



Zootaxa 5078 (1): 001–070

<https://www.mapress.com/j/zt/>

Copyright © 2021 Magnolia Press

Monograph

<https://doi.org/10.11646/zootaxa.5078.1.1>

<http://zoobank.org/urn:lsid:zoobank.org:pub:CCAB7BE3-7C2C-4EFF-85D1-61B6B26C4D69>

ISSN 1175-5326 (print edition)

ZOOTAXA

ISSN 1175-5334 (online edition)

ZOOTAXA

5078

Thirteen new species of *Chilecicada* Sanborn, 2014 (Hemiptera: Auchenorrhyncha: Cicadidae: Tibicininae) expand the highly endemic cicada fauna of Chile

ALLEN F. SANBORN^{1*}, JEFFREY A. COLE^{2,3,4}, MARK STUKEL^{5,6}, PIOTR ŁUKASIK⁷,
CLAUDIO VELOSO⁸, VALORIE A. GONZALEZ^{2,9}, JESSICA B. KARKAR^{2,10}
& CHRIS SIMON^{4,11}

¹Department of Biology, Barry University, 11300 NE Second Avenue, Miami Shores, FL 33161–6695, USA.

 asanborn@barry.edu;  <https://orcid.org/0000-0001-5729-7106>

²Natural Sciences Division, Pasadena City College, 1570 East Colorado Boulevard, Pasadena, CA 91106, USA.

³ jacole@pasadena.edu;  <https://orcid.org/0000-0002-3485-6056>

⁴Entomology Section, Natural History Museum of Los Angeles County, 900 Exposition Boulevard, Los Angeles, CA 90007, USA.

⁵Department of Ecology & Evolutionary Biology, University of Connecticut, Storrs, CT 06268, USA.

⁶ mark.stukel@uconn.edu;  <https://orcid.org/0000-0002-4774-7991>

⁷Institute of Environmental Sciences, Faculty of Biology, Jagiellonian University, Gronostajowa 7, 30-387 Kraków, Poland.

 plukasik@gmail.com;  <https://orcid.org/0000-0002-4164-6487>

⁸Department of Ecological Sciences, Science Faculty, University of Chile, 7800003 Santiago, Chile.

 clveloso@uchile.cl;  <https://orcid.org/0000-0002-1744-5650>

⁹ vag038@ucsd.edu;  <https://orcid.org/0000-0002-8454-8393>

¹⁰ jessicakarkar@gmail.com;  <https://orcid.org/0000-0003-4456-1929>

¹¹ chris.simon@uconn.edu;  <https://orcid.org/0000-0002-3576-1120>

*Corresponding author.  asanborn@barry.edu



Magnolia Press
Auckland, New Zealand

ALLEN F. SANBORN, JEFFREY A. COLE, MARK STUKEL, PIOTR ŁUKASIK, CLAUDIO VELOSO,
VALORIE A. GONZALEZ, JESSICA B. KARKAR & CHRIS SIMON

Thirteen new species of *Chilecicada* Sanborn, 2014 (Hemiptera: Auchenorrhyncha: Cicadidae: Tibicininae) expand the highly endemic cicada fauna of Chile

(*Zootaxa* 5078)

70 pp.; 30 cm.

8 December 2021

ISBN 1-77688-428-5 (paperback)

ISBN 1-77688-429-2 (Online edition)

FIRST PUBLISHED IN 2021 BY

Magnolia Press

P.O. Box 41-383

Auckland 1041

New Zealand

e-mail: magnolia@mapress.com

<https://www.mapress.com/j/zt>

© 2021 Magnolia Press

All rights reserved.

No part of this publication may be reproduced, stored, transmitted or disseminated, in any form, or by any means, without prior written permission from the publisher, to whom all requests to reproduce copyright material should be directed in writing.

This authorization does not extend to any other kind of copying, by any means, in any form, and for any purpose other than private research use.

ISSN 1175-5326 (Print edition)

ISSN 1175-5334 (Online edition)

Table of Contents

Abstract.....	3
Introduction.....	3
Methods.....	4
Results.....	5
Systematics.....	5
Family Cicadidae Latreille, 1802.....	5
Subfamily Tibicininae Distant, 1905.....	5
Tribe Chilecicadini Sanborn, 2014.....	5
<i>Chilecicada</i> Sanborn, 2014.....	5
<i>Chilecicada citatateporaria</i> n. sp. Sanborn and Cole.....	5
<i>Chilecicada culenesensis</i> n. sp. Sanborn and Cole.....	8
<i>Chilecicada curacaviensis</i> n. sp. Sanborn and Cole.....	12
<i>Chilecicada impartemporaria</i> n. sp. Sanborn and Cole.....	15
<i>Chilecicada magna</i> n. sp. Sanborn and Cole.....	19
<i>Chilecicada mapuchensis</i> n. sp. Sanborn.....	23
<i>Chilecicada occidentis</i> (Walker, 1850).....	27
<i>Chilecicada oraria</i> n. sp. Sanborn and Cole.....	33
<i>Chilecicada parrajaraorum</i> n. sp. Sanborn.....	38
<i>Chilecicada partemporaria</i> n. sp. Sanborn and Cole.....	41
<i>Chilecicada pehuenchesensis</i> n. sp. Sanborn and Cole.....	46
<i>Chilecicada trifascia</i> n. sp. Sanborn.....	50
<i>Chilecicada trifasciunca</i> n. sp. Sanborn and Cole.....	53
<i>Chilecicada viridicitata</i> n. sp. Sanborn and Cole.....	57
Morphological key to the species of <i>Chilecicada</i>	61
Discussion.....	64
Acknowledgments.....	67
References.....	67

Abstract

The genus *Chilecicada* Sanborn, 2014 is shown to be a complex of closely related species rather than a monospecific genus. *Chilecicada citatateporaria* Sanborn & Cole **n. sp.**, *C. culenesensis* Sanborn & Cole **n. sp.**, *C. curacaviensis* Sanborn & Cole **n. sp.**, *C. impartemporaria* Sanborn & Cole **n. sp.**, *C. magna* Sanborn & Cole **n. sp.**, *C. mapuchensis* Sanborn **n. sp.**, *C. oraria* Sanborn & Cole **n. sp.**, *C. parrajaraorum* Sanborn **n. sp.**, *C. partemporaria* Sanborn & Cole **n. sp.**, *C. pehuenchesensis* Sanborn & Cole **n. sp.**, *C. trifascia* Sanborn **n. sp.**, *C. trifasciunca* Sanborn & Cole **n. sp.**, and *C. viridicitata* Sanborn & Cole **n. sp.** are described as new. *Chilecicada occidentis* Walker, 1850 is re-described to facilitate separation of the new species from the only previously known species. Song and cytochrome oxidase I analysis available for most species support the separation of the new taxa from the type species of the genus. Known species distributions and a key to the species of the genus are also provided. The new species increases the known cicada diversity 61.9% to 34 species, 91.2% of which are endemic to Chile.

Key words: taxonomy, new species, acoustic signals, cytochrome oxidase, biogeography, biodiversity

Introduction

The genus *Chilecicada* Sanborn, 2014 was erected for a single species of Chilean cicada (Sanborn 2014). However, fieldwork has now demonstrated that there were multiple song types being produced by otherwise similar looking species, all of which were classified previously as *C. occidentis* (Walker, 1850). Sampling of acoustic recordings and additional specimen material indicated that further species complexity was present in *Chilecicada*. This prompted us to examine their morphology, undertake acoustic analysis and explore CO1 sequence data. The morphological examinations confirmed the existence of 13 new species, most of which are supported by acoustic data. The pattern presented by the morphological, acoustic and molecular data is reminiscent of the *Cicadetta montana* (Scopoli, 1772) complex (e.g. Gogala *et al.* 2008, 2009; Hertach 2007; Sueur & Puissant 2007; Wade *et al.* 2015). Here, we describe the new species based on morphology and songs, and present the data on genetic relatedness. We re-describe *C. occidentis* to provide a comparable description to facilitate distinguishing it from the new species.

Available information on species distributions, natural history, and a morphological key to the species are also provided.

Methods

Morphology. Specimens of the new taxa were collected primarily during expeditions in 2004, 2010, and 2014–2019. Type material is deposited in the Natural History Museum of Los Angeles County, Los Angeles (LACM), Museo Nacional de Historia Natural, Santiago (MNNC), Biodiversity Research Collection, University of Connecticut at Storrs (UCMS), and the Sanborn collection, Miami Shores (AFSC). Additional specimens incorporated in this study were originally obtained from the Bohart Museum of Entomology, University of California at Davis (UCDC), the Carnegie Museum of Natural History, Pittsburgh (CMNH), Florida State Collection of Arthropods, Gainesville (FSCA), A.J. Cook Arthropod Collection, Michigan State University, East Lansing (MSUC), the Mississippi Entomological Museum, Mississippi State University (MEMC), and the North Carolina State University Insect Collection (NCSU). Mick Webb of the Natural History Museum, London (BMNH) kindly provided images of the holotype of *C. occidentis* (Walker, 1850). Anatomical terminology follows Moulds (2005, 2012) and Marshall *et al.* (2018). Body measurements were made with Vernier calipers accurate to ± 0.05 mm. The fore wing basal cell measurement ratios used in the key were taken as the greatest distance of the basal cell along the axis with the Radius + Subcostal vein divided by the greatest perpendicular width of the cell to this axis. Basal cell measurements were made with a hand-held microscale under a dissecting microscope accurate to ± 0.01 mm.

Bioacoustics. Cicadas were recorded in the field using a linear PCM recorder with an integral condenser microphone pair (model PCM-D50, Sony Corp., USA) set to a 96 kHz sampling rate, 16-bit depth, and .wav file format. The equipment and settings together recorded frequencies up to 40 kHz, which represented the entire frequency range of *Chilecicada* (see Results). Ambient temperature was measured in the vicinity of a singing male using a digital temperature sensor (model Trail Pilot 2, Highgear USA Inc., Fletcher, NC, USA).

Recordings were prepared for analysis using a custom macro in Audacity v. 2.4.2 (available at www.audacityteam.org) that converted stereo .wav files to mono, applied a high pass filter to remove background noise below 1–5 kHz depending upon the intrusion of noise into the bandwidth of the song, and normalized levels to -3 dB SPL. Batches of .wav files were analyzed with the warbleR package (Araya-Salas & Smith-Vidaurre 2017) implemented in RStudio v. 1.3 running R v. 4.0.2 (available from www.r-project.org) as follows: 1) automatic waveform detection (*autodetec* function) to extract temporal song parameters, with amplitude envelope smoothing (*ssmooth*) set to 300, 2) frequency range detection (*frange* function) at threshold 10, the fast spectrum option (*fast.spec*) activated, and a 5–40 kHz bandpass filter, and 3) detailed spectral analysis (*specan* function). Pulse rates and amplitude modulation rates were estimated from pulse counts in 0.1 s and 0.5 s oscillogram windows, respectively. Waveform and spectrogram images were generated with Raven v. 2.0 (available from www.ravensoundsoftware.org).

Exploratory song character ordinations were performed in Mesquite v. 3.61 (Maddison & Maddison 2015). Song terminology follows that of Baker and Chesmore (2020). Statistical analysis of the warbleR output was performed in R. Differences in echeme duration, echeme rate, and mean dominant frequency distributions were tested among species with MANOVA, with significance evaluated under a Pillai test statistic. The relationship of song characters with ambient temperature was tested with ANCOVA, with morphologically delimited species as the factor and temperature as the covariate. Song differences for three species represented by singleton recordings were tested against song character distributions using single sample *t*-tests (Sokal & Rohlf 2000).

Molecular phylogenetics. Whole specimens were preserved for molecular analysis by direct dispatch in 100% ethanol in the field. Total genomic DNA was extracted from *Chilecicada* tissue samples using the right middle leg. The leg was cut into partitions and preserved in 100% ethanol. The DNeasy (Qiagen Inc, Valencia, CA, USA) commercial bench protocol was followed, with the exception of using two elutions of 50 uL AE instead of 200 uL of AE elution. In addition, two 500 uL of AW2 washes were used in the protocol rather than one wash of 500 uL of AW1 followed by one 500 uL of AW2.

The 3' end of mitochondrial cytochrome C oxidase 1 was targeted using custom primers modified from Simon *et al.* (1994): JerryTGA forward CAACAYYTATTTTGATTTTGG and PatTGA reverse TTCATTGCACTAATCTGCCATATTA. The use of custom primers and the switch to the 3' end of COI followed retrieval of NUMTS with conventional 5' COI barcode region primers (Folmer *et al.* 1994). The DNA extractions were diluted 1:10 in order to even out the range of concentrations and decrease the concentration of impurities. 1

ul of diluted sample or a negative control of ddH₂O was added to a 10 ul PCR reaction for which the thermocycler parameters were set as follows: initial denaturation at 95° C for 5 minutes, cycle denaturation at 95° C for 1 minute, touchdown annealing starting at 55° C and dropping 1° C each for 10 cycles and then fixed at 45° C for 30 more cycles, extension at 72° C for 1 minute, and a final 72° C extension for 7 minutes. The PCR products were checked on a 0.7% agarose gel. Two separate negative controls were checked to ensure there was no contamination. The amplified samples were sent out to be Sanger Sequenced commercially (Laragen, Inc., Culver City, CA, USA).

Trace files were edited in Genius Prime v. 2021.2.2 (www.geneious.com) and trimmed to a single open reading frame. Contigs were edited in Mesquite v. 3.61 (Maddison & Maddison 2015). Two exemplars of *Platypedia* were added as outgroups given their basal position in the cicada phylogeny (Marshall *et al.* 2018). The appropriate sequence evolution model was found using Partition Finder v. 2.1.1 (Lanfear *et al.* 2012, 2016). MrBayes 3.2.7 (Huelsenbeck & Ronquist 2001; Ronquist *et al.* 2012; Ronquist & Huelsenbeck 2003) was then used to estimate the phylogenetic tree from the model acquired using Partition Finder. Four runs of four chains each ran for 10x10⁷ generations, and consensus trees were calculated after 25% relative burnin was discarded.

To explore species distributions and biogeographic patterns, the resulting phylogenetic tree was visualized onto a map of specimen localities with the web application TreeToM (Maya-Lastra 2020) using map layers sourced from Esri (Esri, Redlands, CA, USA).

Results

Systematics

Family Cicadidae Latreille, 1802

Subfamily Tibicininae Distant, 1905

Tribe Chilecicadini Sanborn, 2014

Chilecicada Sanborn, 2014

Chilecicada citatetemporaria n. sp. Sanborn and Cole

Fig. 1 (morphology), Plate 1 (live habitus), Plate 2 (song), Plate 4 (wing flick), Plate 5 (distribution)

Type material. Holotype. “CHILE. Región de Valparaíso: / Petorca Pr.; Comuna de Cabildo, / Puente La Mora, Camino E-41, / 32.44125S, 71.00812W, 244 m. / 20-XII-2018. JA Cole, FA / Calderon, C Veloso leg. S18-05 // JAC000003271” 1♂ (LACM). Paratypes. “CHILE. Región de Valparaíso: / Provincia de Petorca; Comuna de / Cabildo; Puente La Mora, / Camino E-41 / 32.44125S, 71.00812W, 244 m. / 20-XII-2018. JA Cole, FA Calderon / C Veloso leg. S18-05 // 181220-12” 1♂ (AFSC); “CHILE. Región de Valparaíso: / Petorca Pr.; Comuna de Cabildo, / Puente La Mora, Camino E-41, / 32.44125S, 71.00812W, 244 m. / 20-XII-2018. JA Cole, FA / Calderon, C Veloso leg. S18-05 // JAC000000615” 1♂ (LACM).

Etymology. The name is a combination of *citata-* (L. *citatus*, quick, rapid, speedy) and *-temporaria* (L. *temporarius*, of time) in reference to the rapidly produced echemes in the song of the species.

Description. Ground color testaceous marked with piceous and castaneous, costal margin, radius & subcostal vein and basal veins of fore wing ochraceous, costal margin green in live specimens. Body covered with silvery pile giving a grayish appearance when alive.

Head. Head slightly wider than mesonotum, dorsal head piceous except ground color anterior supra-antennal plate, anterolateral corner of vertex, and posterior epicranial suture with mark extending laterally along posterior of head to level of lateral ocelli, castaneous spots on anterolateral corners of frons, short silvery pile on dorsal head, denser longer pile posterior to eye. Ocelli dark red, eyes dark castaneous. Gena piceous margined with ground color along medial margin, anteriorly along supra-antennal plate, and posteromedial margin along lorum, medially castaneous in paratype, lorum ground color with piceous mark in anteromedial corner and posteromedial corner, short silvery pile and radiating long silvery pile on lorum and gena. Postclypeus ground color with piceous transverse grooves and central sulcus, 12 transverse grooves, dorsum piceous posterior to transverse grooves, castaneous mark

on posterolateral corners continuous with castaneous spots on anterolateral frons, long silvery pile radiating from postclypeus, short silvery pile along lateral margin. Anteclypeus piceous with ground color carina and anterior and posterior margins, covered with short silvery pile and radiating long silvery pile. Mentum ground color proximally, castaneous distally, labium castaneous proximally, piceous distally, rostrum radiating long silvery pile, reaching to middle of middle trochanters. Scape ground color, remaining antennal segments piceous.

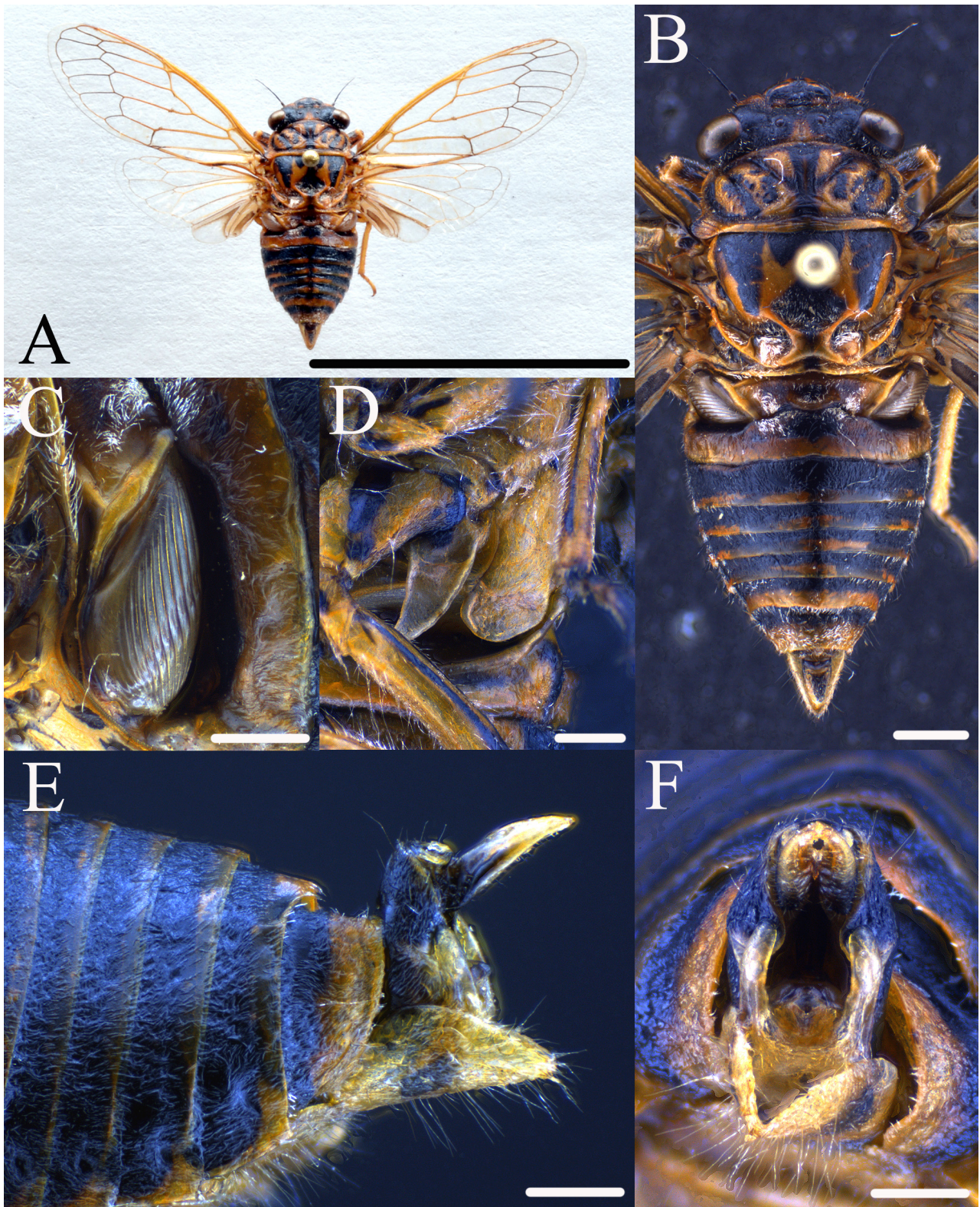


FIGURE 1. *Chilecicada citatatemporaria* n. sp.: A, Holotype male and paratype female habitus; B, holotype male dorsum; C, holotype male timbal; D, paratype male operculum; E, paratype male lateral view of genitalia; F, paratype male posterior view of genitalia. Scale bar: A, 2 cm; B, 2 mm; C–F, 1 mm.

Thorax. Pronotum ground color, piceous fascia on either side of midline fusing medially in anterior fissure and in posterior ambient fissure, lateral and anterior ambient fissures, paramedian, lateral, and lateral portion of posterior ambient fissures piceous, all fissures piceous in paratype, irregular longitudinal mark extending onto disk between paramedian and lateral fissures but not reaching lateral fissure, small piceous spots on disk anterior and posterior to middle of lateral fissure, additional spots just posterior to central paramedian fissure. Pronotal collar ground color with piceous mark on anterolateral margin of lateral angle, mark expanded in paratype forming fascia connecting from anterior pronotal collar lateral angle to lateral ambient fissure. Pronotum with short silvery pile, denser in fissures. Mesonotum ground color, submedian sigilla piceous, piceous fused anteromedially, lateral sigilla piceous, lateral longitudinal fascia, darker and larger in paratype, diamond-shaped piceous mark on central disk posterior to submedian sigilla, expanding laterally to piceous scutal depressions and between anterior arms of cruciform elevation, mark extends along anterior midline of cruciform elevation but not reaching posterior margin, piceous spot on posterior mesonotum continuous with piceous mark on anterior half of lateral cruciform elevation, wing groove ground color with piceous fasciae anteromedially and anterolaterally connected by transverse fascia anteriorly. Metanotum ground color with piceous midline and anterolaterally in wing groove. Dorsum covered with silvery pile, denser and longer between anterior arms of cruciform elevation, between anterior and posterior arms of cruciform elevation, on posterior mesonotum, and in wing groove. Ventral thoracic segments ground color except piceous spots on basisternum 2, posterior katapisternum 2, and lateral trochantin 2. Ventral segments covered with short silvery pile and radiating long silvery pile.

Wings. Fore wings and hind wings hyaline, holotype with eight and seven apical cells in the fore wing and four or five apical cells in the hind wings, paratype exhibits eight and six apical cells in the fore and hind wings respectively. Venation greenish proximally, becoming piceous distally, costal margin and radius & subcostal vein greenish separated by piceous fascia to node, anal vein 2 + 3 piceous. Basal cell about 3.67 times longer than broad with piceous mark proximally on cubitus posterior + anal vein 1. Pterostigma present. Basal membrane of fore wing grayish mottled with orange with darker posterior margin. Hind wing venation greenish with castaneous margining anal vein 2 and anal vein 3, piceous spots on wing base. Basal plaga, anal cell 3 along anal vein 3 to terminal curve, anal cell 2 along anal veins 2 and 3 to terminal curve, and proximal anal cell 1 gray mottled with orange, infuscation in anal cell 3 and anal cell 2 bordering gray.

Legs. Legs ground color, coxae, trochanters and femora striped with piceous, tibiae with piceous spot proximally, striped with piceous, fascia incomplete in hind tibiae, fore tibiae piceous distally, tibial spurs and tibial combs ground color with castaneous tips, fore tarsi piceous except ground color ventral mesotarsus and proximal metatarsus, middle and hind tarsi castaneous with greater proportion of ground color, pretarsal claws ground color proximally with piceous or castaneous tips. Fore femora with primary spine perpendicular to femoral axis, secondary spine upright, longest, with wide base, and very small tertiary spine, spines ground color with piceous proximal margin on primary spine and piceous tip on secondary spine. Proximal segments with short silvery pile, all segments radiating long silvery pile. Male meracanthus ground color with piceous spot on base, an elongated triangle distally curving mediad, reaching beyond operculum posterior margin and middle of tympanal cavity.

Opercula. Male opercula ground color with piceous spot on lateral base, lateral margin straight, obtusely angled posterolateral margin, posterior margin straight, semicircular medial margin, anteromedial margin curved to base, not reaching to anterior of sternite II posteriorly, well separated medially barely reaching lateral meracanthus, covered with short silvery pile, long silvery pile radiating from operculum margin.

Abdomen. Abdominal tergite 1 castaneous medially, ground color laterally, with piceous spot anteromedially, expanded into transverse piceous fascia in one paratype, and small piceous spots on either side of midline on posterior margin, tergite 2 piceous anterodorsally between timbal cavities, piceous within timbal cavity, castaneous posterior to piceous and timbal cavities with greenish testaceous posterior margin, tergites 3–8 piceous anteriorly bordered posteriorly with greenish testaceous, tergites covered with short silvery pile, longer pile radiating from lateral tergites 5–8. Timbal cover a thickened rim, timbal completely exposed with 13 long ribs and 11 intercalary ribs. Male sternite I ground color, sternite II testaceous with ground color anterior margin, small transverse piceous fasciae near anterior margin on either side of midline and in middle of tympanal cavity, auditory capsule castaneous centrally, piceous in one paratype, sternites III–VII testaceous, sternite III with piceous fascia on anterior margin expanding into spot on midline and small piceous spots on anterolateral corners, sternites IV and V with small transverse fascia on anterior midline, small transverse fasciae on anterior of sternites IV–VII in one paratype, sternite VII with ground color posterior margin. Epipleurites testaceous with central castaneous spots. Sternite VIII

ground color, dorsal margin with gentle curve near base forming an obtuse angle, V-shaped when viewed from posterior. Sternites and epipleurites with short silvery pile and radiating long silvery pile, longer on sternites VII and VIII.

Genitalia. Male pygofer ground color ventrally and on posterolateral margin, piceous dorsally separated from ground color by castaneous, distal shoulder undeveloped, smoothly curved, reaching to base of anal tube, dorsal beak absent, pygofer with short silvery pile on dorsolateral posterior. Upper pygofer lobe absent, pygofer basal lobes elongated, adpressed to lateral pygofer, flattened, slightly curved dorsally, extending more than half pygofer length, distal lobe with parallel sides and semicircular terminus, apex against lateral pygofer margin. Anal styles piceous with ground color margins, radiating short silvery pile, anal tube castaneous, piceous in paratype, with ground color anterior and posterior margins. Median uncus lobe piceous at base with castaneous proximal half of lateral margin, ground color distally, elongated, undivided, angled posteriorly from base, distally curving toward sternite VIII, widening laterally from base before tapering to rounded posterior margin, small ridge on dorsal surface midline, castaneous proximally, ground color distally, ventral surface dark ground color with piceous base, ventral surfaces almost meeting along midline expanding to small hole near distal terminus for extension of aedeagus, radiating golden pile. Aedeagus castaneous with darker lateral fascia, terminus not visible in type series, basal aedeagus tubular, dark castaneous.

Measurements (mm). $n=2\♂$, mean (range). Length of body: $\♂$ 16.35 (15.75–16.95); length of fore wing: $\♂$ 17.30 (16.60–18.00); width of fore wing: $\♂$ 6.38 (6.15–6.60); length of head: $\♂$ 3.10 (3.00–3.20); width of head including eyes: $\♂$ 5.33 (5.15–5.50); width of pronotum including suprahumeral plates: $\♂$ 6.30 (6.15–6.45); width of mesonotum: $\♂$ 5.13 (5.00–5.25).

Song. ($n=4$: 1 paratopotype, 2 topotypes (UCMS alcoholic molecular vouchers), 1 male from type locality not captured) Brief echemes of 0.04 ± 0.00 s duration delivered at a rapid rate of 18.13 ± 0.89 s⁻¹. The dominant frequency band is 9.84–12.59 kHz (mean dominant frequency= 11.18 ± 0.61 kHz). Echemes are grouped into echeme sequences that vary widely in length, from 1.67 to 24.51 s. The songs of *C. citatetemporaria* and *C. occidentis* are not significantly different (MANOVA, $P=2.90\times10^{-1}$).

Diagnosis. This is one of the smaller of the *Chilecicada* species. This new species can be distinguished by having in combination a body length between 14.75–16.95 mm, fore wing length between 15.30–18.00 mm, fore wing basal cell about 3.67 times longer than broad, a piceous mark along the proximal fore wing basal cell, a piceous fascia separating the fore wing costa and radius + subcostal veins to node, a triangular meracanthus, ground color medial opercular margin, a semicircular posteromedial operculum, abdominal epipleurites with a central spot, and an uncus that is piceous proximally and ground color distally curving distally to terminus.

Rapid sequences of echemes separate the song of this species from all other *Chilecicada* except *C. occidentis*. The echeme rate is also rapid in *C. viridicitata* songs but is half (~ 10 s⁻¹) the *C. citatetemporaria* rate (~ 20 s⁻¹).

Distribution. The species is known from the type series collected in the Petorca Province of Región de Valparaíso of central Chile.

Chilecicada culenesensis n. sp. Sanborn and Cole

Fig. 2 (morphology), Plate 1 (live habitus), Plate 2 (song), Plate 5 (distribution)

Type material. Holotype. “15.CL.RM.LCN.716.4 / -33.8929, -71.4001 / 19.XII.2015 C.V., K.N., P.L.” $\♂$ (UCMS). Paratypes. “15.CL.RM.LCN.713 / -33.8929, -71.4001 / 19.XII.2015 C.V., K.N., P.L.” 1 $\♂$ (MNNC); “15.CL.RM.LCN.716.3 / -33.8929, -71.4001 / 19.XII.2015 C.V., K.N., P.L.” 1 $\♂$ (AFSC); “15.CL.RM.LCN.714.1 / -33.8929, -71.4001 / 19.XII.2015 C.V., K.N., P.L.” 1 $\♀$ (AFSC); “15.CL.RM.LCN.714.2 / -33.8929, -71.4001 / 19.XII.2015 C.V., K.N., P.L.” 1 $\♂$ (UCMS); “15.CL.RM.LCN.715 / -33.8929, -71.4001 / 19.XII.2015 C.V., K.N., P.L. // Seq.” 1 $\♀$ (UCMS). The code 15.CL.RM.LCN refers to a hill near the village of Los Culenes, Region Metropolitana, Chile collected by Claudio Veloso, Katherine Nazario and Piotr Łukasik.

Etymology. The name is a combination of *culenes*- and *-ensis* (L. suffix denoting place) in reference to the type locality of the species.

Description. Ground color dark testaceous marked with piceous and castaneous, greenish costal margin, radius & subcostal vein and basal veins of fore wing, faded to ochraceous in most paratypes due to ethanol exposure. Body covered with silvery pile.

Head. Head slightly wider than mesonotum, dorsal head piceous except ground color anterior margin of supra-

antennal plate, and anteromedial corner of vertex and posterior epicranial suture, short silvery pile on dorsal head, denser longer pile posterior to eye. Ocelli red, ochraceous in some paratypes, eyes dark castaneous lightly margined proximally with ground color. Gena piceous margined with ground color medial margin, anteriorly along supra-antennal plate, and posteromedial margin along lorum, lorum piceous with ground color lateral margin, short silvery pile and radiating long silvery pile on lorum and gena. Postclypeus ground color with piceous transverse grooves and central sulcus, 12 transverse grooves, dorsum piceous posterior to transverse grooves with castaneous posterior margin, long silvery pile radiating from postclypeus, short silvery pile along lateral margin. Anteclypeus piceous with ground color carina and anterior and posterior margins, covered with short silvery pile and radiating long silvery pile. Mentum ground color with lateral castaneous mark, expanding to cover most of mentum in one paratype, labium piceous, rostrum radiating long silvery pile, reaching to posterior of middle trochanters. Scape ground color, remaining antennal segments piceous.

Thorax. Pronotum ground color, piceous fascia on either side of midline fusing medially in anterior fissure and in posterior ambient fissure, fissures piceous, mark in lateral fissure expanding onto lateral disk, irregular longitudinal mark extending onto disk between paramedian and lateral fissures but not reaching lateral fissure, small piceous spots on disk anterior and posterior to middle of lateral fissure and just posterior to central paramedian fissure. Pronotal collar ground color with piceous anterior margin along ambient fissure, mark on anterolateral margin of lateral angle expanded medially forming fascia connecting to lateral ambient fissure. Pronotum with sparse, short silvery pile in fissures. Mesonotum piceous with ground color outlining sigilla but not reaching anterior margin, on anterolateral corner, cruciform elevation and wing groove, mark on central disk extends along anterior half of cruciform elevation midline, anterior half of lateral cruciform elevation piceous, wing groove ground color with piceous fasciae anteromedially and anterolaterally connected by transverse fascia anteriorly in some paratypes. Metanotum ground color with piceous midline, anterolateral region, and posterolateral fascia. Dorsum covered with sparse silvery pile, denser and longer between anterior arms of cruciform elevation, between anterior and posterior arms of cruciform elevation, and in wing groove. Ventral thoracic segments piceous margined with ground color. Ventral segments covered with short silvery pile.

Wings. Fore wings and hind wings hyaline with eight and six apical cells respectively, one paratype fore wing and one paratype hind wing with modified venation pattern in apical cells but same number of apical cells. Venation greenish proximally, becoming piceous distally, costal margin and radius & subcostal vein greenish separated by piceous fascia proximally, piceous extending to node in some paratypes, cubitus posterior and anal vein 2 + 3 piceous. Basal cell about 3.5 times longer than broad with piceous mark proximally on cubitus posterior + anal vein 1. Pterostigma present. Basal membrane of fore wing grayish mottled with red with darker posterior margin. Hind wing venation similarly colored except piceous median vein, anal vein 2, anal vein 3 and proximal cubitus posterior, piceous spot on wing base. Basal plaga, anal cell 3 along anal vein 3 to terminal curve, anal cell 2 along anal veins 2 and 3 to terminal curve, proximal anal cell 1, posterior to cubitus posterior, proximal medial cell and proximal costal cell with gray mottled with red, infuscation in anal cell 3 and anal cell 2 bordering gray and red area and in base of cubital cell 1, cubital cell 2 and anal cell 1.

Legs. Legs ground color, coxae, trochanters and femora striped with piceous, tibiae with piceous spot proximally, fore tibiae striped with piceous anteriorly and piceous distally, middle tibiae with thinner and shorter fasciae and lesser amount of terminus piceous, hind tibiae lacking distal fascia and terminal mark, tibial spurs and tibial combs ground color with castaneous tips, tarsi piceous except ground color majority of mesotarsi and majority of pretarsus in hind tarsi, piceous expanding on hind tarsi metatarsi also ground color in some paratypes, pretarsal claws castaneous with piceous tips. Fore femora with primary spine angled to femur, secondary spine upright, sinuate with broad proximal base, longest, and small tertiary spine, all spines piceous. Proximal segments with short silvery pile, all segments radiating long silvery pile. Male meracanthus ground color with piceous spot on base, an elongated triangle distally curving mediad, reaching beyond operculum posterior margin to posterior of sternite I. Female meracanthus similarly colored but not curving distally, reaching to anterior of sternite III.

Opercula. Male opercula ground color with piceous spot on lateral base and piceous medial and posterior margins, lateral margin straight, obtusely angled posterolateral margin, posterior margin straight, medial margin rounded, anteromedial margin curved to base, reaching to about middle of tympanal cavity posteriorly, well separated medially barely reaching lateral meracanthus, covered with short silvery pile, long silvery pile radiating from operculum margin. Female operculum similarly shaped and colored with lateral margin also piceous, reaching to middle of sternite II.

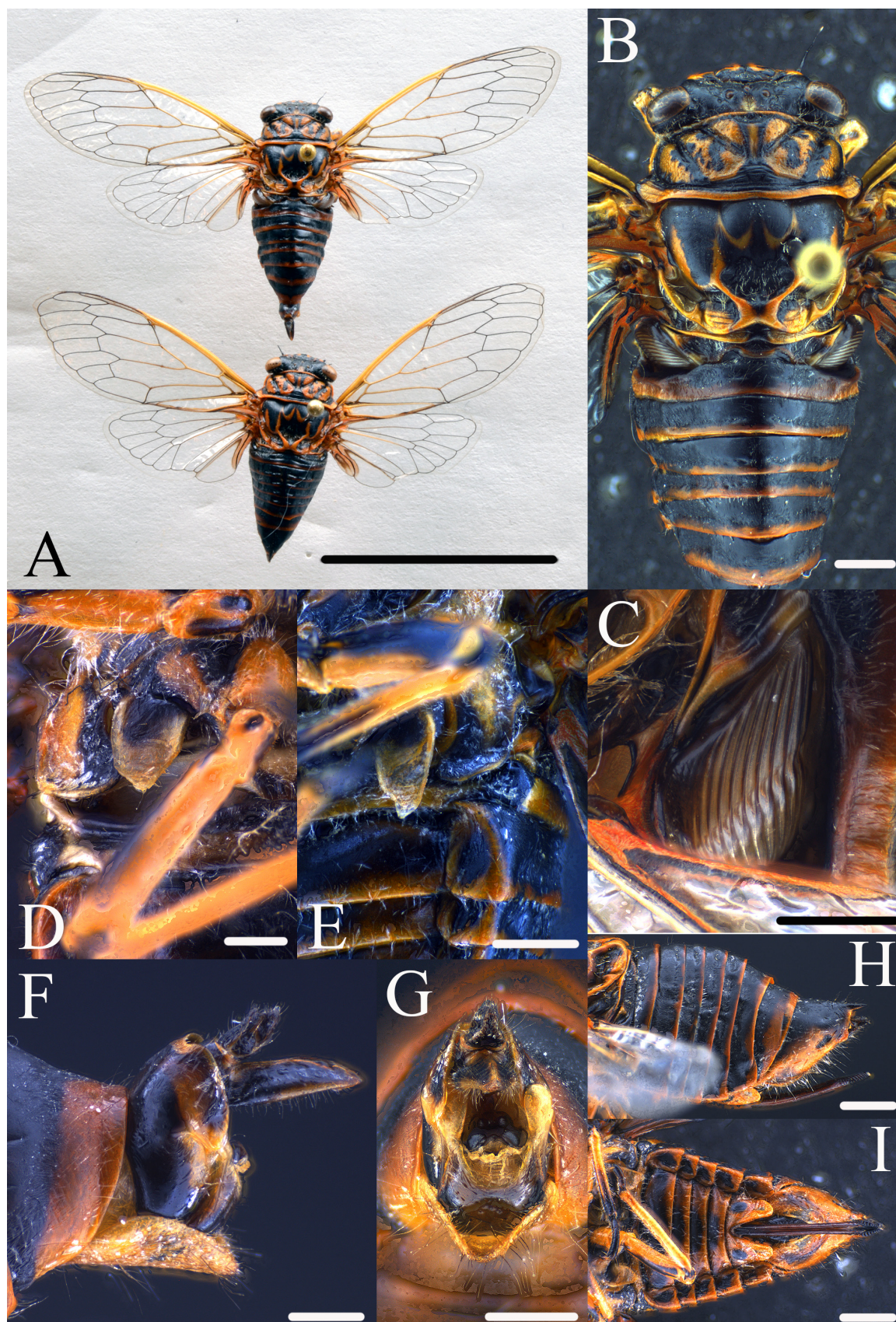


FIGURE 2. *Chilecicada culenesensis* n. sp.: A, Holotype male and paratype female habitus; B, holotype male dorsum; C, holotype male timbal; D, paratype male operculum; E, paratype female operculum; F, paratype male lateral view of genitalia; G, paratype male posterior view of genitalia; H, paratype female lateral view of genitalia; I, paratype female ventral view of genitalia. Scale bar: A, 2 cm; B, 2 mm; C–G, 1 mm; H–I, 2 mm.

Abdomen. Abdominal tergite 1 with ground color anterior margin, anterolateral and posterolateral corners, lateral margin in some paratypes, with transverse piceous fascia narrowing laterally and castaneous posterior margin, tergite 2 piceous anterodorsally between timbal cavities, piceous within timbal cavity and on lateral margin, castaneous posterior to piceous and dorsolateral timbal cavities with ground color laterally and on posterior margin, tergites 3–8 piceous anteriorly bordered posteriorly with castaneous, small amount of ground color on dorsolateral posterior margin of tergite 3 in holotype, tergites covered with sparse, short silvery pile, longer pile radiating from lateral tergites 5–8. Timbal cover a thickened rim, timbal completely exposed with 13 long ribs and 11 intercalary ribs. Male sternite I ground color marked with piceous near anterior and posterior margins, sternite II testaceous with ground color anterolateral margin, transverse piceous fascia on anterior margin almost reaching piceous auditory capsule, sternite III with transverse piceous fascia on anterior margin, castaneous with testaceous posterior margin, sternites IV–VII testaceous with transverse castaneous mark in center, reducing in size in posterior sternites becoming a spot on central sternite VII. Epipleurites testaceous with central castaneous spot. Sternite VIII ground color with piceous anterior margin and piceous spots posterior to dorsal margin curve, spots expanded or absent in various paratypes, dorsal margin smoothly curved near base, V-shaped when viewed from posterior. Sternites and epipleurites with short silvery pile and radiating long silvery pile, longer on sternites VII and VIII. Female sternite VII ground color with large anterolateral piceous spots, single, deep, large V-shaped notch almost reaching anterior margin, posterolateral margin on either side of notch curved anterolaterad to straight lateral margin. Female abdominal segment 9 ground color ventrally and posteriorly surrounding piceous stigma, piceous anteriorly, dorsolaterally, dorsally, and on dorsal beak, margined with castaneous laterally, covered with short silvery pile and radiating long silvery pile ventrally. Dorsal beak not as long as piceous anal styles. Posterior margin of abdominal segment 9 straight.

Genitalia. Male pygofer ground color ventrally and on posterior margin, piceous dorsally and posterolaterally, separated from ground color by castaneous laterally, distal shoulder undeveloped, smoothly curved, not reaching to anal tube, dorsal beak absent. Upper pygofer lobe absent, pygofer basal lobes elongated, adpressed to lateral pygofer, flattened, slightly angled dorsally at oblique angle, extending more than half pygofer length, semicircular terminus, apex against lateral pygofer margin. Anal styles piceous margined with ground color at base, radiating short silvery pile, anal tube piceous. Median uncus lobe piceous with ground color spot on either side of dorsal carina at base and ground color on middle of lateral margin proximal to terminal bend, all but lateral margin base ground color in most paratypes, elongated, undivided, angled posteriorly from base, sinuate when viewed from the side, distal terminus angled toward sternite VIII, widening laterally from base before tapering to pointed posterior margin, small ground color ridge on dorsal surface midline, ventral surface dark ground color with piceous base, ventral surfaces recurved, almost meeting along midline expanding to small hole near distal terminus for extension of aedeagus, radiating golden pile. Aedeagus castaneous with darker lateral fascia, basal aedeagus tubular, dark castaneous, terminus not visible in type series.

Female gonocoxite IX piceous with ground color ventral margin, gonapophysis IX castaneous with piceous tips, gonapophysis X piceous. Ovipositor sheath not reaching to tip of dorsal beak. Long golden pile radiating from ovipositor sheath.

Measurements (mm). $n=4\text{♂}$, 2♀ , mean (range). Length of body: ♂ 19.48 (17.90–21.10), ♀ 18.08 (17.55–18.60); length of fore wing: ♂ 21.50 (20.75–22.50), ♀ 21.33 (20.85–21.80); width of fore wing: ♂ 7.86 (7.50–8.30), ♀ 8.03 (7.95–8.10); length of head: ♂ 3.06 (2.95–3.20), ♀ 3.10 (3.00–3.20); width of head including eyes: ♂ 6.15 (5.95–6.40), ♀ 6.13 (6.00–6.25); width of pronotum including suprahumeral plates: ♂ 7.05 (6.80–7.35), ♀ 6.98 (6.85–7.10); width of mesonotum: ♂ 5.80 (5.65–6.05), ♀ 5.85 (5.80–5.90).

Song. ($n=1$ paratopotype song recording of 21 s duration) The 0.62 s long echemes of *C. culenesensis* occur at a rate of 1.47 s^{-1} . The *C. culenesensis* echeme duration is significantly longer than that of *C. oraria* (1-sample *t*-test, $P=8.07\times 10^{-9}$) and similar to the durations of *C. curacaviensis*, *C. partemporaria*, and *C. trifasciunca* (1-sample *t*-test, $P=5.59\times 10^{-2}$). The *C. culenesensis* echeme rate is indistinguishable from those of *C. curacaviensis* and *C. oraria* (1-sample *t*-test, $P=9.69\times 10^{-1}$), but is faster than those of *C. partemporaria* and *C. trifasciunca* (1-sample *t*-test, $P=5.60\times 10^{-7}$) owing to a short interecheme interval of 0.058 s. The dominant frequency band is 9.03–10.89 kHz (mean dominant frequency=10.16 kHz).

Diagnosis. Another of the smaller of the *Chilecicada* species. This new species can be distinguished by having in combination a body length between 17.55–21.10 mm, fore wing length between 20.75–22.50 mm, fore wing basal cell about 3.50 times longer than broad, a piceous mark along the proximal fore wing basal cell, a piceous fascia separating the proximal fore wing costa and radius + subcostal veins, an elongated, triangular meracanthus,

piceous marking on the medial opercular margin, a semicircular posteromedial operculum, abdominal epipleurites with a large central spot, and an uncus that is piceous with ground color lateral and dorsal fasciae curving slightly to terminus. It is most similar morphologically to *C. curvacaviensis* **n. sp.** but differs in the ambient vein of the fore wing being obtusely angled posteriorly rather than being smoothly curved and the dorsal uncus is smoothly curved in that species.

This species shares a common song type with *C. curvacaviensis*, *C. magna*, *C. oraria*, *C. partemporaria*, *C. pehuenchesensis*, and *C. trifasciunca*: a continuous song with one approximately 0.5 s echeme produced roughly every s. Based on the single recorded male, the combination of long echemes produced at a fast rate may separate *C. culenesensis* from all species but *C. curvacaviensis*: *C. partemporaria* and *C. trifasciunca*, and probably also *C. magna* and *C. pehuenchesensis* sing with slow echeme rates; *C. oraria* songs have a similar fast echeme rate but with short echemes.

Distribution. The species is known from the type locality near the village of Los Culenes, Región Metropolitana, Chile.

Chilecicada curacaviensis **n. sp.** Sanborn and Cole

Fig. 3 (morphology), Plate 2 (song), Plate 5 (distribution)

Type material. Holotype. “CHILE. Región Metropolitana: / Melipilla Pr. Comuna de / Curacaví: G-864-F, 4 km east of El / Pangue, / 33.26978S, 71.18206W, 431 m. / 5-I-2019. JA Cole, FA Calderon / leg. S19-47 // 190105-010 (FC) // JAC000003273” ♂ (LACM).

Etymology. The name is a combination of *curacavi*- and *-ensis* (L. suffix denoting place) in reference to the place of origin of the type specimen.

Description. Ground color dark testaceous marked with piceous and castaneous, ochraceous costal margin, radius & subcostal vein and basal veins of fore wing, probably faded from green due to ethanol exposure. Body covered with silvery pile.

Head. Head slightly wider than mesonotum, dorsal head piceous except ground color anterior margin of supra-antennal plate and anteromedial corner of vertex, short silvery pile on dorsal head, longer, denser pile posterior to eye. Ocelli red, eyes dark castaneous lightly margined with ground color at medial angle. Gena piceous margined with ground color medial margin, anteriorly along supra-antennal plate, and posteromedial margin along lorum, lorum piceous with ground color lateral margin, short silvery pile and radiating long silvery pile on lorum and gena. Postclypeus ground color with piceous transverse grooves and central sulcus, piceous fusing medially across transverse ridges near apex, 12 transverse grooves, dorsum piceous except for ground color spot lateral to anterior terminus of central sulcus, long silvery pile radiating from postclypeus, short silvery pile along lateral margin and within transverse grooves. Anteclypeus piceous with ground color posterior half of carina, medial anterior margin and posterior margin, covered with short silvery pile and radiating long silvery pile. Mentum piceous with ground color medial margin, labium piceous, rostrum radiating long silvery pile, reaching to middle of middle trochanters. Scape ground color, remaining antennal segments piceous.

Thorax. Pronotum ground color, piceous fascia on either side of midline fusing medially in anterior fissure and in posterior ambient fissure, fissures piceous, mark in lateral fissure expanding onto lateral disk, irregular longitudinal mark extending onto disk between paramedian and lateral fissures but not reaching lateral fissure, small piceous spots on disk anterior and posterior to middle of lateral fissure and just posterior to central paramedian fissure. Pronotal collar ground color posteriorly, piceous expanding from ambient fissure over most of the dorsal and mediolateral collar along ambient fissure, piceous on lateral collar extending to lateral margin continuing on anterolateral margin of lateral angle margining the lateral angle of the pronotal collar with piceous. Pronotum with sparse, short silvery pile, denser in fissures. Mesonotum piceous with ground color outlining submedian sigilla but not reaching anterior margin, surrounding posterior two-thirds of lateral sigilla, on anterolateral corner, lateral margin, cruciform elevation and wing groove, piceous mark on central disk extends across central cruciform elevation midline, posterior of anterior arms and anterior half of lateral cruciform elevation piceous extending to form piceous spots on distal terminus of posterior arm, wing groove ground color with piceous fasciae anteromedially and anterolaterally connected by transverse fascia anteriorly. Metanotum ground color with piceous midline, anterolateral region, and posterolateral fascia. Dorsum covered with sparse silvery pile, denser and longer between anterior arms

of cruciform elevation, between anterior and posterior arms of cruciform elevation, and in wing groove. Ventral thoracic segments piceous margined with ground color medially, lateral segments ground color with piceous central regions. Ventral segments covered with short and radiating long silvery pile.

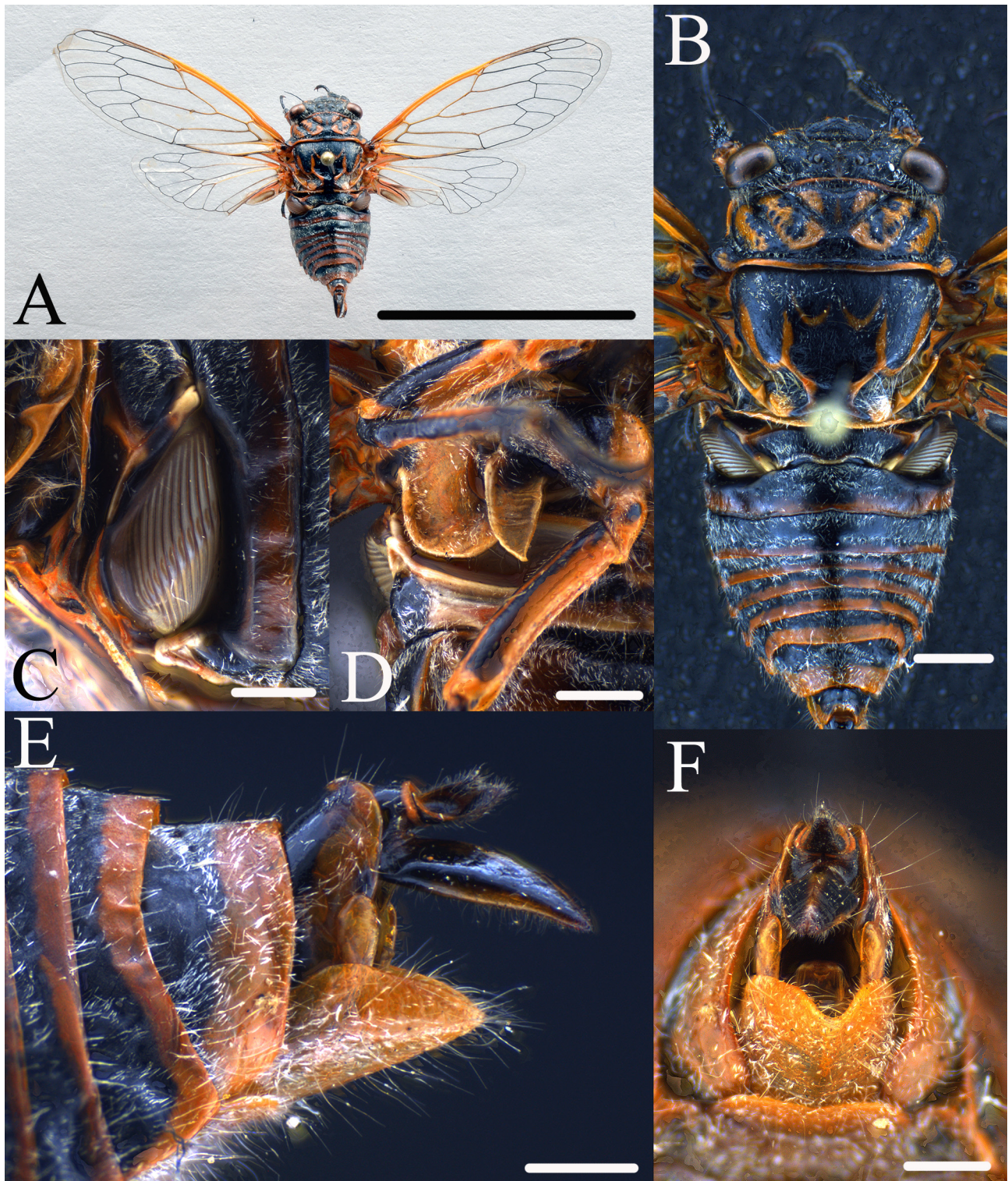


FIGURE 3. *Chilecicada curacaviensis* n. sp.: A, Holotype male habitus; B, holotype male dorsum; C, holotype male timbal; D, holotype male operculum; E, holotype male lateral view of genitalia; F, holotype male posterior view of genitalia. Scale bar: A, 2 cm; B, 2 mm; C–F, 1 mm.

Wings. Fore wings and hind wings hyaline with eight and six apical cells respectively. Venation ochraceous proximally, becoming piceous distally, costal margin and radius & subcostal vein ochraceous separated by piceous fascia proximally along basal cell, cubitus posterior and anal vein 2 + 3 piceous, piceous spot on wing base. Basal cell about 3.5 times longer than broad. Pterostigma present. Basal membrane of fore wing grayish mottled with red with darker posterior margin. Hind wing venation similarly colored except piceous median vein, cubitus posterior, anal vein 2, and anal vein 3, piceous spot on wing base. Basal plaga, anal cell 3 along anal vein 3 to terminal curve, anal cell 2 along anal veins 2 and 3 to terminal curve, proximal anal cell 1, posterior to cubitus posterior, proximal medial cell and proximal costal cell with gray mottled with red, infuscation in anal cell 3 and anal cell 2 bordering gray and red area and in base of cubital cell 1, cubital cell 2 and anal cell 1.

Legs. Legs ground color, coxae, trochanters and femora striped with piceous, tibiae with piceous spot proximally, tibiae striped with piceous anteriorly and piceous distally, middle tibiae with thinner and shorter fasciae and lesser amount of terminus piceous, hind tibiae lacking terminal mark, tibial spurs and tibial combs ground color with castaneous tips, tarsi piceous except ground color majority of mesotari and proximal pretarsus in hind tarsi, pretarsal claws castaneous with piceous tips. Fore femora with primary spine angled to femur, stout, secondary spine almost upright, slightly widened base, longest, and small tertiary spine, all spines piceous. Proximal segments with short silvery pile, all segments radiating long silvery pile. Male meracanthus ground color with piceous spot on base, an elongated triangle with parallel-sided base, reaching beyond operculum posterior margin but not reaching posterior of sternite I.

Opercula. Male opercula ground color with piceous spot on lateral base, lateral margin straight, obtusely angled posterolateral margin, posterior margin straight, medial margin rounded, anteromedial margin curved to base, reaching to about middle of tympanal cavity posteriorly, well separated medially extending medially under lateral meracanthus, covered with short silvery pile, long silvery pile radiating from operculum margin.

Abdomen. Abdominal tergite 1 with ground color anterior margin, anterolateral and posterolateral corners, with transverse piceous fascia narrowing laterally and castaneous posterior margin, tergite 2 piceous anterodorsally to dorsolateral timbal cavities, piceous within timbal cavity and on lateral margin, castaneous posterior to piceous, lighter on posterior margin, ground color on anterolateral corner of timbal cavity, tergites 3–8 piceous anteriorly bordered posteriorly with castaneous, amount of castaneous increasing in posterior tergites, tergites covered with sparse, short silvery pile, longer pile radiating from lateral tergites 5–8. Timbal cover a thickened rim, timbal completely exposed with 13 long ribs and 11 intercalary ribs. Male sternite I ground color marked with piceous near anterior and posterior margins, sternite II testaceous with ground color anterolateral margin, transverse piceous fascia on anterior margin extending to medial third of tympanal cavity, auditory capsule piceous, sternite III testaceous with transverse piceous fascia on anterior margin extending on midline forming central spot, sternites IV–VI testaceous with transverse piceous mark in center bordered posteriorly with castaneous, increasing in size in posterior sternites, sternite VII testaceous with small piceous mark on anterior midline. Epipleurites testaceous with large piceous spots. Sternite VIII ground color, dorsal margin smoothly curved near base, V-shaped when viewed from posterior. Sternites and epipleurites with short silvery pile and radiating long silvery pile, longer on sternites VII and VIII.

Genitalia. Male pygofer ground color ventrally, ventrolaterally and on posterior margin, piceous dorsally, dorsolaterally and posterolaterally, distal shoulder undeveloped, smoothly curved, not reaching to anal tube, dorsal beak absent, pygofer covered with short silvery pile. Upper pygofer lobe absent, pygofer basal lobes elongated, adpressed to lateral pygofer, flattened, slightly angled dorsally at oblique angle, extending more than half pygofer length, expanding after angle before forming rounded terminus, apex against lateral pygofer margin. Anal styles piceous margined with ground color at base, radiating short silvery pile, anal tube piceous with ground color anterior and posterior margins. Median uncus lobe piceous with dark ground color lateral margin distal to base, elongated, undivided, angled posteriorly from base, dorsal surface smoothly curved and ventral surface straight with down turned terminus when viewed from the side, widening laterally from base before tapering to pointed posterior margin, small castaneous ridge on dorsal surface midline, ventral surface dark ground color with piceous base, ventral surfaces recurved, almost meeting along midline expanding to small hole near distal terminus for extension of aedeagus, radiating golden pile. Aedeagus not visible in type specimen.

Female is unknown.

Measurements (mm). n=1♂. Length of body: 17.35; length of fore wing: 20.70; width of fore wing: 7.10; length of head: 3.00; width of head including eyes: 5.80; width of pronotum including suprahumeral plates: 6.45; width of mesonotum: 5.55.

Song. (n=4, holotype and 3 topotype males not captured) Echemes of length 0.58 ± 0.11 repeat at a rate of $1.43 \pm 0.46 \text{ s}^{-1}$. The *C. curacaviensis* echeme duration is significantly longer than those of *C. oraria* and *C. trifasciunca* (MANOVA, $P=2.26 \times 10^{-3}$). The echeme rate is at the upper end of variation for this song type and is often faster than the rates of *C. partemporaria* and *C. trifasciunca* but the differences are not significant (MANOVA, $P=9.00 \times 10^{-2}$). The dominant frequency band is 9.22–11.58 kHz (mean dominant frequency = 10.46 ± 0.04 kHz).

Diagnosis. Another of the smaller of the *Chilecicada* species. This new species can be distinguished by having in combination a body length about 17.35 mm, fore wing length about 20.70 mm, fore wing basal cell about 3.50 times longer than broad, proximal fore wing basal cell lacking a piceous marking, a piceous fascia separating the proximal fore wing costa and radius + subcostal veins, an elongated meracanthus with parallel-sided base and triangular terminus, a ground color medial opercular margin, a semicircular a semicircular posteromedial operculum, abdominal epipleurites with a central spot, and an uncus that is piceous with ground color lateral and dorsal fasciae and smoothly curved on the dorsal surface. It is most similar to *C. culenesensis* n. sp. but differs in the ambient vein of the fore wing is smoothly curved posteriorly rather than being obtusely angled and the dorsal uncus is only curved distally in that species.

Shares the common medium echeme duration, slow echeme rate song type shared with *C. culenesensis*, *C. magna*, *C. oraria*, *C. partemporaria*, *C. pehuenchesensis*, and *C. trifasciunca*. Longer echemes separate *C. curacaviensis* from the shorter echemes of *C. oraria*, *C. trifasciunca*, and perhaps also *C. magna* and *C. pehuenchesensis*. Although the echeme durations are similar, echeme rate tends to be faster in *C. curacaviensis* than in *C. partemporaria* and *C. trifasciunca*. The song is perhaps indistinguishable from *C. culenesensis*.

Distribution. The species is known from the type specimen collected 4 km east of El Pangué, Comuna de Curacaví, Provincia de Melipilla, Metropolitana de Santiago Region, Chile.

Chilecicada impartemporaria n. sp. Sanborn and Cole

Fig. 4 (morphology), Plate 1 (live habitus), Plate 2 (song), Plate 4 (wing flick), Plate 5 (distribution)

Type material. Holotype. “CHILE. Región de Valparaíso: / Quillota Pr.; Comuna de Quillota, / F-390, 0.75 km east of jct. / highway 60 and 4.38 east of / Tabolango, / 32.94236S, 71.32465W, 107 m. / 31-XII-2018. JA Cole, FA Calderon / leg. S18-41 // JAC000003283” 1♂ (LACM). Paratypes. “CHILE. Región de Valparaíso: / Petorca Pr.; Comuna de Cabildo, / cuesta de Camino E-35, antes del / tunel a artificio, / 32.40900S, 71.06156W, 256 m. / 20-XII-2018. JA Cole, FA / Calderon, C Veloso leg. S18-06 // JCR181220_15 // JAC000003276” 1♂ (LACM); CHILE. Región de Valparaíso: / Petorca Pr.; Comuna de Cabildo, / cuesta de Camino E-35, antes del / tunel a artificio, / 32.40900S, 71.06156W, 256 m. / 20-XII-2018. JA Cole, FA / Calderon, C Veloso leg. S18-06 // JCR181220_16 // JAC000003277” 1♂ (LACM); CHILE. Región de Valparaíso: / Petorca Pr.; Comuna de Cabildo, / cuesta de Camino E-35, antes del / tunel a artificio, / 32.40900S, 71.06156W, 256 m. / 20-XII-2018. JA Cole, FA / Calderon, C Veloso leg. S18-06 // JAC000003278” 1♂ (LACM); “CHILE. Región de Valparaíso: / Provincia de Quillota; Comuna de / Nogales; Cuesta El Melón, south / slope, 2.5 km north of Ruta 5, / 32.61556S, 71.23225W, 498 m. / 21-XII-2018. JA Cole, FA Calderon, / C Veloso leg. S18-10 // 181221-04” 1♂ (AFSC); “CHILE. Región de Valparaíso: / Petorca Pr.; Comuna de Zapallar, / Cuesta El Melón, north slope, 2.6 / km north of Ruta 5, / 32.59915S, 71.23936W, 447 m. / 21-XII-2018. JA Cole, FA / Calderon, C Veloso leg. S18-09 // 181221-000 FC // JAC000003280” 1♂ (LACM); “CHILE. Región de Valparaíso: / Provincia de Quillota; Comuna de / Nogales; Cuesta El Melón, south / slope, 2.5 km north of Ruta 5, / 32.61556S, 71.23225W, 498 m. / 21-XII-2018. JA Cole, FA Calderon, / C Veloso leg. S18-09 // 181221-00” 1♂ (AFSC); “CHILE. Región de Valparaíso: / Petorca Pr.; Comuna de Zapallar, / Cuesta El Melón, north slope, 2.6 / km north of Ruta 5, / 32.59915S, 71.23936W, 447 m. / 21-XII-2018. JA Cole, FA / Calderon, C Veloso leg. S18-09 // JCR181221_01 // JAC000003279” 1♂ (LACM); “CHILE. Región de Valparaíso: / Petorca Pr.; Comuna de Zapallar, / Cuesta El Melón, north slope, 2.6 / km north of Ruta 5, / 32.59915S, 71.23936W, 447 m. / 21-XII-2018. JA Cole, FA / Calderon, C Veloso leg. S18-09 // JAC000003281” 1♂ (LACM); “CHILE. Región de Valparaíso: / Petorca Pr.; Comuna de Zapallar, / Cuesta El Melón, north slope, 2.6 / km north of Ruta 5, / 32.59915S, 71.23936W, 447 m. / 21-XII-2018. JA Cole, FA / Calderon, C Veloso leg. S18-09 // 181221-01 // JAC000003282” 1♂ (LACM); “CHILE. Región de Valparaíso: / Petorca Pr.; Comuna de Zapallar, / Cuesta El Melón, north slope, 2.6 / km north of Ruta 5, / 32.59915S, 71.23936W, 447 m. / 21-XII-2018. JA Cole, FA / Calderon, C Veloso leg. S18-09 // 181221-01 // JAC000001903” 1♀ (LACM); “CHILE. Región de Valparaíso: / Provincia de Quillota;

Comuna de / Nogales; Cuesta El Melón, south / slope, 2.5 km north of Ruta 5, / 32.61556S, 71.23225W, 498 m. / 21-XII-2018. JA Cole, FA Calderon, / C Veloso leg. S18-09", 1♀ (AFSC); "CHILE. Región de Valparaíso: / Provincia de Petorca; Comuna de / Zapallar; Cuesta El Melón, north / slope, 2.6 km south of Ruta 5, / 32.599158S, 71.23936W, 447 m. / 21-XII-2018. JA Cole, FA Calderon, / C Veloso leg. S18-09" 1♂ (AFSC); "16.CL.RM.TCD.980 / -33.0612, -71.0099 / 22.I.2016 C.V., P.L." 1♂ (UCMS); "16.CL.RM.TCD.981 / -33.0612, -71.0999 / 22.I.2016 C.V., P.L." 1♂ (MNNC); "16.CL.RM.TCD.983 / -33.0612, -71.0099 / 22.I.2016 C.V., P.L." 1♂ (AFSC); "16.CL.RM.TCD.984 / -33.0612, -71.0099 / 22.I.2016 C.V., P.L." 1♂ (AFSC); "16.CL.RM.LPD.992 / -33.4397, -70.9913 / 22.I.2016 C.V., P.L." 1♂ (UCMS); "16.CL.RM.LPD.995 / -33.4397, -70.9913 / 22.I.2016 C.V., P.L." 1♂ (UCMS); "14.CL.RM.CLU.325 / -33.0163, -70.9948 / 10.XII.2014 Piotr Lukasik" 1♂ (UCMS); "14.CL.RM.CLU.323 / -33.0163, -70.9948 / 10.XII.2014 Piotr Lukasik" 1♂ (MNNC); "14.CL.RM.PLN.304.3 / -33.4926, -70.5177 / 9.XII.2014 Piotr Lukasik" 1♂ (UCMS); "14.CL.RM.PLN.520.1 / -33.4926, -70.5177 / 16.XII.2014 Piotr Lukasik" 1♂ (MNNC); "14.CL.LI.BLV.425 / -34.8258, -70.7418 / 14.XI.2014 Piotr Lukasik" 1♂ (UCMS); "15.CL.RM.CDM.602 / -33.8192, -70.1322 / 5.XII.2015 Piotr Lukasik" 1♂ (UCMS); "15.CL.CO.CHP.691 / -31.7222, -71.2747 / 12.XII.2015 Piotr Lukasik" 1♂ (UCMS). The code 16.CL.RM.TCD refers to paso superior Cuesta la Dormida, Tiltit, Region Metropolitana, Chile collected by Claudio Veloso and Piotr Lukasik. The code 16.CL.RM.LPD refers to the side of highway 68, 3.5 km E from Los Panguiles, Region Metropolitana, Chile collected by Claudio Veloso and Piotr Lukasik. The code 14.CL.RM.CLU refers to Caleu, Tiltit area, Santiago Metropolitan Region, Chile. The code 14.CL.RM.PLN refers to Park Quebrada de Macul, Peñalolen, Santiago, Metropolitan Region, Chile. The code 14.CL.LI.BLV refers to Sierra de Bellavista area, O'Higgins Region, Chile. The code 15.CL.RM.LCN refers to the hill near the village of Los Culenes, Metropolitan Region Chile. The code 15.CL.RM.CDM refers to the side of the road Camino Al Volcán, 3.5 km E from the village of El Volcán, Cajón del Maipo, Metropolitan Region, Chile. The Code 15.CL.CO.CHP refers to the intersection between roads D-37-E and D-85, 9 KM W from the town of Choapa, Coquimbo Region, Chile.

Etymology. The name is a combination of *impar*- (*L. impar*, unequal, uneven) and *-temporaria* (*L. temporarius*, of time) in reference to the temporally inconsistent song echemes of the species.

Description. Ground color castaneous heavily marked with piceous, greenish costal margin, radius & subcostal vein and basal veins of fore wing. Pronotum, mesonotum and metanotum greenish in some paratypes and live specimens. Costal margin, radius & subcostal vein and basal veins of fore wing faded from green to ochraceous due to ethanol exposure in most paratypes. Body covered with silvery pile giving a grayish appearance when live.

Head. Head slightly wider than mesonotum, dorsal head piceous except ground color anterior margin and anterolateral supra-antennal plate and posterior epicranial suture with mark extending laterally along posterior of head from posterior epicranial suture to cranial depressions, mark reduced to only epicranial suture in some paratypes, short silvery pile and radiating longer silvery pile on dorsal head, denser longer pile posterior to eye. Ocelli dark red, eyes dark castaneous lightly margined proximally with ground color. Gena piceous margined with ground color medial margin, anteriorly along supra-antennal plate, and posteromedial margin along lorum, piceous expanded in some paratypes, lorum ground color with piceous mark along anteromedial and posteromedial margins, short silvery pile and radiating long silvery pile on lorum and gena. Postclypeus ground color with piceous transverse grooves and central sulcus, 12 transverse grooves, dorsum piceous posterior to transverse grooves, long silvery pile radiating from postclypeus, short silvery pile along lateral and posterior margins. Anteclypeus ground color with piceous lateral spot extending towards midline in middle, all but carina and anterior and posterior margins piceous in some paratypes, covered with short silvery pile and radiating long silvery pile. Mentum ground color with lateral castaneous fascia, expanding to cover most of mentum in some paratypes, labium piceous, rostrum radiating long silvery pile, reaching to middle of middle trochanters. Scape ground color, remaining antennal segments piceous.

Thorax. Pronotum ground color, piceous fascia on either side of midline fusing medially in anterior fissure and in posterior ambient fissure, lateral ambient fissures, paramedian and lateral fissures piceous, all fissures piceous in some paratypes, mark in lateral fissure expanding onto lateral disk, irregular longitudinal mark extending onto disk between paramedian and lateral fissures but not reaching lateral fissure, small piceous spots on disk anterior and posterior to middle of lateral fissure, additional spots just posterior to central paramedian fissure in some paratypes, spots expanded or reduced in some paratypes. Pronotal collar ground color with piceous mark on posterolateral margin of lateral angle, mark expanded in some paratypes forming fascia connecting along anterior pronotal collar lateral angle which may connect to lateral ambient fissure. Pronotum with short silvery pile, denser in fissures.

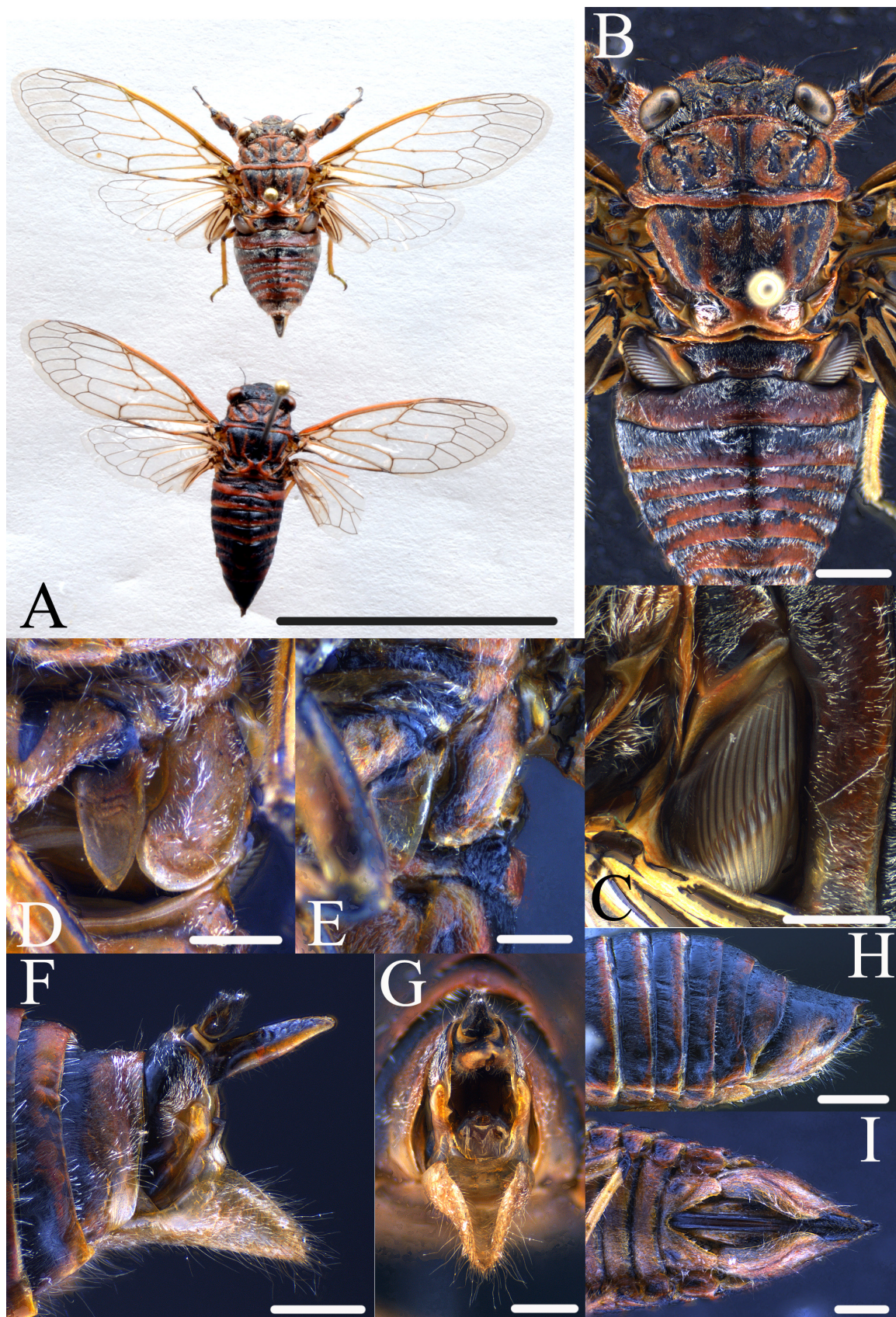


FIGURE 4. *Chilecicada impartemporaria* n. sp.: A, Holotype male and paratype female habitus; B, holotype male dorsum; C, holotype male timbal; D, paratype male operculum; E, paratype female operculum; F, paratype male lateral view of genitalia; G, paratype male posterior view of genitalia; H, paratype female lateral view of genitalia; I, paratype female ventral view of genitalia. Scale bar: A, 2 cm; B, 2 mm; C–G, 1 mm; H–I, 2 mm.

Mesonotum ground color, submedian sigilla piceous, piceous fused anteromedially, lateral sigilla mottled piceous, completely piceous in some paratypes, lateral longitudinal fascia in some paratypes, anchor-shaped piceous mark on central disk posterior to submedian sigilla, expanding to large rectangular spot or expanding to cover all but ground color margin along submedian sigilla in some paratypes, piceous scutal depressions and between anterior arms of cruciform elevation fusing on midline with posterior of anchor-shaped mark, mark extends along anterior midline of cruciform elevation, mark extending over most of cruciform elevation midline in some paratypes but not reaching posterior margin, posterior of anterior arm and anterior half of lateral cruciform elevation piceous, wing groove ground color with piceous fasciae anteromedially and anterolaterally connected by transverse fascia anteriorly. Metanotum ground color with piceous midline and anterolateral, mediolateral and posterolateral fasciae. Dorsum covered with silvery pile, denser between anterior arms of cruciform elevation, between anterior and posterior arms of cruciform elevation, and long silvery pile in wing groove. Ventral thoracic segments ground color except piceous on basisternum 2, anterior anepisternum 2 in some paratypes, posterior katepisternum 2, lateral trochantin 2, medial margin of meron 2, basisternum 3, transverse fascia on posterior episternum 3 and medial margin of trochantin 3, piceous expanded in some paratypes. Ventral segments covered with short silvery pile and radiating long silvery pile.

Wings. Fore wings and hind wings hyaline with eight and six apical cells respectively, several paratype hind wings with five apical cells, some with six in one hind wing and five in the other. Venation greenish proximally, becoming piceous distally, costal margin and radius & subcostal vein greenish separated by piceous fascia proximally, piceous absent or extending to node in some paratypes, anal vein 2 + 3 piceous. Basal cell about three times longer than broad with piceous mark proximally on cubitus posterior + anal vein 1. Pterostigma present. Basal membrane of fore wing grayish mottled with orange with darker posterior margin. Hind wing venation similarly colored except piceous median vein, anal vein 2 and anal vein 3, piceous spot on wing base. Basal plaga, anal cell 3 along anal vein 3 to terminal curve, anal cell 2 along anal veins 2 and 3 to terminal curve, proximal anal cell 1, posterior to cubitus posterior, proximal medial cell and proximal costal cell with gray mottled with orange, infuscation in anal cell 3 and anal cell 2 bordering gray and orange area and base of cubital cell 1, cubital cell 2 and anal cell 1.

Legs. Legs ground color, tinged with green in some paratypes, coxae, trochanters and femora striped with piceous, tibiae with piceous spot proximally, fore tibiae striped with piceous distally and fusing near distal terminus, middle tibiae with thinner and shorter fasciae, hind tibiae lacking distal fascia, tibial spurs and tibial combs ground color with castaneous tips, tarsi piceous except ground color proximal mesotarsus and metatarsus of fore tarsi, ventral and lateral mesotarsus and all but distal mesotarsus and pretarsus of hind tarsi, piceous expanding in some paratypes, pretarsal claws piceous. Fore femora with primary spine angled to femur, secondary spine almost upright, longest, and very small tertiary spine, primary and secondary spines piceous, tertiary spine ground color. Proximal segments with short silvery pile, all segments radiating long silvery pile. Male meracanthus ground color with castaneous spot on base, an elongated triangle distally curving mediad, reaching beyond operculum posterior margin to middle of tympanal cavity. Female meracanthus similarly shaped and colored, reaching to anterior of sternite III.

Opercula. Male opercula ground color with piceous spot on lateral base, lateral margin straight, obtusely angled posterolateral margin, posterior margin straight, obtusely angled posteromedially, medial margin rounded, anteromedial margin curved to base, not reaching to anterior of sternite II posteriorly, well separated medially barely reaching lateral meracanthus, covered with short silvery pile, long silvery pile radiating from operculum margin. Female operculum similarly colored and shaped reaching to anterior of sternite II.

Abdomen. Abdominal tergite 1 with ground color anterior margin and anterolateral corners with transverse piceous fascia narrowing laterally and castaneous posterior, tergite 2 piceous anterodorsally between timbal cavities, piceous within timbal cavity, castaneous posterior to piceous and timbal cavities, tergites 3–8 piceous anteriorly bordered posteriorly with castaneous, piceous extending posteriorly on midline on tergite 3 half way to posterior margin, piceous expanding laterally or on dorsolateral tergites in some paratypes, tergites covered with short silvery pile, longer pile radiating from lateral tergites 5–8. Timbal cover a thickened rim, timbal completely exposed with 13 long ribs and 11 intercalary ribs. Male sternite I ground color, sternite II testaceous with ground color anterior margin, small transverse piceous fascia on either side of midline near anterior margin and piceous auditory capsule, sternites III–VII testaceous, sternite III with ground color anterior and posterior margins and piceous fascia on anterior margin expanding into spot on midline and small piceous spots on anterolateral corners, sternite VII with ground color posterior margin. Epipleurites testaceous. Sternite VIII ground color, dorsal margin with curve near base forming an obtuse angle, V-shaped when viewed from posterior. Sternites and epipleurites with short silvery

pile and radiating long silvery pile, longer on sternites VII and VIII. Female sternite VII ground color with large anterolateral piceous spots, single, deep, large V-shaped notch almost reaching anterior margin, posterolateral margin on either side of notch curved anterolaterad to straight lateral margin. Female abdominal segment 9 ground color ventrally and laterally anterior to stigma, piceous anteriorly, dorsolaterally, dorsally, posteriorly and laterally on stigma, dorsal beak piceous, covered with short silvery pile and radiating long silvery pile ventrally. Dorsal beak not as long as piceous anal styles. Posterior margin of abdominal segment 9 straight.

Genitalia. Male pygofer ground color ventrally, piceous dorsally separated from ground color by castaneous, distal shoulder undeveloped, smoothly curved, not reaching to anal tube, dorsal beak absent, pygofer with short silvery pile on dorsolateral posterior. Upper pygofer lobe absent, pygofer basal lobes elongated, adpressed to lateral pygofer, flattened, angled dorsally at oblique angle, extending more than half pygofer length, semicircular terminus, apex against lateral pygofer margin. Anal styles piceous, radiating short silvery pile, anal tube piceous with ground color posterior margin. Median uncus lobe piceous with lateral margin castaneous in middle and ground color distally, elongated, undivided, angled posteriorly from base, distal third curving toward sternite VIII, widening laterally from base before tapering to transverse posterior margin, small ground color ridge on dorsal surface midline, ventral surface dark ground color with piceous base, ventral surfaces almost meeting along midline expanding to small hole near distal terminus for extension of aedeagus, radiating golden pile. Aedeagus castaneous with darker lateral fascia with a pair of terminal spines extending from ochraceous lateral lobes, basal aedeagus tubular, dark castaneous.

Female gonocoxite IX ground color with piceous posterolateral spots, gonapophysis IX castaneous, gonapophysis X piceous. Ovipositor sheath not reaching to tip of dorsal beak. Long golden pile radiating from ovipositor sheath.

Measurements (mm). n=10♂, 3♀, mean (range). Length of body: ♂ 15.55 (14.60–16.55), ♀ 16.13 (15.65–16.55); length of fore wing: ♂ 16.63 (15.60–17.65), ♀ 16.43 (15.65–17.65); width of fore wing: ♂ 5.79 (5.40–6.20), ♀ 5.80 (5.60–6.15); length of head: ♂ 2.66 (2.50–2.80), ♀ 2.63 (2.45–2.80); width of head including eyes: ♂ 5.02 (4.80–5.30), ♀ 5.13 (5.00–5.30); width of pronotum including suprahumeral plates: ♂ 5.32 (5.00–5.60), ♀ 5.60 (5.50–5.70); width of mesonotum: ♂ 4.57 (4.30–5.00), ♀ 4.63 (4.60–4.70).

Song. (n=14: 2 paratypes, 1 UCMS alcoholic molecular voucher, and 1♂ not captured from Valparaíso Region, Petorca Pr. (S18-06); 2♂ not captured from Valparaíso Region, Choapa Pr. (S18-07); 2 paratypes and 1♂ UCMS alcoholic molecular vouchers from Valparaíso Region, Petorca Pr. (S18-09); 1 paratype and 1♂ UCMS alcoholic molecular voucher from Valparaíso Region, Quillota Pr. (S18-10), 1♂ not captured from Metropolitana Region, Chacabuco Pr. (S18-11); 2♂ topotypes not captured from Valparaíso Region, Quillota Pr. (S18-41)) Long, sustained echemes that vary in duration from 1 to 13 s (median=2.74 s) diagnose this species. The wide standard deviation of the mean echeme duration (3.85 ± 3.42 s) emphasizes the substantial variation. The echeme rate is 0.37 ± 0.20 s⁻¹. Dominant frequencies extend the highest among *Chilecicada* from 7.45 to 13.97 kHz (mean dominant frequency=10.99±0.38 kHz).

Diagnosis. One of the smaller species the *Chilecicada* species including the smallest specimen studied. This new species can be distinguished by having in combination a body length between 14.60–16.55 mm, fore wing length between 15.60–17.65 mm, fore wing basal cell about 3.00 times longer than broad, a piceous mark along the proximal fore wing basal cell, a piceous fascia separating the fore wing costa and radius + subcostal veins that can extend partially or completely to node, a triangular meracanthus, ground color medial opercular margin, posteromedial operculum forming an obtuse angle, abdominal epipleurites lack a central spot, and an uncus that is piceous with ground color and/or castaneous lateral and dorsal fasciae with the distal third curving to the terminus.

No other *Chilecicada* sings with long echemes of uneven duration at a high dominant frequency.

Distribution. The species is known from the type series collected in multiple localities in the Coquimbo, Metropolitana, and Valparaíso Regions of central Chile.

Chilecicada magna n. sp. Sanborn and Cole

Fig. 5 (morphology), Plate 1 (live habitus), Plate 2 (song), Plate 4 (wing flick), Plate 5 (distribution)

Chilecicada occidentis (in part) non Walker: Figs. 1–9, 341, 345.

Type material. Holotype. “16.CL.ML.CCP.037 / -35.8144, -70.8314 / 6.I.2016 C.V., J.M.” ♂ (UCMS). Paratypes. “14.CL.LI.CCC.493.1 / -34.2343, -70.4806 / 15.XII.2014 Piotr Lukasik” 1♀ (MNNC); “14.CL.LI.CCC.493.2 / -34.2343, -70.4806 / 15.XII.2014 Piotr Lukasik” 1♂ (MNNC); “14.CL.LI.CCC.491.1 / -34.2343, -70.4806 /

15.XII.2014 Piotr Łukasik" 1♀ (UCMS); "14.CL.LI.CCC.491.2 / -34.2343, -70.4806 / 15.XII.2014 Piotr Łukasik" 1♂ (UCMS); "15.CL.ML.LMT.721 / -34.9691, -70.9461 / 19.XII.2015 C.V., K.N., P.L." 1♂ (UCMS); "15.CL.ML.LMT.724.2 / -34.9691, -70.9461 / 19.XII.2015 C.V., K.N., P.L." 1♂ (UCMS); "15.CL.ML.LMT.725 / -34.9691, -70.9461 / 19.XII.2015 C.V., K.N., P.L." 1♀ (AFSC); "15.CL.ML.LMT.724.1 / -34.9691, -70.9461 / 19.XII.2015 C.V., K.N., P.L." 1♂ (AFSC); "Sex: Male (12) / Collector: C. Veloso & C. Cecchi / Date: 01/27/10 / Location Farellones. RM. / (33°20'51" S. 70°19'15" W. 1830 m)" 1♂ (AFSC); "El Canelo / Chile / Dec. 29 1950 / L. E. Pena" 2♂ and 2♀ (AFSC); "Cjn. Del Maipo / Santiago / X-XII-1978 / Coll. L.E. Pena" 1♂ (AFSC); "CHILE: Región Metro. / curva 18, 6km W. / Corral Qumada / 33°21' S 180m / 70°20' W 11.XI.1994 / SL Heydon & E. Arias / ex *Baccharis*" 1♂ (AFSC). The code 16.CL.ML.CCP.037 refers to the side of the road, Valley of Rio Maule, Maule Región, Chile collected by collected by Claudio Veloso and John McCutcheon and is the type locality of the species. The code 14.CL.LI.CCC refers to the area near the confluence of rivers Pangal and Cachapoal, 7 km SE from the village of Coya, O'Higgins Regions, Chile. The 15.CL.ML.LMT refers to the View point near the village of La Montana, Maule Region, Chile collected by Claudio Veloso and Piotr Łukasik.

Etymology. The name (*L. magnus*, large, great) in reference to the large body size of the species in comparison to the majority of congeneric species.

Description. Ground color testaceous heavily marked with piceous, ochraceous costal margin, radius & subcostal vein and basal veins of fore wing. Costal margin, radius & subcostal vein and basal veins of fore wing faded with greenish tinge in some paratypes. Body covered with silvery pile.

Head. Head slightly wider than mesonotum, dorsal head piceous except ground color supra-antennal plate, medial margin along postclypeus ground color in some paratypes, medial supra-antennal plate piceous in one paratype, ground color anteromedial corner of vertex ground color posterior cranial depression with mark extending laterally to level of posterior cranial depression, extending as far laterad as medial angle of eye in some paratypes, mark extending anteriorly into posterior epicranial suture or anteriorly to surround piceous posterior cranial depression forming a spot on either side of ground color mark in some paratypes, short silvery pile and radiating long silvery pile on dorsal head, denser in some paratypes, denser long silvery pile posterior to eye. Two ocelli rosaceous, one ochraceous, rosaceous or combination in paratypes, eyes dark castaneous margined proximally with ground color. Gena piceous centrally surrounded by ground color on anterior, medial and posteromedial margins along lorum, lorum piceous with ground color anteromedial corner and anterior and lateral margins, short white pile and radiating long silvery pile on lorum and gena. Postclypeus ground color with piceous transverse grooves and central sulcus, 12 transverse grooves, dorsum piceous with angled elongated castaneous spot on either side of midline, long white pile radiating from postclypeus, short white pile along lateral margin. Anteclypeus with ground color carina, medial anterior and posterior margins, piceous laterally with piceous extending towards midline in middle, ground color expanding laterally in some paratypes, short fascia on either side of midline in some paratypes where piceous not expanding medially, covered with short white pile and radiating long white pile. Mentum ground color with lateral U-shaped castaneous fascia pointing distally, labium piceous, rostrum radiating long silvery pile, reaching to anterior of hind coxae. Scape ground color, remaining antennal segments piceous.

Thorax. Pronotum ground color, piceous fascia on either side of midline between anterior fissure and pronotal collar, mark extending laterad anteriorly and posteriorly to form triangular mark terminating in fissure, anteromedial, lateral and posterior ambient fissures, paramedian and lateral fissures piceous, all fissures piceous in some paratypes, anterior paramedian and lateral fissures ground color in some paratypes, mark in ambient fissure extending irregularly onto disks, irregular longitudinal mark extending onto disk between paramedian and lateral fissures but not reaching lateral fissure, small piceous spots on disk just posterior to central paramedian fissure and anterior and posterior to middle of lateral fissure, spots expanded or reduced in some paratypes. Pronotal collar ground color with piceous anterior margin dorsally, angled piceous fascia from lateral ambient fissure along anterior margin of pronotal collar lateral angle, mark extending to posterolateral corner of lateral angle in some paratypes. Short silvery pile in pronotal fissures, also on disks in some paratypes. Mesonotum piceous with ground color anterolateral corner, lateral margin, J-shaped fascia along parapsidal suture, posterolateral surface extending as fascia to surround posterior lateral sigilla connecting to anterior arm of cruciform elevation, piceous mark lateral to lateral sigillum extending to lateral margin, reduced or absent in some paratypes, cruciform elevation ground color except between anterior arms, small mark on anterior midline, anterior half of lateral cruciform elevation piceous, wing groove ground color with piceous fasciae anteromedially and anterolaterally connected anteriorly by transverse piceous fascia. Metanotum ground color with piceous midline and anterolateral, mediolateral and posterolateral fasciae, small, semicircular notch in

posteromedial margin. Dorsum with silvery pile between anterior arms of cruciform elevation, between anterior and posterior arms of cruciform elevation, and long silvery pile in wing groove, short silvery pile on dorsum in some paratypes. Ventral thoracic segments ground color except piceous on central basisternum 2, posterior katepisternum 2, medial anepisternum 2, lateral trochantin 2, anterior margin and lateral meron 2, basisternum 3, transverse fascia on episternum 3 and lateral trochantin 3, piceous expanded or reduced in some paratypes. Ventral segments covered with short white pile and radiating long white pile.

Wings. Fore wings and hind wings hyaline with eight and six apical cells respectively. Venation ochraceous, greenish-ochraceous in some paratypes, proximally, becoming piceous distally, costal margin and radius & subcostal vein separated by piceous fascia proximally along basal cell, extending distal to basal cell or absent in some paratypes, cubitus posterior piceous, posterior of anal vein 2 + 3 piceous. Basal cell about 3.75 times longer than broad with piceous mark proximally. Pterostigma present. Basal membrane of fore wing orange mottled with red with darker posterior margin. Hind wing venation similarly colored except piceous median vein, anal vein 2 and anal vein 3, piceous spot on wing base. Basal plaga, anal cell 3 along anal vein 3 to terminal curve, anal cell 2 along anal veins 2 and 3 to terminal curve, proximal anal cell 1, proximal medial cell and proximal costal cell with orange mottled with red, infuscation in anal cell 3 and anal cell 2 bordering orange and red area and base of cubital cell 1, cubital cell 2 and anal cell 1.

Legs. Legs ochraceous, tinged with green in some paratypes, coxae, trochanters and femora striped with piceous, fore tibiae with piceous spot proximally, striped with piceous and piceous distal terminus, middle with thinner and shorter fascia and incomplete marking distally, hind tibiae proximal spot reduced to three small spots without the fascia and terminal mark, tibial spurs and tibial combs castaneous with darker tips, tarsi piceous except ground color proximal pretarsus in fore tarsi, ventral and lateral mesotarsus also ground color in middle tarsi, and all but distal pretarsus ground color in hind tarsi, pretarsal claws piceous. Fore femora with primary spine angled to femur, secondary spine almost upright, angled distally in some paratypes, with proximally expanding base, and very small tertiary spine, primary spine piceous with ground color base, secondary spine ground color with piceous tip, darker in some paratypes, tertiary spine ground color, piceous in some paratypes. Proximal segments with short white pile, all segments radiating white silvery pile. Male meracanthus ground color with piceous spot on base, an elongated triangle with parallel-sided base and triangular tip, reaching to posterior margin of sternite I but not reaching posterior of tympanal cavity. Female meracanthus similarly shaped and colored, reaching to anterior of sternite III.

Opercula. Male opercula ground color with piceous spot on lateral base, lateral margin straight, obtusely angled posterolateral margin, posterior margin straight, medial margin rectangular, anteromedial margin obliquely angled to base, lightly margined with piceous in some paratypes, not reaching to anterior of sternite II posteriorly, well separated medially extending under lateral margin of meracanthus, covered with short white pile, long white pile radiating from operculum margin. Female operculum similarly colored and shaped but only reaching just past half the length of the meracanthus to the middle of sternite II.

Abdomen. Abdominal tergite 1 with ground color anterior margin, anterolateral and posterolateral corners, with transverse piceous fascia narrowing laterally and dark ground color dorsoposterior margin, tergite 2 piceous anterodorsally between timbal cavity medial margins, piceous margined with castaneous posteriorly, ground color posteriorly and laterally, piceous within timbal cavity, tergites 3–8 piceous bordered posteriorly and laterally with ground color, ground color proportion increasing in tergites 7 and 8 becoming half of tergite 8, tergites covered with sparse, short silvery pile, longer pile radiating from lateral tergites 5–8. Timbal cover a thickened rim, ground color in holotype, piceous in some paratypes, timbal completely exposed with 13 long ribs and 11 intercalary ribs. Male sternite I ground color, sternite II ground color with small piceous spots on either side of midline and posterior auditory capsule, sternite III ground color with piceous anterior margin and transverse piceous spot posterior to piceous fascia, fusing to piceous fascia in some paratypes, sternites IV–VII ground color. Epipleurites ground color, light castaneous spot centrally, much darker and obvious in some paratypes. Sternite VIII ground color with small piceous spot ventral to dorsal margin curve, dorsal margin with curve near base forming a slightly obtuse angle, V-shaped when viewed from posterior. Sternites and epipleurites with short silvery pile and radiating long silvery pile, longer on medial sternites I and II and on sternites VII and VIII. Female sternite VII ground color with large anterolateral piceous spots, single, deep, V-shaped notch almost reaching anterior margin, posterolateral margin on either side of notch curved, connecting to straight lateral margin. Female abdominal segment 9 ground color ventrally and posteriorly, piceous dorsally, dorsoanteriorly, dorsolaterally, on stigma, piceous margined with castaneous, castaneous

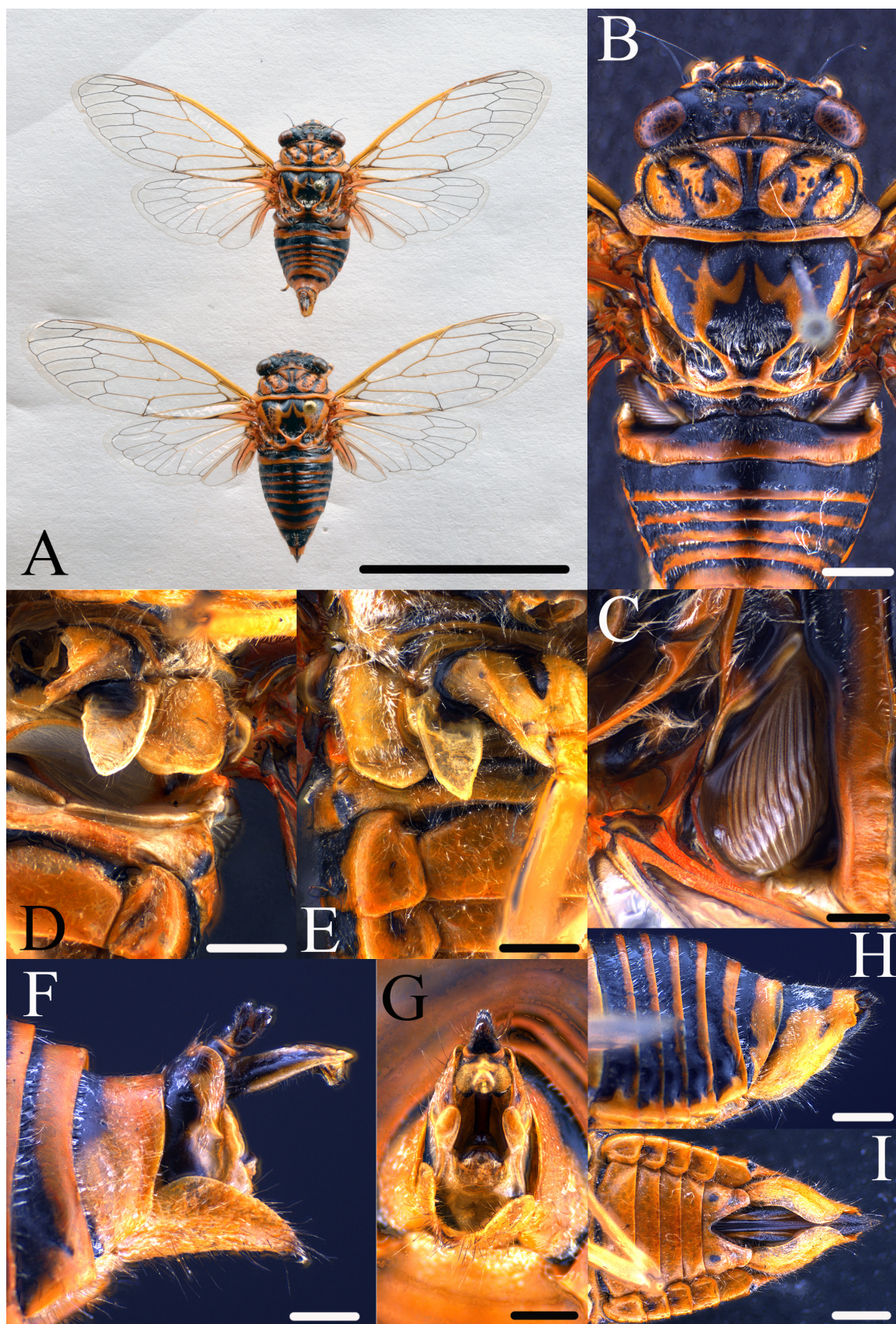


FIGURE 5. *Chilecicada magna* n. sp.: A, Holotype male and paratype female habitus; B, holotype male dorsum; C, holotype male timbal; D, holotype male operculum; E, paratype female operculum; F, paratype male lateral view of genitalia; G, paratype male posterior view of genitalia; H, paratype female lateral view of genitalia; I, paratype female ventral view of genitalia. Scale bar: A, 2 cm; B, 2 mm; C–G, 1 mm; H–I, 2 mm.

fascia on ventrolateral surface ventral to stigma in one paratype, dorsal beak piceous, covered with short silvery pile and radiating long silvery pile ventrally. Dorsal beak not as long as piceous margined with ground color anal styles. Posterior margin of abdominal segment 9 straight.

Genitalia. Male pygofer ground color with piceous dorsally, anterolaterally, and dorsolateral spots anterior to posterior margin that fuse to dorsal mark, a small castaneous spot on ventral base of distal shoulder, piceous or absent in some paratypes, ground color expanded in some paratypes, distal shoulder undeveloped, smoothly curved, not reaching to middle of anal tube, dorsal beak absent, pygofer with short silvery pile on dorsolateral posterior. Upper pygofer lobe absent, pygofer basal lobes elongated, adpressed to lateral pygofer, flattened, curving dorsally at slightly oblique angle, extending more than half pygofer length, expanding distal to bend to spoon-shaped terminus, apex against lateral pygofer margin. Anal styles piceous with ground color margins, radiating short silvery pile, anal tube piceous with ground color posterior margin. Median uncus lobe ground color with piceous base, dorsolateral castaneous fascia narrowing and terminating proximal to terminus, elongated, undivided, angled posteriorly from base, distal third angled toward sternite VIII, widening laterally from base before tapering to pointed posterior margin leaving small notch on terminus, small ground color ridge on distal dorsal surface midline, ventral surface recurved, almost meeting along midline except for small hole near distal terminus for extension of aedeagus, radiating long golden pile. Aedeagus castaneous with darker lateral fascia with a pair of terminal spines extending from ochraceous lateral lobes, basal aedeagus tubular, dark castaneous.

Female gonocoxite IX piceous with ground color ventral margin, gonapophysis IX castaneous with piceous tip, gonapophysis X piceous. Ovipositor sheath not reaching terminus of dorsal beak, reaching to middle of anal styles. Long golden pile radiating from ovipositor sheath.

Measurements (mm). $n=10\text{♂}$, 5♀ , mean (range). Length of body: ♂ 19.61 (18.45–20.70), ♀ 19.67 (18.80–20.45); length of fore wing: ♂ 22.49 (21.35–23.20), ♀ 23.33 (22.30–24.80); width of fore wing: ♂ 8.24 (7.95–8.85), ♀ 8.55 (8.00–9.30); length of head: ♂ 3.40 (3.25–3.60), ♀ 3.43 (3.35–3.60); width of head including eyes: ♂ 6.60 (6.40–6.80), ♀ 6.68 (6.20–7.00); width of pronotum including suprahumeral plates: ♂ 7.12 (7.05–7.35), ♀ 7.58 (7.20–8.00); width of mesonotum: ♂ 6.14 (6.00–6.30), ♀ 6.33 (6.70–6.10).

Song. ($n=1$, a 45 s recording of a paratype from 15.CL.ML.LMT, O'Higgins Region, La Montana) Echemes lasting 0.53 s produced at a rate of 1.20 s^{-1} . Echeme duration is significantly shorter than *C. curacaviensis*, *C. partemporaria*, and *C. trifasciunca* (1-sample *t*-test, $P=3.86\times 10^{-7}$) but significantly longer than *C. oraria* (1-sample *t*-test, $P=1.65\times 10^{-6}$). There are no significant echeme rate differences between *C. magna* and *C. curacaviensis*, *C. oraria*, *C. partemporaria*, and *C. trifasciunca*. The dominant frequency band is 8.96–11.08 kHz (mean dominant frequency=10.25 kHz).

Diagnosis. One of the larger of the *Chilecicada* species. This new species can be distinguished by having in combination a body length between 18.45–20.70 mm, fore wing length between 21.35–24.80 mm, fore wing basal cell about 3.75 times longer than broad, a piceous mark along the proximal fore wing basal cell, a piceous fascia separating the proximal fore wing costa and radius + subcostal veins, an elongated meracanthus with a parallel-sided base and triangular distal terminus, ground color medial opercular margin, rectangular medial operculum, abdominal epipleurites with a central spot, and an uncus that is piceous with ground color lateral and dorsal fasciae with the distal third bent to terminus.

The song is the common medium echeme duration ($\sim 0.5\text{ s}$) slow echeme rate ($\sim 1\text{ s}^{-1}$) type shared with *C. culenesensis*, *C. curacaviensis*, *C. partemporaria*, *C. oraria*, *C. pehuenchesensis*, and *C. trifasciunca*. The single recording suggests that the *C. magna* echeme duration may be intermediate between other species with similar songs: shorter than *C. curacaviensis*, *C. partemporaria*, *C. trifasciunca*, and perhaps *C. culenesensis*, but longer than *C. oraria*. Echeme durations may be indistinguishable between *C. magna* and *C. pehuenchesensis*. The lack of concomitant echeme rate differences will make song-based diagnosis difficult.

Distribution. The species is known from the type series collected in multiple localities in the Maule, Metropolitana, and O'Higgins Regions of central Chile.

Chilecicada mapuchensis n. sp. Sanborn

Fig. 6 (morphology), Plate 1 (live habitus), Plate 5 (distribution)

Chilecicada occidentis (in part) non Walker: 345.

Type material. Holotype. “14.CL.RM.PLN.518.2 / -33.4926, -70.5177 / 16.XII.2014 Piotr Łukasik” ♂ (UCMS). Paratypes. “15.CL.LI.RT1.720 / -34.0617, -71.3773 / 19.XII.2015 C.V., K.N., P.L.” 1♂ (AFSC); “16.CL.VS.PBA.989 / -33.0468, -71.3229 / 22.I.2016 C.V., P.L.” 1♂ (MNNC); “16.CL.VS.PBA.986 / -33.0468, -71.3229 / 22.I.2016 C.V., P.L. // Seq.” 1♂ (UCMS); “16.CL.RM.TCD.997 / -33.0468, -71.3229 / 22.I.2016 C.V., P.L.” 1♂ (AFSC); “16.CL.RM.TCD.998 / -33.0468, -71.3229 / 22.I.2016 C.V., P.L.” 1♂ (UCMS); “16.CL.VS.PBA.990 / -33.0468, -71.3229 / 22.I.2016 C.V., P.L.” 1♂ (UCMS); “16.CL.VS.LVZ.991 / -33.0468, -71.3229 / 22.I.2016 C.V., P.L.” 1♂ (MNNC); “16.CL.VS.PBA.987 / -33.0468, -71.3229 / 22.I.2016 C.V., P.L.” 1♀ (UCMS); “15.CL.RM.LCN.716.2 / -33.8929, -71.4001 / 19.XII.2015 C.V., K.N., P.L.” 1♂ (UCMS); “15.CL.RM.LCN.716.1 / -33.8929, -71.4001 / 19.XII.2015 C.V., K.N., P.L.” 1♂ (AFSC); “15.CL.RM.LCN.717 / -33.8929, -71.4001 / 19.XII.2015 C.V., K.N., P.L.” 1♂ (UCMS); “14.CL.RM.PLN.518.1 / -33.4926, -70.5177 / 16.XII.2014 Piotr Łukasik” 1♀ (AFSC); “Sex: Male (15) / Collector: Leonardo Diaz / Date: 12/26/04 / Location Curacaví. RM. / (33°22’32” S. 71°08’23”W. 240 m)” 1♂ (AFSC); “Sex: Male (16) / Collector: Leonardo Diaz / Date: 12/26/04 / Location Curacaví. RM. / (33°22’32” S. 71°08’23”W. 240 m)” 1♂ (AFSC); “Sex: Male (07) / Collector: C. Veloso & C. Cecchii / Date: 01/27/10 / Location Farellones. RM. / (33°20’54” S. 70°21’18”W. 1583 m)” 1♂ (AFSC). The code 14.CL.RM.PLN refers to Peñalolen, Quebrada de Macul, Santiago, Región Metropolitana, Chile and is the type locality for the species, 15.CL.LI.RT1 C.V., K.N., P.L. refers to Side of Ruta 66, Región O’Higgins, Chile collected by Claudio Veloso, Katherine Nazario and Piotr Łukasik. 16.CL.VS.PBA refers to the hill near the exit from Ruta 60, near Peñablanca, Región Valparaíso, Chile collected by Claudio Veloso and Piotr Łukasik. 16.CL.VS.LVZ refers to the side of road F-50, 5.5 km N from the intersection with Ruta 68, 8 km from Lo Vasquez, -33.2255, -71.4092, Región Valparaíso, Chile collected by Claudio Veloso and Piotr Łukasik. The GPS data on the specimen label are incorrect. 16.CL.RM.TCD refers to Cuesta la Dormida, Tiltill, -33.0730, -70.9639, Región Metropolitana, collected by Claudio Veloso and Piotr Łukasik. The GPS data on the specimen label are incorrect. Finally, 15.CL.RM.LCN refers to the hill near the village of Los Culenes, Región Metropolitana, Chile collected by Claudio Veloso, Katherine Nazario and Piotr Łukasik.

Etymology. The name is a combination of *mapuch-* and *-ensis* (L. suffix denoting place) in reference to the distribution of the species over much of the historical territory of the Mapuche civilization where the type series was collected.

Description. Ground color testaceous heavily marked with piceous, greenish costal margin, radius & subcostal vein and basal veins of fore wing. Costal margin, radius & subcostal vein and basal veins of fore wing faded from green to ochraceous due to ethanol exposure in most paratypes. Body covered with silvery pile.

Head. Head slightly wider than mesonotum, dorsal head piceous except ground color supra-antennal plate, anteromedial corner of vertex and medioposterior head with mark extending lateral to posterior cranial depressions, mark reduced to only epicranial suture in some paratypes, mark extending anteriorly into posterior epicranial suture, mark extends anteriorly to surround piceous posterior cranial depression forming a spot on either side of ground color mark in some paratypes, short golden pile and radiating long golden pile on dorsal head, very dense on frons, denser long silvery pile posterior to eye. Ocelli rosaceous, ochraceous in some paratypes, eyes dark castaneous margined proximally with ground color. Gena piceous medially and laterally to eye surrounded by ground color on medial, anterior and posteromedial margins along lorum, lorum ground color with piceous mark along anteromedial and posteromedial margins, castaneous spot in middle in some paratypes, mostly piceous in some paratypes, short white pile and radiating long silvery pile on lorum and gena. Postclypeus ground color with piceous transverse grooves and central sulcus, 12 transverse grooves, dorsum castaneous with piceous posterior margin, long silvery pile radiating from postclypeus, short white pile along lateral margin. Anteclypeus with ground color carina, and medial anterior and posterior margins, piceous laterally with piceous extending towards midline in middle, all but carina and anterior and posterior margins piceous in some paratypes, short fascia on either side of midline in some paratypes where piceous not expanding medially, covered with short white pile and radiating long silvery pile. Mentum ground color with lateral U-shaped castaneous fascia pointing distally, expanding to cover most of mentum in some paratypes, labium piceous, rostrum radiating long silvery pile, reaching to posterior of middle trochanters. Scape ground color, remaining antennal segments piceous.

Thorax. Pronotum ground color, castaneous fascia, piceous in some paratypes, on either side of midline between anterior fissure and pronotal collar, dorsal ambient fissures castaneous, lateral ambient fissures, paramedian and lateral fissures piceous, all fissures piceous in some paratypes, irregular longitudinal mark extending onto disk between paramedian and lateral fissures but not reaching lateral fissure, small piceous spots on disk just posterior

to central paramedian fissure and anterior and posterior to middle of lateral fissure, spots expanded or reduced in some paratypes. Pronotal collar ground color with piceous angled fascia from lateral ambient fissure along anterior margin of pronotal collar lateral angle to posterolateral corner of lateral angle, posterolateral mark castaneous in some paratypes. Pronotum with short golden pile in fissures in some paratypes. Mesonotum ground color, submedian sigilla piceous, piceous fused anteromedially, lateral sigilla piceous with slightly mottled posterior region, anchor-shaped castaneous mark on central disk posterior to submedian sigilla, expanding to large rectangular spot or expanding to cover all but ground color margin along submedian sigilla in some paratypes, piceous scutal depressions and between anterior arms of cruciform elevation fusing on midline with posterior of anchor-shaped mark, mark extends along midline of cruciform elevation but not reaching posterior margin, anterior half of lateral cruciform elevation piceous, expanding to spot on anterolateral margin in some paratypes, wing groove ground color with castaneous fasciae anteromedially and anterolaterally. Metanotum ground color with piceous midline and anterolateral, mediolateral and posterolateral fasciae. Dorsum with silvery pile between anterior arms of cruciform elevation, between anterior and posterior arms of cruciform elevation, and long silvery pile in wing groove. Ventral thoracic segments ground color except piceous on basisternum 2, posterior katepisternum 2, medial anepisternum 2, posterior margin of trochantin 2, anterior margin and lateral meron 2, basisternum 3, transverse fascia on posterior episternum 3 and medial margin of trochantin 3, piceous reduced in some paratypes. Ventral segments covered with short white pile and radiating long silvery pile.

Wings. Fore wings and hind wings hyaline with eight and six apical cells respectively, some paratype hind wings with five apical cells, one paratype with four apical cells in one hind wing and five apical cells in the other. Venation greenish proximally, becoming piceous distally, costal margin and radius & subcostal vein greenish separated by piceous fascia, absent in some paratypes, cubitus posterior piceous, posterior of anal vein 2 + 3 piceous in some paratypes. Basal cell about four times longer than broad. Pterostigma present. Basal membrane of fore wing orange mottled with red. Hind wing venation similarly colored except castaneous median vein, anal vein 2 and anal vein 3, castaneous spot on wing base. Basal plaga, anal cell 3 along anal vein 3 to terminal curve, anal cell 2 along anal veins 2 and 3 to terminal curve, proximal anal cell 1, proximal medial cell and proximal costal cell with orange mottled with red, infuscation in anal cell 3 and anal cell 2 bordering orange and red area and base of cubital cell 1, cubital cell 2 and anal cell 1.

Legs. Legs ochraceous, tinged with castaneous in some paratypes, coxae, trochanters and femora striped with piceous, fore tibiae with piceous spot proximally, thickly striped with piceous and transverse piceous mark near distal terminus, middle and hind tibiae with thinner and shorter fascia and incomplete marking distally, tibial spurs and tibial combs castaneous with darker tips, tarsi piceous except ground color ventral and lateral mesotarsus and annular ground color mark on proximal pretarsus just distal to proximal margin, amount of ground color increasing in posterior segments, pretarsal claws piceous with dark ground color base. Fore femora with primary spine angled to femur with distally curved tip, secondary spine almost upright with proximally curved tip, and very small tertiary spine, primary spine piceous, secondary spine ground color, darker in some paratypes, tertiary spine ground color. Proximal segments with short silvery pile, all segments radiating long silvery pile. Male meracanthus ground color with castaneous spot on base, an elongated triangle with mediad curved tip, reaching beyond operculum posterior margin to middle of tympanal cavity. Female meracanthus similarly shaped and colored, reaching to anterior of sternite III.

Opercula. Male opercula ground color with piceous spot on lateral base, lateral margin straight, obtusely angled posterolateral margin, posterior margin straight, obtusely angled posteromedially, medial margin rounded, anteromedial margin obliquely angled to base, not reaching to anterior of sternite II posteriorly, well separated medially barely reaching lateral base of meracanthus, covered with short white pile, long silvery pile radiating from operculum margin. Female operculum similarly colored and shaped but only reaching just past half the length of the meracanthus to the middle of sternite II.

Abdomen. Abdominal tergite 1 ground color in holotype, ground color with transverse piceous fascia narrowing laterally, castaneous dorsoposterior castaneous in some paratypes, tergite 2 with ground color castaneous spot on dorsal midline and light castaneous transverse dorsal fascia, paratypes generally with ground color anterior dorsolateral margin and posterior margin and transverse piceous fascia connecting to anterodorsal timbal cavity on primarily castaneous tergite with dark castaneous spot on dorsal midline, interior timbal cavity piceous, tergites 3–8 piceous anteriorly bordered posteriorly with castaneous and ground color posterior and lateral margins with dark castaneous spot on dorsal midline, piceous expanded in most paratypes, tergites sparsely covered with short silvery pile,

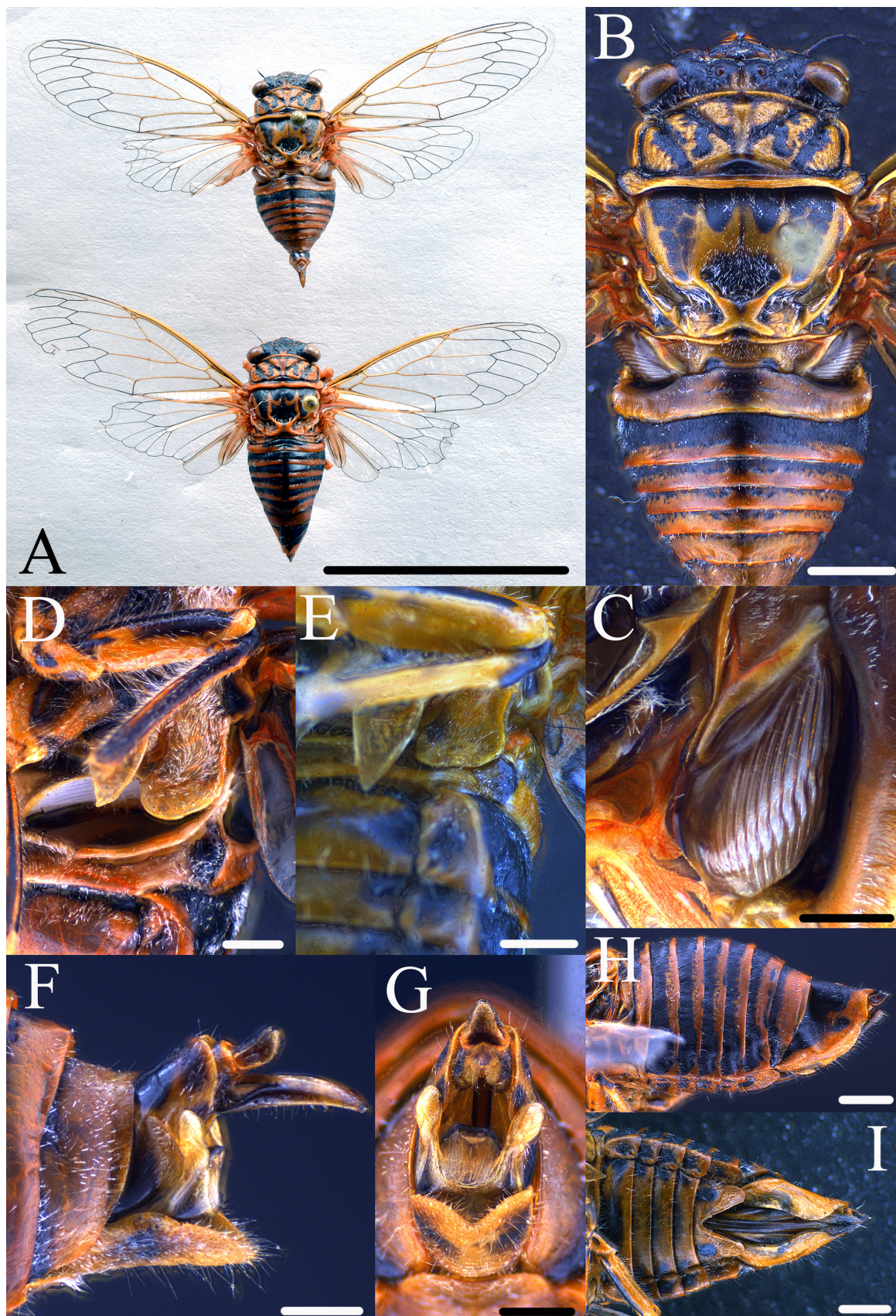


FIGURE 6. *Chilecicada mapuchensis* n. sp.: A, Holotype male and paratype female habitus; B, holotype male dorsum; C, holotype male timbal; D, paratype male operculum; E, paratype female operculum; F, holotype male lateral view of genitalia; G, holotype male posterior view of genitalia; H, paratype female lateral view of genitalia; I, paratype female ventral view of genitalia. Scale bar: A, 2 cm; B, 2 mm; C–G, 1 mm; H–I, 2 mm.

denser in some paratypes, longer pile radiating from lateral tergites 6–8. Timbal cover a thickened rim, timbal completely exposed with 13 long ribs and 11 intercalary ribs. Male sternite I ground color with anterolateral castaneous spot, sternite II with small piceous spots on either side of midline near posterior margin and on posterior auditory capsule, sternites III–VII dark ground color with castaneous lateral spot, sternite III with piceous anterior margin expanding into spot on midline. Epipleurites dark ground color with castaneous spot, spots becoming darker in posterior epipleurites. Sternite VIII ground color with elongated, lateral piceous spots, dorsal margin with curve near base forming an obtuse angle, V-shaped when viewed from posterior. Sternites and epipleurites with short silvery pile and radiating long silvery pile, longer on sternites VII and VIII. Female sternite VII dark ground color with large anterolateral piceous spots, single, deep, V-shaped notch almost reaching anterior margin, posterolateral margin on either side of notch semicircular connecting to straight lateral margin. Female abdominal segment 9 ground color ventrally, piceous dorsoanteriorly, dorsolaterally, laterally on stigma and spots on the middle of the ventral margin, with castaneous spots on dorsoanterior and dorsally between posterior piceous marks, dorsal beak ground color with piceous tip, covered with short silvery pile and radiating long silvery pile ventrally. Dorsal beak not as long as castaneous margined with ground color anal styles. Posterior margin of abdominal segment 9 straight.

Genitalia. Male pygofer ground color with piceous anterior, large dorsolateral spots, dorsolateral spots anterior to posterior margin and a spot on ventral base of distal shoulder, and a castaneous dorsal spot anterior to posterior margin, piceous with ground color margin in some paratypes, distal shoulder undeveloped, smoothly curved, not reaching to anal tube, dorsal beak absent, pygofer with short silvery pile on dorsolateral posterior. Upper pygofer lobe absent, pygofer basal lobes elongated, adpressed to lateral pygofer, flattened, curving dorsally at slightly oblique angle, extending more than half pygofer length, expanding distal to bend to leaf-shaped terminus, apex against lateral pygofer margin. Anal styles piceous with ground color margin on ventral style, radiating short silvery pile, anal tube castaneous with ground color posterior margin. Median uncus lobe ground color with piceous base, lateral piceous fascia becoming castaneous before terminating proximal to terminus, piceous on terminus, elongated, undivided, angled posteriorly from base, distal third curving toward sternite VIII, widening laterally from base before tapering to transverse posterior margin, small ridge on distal dorsal surface midline, ventral surface almost meeting along midline except for small hole near distal terminus for extension of aedeagus, radiating long golden pile. Aedeagus castaneous with darker lateral fascia with a pair of terminal spines extending from ochraceous lateral lobes, basal aedeagus tubular, dark castaneous.

Female gonocoxite IX piceous with ground color ventral margin, gonapophysis IX castaneous, gonapophysis X castaneous with piceous tip. Ovipositor sheath reaching beyond dorsal beak to middle of anal styles. Long golden pile radiating from ovipositor sheath.

Measurements (mm). n=10♂, 2♀, mean (range). Length of body: ♂ 18.16 (16.35–19.55), ♀ 18.70 (18.10–19.30); length of fore wing: ♂ 19.64 (18.50–20.75), ♀ 20.68 (20.45–20.90); width of fore wing: ♂ 6.88 (6.35–7.30), ♀ 7.03 (6.80–7.25); length of head: ♂ 3.12 (2.65–3.45), ♀ 3.38 (3.35–3.40); width of head including eyes: ♂ 5.84 (5.35–6.20), ♀ 6.20 (6.10–6.30); width of pronotum including suprahumeral plates: ♂ 6.20 (5.60–6.65), ♀ 6.73 (6.70–6.75); width of mesonotum: ♂ 5.46 (4.95–5.80), ♀ 5.93 (5.75–6.10).

Song. Unknown.

Diagnosis. This new species can be distinguished by having in combination a body length between 16.35–19.55 mm, fore wing length between 18.50–20.90 mm, fore wing basal cell about 4.00 times longer than broad, a piceous mark along the proximal fore wing basal cell, a piceous fascia separating the fore wing costa and radius + subcostal veins extending to node, a triangular meracanthus, medial opercular margin ground color, posteromedial operculum forming an obtuse angle, abdominal epipleurites with a central spot, and an uncus that is ground color with a piceous base and tip and a distal third of the dorsal side smoothly curving to the terminus.

Distribution. The species is known from the type series collected in multiple localities in the Metropolitan, O'Higgins, and Valparaíso Regions of central Chile.

Chilecicada occidentis (Walker, 1850)

Fig. 7 (morphology), Plate 1 (live habitus), Plate 2 (song), Plate 4 (wing flick), Plate 5 (distribution)

Cicada occidentis Walker 1850: 225.

Cicada crassimargo Spinola 1852: 241.

Type material. Holotype. “W. Coast / of Amer (circular label) // Type (circular label with green surrounding text) // 179. Cicada occidentis. // crassimargo / Spin.” ♂ (BMNH).

Material examined. “CHILE, Región Metropolitana: / Santiago Pr.; Parque Natural / Quebrada de Macul / 33.49278S, 70.51833W, 860 m. / 4-I-2018, JA Cole, E Gordon, C Simon, S Chiswell leg. // JAC000003284” 1♂ (LACM); “CHILE, Región Metropolitana: / Santiago Pr.; Parque Natural / Quebrada de Macul / 33.49278S, 70.51833W, 860 m. / 4-I-2018, JA Cole, E Gordon, C Simon, S Chiswell leg. // JAC000003285” 1♂ (LACM); “CHILE, Región Metropolitana: / Santiago Pr.; Parque Natural / Quebrada de Macul / 33.49278S, 70.51833W, 860 m. / 4-I-2018, JA Cole, E Gordon, C Simon, S Chiswell leg. // JAC000003286” 1♂ (LACM); “CHILE, Región Metropolitana: / Santiago Pr.; Parque Natural / Quebrada de Macul / 33.49278S, 70.51833W, 860 m. / 4-I-2018, JA Cole leg. // 18.CL.SA.FQD // JAC000003287” 1♂ (LACM); “CHILE, Región Metropolitana: / Santiago Pr.; Parque Natural / Quebrada de Macul / 33.49278S, 70.51833W, 860 m. / 4-I-2018, JA Cole, E Gordon, C Simon, S Chiswell leg.” 1♂ (MNNC), 1♂ (AFSC); “CHILE, Región Metropolitana: / Santiago Pr.; Universidad de / Ibañez, Botánico, Peñalolén / 33.48944S, 70.51194W, 998 m. / 4-I-2018, JA Cole, E Gordon, C Simon, S Chiswell leg. // 18.CL.SA.FQD // JAC000003288” 1♂ (LACM); “CHILE, Región Metropolitana: / Santiago Pr.; Universidad de / Ibañez Botánico, Peñalolén / 33.48944S, 70.51194W, 997 m. / 4-I-2018, JA Cole leg.” 1♂ (AFSC); “El Canelo / Chile / Dec. 29 1950 / L. E. Pena” 1♂ (AFSC); “14.CL.RM.PLN.304.4 / -33.4926, -70.5177 / 9.XII.2014 Piotr Lukasik” 1♂ (UCMS); “14.CL.RM.PLN.304.5 / -33.4926, -70.5177 / 9.XII.2014 Piotr Lukasik” 1♂ (AFSC); “14.CL.RM.PLN.304.1 / -33.4926, -70.5177 / 9.XII.2014 Piotr Lukasik” 1♀ (UCMS); “14.CL.RM.PLN.304.2 / -33.4926, -70.5177 / 9.XII.2014 Piotr Lukasik” 1♀ (AFSC); “14.CL.RM.PLN.1000 / Peñalolén / 3.XII.2014 Claudio Veloso” 1♂ (MNNC); “14.CL.VS.CPA.370 / -32.4608, -70.7047 / 11.XII.2014 Piotr Lukasik” 1♂ (UCMS); “14.CL.RM.CPA.340 / -32.4804, -70.7091 / 11.XII.2014 Piotr Lukasik” 1♂ (MNNC); “16.CL.RM.TCD.979 / -33.0730, -70.9639 / 22.I.2016 C.V., P.L.” 1♂ (UCMS); “16.CL.RM.LPD.993 / -33.4397, -70.9913 / 22.I.2016 C.V., P.L.” 1♂ (UCMS). The code 14.CL.RM.PLN refers to Peñalolén, Quebrada de Macul, Santiago, Región Metropolitana, Chile. The code 14.CL.VS.CPA refers to the high part of the road between Putaendo and Alicahue, Valparaíso Region, Chile. The code 14.CL.RM.CPA refers to the side of the road between Putaendo and Alicahue, Valparaíso Region, Chile. The code 16.CL.RM.TCD refers to Cuesta la Dormida, Tiltil, Región Metropolitana, collected by Claudio Veloso and Piotr Łukasik. Finally, 16.CL.RM.LPD refers to the side of highway 68, 3.5 km E from Los Panguiles, Región Metropolitana, Chile, collected by Claudio Veloso and Piotr Łukasik.

Remarks. These specimens match the image of the holotype provided by M. Webb. The studied examples were also collected in the vicinity of Santiago that was the most likely place specimens were collected prior to the original description as a main port of entry and egress from the country.

Etymology. The name is in reference to the collection locality of the holotype (*L. occidentis*, west).

Description. Ground color testaceous heavily marked with piceous, greenish, but not the vibrant green of some of the new species, costal margin, radius & subcostal vein and basal veins of fore wing. Costal margin, radius & subcostal vein and basal veins of fore wing faded from green to ochraceous in many paratypes. Body covered with silvery pile.

Head. Head slightly wider than mesonotum, dorsal head piceous except ground color anterior margin of supra-antennal plate, mark extends along medial margin with postclypeus in some specimens, anteromedial corner of vertex and triangular mark in posterior half of epicranial suture, mark extending laterad on posterior head margin in some specimens to level of lateral ocelli, short silvery pile, golden in some specimens, and radiating long silvery pile on dorsal head, very dense on frons, denser long silvery pile posterior to eye. Ocelli rosaceous, ochraceous in some specimens, eyes dark castaneous, ochraceous in a few specimens, margined proximally with ground color. Gena piceous medially and laterally to eye surrounded by ground color on medial, anterior and posteromedial margins along lorum, lorum piceous margined anteriorly and laterally with ground color, short white pile and radiating long silvery pile on lorum and gena. Postclypeus ground color with piceous transverse grooves and central sulcus, 12 transverse grooves, dorsum piceous, long silvery pile radiating from postclypeus, short white pile along lateral margin. Anteclypeus with ground color carina, and medial anterior and posterior margins, piceous laterally with piceous extending towards midline in middle, all but carina and anterior and posterior margins piceous in some specimens, short fascia on either side of midline in some specimens where piceous not expanding medially, covered with short white pile and radiating long silvery pile. Mentum ground color with lateral U-shaped castaneous fascia pointing distally, expanding to cover most of mentum in some specimens, labium piceous, rostrum radiating long silvery pile, reaching to middle of middle trochanters. Scape ground color, remaining antennal segments piceous, junction of distal pedicel and first flagellar segment ground color in some specimens.

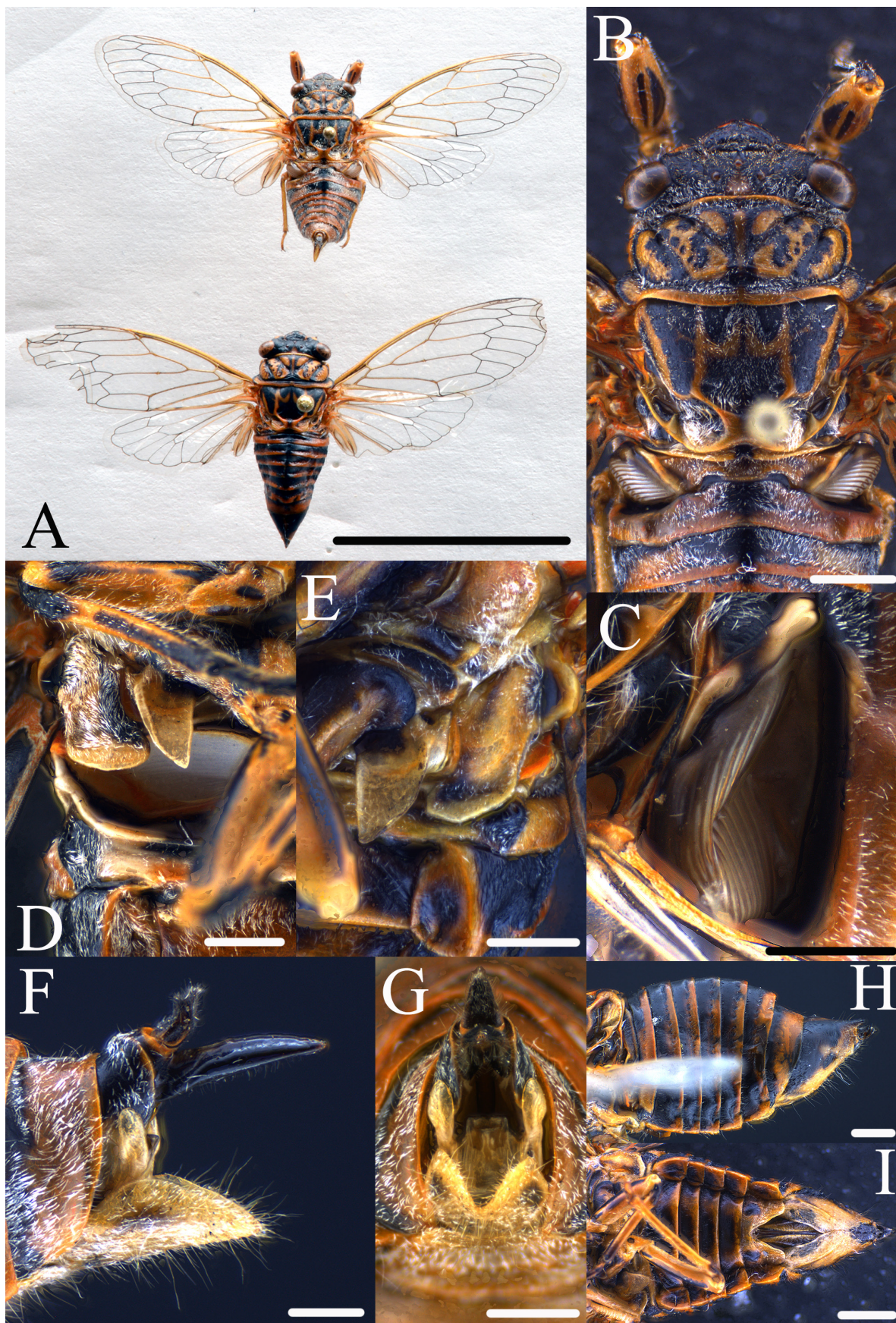


FIGURE 7. *Chilecicada occidentalis* (Walker, 1850): A, Male and female habitus; B, male dorsum; C, male timbal; D, male operculum; E, female operculum; F, male lateral view of genitalia; G, male posterior view of genitalia; H, female lateral view of genitalia; I, female ventral view of genitalia. Scale bar: A, 2 cm; B, 2 mm; C–G, 1 mm; H–I, 2 mm.



PLATE 1. Living habitus of *Chilecicada* species. A. *C. citatemporaria* PARATOPOTYPE, Región de Valparaíso, Provincia de Petorca; B. *C. culenesensis* PARATOPOTYPE specimen PL714, Región Metropolitana; C. *C. impartemporaria* PARATYPE, Región de Valparaíso, Provincia de Petorca; D. *C. magna* HOLOTYPE specimen JM037, Región del Maule; E. *C. mapuchensis* HOLOTYPE specimen PL518, Región Metropolitana; F. *C. occidentis* Región Metropolitana, Provincia de Santiago; G. *C. oraria* PARATOPOTYPE, Región del Maule, Provincia de Cauquenes; H. *C. parrajaraorum* HOLOTYPE specimen PL722, Región O'Higgins; I. *C. partemporaria*; J. *C. pehuenchesensis* PARATYPE specimen PL516, Región Metropolitana; K. *C. trifascia* HOLOTYPE specimen PL430, Región O'Higgins; L. *C. trifasciunca* PARATOPOTYPE specimen PL515, Región Metropolitana ; M. *C. viridicitata* PARATOPOTYPE, Región O'Higgins, Provincia de Cochagüa.

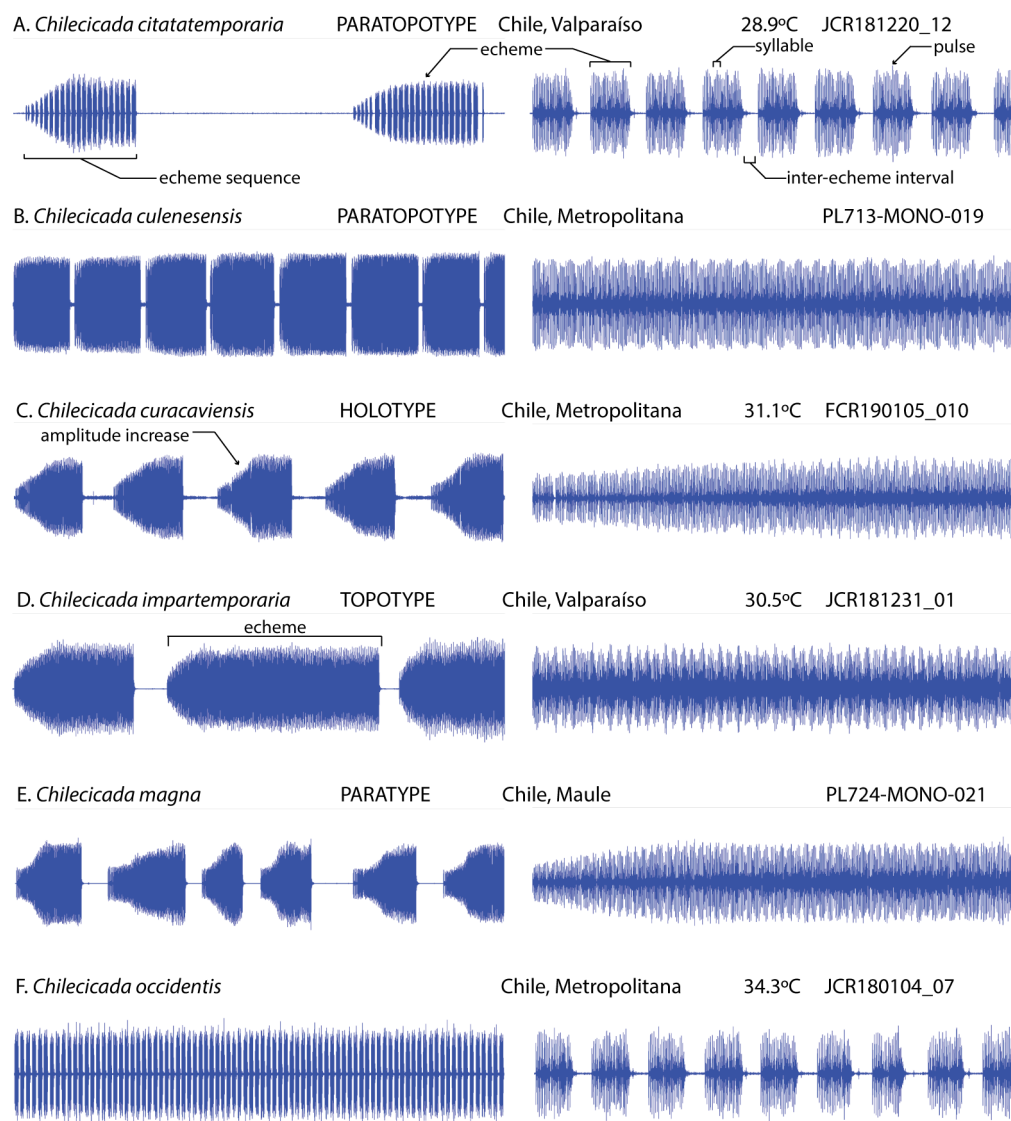


PLATE 2. Waveforms of *Chilecicada* songs. Left column 5 s oscillogram windows show echemes and echeme sequences, right column 0.5 s windows show pulses and syllables within echemes.

Thorax. Pronotum ground color, piceous fascia on either side of midline between anterior fissure and pronotal collar, expanding into triangular mark anteriorly and posteriorly, all fissures piceous, irregular longitudinal mark extending onto disk between paramedian and lateral fissures but not reaching lateral fissure, small piceous spots on disk just posterior to central paramedian fissure and anterior and posterior to middle of lateral fissure, spots expanded, reduced or fused in some specimens. Pronotal collar ground color with piceous angled fascia from lateral ambient fissure along anterior margin of pronotal collar lateral angle to posterolateral corner of lateral angle. Pronotum with short silvery pile in fissures. Mesonotum ground color, submedian sigilla piceous, piceous fused anteromedially, lateral sigilla piceous, longitudinal fascia lateral to lateral sigilla, expanding and fusing anteriorly with lateral sigilla in some specimens, posterior mesonotum piceous, posteromedial central disk piceous, mark extending anteriorly between posterior submedian sigilla and anterolaterally to form ground color mark surrounding sigilla, scutal depressions and between anterior arms of cruciform elevation piceous, mark extends along midline of cruciform elevation for various lengths but not reaching posterior margin, anterior half of lateral cruciform elevation piceous, wing groove ground color with piceous fasciae anteromedially and anterolaterally, additional transverse fascia in some specimens. Metanotum ground color with piceous midline and anterolateral, mediolateral and posterolateral fasciae. Dorsum with silvery pile, denser and longer between anterior arms of cruciform elevation, between anterior and posterior arms of cruciform elevation, and long silvery pile in wing groove. Ventral thoracic segments ground color except piceous on basisternum 2, lateral anepisternum 2, posterior katapisternum 2, transverse fascia in

trochantin 2, meron 2, medial katapimeron 2, basisternum 3, transverse fascia on posterior episternum 3, transverse fascia in trochantin 3, and meron 3, piceous expanded or reduced in various specimens. Ventral segments covered with short white pile and radiating long silvery pile.

Wings. Fore wings and hind wings hyaline with eight and six apical cells respectively, some specimens with five hind wing apical cells. Venation greenish, fading to ochraceous, proximally, becoming piceous distally, costal margin with piceous or castaneous fascia along anterior margin proximally extending as far as node, costal margin and radius & subcostal vein greenish separated by piceous fascia extending to node, cubitus posterior piceous, posterior of anal vein 2 + 3 at bend piceous or castaneous, piceous spot on wing base. Basal cell about 2.78 times longer than broad with piceous mark in base. Pterostigma present. Basal membrane of fore wing orange mottled with red. Hind wing venation similarly colored except piceous median vein, castaneous anal vein 2 and anal vein 3, piceous spot on wing base. Basal plaga, anal cell 3 along anal vein 3 to terminal curve, anal cell 2 along anal veins 2 and 3 to terminal curve, proximal anal cell 1, proximal medial cell and proximal costal cell with orange mottled with red, infuscation in anal cell 3 and anal cell 2 bordering orange and red area and base of cubital cell 2.

Legs. Legs ground color, coxae, trochanters and femora striped with piceous and/or castaneous, fore tibiae with piceous spot proximally, thickly striped with piceous and annular piceous mark at distal terminus, middle and hind tibiae with thinner and shorter fascia and incomplete or absent distal mark in middle tibia, distal mark absent in hind tibia, tibial spurs and tibial combs castaneous with darker tips, tarsi ground color with piceous distal pretarsus, amount of piceous decreasing in middle and posterior tarsi, piceous expanding in some specimens, pretarsal claws ground color with piceous tips. Fore femora with primary spine angled to femur, secondary spine almost upright with proximally extended base, and very small tertiary spine, primary spine piceous, secondary spine ground color with piceous tip, piceous expanding in some specimens, tertiary spine ground color. Proximal segments with short silvery pile, all segments radiating long silvery pile. Male meracanthus ground color with piceous spot on base, elongated with parallel-sided extension from base to triangular tip, reaching beyond operculum and sternite I posterior margins to middle of tympanal cavity. Female meracanthus similarly shaped and colored, reaching to anterior of sternite III.

Opercula. Male opercula ground color with piceous spot on lateral base and piceous and/or castaneous fascia along medial margin with meracanthus, may be reduced to spot in some specimens, lateral margin straight, obtusely angled posterolateral margin, posterior margin straight, obtusely angled posteromedially, medial margin rounded, anteromedial margin obliquely angled to base, not reaching to anterior of sternite II posteriorly, well separated medially barely reaching lateral base of meracanthus, covered with short white pile, long silvery pile radiating from operculum margin. Female operculum similarly colored and shaped but only reaching just past half the length of the meracanthus to the middle of sternite II.

Abdomen. Abdominal tergite 1 ground color with transverse piceous fascia narrowing laterally, castaneous dorsoposterior castaneous in some specimens, tergite 2 with transverse piceous fascia anterior and ground color posterior, piceous mark extending posteriorly on midline but not reaching posterior margin, piceous and ground color separated by castaneous in some specimens, interior timbal cavity piceous, tergites 3–8 piceous anteriorly bordered posteriorly by ground color posterior, piceous expanding on lateral surface, proportion of piceous reducing in posterior tergites, tergites sparsely covered with short silvery pile, denser in some specimens, longer pile radiating from posterior tergite margins and lateral tergites 6–8. Timbal cover a thickened rim, timbal completely exposed with 13 long ribs and 11 intercalary ribs. Male sternite I ground color with lateral piceous fascia and castaneous spots on either side of posterior midline, sternite II with transverse piceous fascia on either side of midline, near posterior margin and piceous auditory capsule, sternites III–VII dark ground color with piceous anterior margin and lateral spots, spots connected to transverse fascia in some specimens, anteromedial piceous spot connected to transverse fascia, largest in sternite III, reducing in posterior sternites. Epipleurites dark ground color with central piceous spot. Sternite VIII ground color with elongated, lateral piceous or castaneous spots or fascia ventral to dorsal margin curve, dorsal margin with curve near base forming an obtuse angle, V-shaped when viewed from posterior. Sternites and epipleurites with short silvery pile and radiating long silvery pile, longer on sternites VII and VIII. Female sternite VII dark ground color with large anterolateral piceous spots, single, deep, V-shaped notch almost reaching anterior margin, posterolateral margin on either side of notch semicircular connecting to straight lateral margin. Female abdominal segment 9 ground color ventrally, piceous dorsoanteriorly, dorsolaterally, laterally on stigma and tip of dorsal beak, castaneous mark on dorsal midline connecting to posterior dorsolateral piceous spots, covered with short silvery pile and radiating long silvery pile ventrally. Dorsal beak not as long as piceous margined proximally with ground color anal styles. Posterior margin of abdominal segment 9 straight.

Genitalia. Male pygofer ground color with piceous anterior, large dorsolateral spots that fuse posteriorly but anterior to posterior margin and recurving dorsal to ventral margin to terminate at distal terminus of basal pygofer lobe, posterior and ventral margins ground color, distal shoulder undeveloped, smoothly curved, not reaching to distal anal tube, dorsal beak absent, pygofer with short silvery pile on dorsolateral posterior. Upper pygofer lobe absent, pygofer basal lobes elongated, adpressed to lateral pygofer, flattened, curving dorsally at slightly oblique angle, extending more than half pygofer length, expanding distal to bend to paddle-shaped terminus, apex against lateral pygofer margin. Anal styles piceous with ground color margins and base, radiating short silvery pile, anal tube piceous, ground color posterior margin in some specimens. Median uncus lobe piceous, narrow, elongated, undivided, expanding laterally only slightly near base, angled posteriorly from base, lateral margins straight, narrowing to pointed terminus, distal quarter curving toward sternite VIII, small ridge on distal dorsal surface midline ground color, ventral surface piceous with ground color medial margin, ground color expanding distally, medial margins almost meeting along midline except for small hole near distal terminus for extension of aedeagus, radiating long golden pile. Aedeagus castaneous, basal aedeagus tubular, distal terminus not exposed in available specimens.

Female gonocoxite IX piceous with ground color ventral margin, gonapophysis IX castaneous, gonapophysis X castaneous with piceous tip. Ovipositor sheath reaching to terminus of dorsal beak and middle of anal styles. Long golden pile radiating from ovipositor sheath.

Measurements (mm). n=10♂, 2♀, mean (range). Length of body: ♂ 17.12 (15.40–18.30), ♀ 17.33 (17.30–17.35); length of fore wing: ♂ 18.96 (18.20–19.90), ♀ 20.23 (20.10–20.35); width of fore wing: ♂ 6.72 (6.40–7.15), ♀ 7.23 (7.20–7.25); length of head: ♂ 3.22 (3.05–3.40), ♀ 3.43 (3.35–3.50); width of head including eyes: ♂ 5.70 (5.50–5.90), ♀ 6.00 (6.00–6.00); width of pronotum including suprahumeral plates: ♂ 6.23 (6.10–6.45), ♀ 6.58 (6.45–6.70); width of mesonotum: ♂ 5.32 (5.15–5.55), ♀ 5.55 (5.50–5.60).

Song. (n=9, from 3 localities in the Metropolitan Region) Brief, rapidly produced echemes, a song type shared only with *C. citatetemporaria* and that is indistinguishable from that species (MANOVA, $P=2.90 \times 10^{-1}$). Echemes of 0.04 ± 0.00 s are delivered at a rapid rate of 18.07 ± 0.89 s⁻¹. Dominant frequency band is 9.11–12.63 kHz (mean dominant frequency = 10.69 ± 0.52 kHz). Echemes are grouped into in echeme sequences that vary widely in length from 3.60 to 10.12 s.

Diagnosis. Another of the smaller of the *Chilecicada* species. The species can be distinguished by having in combination a body length between 15.40–18.30 mm, fore wing length between 18.20–20.35 mm, fore wing basal cell about 2.78 times longer than broad, proximal fore wing basal cell is ground color, a piceous fascia separating the fore wing costa and radius + subcostal veins that can extend partially or completely to node, an elongated meracanthus with a parallel-sided base and triangular terminus, a piceous mark along the medial opercular margin, posteromedial operculum forming an obtuse angle, abdominal epipleurites with a central spot, and a narrow piceous uncus with the distal quarter curving to the terminus.

The song with rapid sequences of echemes (~ 20 s⁻¹) can be confused only with *C. citatetemporaria*. Brief, fast echemes also occur in *C. viridicitata* but the rate is half (~ 10 s⁻¹) that of *C. occidentis*.

Distribution. The specimens examined were collected in multiple localities in the Metropolitana and Valparaíso Regions of central Chile. Walker (1850) recorded the species from the west coast of America. Spinola (1852) provided no specific location data other than the central provinces of Chile.

Chilecicada oraria n. sp. Sanborn and Cole

Fig. 8 (morphology), Plate 1 (live habitus), Plate 3 (song), Plate 5 (distribution)

Chilecicada occidentis (in part) non Walker: 345.

Type material. Holotype. “CHILE. Región del Maule: / Cauquenes Pr.: Comuna de / Cauquenes, Cauquenes, Ruta / 126, / 36.09182S, 72.43223W, 190 m. / 25-XII-2018. JA Cole, / FA Calderon, C Veloso leg. S18-24 // JCR181225_00 // JAC000003272” ♂ (LACM). Paratypes. “CHILE. Región del Maule: Provincia / de Cauquenes: Communa de / Cauquenes, Cauquenes, ruta 126, / 36.09182S, 72.43223W, 190 m. / 25-XII-2018. JA Cole, FA Calderon, / C. Veloso leg. S18-24 // S18-24” 1♂ (AFSC); “CHILE. Región del Maule: Provincia / de Cauquenes: Communa de / Cauquenes, Cauquenes, ruta 126, / 36.09182S, 72.43223W, 190 m. / 25-XII-2018. JA Cole, FA Calderon, / C. Veloso leg. S18-24 // 181225-21 / S18-24” 1♂ in ethanol (UCMS); “15.CL.ML.CQQ.734 / -36.0992, -72.4466 / 20.XII.2015 K.N., P.L. // Seq.” 1♂ (UCMS); “Angol-Chile / 19.XI.1958 / S. Sénez” 1♂ (AFSC); “Pelluhue / Chile. Dec. 2 1953

/ L.E. Pena" 2♂ (AFSC); "Tregualemo / Chile / Dec. 1953 / L.E. Pena" 1♂ (AFSC); "Concepcion—Chile / Feb. 1940 / D.S. Bullock" 1♂ (AFSC); "Carmavida / Chile / Dec. 25–31 1953 / L.E. Pena" 1♂ (AFSC); "Nogueche / Chile / Dec. 15–17 1953 / L.E. Pena" 1♀ (AFSC); "Constitucion / Chile / Nov. 1953 / L.E. Pena" 1♂ (AFSC); "15.CL.ML.CQQ.735 / -36.0992, -72.4466 / 20.XII.2015 K.N., P.L." 1♂ (AFSC); "15.CL.ML.CQQ.749 / -36.0992, -72.4466 / 20.XII.2015 K.N., P.L." 1♂ (MNNC); "15.CL.ML.CQQ.003 / -36.0992, -72.4466 / 20.XII.2015 K.N., P.L." 1♂ (UCMS); "15.CL.ML.CQQ.002 / -36.0992, -72.4466 / 20.XII.2015 K.N., P.L." 1♂ (AFSC). The code 15.CL.ML.CQQ on the label of the last five specimens listed refers to Ruta 126 between Cauquenes and Quirihue, near Estero el Cajon, Maule Region, Chile collected by Katherine Nazario and Piotr Łukasik.

Etymology. The name is in reference to the distribution of the species being near the coast (*L. orarius*, of the coast).

Description. Ground color testaceous marked with piceous and castaneous with green costal margin, radius & subcostal vein and basal veins of fore wing, faded to ochraceous in most of type series. Testaceous greenish in some paratypes, live specimens with green more pronounced, especially dorsolaterally and posteriorly, with green pronotal collar, costal margin, radius & subcostal vein and basal veins of fore wing. Body covered with silvery pile.

Head. Head slightly wider than mesonotum, dorsal head piceous except ground color supra-antennal plate, anteromedial corner of vertex and medioposterior head with mark extending lateral to posterior cranial depressions, mark extending anteriorly into posterior epicranial suture and anterior to surround piceous posterior cranial depression forming a spot on either side of ground color mark, extending anteriorly only to posterior cranial depression in some paratypes, short golden pile and radiating long golden pile on dorsal head, very dense on frons, denser long silvery pile posterior to eye. Ocelli rosaceous, eyes dark castaneous margined proximally with ground color. Gena piceous with ground color medial and anterior margins and piceous posteromedial margin along anteclypeus, lorum ground color with piceous mark along anteromedial and posteromedial margins, castaneous spot in middle, short white pile and radiating long silvery pile on lorum and gena. Postclypeus ground color with piceous transverse grooves and central sulcus, 12 transverse grooves, dorsum castaneous with piceous posterior margin, long silvery pile radiating from postclypeus, short white pile along lateral margin. Anteclypeus piceous laterally with piceous extending towards midline in middle, short fascia on either side of midline in some paratypes where piceous not expanding medially, with ground color carina, and medial anterior and posterior margins, covered with short white pile and radiating long silvery pile. Mentum ground color with lateral ovoid castaneous mark and anterolaterad angled castaneous mark in middle, remaining along midline or forming short fascia on either side of midline in some paratypes, labium piceous, rostrum radiating long silvery pile, reaching to middle trochanters. Scape ground color, remaining antennal segments piceous.

Thorax. Pronotum ground color, piceous fascia on either side of midline between anterior fissure and posterior paramedian fissure, ground color mark remaining on midline extending more posterior in some paratypes, piceous fuses anteriorly and posteriorly on midline into triangular mark expanding laterally in anterior and ambient fissures, small fascia extending on anterior margin of posterior paramedian fissure, separated from longitudinal fasciae in some paratypes, anterior half of paramedian fissure piceous, irregular longitudinal mark extending onto disk between paramedian and lateral fissures but not reaching lateral fissure, small piceous spot on disk just anterior to middle of lateral fissure, additional spots in some paratypes, posterior two-thirds of lateral fissure piceous connecting to piceous ambient fissure, piceous in ambient fissure extends to middle of lateral fissure, extends around disk to anterior lateral fissure in some paratypes, mark in ambient fissure extends irregularly onto posterior lateral disk. Pronotal collar ochraceous, bright green in live specimens, greenish tint in some paratypes, with piceous angled fascia from lateral ambient fissure along anterior margin of pronotal collar lateral angle to anterolateral corner of lateral angle. Pronotum covered with short golden pile, denser in fissures. Mesonotum ground color, submedian sigilla piceous, lateral sigilla piceous with mottled posterior region, anchor-shaped castaneous mark central disk posterior to submedian sigilla, piceous scutal depressions and between anterior arms of cruciform elevation fusing on midline with posterior of anchor-shaped mark, posterior mark expands to fuse with lateral anchor-shaped mark in some paratypes, marks completely fuse in some paratypes and may extend anterolateral to between submedian and lateral sigilla, lateral X of cruciform elevation piceous with mark curving along anterior of lateral cruciform elevation and expanding to spot on anterolateral margin, wing groove ground color with castaneous fasciae anteromedially and anterolaterally. Metanotum ground color with piceous midline spot and piceous fasciae anterolaterally, mediolaterally and posterolaterally. Dorsum with short silvery pile, denser long silvery pile between anterior arms of cruciform elevation, between anterior and posterior arms of cruciform elevation, on posterior mesonotum, and in wing groove.

Ventral thoracic segments ground color except piceous on basisternum 2, posterior katapisternum 2, posterior margin of trochantin 2, anterior margin and lateral meron 2, mark on medial katapimeron 2 along meron 2 in some paratypes, basisternum 3, transverse fascia on posterior episternum 3 and medial margin of trochantin 3, covered with short silvery pile and radiating long silvery pile.

Wings. Fore wings and hind wings hyaline with eight and six apical cells respectively, right hind wing of holotype with five apical cells due to the fusion of apical cells 5 and 6. Venation greenish ochraceous proximally, becoming piceous distally, basal veins bright green in living specimens, costal margin and radius & subcostal vein ochraceous, green in fresh specimens, castaneous mark on base of cubitus anterior adjacent to basal cell, distal anal vein 2 + 3 castaneous. Basal cell about 4.5 times longer than broad. Pterostigma present. Basal membrane of fore wing orange mottled with red. Hind wing venation similarly colored except castaneous median vein, anal vein 2 and anal vein 3, castaneous spot on wing base. Basal plaga, anal cell 3 along anal vein 3 to terminal curve, anal cell 2 along anal veins 2 and 3 to terminal curve, proximal anal cell 1, proximal medial cell and proximal costal cell with orange mottled with red, infuscation in anal cell 3 and anal cell 2 bordering orange and red area.

Legs. Legs ochraceous, green in some paratypes, proximal coxae piceous, coxae, trochanters and femora striped with piceous, fore tibiae with piceous spot proximally, thickly striped with piceous and piceous distal terminus, middle and hind tibiae with thinner and shorter fascia and incomplete marking distally, tibial spurs and tibial combs castaneous with darker tips, tarsi piceous except dark ground color ventral and lateral mesotarsus and annular ground color mark on proximal pretarsus just distal to proximal margin, pretarsal claws piceous with dark ground color base. Fore femora with primary spine adpressed to femur, elevated above femur in most paratypes, secondary spine almost upright with curved tip, and very small tertiary and apical spines, primary and secondary spines ground color with piceous tips, tertiary and apical spines castaneous. Proximal segments with short silvery pile, all segments radiating long silvery pile. Male meracanthus ground color with castaneous spot on base, an elongated triangle, reaching beyond operculum posterior margin to anterior of sternite II.

Opercula. Male opercula ground color with piceous spot on lateral base, lateral margin straight, obtusely angled posterolateral margin, posterior margin straight, obtusely angled posteromedially, curved in some paratypes, medial margin rounded, anteromedial margin obliquely angled to base, not reaching to anterior of sternite II posteriorly, well separated medially barely reaching lateral base of meracanthus, covered with short silvery pile, long silvery pile radiating from operculum margin. Female operculum similarly colored and shaped but not reaching half the length of meracanthus nor middle of sternite II.

Abdomen. Abdominal tergite 1 ground color with transverse piceous fascia narrowing laterally, tergite 2 with ground color anterior and posterior margins, transverse piceous fascia connecting to anterodorsal timbal cavity, interior timbal cavity piceous, transverse castaneous fascia posterior to piceous fascia extending almost to middle of timbal cavity, tergites 3–8 piceous anteriorly bordered posteriorly with castaneous and ground color posterior and lateral margins, tergite 8 of holotype with short transverse castaneous fascia across midline anterior to posterior margin, mark not found in paratypes, tergites covered with long silvery pile, denser on dorsal tergite 1 and lateral tergites 7 and 8. Timbal cover a thickened rim, timbal completely exposed with 13 long ribs and 11 intercalary ribs. Male sternite I ground color with piceous anterior spot, sternite II with small piceous spots on either side of midline near posterior margin and on posterior auditory capsule, sternites III–VII dark ground color, sternite III with piceous anterior margin, holotype with some castaneous staining on sternites, paratypes unicolorous posterior to sternite III. Epipleurites dark ground color. Sternite VIII ground color, dorsal margin with curve near base the sides almost forming a right triangle, V-shaped when viewed from posterior. Sternites and epipleurites with short silvery pile and radiating long silvery pile, longer on sternites VII and VIII. Female sternite VII dark ground color with large anterolateral piceous spots, single, deep, V-shaped notch almost reaching anterior margin, posterolateral margin on either side of notch semicircular connecting to straight lateral margin. Female abdominal segment 9 ground color with piceous anteromedial and anterolateral margins reducing posteriorly forming a piceous triangular mark terminating as thin fascia on piceous dorsal beak, stigma piceous, covered with short silvery pile and radiating long silvery pile ventrally. Dorsal beak not as long as piceous anal styles. Posterior margin of abdominal segment 9 straight.

Genitalia. Male pygofer piceous anteriorly, ground color posteriorly and ventrally, distal shoulder undeveloped, smoothly curved, not reaching to anal tube, dorsal beak absent, pygofer with short silvery pile dorsally and posteriorly. Upper pygofer lobe absent, pygofer basal lobes elongated, adpressed to lateral pygofer, flattened, curving dorsally at oblique angle, extending more than half pygofer length, widening to semicircular apex, apex convex laterally and concave medially forming a spoon-like terminus, apex against lateral pygofer margin. Anal styles piceous with

red posterior margin, radiating short silvery pile, anal tube piceous with red posterior margin. Median uncus lobe ground color with piceous base, elongated, undivided, angled posteriorly from base, dorsal surface arched with distal quarter angled anteriorly, posterior surface smoothly curved, widening laterally from base before tapering to rounded posterior margin, small ridge on dorsal surface midline, ventral surface almost meeting along midline except for small hole near distal terminus for extension of aedeagus. Only terminal aedeagus of holotype visible, dark castaneous with at least two terminal spines extending from lateral lobes, basal aedeagus tubular, dark castaneous.

Female gonocoxite IX piceous with ground color ventral margin, gonapophysis IX castaneous, gonapophysis X piceous. Ovipositor sheath reaching to distal dorsal beak. Long golden pile radiating from ovipositor sheath.

Measurements (mm). n=10♂, 1♀, mean (range). Length of body: ♂ 19.20 (17.90–21.00), ♀ 19.75; length of fore wing: ♂ 21.48 (19.90–22.75), ♀ 21.75; width of fore wing: ♂ 7.55 (6.75–8.50), ♀ 7.75; length of head: ♂ 3.37 (3.10–3.45), ♀ 3.15; width of head including eyes: ♂ 6.44 (5.85–6.95), ♀ 6.55; width of pronotum including suprahumeral plates: ♂ 7.36 (6.30–8.15), ♀ 7.35; width of mesonotum: ♂ 6.26 (5.75–7.00), ♀ 6.35.

Song. (n=4: holotype and 1 paratopotype from Región Maule, Cauquenes Pr., 2 paratypes from Q15.CL.ML. CQQ, Región Maule, Quirihue) The echeme duration of 0.39 ± 0.11 s is significantly shorter than all other *Chilecicada* (MANOVA, $P = 1.12 \times 10^{-3}$). These echemes occur at a rate of 1.51 ± 0.26 s⁻¹, a rate that is not significantly different from *C. partemporaria* and *C. trifasciunca* (MANOVA, $P = 9.00 \times 10^{-1}$). The dominant frequency band is 8.89–11.52 kHz (mean dominant frequency = 10.21 ± 0.42 kHz).

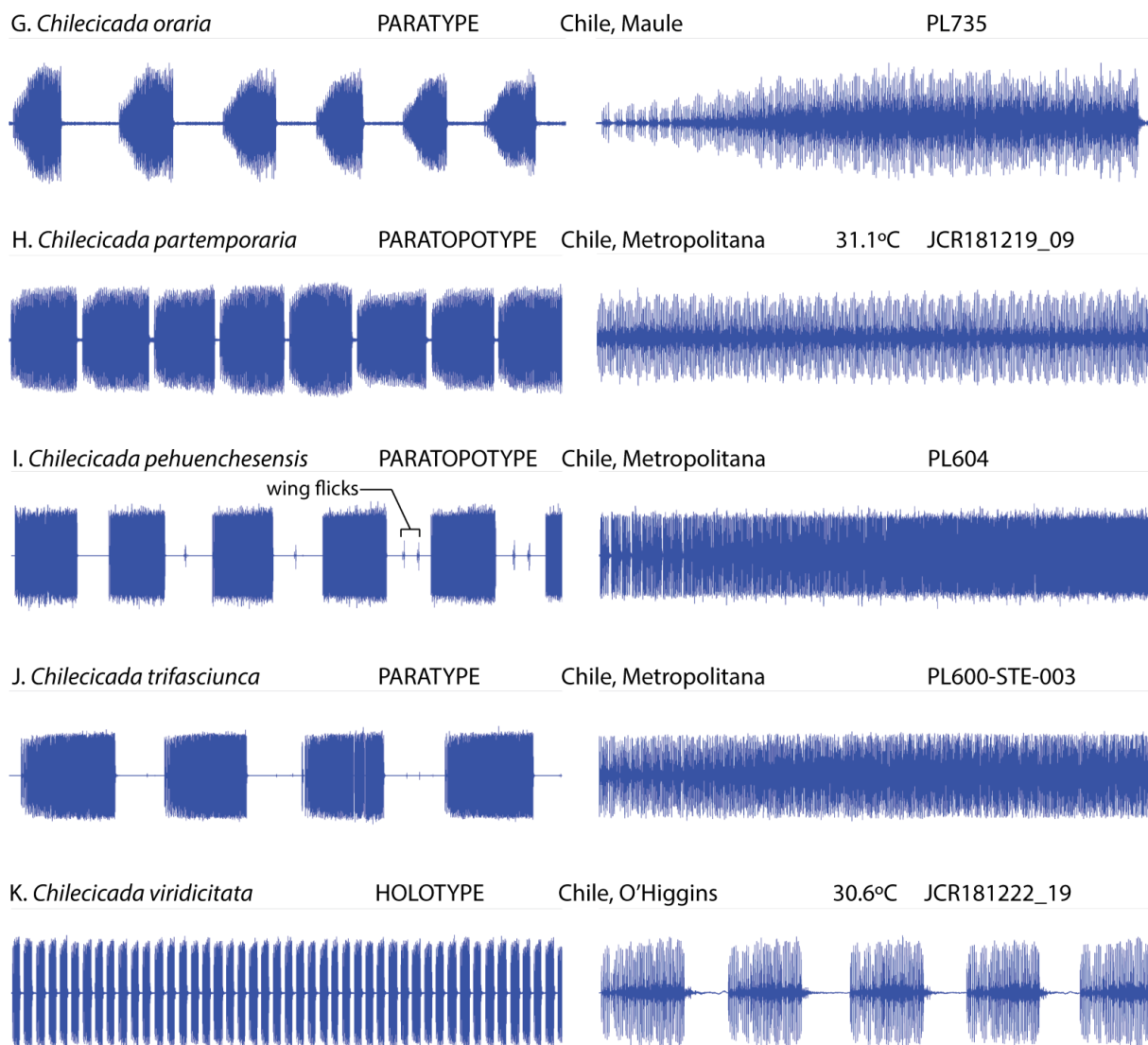


PLATE 3. Waveforms of *Chilecicada* songs. Left column 5 s oscillogram windows show echemes and echeme sequences, right column 0.5 s windows show pulses and syllables within echemes.

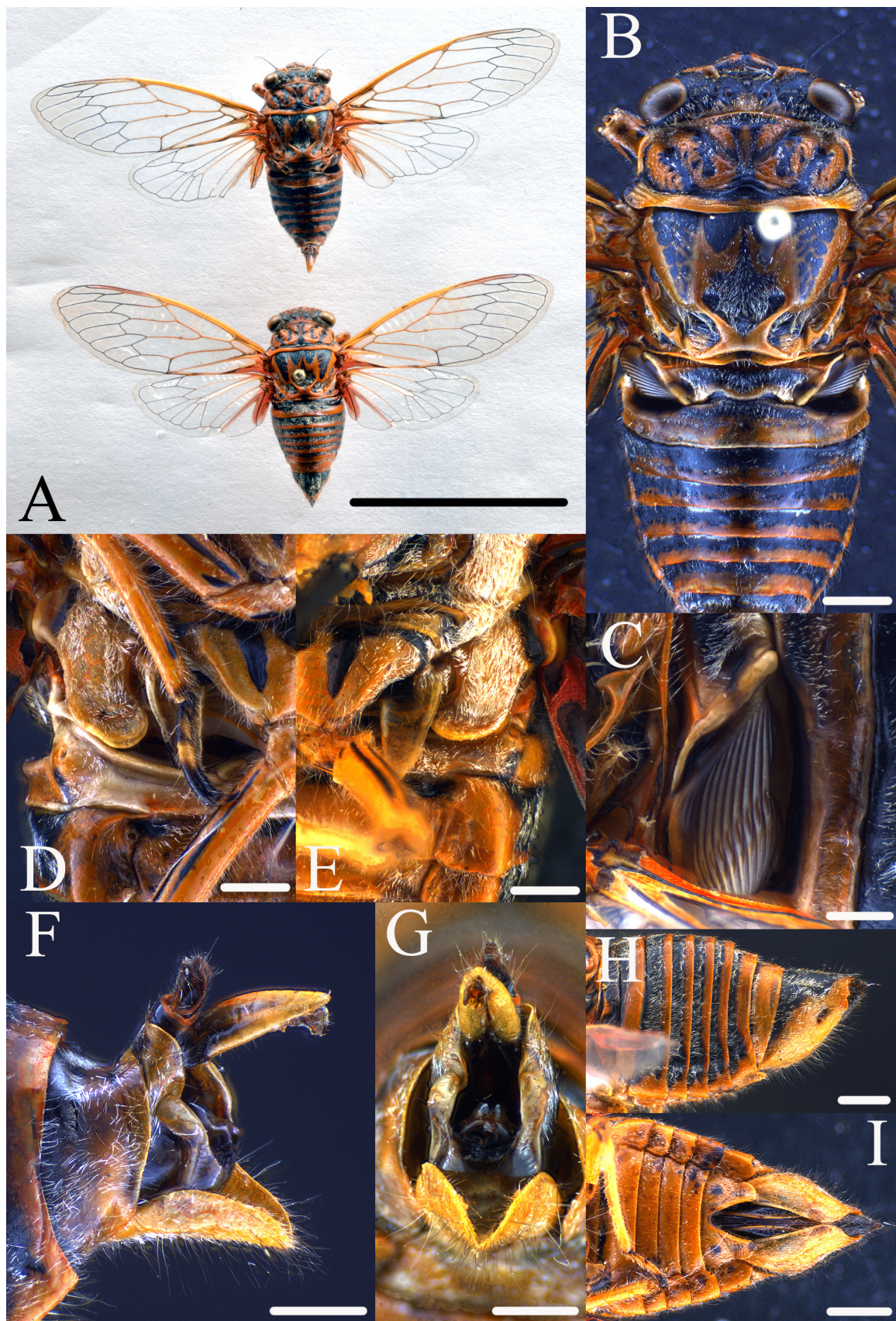


FIGURE 8. *Chilecicada oraria* n. sp.: A, Holotype male and paratype female habitus; B, holotype male dorsum; C, holotype male timbal; D, holotype male operculum; E, paratype female operculum; F, holotype male lateral view of genitalia; G, holotype male posterior view of genitalia; H, paratype female lateral view of genitalia; I, paratype female ventral view of genitalia. Scale bar: A, 2 cm; B, 2 mm; C–G, 1 mm; H–I, 2 mm.

Diagnosis. Another of the smaller of the *Chilecicada* species. This new species can be distinguished by having in combination a body length between 17.90–21.00 mm, fore wing length between 19.90–22.75 mm, fore wing basal cell about 4.50 times longer than broad, a piceous mark along the proximal fore wing basal cell, no piceous fascia separating the fore wing costa and radius + subcostal veins, a triangular meracanthus, medial opercular margin ground color, posteromedial operculum forming an obtuse angle, abdominal epipleurites lack a central spot, and an uncus that is ground color with a piceous base with the dorsal side arched and curving to the terminus.

Among the species with slow ($\sim 1\text{ s}^{-1}$) medium echeme duration ($\sim 0.5\text{ s}$) songs, *C. oraria* males deliver short echemes at the upper end of the echeme rate variation. The short echemes of *C. oraria* will separate that species from those with longer echemes: *C. curacaviensis*, *C. partemporaria*, *C. trifasciunca*, and probably also *C. culenesensis*, *C. pehuenchesensis*, and *C. magna*. The faster echeme rate will separate *C. oraria* from species that tend to sing at slower echeme rates: *C. partemporaria*, *C. trifasciunca* and probably also *C. magna* and *C. pehuenchesensis*.

Distribution. The species is known from the type series collected in Cauquenes Province in the southwestern corner of the Región del Maule, and a number of coastal communities in central Chile.

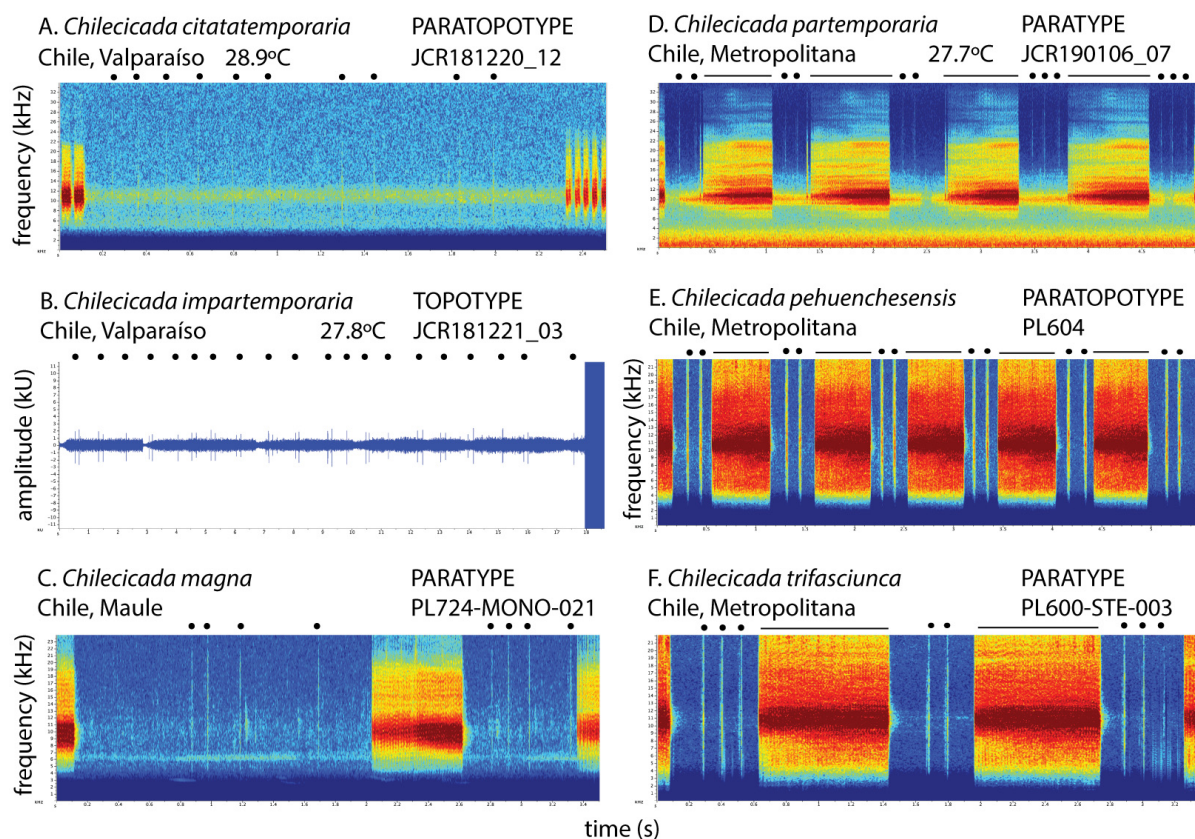


PLATE 4. Male *Chilecicada* wing flick behavior. Wing flicks are depicted on spectrograms with Hanning window size 512 except 4B *C. impartemporaria*, which best resolved on an oscillogram. Each wing flick is annotated with a dot above its position on the window, while echemes are annotated with dashes.

Chilecicada parrajaraorum n. sp. Sanborn

Fig. 9 (morphology), Plate 1 (live habitus), Plate 5 (distribution)

Type material. Holotype. “15.CL.LI.LCB.722 / -34.2993, -71.2636 / 19.XII.2015 C.V., K.N., P.L.” ♂ (UCMS). Paratypes. 14.CL.RM.PLN.520.2 / -33.4926, -70.5177 / 16.XII.2014 Piotr Lukasik” 1♂ (AFSC). The code 15.CL.LI.LCB refers to a hill near the village of Las Cabras, O’Higgins Region, Chile collected by Claudio Veloso, Katherine Nazario and Piotr Łukasik. The code 14.CL.RM.PLN refers to Park Quebrada de Macul, Peñalolen, Santiago, Metropolitan Region, Chile.

Etymology. The name is a combination of *parra-*, *-jara-* and *-orum* (L. genitive plural). The species is named in honor of Violeta del Carmen Parra Sandoval (1917-1967) and Victor Lidio Jara Martinez (1932-1973), popular Chilean singers and songwriters in reference to the importance of the songs in identifying species of *Chilecicada*.

Description. Ground color dark testaceous marked with piceous and castaneous, greenish testaceous costal margin, radius & subcostal vein and basal veins of fore wing, probably faded from green in live specimens due to ethanol exposure. Body covered with silvery pile.

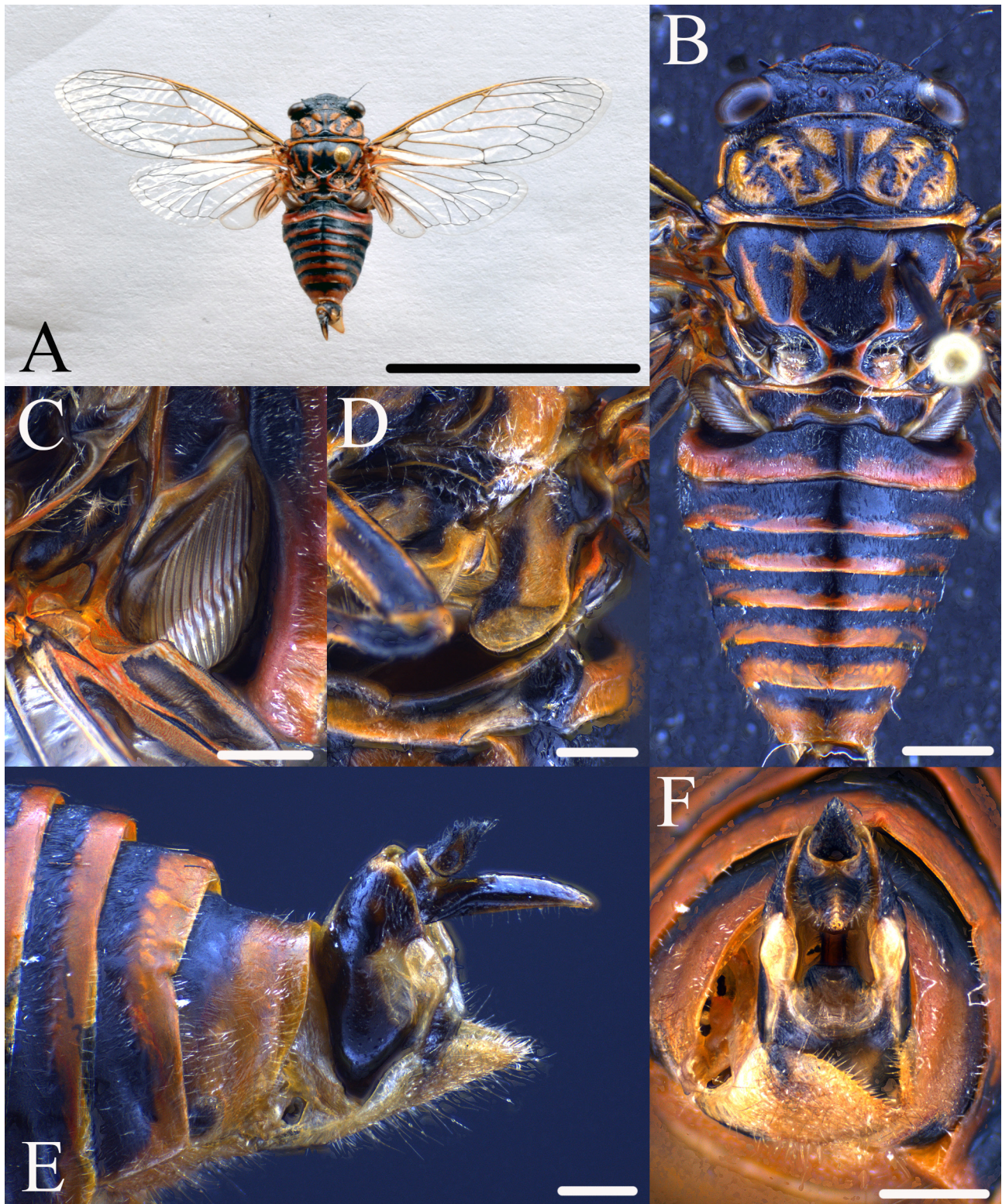


FIGURE 9. *Chilecicada parrajaraorum* n. sp.: A, Holotype male habitus; B, holotype male dorsum; C, holotype male timbal; D, paratype male operculum; E, holotype male lateral view of genitalia; F, holotype male posterior view of genitalia. Scale bar: A, 2 cm; B, 2 mm; C–F, 1 mm.

Head. Head slightly wider than mesonotum, dorsal head piceous except ground color spots on junction of anterolateral supra-antennal plate margin and anteromedial corner of vertex and in posterior epicranial suture, short silvery pile on dorsal head, denser longer pile posterior to eye. Ocelli red, eyes dark castaneous lightly margined with ground color. Gena piceous margined with ground color medial margin, anteriorly along supra-antennal plate, and posteromedial margin along lorum, lorum ground color with piceous spots on anteromedial and posteromedial corners, piceous with ground color lateral margin in paratype, short silvery pile and radiating long silvery pile on lorum and gena. Postclypeus ground color with piceous transverse grooves, central sulcus and dorsum, 12 transverse grooves, long silvery pile radiating from postclypeus, short silvery pile along lateral margin. Anteclypeus piceous with ground color carina and anterior and posterior margins, piceous extending across middle of carina in holotype, covered with short silvery pile and radiating long silvery pile. Mentum ground color with lateral U-shaped castaneous mark, labium piceous, rostrum radiating long silvery pile, reaching to middle of middle trochanters. Scape ground color, remaining antennal segments piceous.

Thorax. Pronotum ground color, piceous fascia on either side of midline fusing medially anteriorly and posteriorly forming a triangular mark tapering laterally to anterior fissure and posterior ambient fissure, fissures piceous, mark in lateral fissure expanding onto lateral disk, irregular longitudinal mark extending onto disk between paramedian and lateral fissures but not reaching lateral fissure, small piceous spots on disk anterior and posterior to middle of lateral fissure and just posterior to central paramedian fissure. Pronotal collar ground color with piceous extending from ambient fissure, dorsally piceous covering majority of pronotal collar, lateral angle margined with piceous extended medially from anterolateral corner to lateral ambient fissure. Pronotum with sparse, short silvery pile in fissures, additional pile on pronotal collar lateral angle in paratype. Mesonotum piceous with ground color outlining sigilla but not reaching anterior margin, on anterolateral corner, most of cruciform elevation and wing groove, mark on central disk extends along anterior half of cruciform elevation midline, anterior half and medial regions of lateral cruciform elevation piceous, mark extending onto posterior mesonotum, wing groove ground color with piceous medial spot, piceous fasciae anteromedially and anterolaterally connected by transverse fascia anteriorly. Metanotum with posterior notch on dorsal midline, ground color with piceous midline, anterolateral region, and posterolateral fascia. Dorsum covered with sparse silvery pile, denser and longer between anterior arms of cruciform elevation, between anterior and posterior arms of cruciform elevation, and in wing groove. Ventral thoracic segments piceous margined with ground color, ground color expanded in anepimeron 2 and katepimeron 2. Ventral segments covered with short silvery and radiating long silvery pile.

Wings. Fore wings and hind wings hyaline with eight and six apical cells respectively. Venation greenish-testaceous proximally, becoming piceous distally, costal margin and radius & subcostal vein separated by piceous fascia extending to node, cubitus posterior and anal vein 2 + 3 piceous, piceous spot on basal vein of clavus. Basal cell about 3.7 times longer than broad with small infuscation in anterodistal corner, absent in paratype. Pterostigma present. Basal membrane of fore wing grayish mottled with orange with darker posterior margin. Hind wing venation similarly colored except piceous median vein, cubitus posterior, anal vein 2, anal vein 3, cubitus posterior ground color and anal veins castaneous in paratype, piceous spot on wing base. Basal plaga, anal cell 3 along anal vein 3 to terminal curve, anal cell 2 along anal veins 2 and 3 to terminal curve, proximal anal cell 1, posterior to cubitus posterior, proximal medial cell and proximal costal cell with gray mottled with orange, infuscation in anal cell 3 and anal cell 2 bordering gray and orange area and in base of cubital cell 1, cubital cell 2 and anal cell 1.

Legs. Legs ground color, coxae, trochanters and femora striped with piceous, tibiae with piceous spot proximally, fore tibiae thickly striped with piceous anteriorly and piceous distally, middle tibiae with thinner fasciae and lesser amount of terminus piceous, hind tibiae with shorter distal fascia and lacking terminal mark, tibial spurs and tibial combs ground color with castaneous tips, tarsi piceous except ground color proximal pretarsus in middle leg and majority of tarsi in hind tarsi, pretarsal claws castaneous with piceous tips. Fore femora with primary spine angled to femur, secondary spine almost upright with broad proximal base, longest, and small tertiary spine, all spines piceous. Proximal segments with short silvery pile, all segments radiating long silvery pile. Male meracanthus ground color with piceous spot on base, an elongated triangle distally curving mediad, reaching slightly beyond operculum posterior margin to posterior of sternite I.

Opercula. Male opercula ground color with piceous spot on lateral base and piceous medial margin, lateral margin straight, obtusely angled posterolateral margin, posterior margin obtusely angled becoming transverse medially, medial margin rounded, anteromedial margin curved to base, reaching beyond middle of tympanal cavity posteriorly but not reaching sternite II, well separated medially barely reaching lateral meracanthus, covered with short silvery pile, long silvery pile radiating from operculum margin.

Abdomen. Abdominal tergite 1 with ground color anterior margin, anterolateral and posterolateral corners, with transverse piceous fascia narrowing laterally, margined posteriorly with castaneous and ground color dorsoposterior margin, tergite 2 piceous anterodorsally between timbal cavities, piceous within timbal cavity and on lateral margin, piceous extending posteriorly on dorsal midline not reaching posterior margin, castaneous posterior to piceous and dorsolateral timbal cavities with ground color dorsolaterally, tergites 3–8 piceous bordered posteriorly with ground color, transverse castaneous mark on dorsal midline posterior to piceous, tergites covered with sparse, short silvery pile, longer pile radiating from lateral tergites 7 and 8. Timbal cover a thickened rim, timbal completely exposed with 13 long ribs and 11 intercalary ribs. Male sternite I ground color marked with piceous along anterolateral and posteromedial margins, sternite II testaceous with ground color anterolateral margin, transverse piceous fascia on either side of midline and along anterior margin reaching piceous auditory capsule, sternite III with transverse piceous fascia on anterior margin, large anteromedial and small lateral castaneous spots, sternites IV–VI testaceous anteromedial castaneous mark in center and lateral castaneous spots, reducing in size in posterior sternites, medial spots larger in paratype, sternite VII testaceous. Epipleurites testaceous with central castaneous spot. Sternite VIII ground color with curving castaneous marks on anterolateral margin and castaneous spot ventral to dorsal margin curve, dorsal margin smoothly curved near base, V-shaped when viewed from posterior. Sternites and epipleurites with short silvery pile and radiating long silvery pile, longer on sternites VII and VIII.

Genitalia. Male pygofer ground color ventrally and on posterior margin, piceous dorsally and posterolaterally, separated from ground color by castaneous laterally, distal shoulder undeveloped, smoothly curved, not reaching to anal tube, dorsal beak absent, silvery pile on dorsolateral surfaces. Upper pygofer lobe absent, pygofer basal lobes elongated, adpressed to lateral pygofer, flattened, slightly angled dorsally at oblique angle, extending more than half pygofer length, widening distal to angle forming spoon-like terminus, apex against lateral pygofer margin. Anal styles piceous margined with ground color at base, radiating short silvery pile, anal tube piceous with testaceous anterior and posterior margins. Median uncus lobe dark castaneous distal two-thirds of lateral margin ground color, elongated, undivided, angled posteriorly from base, dorsal side slightly sinuate when viewed from the side, ventral side straight to downward angled distal terminus, widening laterally from base before tapering to pointed posterior margin, small ground color ridge on dorsal surface midline, ventral surface dark ground color with piceous base, ventral surfaces recurved, almost meeting along midline expanding to small hole near distal terminus for extension of aedeagus, radiating silvery pile. Aedeagus castaneous with darker lateral fascia, basal aedeagus tubular, dark castaneous, terminus not visible in type series.

Measurements (mm). $n=2\text{♂}$, mean (range). Length of body: 19.10 (18.00–20.20); length of fore wing: 20.45 (20.15–20.75); width of fore wing: 6.98 (6.95–7.00); length of head: 3.38 (3.35–3.40); width of head including eyes: 6.03 (5.90–6.15); width of pronotum including suprahumeral plates: 6.68 (6.60–6.75); width of mesonotum: 5.70 (5.65–5.75).

Song. Unknown.

Diagnosis. This new species can be distinguished by having in combination a body length between 18.00–20.20 mm, fore wing length between 20.15–20.75 mm, fore wing basal cell about 3.70 times longer than broad, a piceous mark along the proximal fore wing basal cell, a piceous fascia separating the fore wing costa and radius + subcostal veins extending to node, a triangular meracanthus, piceous marking on the medial opercular margin, posteromedial operculum forming an obtuse angle, abdominal epipleurites with a central spot, and an uncus that is piceous with ground color and/or castaneous lateral and dorsal fasciae with a sinuate dorsal surface when viewed from the side and the ventral terminus slightly bent.

Distribution. The species is known from the type series collected in the O'Higgins and Metropolitana Regions, Chile.

***Chilecicada partemporaria* n. sp. Sanborn and Cole**

Fig. 10 (morphology), Plate 1 (live habitus), Plate 3 (song), Plate 4 (wing flick), Plate 5 (distribution)

Type material. Holotype. “CHILE. Región Metropolitana: / Santiago Pr.: Comuna de Lo / Barnechea; Camino a Farellones / en Puente el Manzano (curva 16), / 33.34699S, 70.33109W, 1819 m. / 19-XII-2018, JA Cole, FA / Calderon, C. Veloso leg. S18-03 // JCR181219_08 // JAC000003294” ♂ (LACM). Paratypes. “CHILE. Región Metropolitana: / Provincia de Santiago: Comuna de / Lo Barnechea; Camino a Farellones / en Puentes el Manzano (curva 14), / 33.34859S, 70.35332W, 1549 m. / 19-XII-2018, JA Cole, FA Calderon, / C Veloso leg. S18-02 //

JAC000003290” 1♂ (LACM); “CHILE. Región Metropolitana: / Provincia de Santiago: Comuna de / Lo Barnechea; Camino a Farellones / en Puentes el Manzano (curva 14), / 33.34859S, 70.35332W, 1549 m. / 19-XII-2018, JA Cole, FA Calderon, / C Veloso leg. S18-02 // JAC000003291” 1♂ (LACM); “CHILE. Región Metropolitana: / Santiago Pr.: Comuna de Lo / Barnechea; Camino a Farellones / en Puente el Manzano (curva 16), / 33.34699S, 70.33109W, 1819 m. / 19-XII-2018, JA Cole, / FA Calderon, C. Veloso leg. S18-03 // JCR181219_03 or 06 // JAC000003292” 1♂ (LACM); “CHILE. Región Metropolitana: / Santiago Pr.: Comuna de Lo / Barnechea; Camino a Farellones / en Puente el Manzano (curva 16), / 33.34699S, 70.33109W, 1819 m. / 19-XII-2018, JA Cole, FA / Calderon, C. Veloso leg. S18-03 // JCR181219_06 or 03 // JAC000003293” 1♂ (LACM); “CHILE. Región Metropolitana: / Santiago Pr.: Comuna de Lo / Barnechea; Camino a Farellones / en Puente el Manzano (curva 16), / 33.34699S, 70.33109W, 1819 m. / 19-XII-2018, JA Cole, FA / Calderon, C Veloso leg. S18-03 // JCR181219_09 // JAC000003295” 1♂ (LACM); “CHILE. Región Metropolitana: / Santiago Pr.: Comuna de Lo / Barnechea; Camino a Farellones / en Puente el Manzano (curva 16), / 33.34699S, 70.33109W, 1819 m. / 19-XII-2018, JA Cole, FA / Calderon, C Veloso leg. S18-03 // JAC000003296” 1♂ (LACM); “CHILE. Región Metropolitana: / Provincia de Santiago: Comuna de / Lo Barnechea; Camino a Farellones / en Puente el Manzano (curva 16), / 33.34699S, 70.33109W, 1819 m. / 19-XII-2018, JA Cole, FA Calderon, / C. Veloso leg. S18-03 1♂ (MNNC), 1♂ and 1♀ (AFSC); “CHILE. Región Metropolitana: / Cordillera Pr.: Comuna de San / José de Maipo, Camino Al Volcán, / 3.2 km E of El Volcán pueblo, / 33.81716S, 70.15041W, 1487 m. / 6-I-2019, JA Cole, FA Calderon, / C Veloso leg. S18-50 // 190106-09? // JAC000003303” 1♂ (LACM); “CHILE. Región Metropolitana: / Cordillera Pr.: Comuna de San / José de Maipo, Camino Al Volcán, / 3.2 km E of El Volcán pueblo, / 33.81716S, 70.15041W, 1478 m. / 6-I-2019, JA Cole, FA Calderon, / C. Veloso leg. S19-50 // 190106-020 (FC) // JAC000003304” 1♂ (LACM); “CHILE. Región Metropolitana: / Cordillera Pr.: Comuna de San / José de Maipo; Camino Al Volcán, / 3.2 km E of El Volcán pueblo, / 33.81716S, 70.15041W, 1487 m. / 6-I-2019, JA Cole, FA Calderon, / C Veloso leg. S19-50 // 190106-021 (FC) // JAC000003305” 1♂ (LACM); “CHILE. Región Metropolitana: / Cordillera Pr.: Comuna de San / José de Maipo, Camino Al Volcán, / 3.2 km E of El Volcán pueblo, / 33.81716S, 70.15041W, 1478 m. / 6-I-2019, JA Cole, FA Calderon, / C. Veloso leg. S19-50 // JAC000003306” 1♂ (LACM); “CHILE. Región Metropolitana: / Provincia de Cordillera: Comuna de / San José de Maipo; Camino Al / Volcán, 3.2 km E of El Volcán / pueblo, / 33.81716S, 70.15041W, 1478 m. / 6-I-2019, JA Cole, FA Calderon, C. / Veloso leg. S18-50” 1♂ (MNNC), 2♂ (AFSC); “CHILE. Región Metropolitana: / Provincia de Cordillera: Comuna de San / José de Maipo; Campground 1.26 / km east of El Volcán pueblo on / Villorio El Volcán / 33.81446S, 70.17072W, 1398 m. / 6-I-2019, JA Cole, FA Calderon, / C Veloso leg. S19-49 // JCR190106_06 // JAC000003300” 1♂ (LACM); “CHILE. Región Metropolitana: / Cordillera Pr.: Comuna de San / José de Maipo; Campground 1.26 / km east of El Volcán pueblo on / Villorio El Volcán / 33.81446S, 70.17072W, 1398 m. / 6-I-2019, JA Cole, FA Calderon, / C Veloso leg. S19-49 // JCR190106_07 // JAC000003301” 1♂ (LACM); “CHILE. Región Metropolitana: / Cordillera Pr.: Comuna de San / José de Maipo; Campground 1.26 / km east of El Volcán pueblo on / Villorio El Volcán / 33.81446S, 70.17072W, 1398 m. / 6-I-2019, JA Cole, FA Calderon, / C Veloso leg. S19-49 // JAC000003302” 1♂ (LACM); “CHILE. Región Metropolitana: / Provincia de Cordillera: Comuna de / San José de Maipo; Campground / 1.26 km east of El Volcán pueblo on / Villorio El Volcán / 33.81446S, 70.17072W, 1398 m. / 6-I-2019, JA Cole, FA Calderon, C. / Veloso leg. S18-49 // 190106-05” 1♂ (MNNC); “CHILE. Región O’Higgins: / Cachapoal Pr.: Comuna de / Machali, Puente Chacayes, road / H-33 at El / Manzanar, / 34.23566S, 70.48223W, 844 m. / 22-XII-2018, JA Cole, FA / Calderon, C. Veloso leg. S18-14 // JAC000003299” 1♂ (LACM); “CHILE. Región O’Higgins: Provincia / de Cachapoal: Comuna de Machali; / Puente Chacayes, road H-33 at El / Manzanar, / 34.23566S, 70.48223W, 844 m. / 22-XII-2018, JA Cole, FA Calderon, / C. Veloso leg. S18-14” 1♂ (AFSC); “CHILE. Región O’Higgins: / Cachapoal Pr.: Comuna de / Machali, Entrance of Club de / Campo Coya, / 34.20087S, 70.55859W, 985 m. / 22-XII-2018, JA Cole, FA Calderon, / C. Veloso leg. S18-13 // 181222-002 (FC) // JAC000003297” 1♂ (LACM); “CHILE. Región O’Higgins: / Cachapoal Pr.: Comuna de / Machali; Entrance of Club de / Campo Coya, / 34.20087S, 70.55859W, 985 m. / 22-XII-2018, JA Cole, FA / Calderon, C. Veloso leg. S18-13 // JAC000003298” 1♂ (LACM); “CHILE. Región O’Higgins: Provincia / de Cachapoal: Comuna de Machali; / Entrance of Club de Campo Coya, / 34.20087S, 70.55859W, 985 m. / 22-XII-2018, JA Cole, FA Calderon, / C. Veloso leg. S18-13” 1♂ (AFSC); “CHILE. Región O’Higgins: Provincia / de Cachapoal: Comuna de Machali; / Entrance of Club de Campo Coya, / 34.20087S, 70.55859W, 985 m. / 22-XII-2018, JA Cole, FA Calderon, / C. Veloso leg. S18-13 / 181222-003 (FC)” 1♂ (MNNC); “CHILE. Región O’Higgins: Provincia / de Colchagua: Comuna de San / Fernando: Sierra Bellavista, / 34.82697S, 70.74717W, 118 0 m. / 24-XII-2018. JA Cole, FA Calderon, / C Veloso leg. S18-19” 1♂ (LACM); “CHILE. Región

Metropolitana: / Santiago Pr.: Universidad de / Ibáñez, Botánico, Peñalolén / 33.48944S, 70.51194W, 998 m. / 4-I-2018, JA Cole leg. // 18.CL.SA.UUB // Santiago Reg. CL / 18.CL.SA.UUB / U. Adolfo Ibanez / 4 Jan 18 JC, EG, CS, SC / Chilecicada verde // JAC000003289" 1♀ (LACM); "14.CL.LI.BLV.421 / -34.8258, -70.7418 / 14.XII.2014 Piotr Lukasik" 1♀ (MNNC); "14.CL.LI.BLV.423.1 / -34.8258, -70.7418 / 14.XII.2014 Piotr Lukasik" 1♀ (MNNC); "14.CL.LI.BLV.423.2 / -34.8258, -70.7418 / 14.XII.2014 Piotr Lukasik" 1♂ (AFSC); "14.CL.LI.BLV.424.1 / -34.8258, -70.7418 / 14.XII.2014 Piotr Lukasik" 1♀ (UCMS); "14.CL.LI.BLV.424.3 / -34.8258, -70.7418 / 14.XII.2014 Piotr Lukasik" 1♂ (UCMS); "14.CL.LI.CRC.475.3 / -34.1596, -70.6347 / 15.XII.2014 Piotr Lukasik" 1♂ (UCMS); "14.CL.LI.CLT.510 / -34.74115, -70.7655 / 15.XII.2014 Piotr Lukasik" 1♂ (UCMS); "16.CL.LI.RTT.048.2 / -34.9595, -70.4329 / 8.I.2016 C.V., J.M." 1♂ (MNNC); "16.CL.LI.RTT.048.1 / -34.9595, -70.4329 / 8.I.2016 C.V., J.M." 1♂ (AFSC); "16.CL.LI.RTT.047 / -34.9595, -70.4329 / 8.I.2016 C.V., J.M." 1♂ (UCMS); "Sex: Male (05) / Collector: C. Veloso & C. Cecchii / Date: 01/27/10 / Location Farellones. RM. / (33°20'54" S. 70°21'18"W. 1583 m)" 1♂ (AFSC); "Sex: Male (02) / Collector: C. Veloso & C. Cecchii / Date: 01/27/10 / Location Farellones. RM. / (33°20'54" S. 70°21'18"W. 1583 m)" 1♂ (AFSC); "Sex: Male (11) / Collector: C. Veloso & C. Cecchii / Date: 01/27/10 / Location Farellones. RM. / (33°20'54" S. 70°21'18"W. 1583 m)" 1♂ (AFSC); "Sex: Female (04) / Collector: C. Veloso & C. Cecchii / Date: 01/27/10 / Location Farellones. RM. / (33°20'54" S. 70°21'18"W. 1583 m)" 1♂ (AFSC). The code 14.CL.LI.BLV corresponds to Sierra de Bellavista, O'Higgins Region, Chile. The code 14.CL.LI.CRC corresponds to Camino Rancagua-Coya, VI Region (O'Higgins Region), Chile. The code 14.CL.LI.CLT corresponds to side of the road towards Termas del Flaco, O'Higgins Region, Chile. The code 16.CL.LI.RTT corresponds to the road to Termas del Flaco, -34.7838, -70.6465, VI Region (O'Higgins Region), Chile, collected by Claudio Veloso and John McCutcheon. The GPS data on the specimen label are incorrect.

Etymology. The name is a combination of *par-* (L. *par*, equal, even) and *-temporaria* (L. *temporarius*, of time) in reference to the temporally consistent song echemes of the species.

Description. Ground color testaceous, castaneous in some paratypes, heavily marked with piceous, greenish costal margin, radius & subcostal vein and basal veins of fore wing. Head and thorax greenish in live specimens, greenish tint remaining in some specimens of the type series. Costal margin, radius & subcostal vein and basal veins of fore wing faded from green to ochraceous due to ethanol exposure in some paratypes. Body covered with silvery pile.

Head. Head slightly wider than mesonotum, dorsal head piceous except ground color anterior supra-antennal plate margin, anteromedial corner of vertex and mark on medioposterior head in posterior epicranial suture extending laterally along posterior head to expand anteriorly to posterior cranial depressions, mark reduced to only epicranial suture in some paratypes, short silvery pile and radiating long silvery pile on dorsal head, long silvery pile posterior to eye. Ocelli rosaceous, eyes dark castaneous. Gena piceous with ground color margin along lorum, lorum piceous with ground color anterior and lateral margins, ground color margin thicker in some paratypes, short silvery pile and radiating long silvery pile on lorum and gena. Postclypeus ground color with piceous transverse grooves and central sulcus, 12 transverse grooves, dorsum piceous posterior to transverse grooves, long silvery pile radiating from postclypeus, short silvery pile along lateral margin. Anteclypeus with ground color carina and anterior margins, piceous connected across carina in some paratypes, covered with short silvery pile and radiating long silvery pile. Mentum piceous except ground color ventral midline and posterior margins, labium piceous, rostrum radiating long silvery pile, reaching to middle of middle trochanters. Scape ground color, remaining antennal segments piceous.

Thorax. Pronotum ground color, piceous fascia on either side of midline fusing anteriorly and posteriorly producing short ground color fascia on midline, fissures piceous, incomplete anterior or lateral ambient fissures or posterior paramedian fissure in some paratypes, irregular longitudinal mark extending onto disk between paramedian and lateral fissures but not reaching lateral fissure, small piceous spots on disk just posterior to central paramedian fissure and anterior and posterior to middle of lateral fissure, spots expanded or reduced in some paratypes. Pronotal collar ground color with piceous angled fascia from middle of lateral ambient fissure to anterior margin of pronotal collar lateral angle. Pronotum with short silvery pile, denser in fissures. Mesonotum ground color, submedian sigilla piceous, piceous fused anteromedially, separated in some paratypes, lateral sigilla mottled piceous, completely piceous or with ground color lateral region in some paratypes, anchor-shaped piceous mark on central disk posterior to submedian sigilla expanding to large rectangular spot including scutal depressions and area between anterior arms of cruciform elevation, mark extending onto midline of cruciform elevation, anterolateral curve reduced in some paratypes connecting to lateral sigilla in other paratypes, mark expanding to cover all but ground color margin along submedian sigilla in some paratypes, anterior and medial portion of lateral cruciform elevation piceous, small piceous mark crossing middle of anterior arms of cruciform elevation in some paratypes, wing groove ground color

with piceous fasciae anteromedially and anterolaterally. Metanotum ground color, piceous fascia on dorsal midline, piceous anterolateral and piceous posterolateral fasciae. Dorsum with silvery pile, denser and longer between anterior arms of cruciform elevation, radiating from posterolateral margin, between anterior and posterior arms of cruciform elevation, and in wing groove. Ventral thoracic segments ground color except piceous on basisternum 2, posterior katepisternum 2, lateral trochantin 2, central meron 2, basisternum 3, transverse fascia on posterior episternum 3 and lateral trochantin 3, piceous expanded in some paratypes, plates almost completely piceous in one paratype. Ventral segments covered with short silvery pile and radiating long silvery pile.

Wings. Fore wings and hind wings hyaline with eight and six apical cells respectively. Venation greenish proximally, becoming piceous distally, costal margin and radius & subcostal vein greenish separated by piceous fascia along basal cell, fascia extending to node in some paratypes, reduced to proximal spot in other paratypes, cubitus posterior piceous, posterior of anal vein 2 + 3 piceous in middle, completely piceous in some paratypes. Basal cell about 3.5 times longer than broad. Pterostigma present. Basal membrane of fore wing orange with piceous posterior margin, mottled with red in some paratypes. Hind wing venation similarly colored except piceous median vein, anal vein 2 and anal vein 3, castaneous spot on wing base. Basal plaga, anal cell 3 along anal vein 3 to terminal curve, anal cell 2 along anal veins 2 and 3 to terminal curve, proximal medial cell and proximal costal cell with orange, mottled with red in some paratypes, infuscation in proximal anal cell 1, anal cell 3 and anal cell 2 bordering orange and red area and base of cubital cell 1, cubital cell 2 and anal cell 1.

Legs. Legs ochraceous, tinged with castaneous or testaceous in some paratypes, coxae, trochanters and femora striped with piceous, fore tibiae with piceous spot proximally, thickly striped with piceous and distally piceous, middle tibiae with proximal and distal piceous marks, hind tibiae with on proximal piceous mark, tibial spurs and tibial combs ground color with castaneous tips, tarsi piceous except ground color distal mesotarsus and annular ground color mark on proximal pretarsus just distal to proximal margin, middle tarsi piceous, hind tarsi with ground color proximal pretarsus, some or all tarsi completely piceous in some paratypes, pretarsal claws piceous with dark ground color base, completely piceous in some paratypes. Fore femora with primary spine angled to femur, secondary spine almost upright with proximally expanded base, and very small tertiary spine, primary spine piceous, secondary spine ground color with piceous tip and majority of anterior surface, tertiary spine piceous. Segments covered with short silvery pile and radiating long silvery pile. Male meracanthus ground color with castaneous spot on base, an elongated triangle with parallel-sided base, reaching beyond operculum posterior margin to middle anterior or sternite II. Female meracanthus similarly shaped and colored, reaching to middle of sternite III.

Opercula. Male opercula ground color with piceous spot on lateral base, lateral margin straight, curved obtusely angled posterolateral margin, posterior margin straight, rounded medial margin, anteromedial margin obliquely angled to base, not reaching to anterior of sternite II posteriorly, well separated medially barely reaching lateral margin of meracanthus, covered with short silvery pile, long silvery pile radiating from operculum margin. Female operculum similarly colored and shaped but only reaching posteriorly to middle of sternite II.

Abdomen. Abdominal tergite 1 piceous with ground color anterior margin and posterolateral corners, tergite 2 with piceous interior timbal cavity piceous, tergites 2–8 piceous anteriorly bordered posteriorly with castaneous and ground color posterior and lateral margins, castaneous expanded in posterior tergites, castaneous replaced with piceous in some paratypes, tergite 8 with piceous on dorsolateral posterior margin, tergites sparsely covered with short silvery pile, denser in some paratypes, longer pile radiating from lateral tergites 3–8. Timbal cover a thickened rim, timbal completely exposed with 13 long ribs and 11 intercalary ribs. Male sternite I ground color with anterolateral piceous spot, sternite II with small piceous spots on either side of midline near anterior margin, short fascia on posterior margin in middle of tympanal cavity, these marks fuse with central marks in some paratypes, and on auditory capsule, sternites III–VII ground color, sternite III with piceous anterior margin expanding on midline. Epipleurites ground color. Sternite VIII ground color, dorsal margin with curve at posterior of tergite 8 forming an obtuse angle, V-shaped when viewed from posterior. Sternites and epipleurites with short silvery pile and radiating long silvery pile, longer on sternites VII and VIII. Female sternite VII ground color with large anterolateral piceous spots, single, deep, U-shaped notch almost reaching anterior margin, posterolateral margin on either side of notch semicircular connecting to straight lateral margin. Female abdominal segment 9 ground color ventrally, piceous dorsoanteriorly, dorsolaterally, laterally on stigma and along dorsal midline terminated at end of dorsal beak, covered with short silvery pile and radiating long silvery pile ventrally. Dorsal beak not as long as piceous anal styles. Posterior margin of abdominal segment 9 straight.

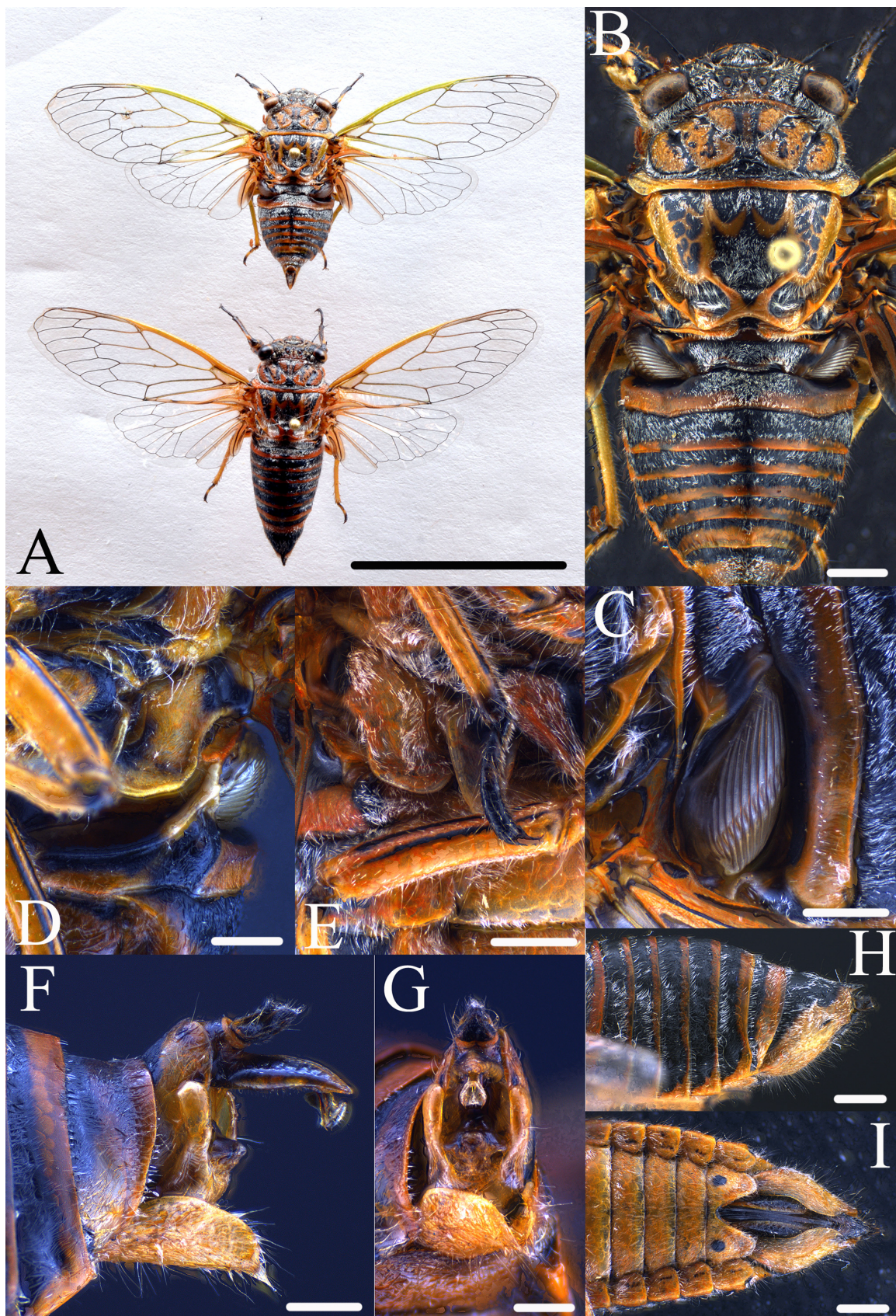


FIGURE 10. *Chilecicada partemporaria* n. sp.: A, Holotype male and paratype female habitus; B, holotype male dorsum; C, holotype male timbal; D, paratype male operculum; E, paratype female operculum; F, paratype male lateral view of genitalia; G, paratype male posterior view of genitalia; H, paratype female lateral view of genitalia; I, paratype female ventral view of genitalia. Scale bar: A, 2 cm; B, 2 mm; C–G, 1 mm; H–I, 2 mm.

Genitalia. Male pygofer ground color with piceous anterior, large piceous dorsolateral spots angled mediad posteriorly margined with castaneous, dorsolateral spots terminate anterior to posterior margin, castaneous connecting on midline, small piceous spot on ventral base of distal shoulder, and a castaneous dorsal spot anterior to posterior margin, piceous and connecting across midline in some paratypes, distal shoulder undeveloped, smoothly curved, not reaching to anal tube, dorsal beak absent, pygofer with short silvery pile. Upper pygofer lobe absent, pygofer basal lobes elongated, adpressed to lateral pygofer, flattened, curving dorsally at slightly oblique angle, extending more than half pygofer length, expanding distal to semicircular terminus, apex against lateral pygofer margin. Anal styles piceous with ground color margins, radiating short silvery pile, anal tube piceous with ground color margins. Median uncus lobe piceous with ground color lateral margin and dorsal carina, elongated, undivided, angled posteriorly from base, distal quarter angled toward sternite VIII, widening laterally from base before tapering to pointed terminus, notched in some paratypes, ventral surface meeting proximally along midline, separating distally forming opening near distal terminus for extension of aedeagus, radiating short silvery pile. Aedeagus castaneous with two terminal spines extending from ochraceous lateral lobes, basal aedeagus tubular, dark castaneous.

Female gonocoxite IX piceous with ground color ventral margin, gonapophysis IX castaneous, gonapophysis X castaneous with piceous tip. Ovipositor sheath reaching not reaching to distal dorsal beak, only to base of anal styles. Long golden pile radiating from ovipositor sheath.

Measurements (mm). $n=10\text{♂}$, 4♀ , mean (range). Length of body: ♂ 18.48 (17.20–19.90), ♀ 19.74 (18.00–21.35); length of fore wing: ♂ 21.92 (19.80–24.40), ♀ 21.81 (20.50–22.85); width of fore wing: ♂ 7.59 (6.70–8.10), ♀ 7.84 (7.65–8.10); length of head: ♂ 3.16 (3.00–3.40), ♀ 3.26 (3.15–3.35); width of head including eyes: ♂ 6.36 (5.75–6.70), ♀ 6.40 (6.20–6.50); width of pronotum including suprahumeral plates: ♂ 6.95 (6.30–7.40), ♀ 7.36 (7.10–7.55); width of mesonotum: ♂ 5.78 (5.00–6.30), ♀ 6.11 (5.85–6.20).

Song. ($n=30$: 2 UCMS alcoholic molecular vouchers and 2 not captured from Metropolitana Region, Santiago Pr. (S18-02); holotype, paratopotype, and topotype UCMS alcoholic molecular voucher from Metropolitana Region, Santiago Pr. (S18-03); 1 paratype and 4 not captured from O'Higgins Region, Cachapoal Pr. (S18-13); 1 not captured from O'Higgins Region, Cachapoal Pr. (S18-14); 3 not captured from O'Higgins Region, Colchagua Pr. (S18-18, S18-19), 1 from Maule Region, Linares Pr. (S18-20), 3 paratypes and 3 not captured from Metropolitana Region, Cordillera Pr. (S19-49), 1 paratype and 1 not captured from Metropolitana Region, Cordillera Pr. (S19-50)) The *C. partemporaria* echeme duration is 0.68 ± 0.13 s. The echeme rate is 1.18 ± 0.26 s⁻¹, which is significantly longer than in *C. oraria* and *C. trifasciunca* songs (MANOVA, $P=1.12\times10^{-3}$). Echeme rates of *C. partemporaria* tend to be slower than in *C. curacaviensis* and *C. oraria*, but the differences are not significant (MANOVA, $P=9.00\times10^{-1}$). The dominant frequency band is 7.78–12.09 kHz (mean dominant frequency= 9.99 ± 0.36 kHz).

Diagnosis. Another of the larger species of the *Chilecicada* species including the largest specimen. This new species can be distinguished by having in combination a body length between 17.20–21.35 mm, fore wing length between 19.80–24.40 mm, fore wing basal cell about 3.50 times longer than broad, a piceous mark along the proximal fore wing basal cell, a piceous fascia separating the proximal fore wing costa and radius + subcostal veins, meracanthus an elongated triangle with a parallel-sided base, medial opercular margin ground color, posteromedial operculum forming an obtuse angle, abdominal epipleurites lack a central spot, and an uncus that is piceous with ground color lateral and dorsal fasciae with the distal quarter bent.

C. partemporaria is named for the common song type that it exemplifies: medium length echemes slightly longer than 0.5 s produced evenly and continuously at a rate of just over 1 s⁻¹. This song type is also found in *C. culenesensis*, *C. curacaviensis*, *C. magna*, *C. oraria*, *C. pehuenchesensis*, and *C. trifasciunca*. *C. partemporaria* has the longest echemes of the species with this song type but may overlap with other species at the minimum of the duration distribution. In cases of overlap, the *C. partemporaria* echeme rate tends to be slower than in *C. curacaviensis* and *C. oraria*, and probably also *C. culenesensis*.

Distribution. The species is known from the type series collected in multiple localities in the Metropolitana and O'Higgins Regions of central Chile.

Chilecicada pehuenchesensis n. sp. Sanborn and Cole

Fig. 11 (morphology), Plate 1 (live habitus), Plate 3 (song), Plate 4 (wing flick), Plate 5 (distribution)

Type material. Holotype. “15.CL.RM.CDM.602 / -33.8192, -70.1322 / 5.XII.2015 Piotr Lukasik” ♂ (UCMS). Paratypes. “15.CL.RM.CDM.604 / -33.8192, -70.1322 / 5.XII.2015 Piotr Lukasik” 1♂ (MNNC); “14.CL.RM.

CEY.517.1 / -33.7878, -70.1816 / 16.XII.2014 Piotr Lukasik" 1♂ (UCMS); "14.CL.RM.CEY.516 / -33.7878, -70.1816 / 16.XII.2014 Piotr Lukasik" 1♂ (AFSC). The code 15.CL.RM.CDM refers to the side of the road Camino Al Volcán, 3.5 km E from the village of El Volcán, Cajón del Maipo, -33.8233, -70.1220, Metropolitan Region, Chile and is the type locality for the species. The GPS data on the label are incorrect. The code 14.CL.RM.CEY refers to Cajón del Maipo, Camino Embalse el Yeso 2 (sitio alto), Región Metropolitana, Chile. The code 14.CL.RM.CAV refers the side of the road Camino Al Volcán, 3.5 km E from the village El Volcan, Cajón del Maipo, Metropolitan Region, Chile.

Etymology. The name is a combination of *pehuenches*- and *-ensis* (L. suffix denoting place) in reference to the distribution of the species and the Pehuenches people of central Chile.

Description. Ground color testaceous heavily marked with piceous, ochraceous costal margin, radius & subcostal vein and basal veins of fore wing. Costal margin, radius & subcostal vein and basal veins of fore wing probably faded from green to ochraceous due to ethanol exposure in type series. Body covered with sparse, silvery pile.

Head. Head slightly wider than mesonotum, dorsal head piceous except ground color supra-antennal plate anterior margin, mark extending along anteromedial and anterolateral margin, reduced in some paratypes, anteromedial corner of vertex and medioposterior head with mark extending laterally to posterior epicranial suture angled anterolaterally to anterior of piceous posterior cranial depressions, sparse, short silvery pile on dorsal head, denser long silvery pile posterior to eye. Ocelli ochraceous, rosaceous in some paratypes, eyes dark castaneous with lighter proximal margin. Gena piceous centrally margined by ground color on medial, anterior and posteromedial margins along lorum, lorum piceous with ground color lateral margin and central fascia splitting piceous into two large spots, short white pile and radiating long white pile on lorum and gena. Postclypeus ground color with piceous transverse grooves and central sulcus, 12 transverse grooves, dorsum piceous posterior to transverse grooves, long silvery pile radiating from postclypeus, short white pile along lateral margin. Anteclypeus with ground color carina, medial anterior margin and medial posterior margin extending laterad beyond carina, covered with short white pile and radiating long white pile. Mentum ground color with lateral U-shaped castaneous fascia pointing distally, labium piceous, rostrum radiating long silvery pile, reaching to posterior of middle coxae. Scape ground color, remaining antennal segments piceous.

Thorax. Pronotum ground color, piceous fasciae on either side of midline between anterior fissure and pronotal collar, expanding laterally into triangular mark along anterior and posterior fissures, fissures piceous except anterior fissure medial to anterior end of paramedian fissure, irregular longitudinal mark extending onto disk between paramedian and lateral fissures but not reaching lateral fissure, small piceous spots on disk just posterior to central paramedian fissure and anterior to middle of lateral fissure, central lateral fissure expanding onto disk, separating partially or completely to form short fascia parallel to lateral fissure in some paratypes. Pronotal collar ground color with piceous margin along ambient fissure, anterior half of lateral angle of pronotal collar piceous, reduced distally or absent in some paratypes. Pronotum with short silvery pile in fissures. Mesonotum ground color, sigilla piceous surrounded with ground color not reaching anterior margin between sigilla, small longitudinal piceous mark lateral to lateral sigilla, central disk posterior to submedian sigilla, scutal depressions and area between anterior arms of cruciform elevation piceous, cruciform elevation ground color anterior half of lateral cruciform elevation piceous, wing groove ground color with piceous fasciae anteromedially and anterolaterally connected anteriorly by transverse fascia. Metanotum ground color with piceous midline, piceous anterolateral, mediolateral and posterolateral fasciae, smoothly curved concavity in dorsal posterior margin. Dorsum covered with short silvery pile, longer and denser silvery pile between anterior arms of cruciform elevation, between anterior and posterior arms of cruciform elevation, in wing groove, and radiating from lateral metanotum. Ventral thoracic segments ground color except piceous on basisternum 2, posterior katapisternum 2, medial anepimeron 2, lateral spot on trochantin 2, basisternum 3, transverse fascia on lateral episternum 3 and medial spot on trochantin 3, piceous reduced in some paratypes. Ventral segments covered with short white pile and radiating long white pile.

Wings. Fore wings and hind wings hyaline with eight and six apical cells respectively, radial crossvein missing in hind wing of holotype and one paratype leaving five apical cells in one hind wing. Venation ochraceous proximally, becoming piceous distally, proximal and distal venation distinctly contrasting, piceous fascia along anterior basal cell, piceous fascia on anterior costal margin to distal basal cell, cubitus posterior piceous, posterior of anal vein 2 + 3 piceous at curve, piceous spot on wing base. Basal cell about 4.20 times longer than broad. Pterostigma present. Basal membrane of fore wing gray mottled with orange with darker posterior margin. Hind wing venation similarly

colored except piceous median vein and castaneous anal vein 2 and anal vein 3, piceous spot on wing base. Basal plaga, anal cell 3 along anal vein 3 to terminal curve, anal cell 2 along anal veins 2 and 3 to terminal curve, proximal anal cell 1, proximal medial cell and proximal costal cell with gray mottled with orange, infuscation in anal cell 3 and anal cell 2 bordering gray and orange area and base of cubital cell 1 and cubital cell 2.

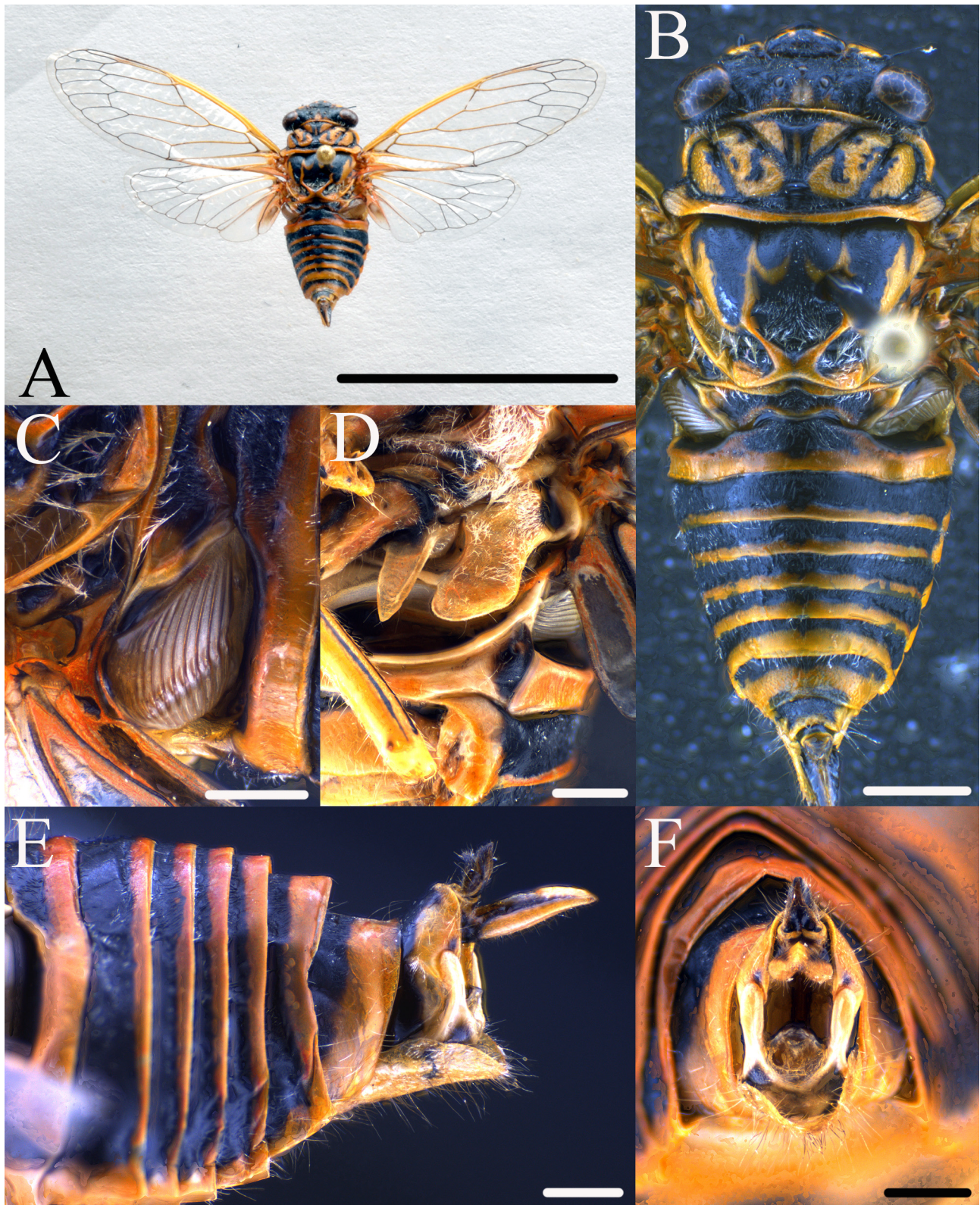


FIGURE 11. *Chilecicada pehuenchesensis* n. sp.: A, Holotype male habitus; B, holotype male dorsum; C, holotype male timbal; D, paratype male operculum; E, paratype male lateral view of genitalia; F, paratype male posterior view of genitalia. Scale bar: A, 2 cm; B, 2 mm; C–F, 1 mm.

Legs. Legs ground color, coxae, trochanters and femora striped with piceous, tibiae with piceous spot proximally, fore tibiae thickly striped with piceous anteriorly and piceous distally, middle tibiae with thinner fasciae and lesser amount of terminus piceous, hind tibiae lacking fascia and terminal mark, tibial spurs and tibial combs ground color with castaneous tips, tarsi piceous except ground color proximal pretarsus, pretarsal claws dark ground color with piceous tips. Fore femora with primary spine angled to femur, longest, secondary spine upright with curving proximal base, and small tertiary spine, primary and secondary spines piceous with ground color base, tertiary spine ground color. Proximal segments with short white pile, all segments radiating long silvery pile. Male meracanthus ground color with piceous spot on base, elongated, with parallel sides proximally becoming triangular distally, reaching beyond operculum posterior margin but not reaching posterior of sternite I.

Opercula. Male opercula ground color with piceous spot on lateral base, lateral margin straight, obtusely angled posterolateral margin, posterior margin straight, obtusely angled posteromedially, medial margin rounded, anteromedial margin obliquely angled to base, not reaching posteriorly to posterior of sternite I, well separated medially not reaching lateral margin of meracanthus, covered with short white pile, long silvery pile radiating from operculum margin.

Abdomen. Abdominal tergite 1 with ground color anterior margin, anterolateral corner and lateral margin, with transverse piceous fascia narrowing laterally and not reaching lateral margin, posterior margin castaneous, ground color in some paratypes, tergite 2 piceous anterodorsally with castaneous extending to medial timbal cavity margin, castaneous replaced with ground color in some paratypes, piceous within timbal cavity, remainder of tergite ground color, tergites 3–6 piceous bordered posteriorly and laterally with dark ground color and castaneous mark on dorsal midline posterior to piceous, ground color proportion increasing in posterior tergites until becoming more than half of tergite 8, tergites covered with sparse, short silvery pile, longer pile radiating from lateral tergite 8. Timbal cover a thickened rim, timbal completely exposed with 13 long ribs and 11 intercalary ribs. Male sternite I ground color, sternite II ground color with ground color anterolateral margin, small transverse piceous fascia on either side of midline and along anteromedial margin posterior to tympanal cavity with piceous auditory capsule, sternite III dark ground color with piceous anterior margin, short, transverse piceous fascia across midline just posterior to piceous fascia along anterior margin, piceous fascia fused in some paratypes, sternites IV–VII dark ground color. Epipleurites dark ground color. Sternite VIII ground color with piceous spot on either side of midline near anterior margin, dorsal margin with curve near base forming an obtuse angle, V-shaped when viewed from posterior. Sternites and epipleurites with short silvery pile and radiating long silvery pile, longer on medial sternites I–III and on sternites VII and VIII.

Genitalia. Ventral male pygofer and posterior margin ground color, piceous dorsally and dorsolaterally, piceous spot on ventral base posterior to distal terminus of basal pygofer lobe, and piceous anteroventral margin, distal shoulder undeveloped, smoothly curved, not reaching to distal anal tube, dorsal beak absent, pygofer with long silvery pile on dorsolateral posterior. Upper pygofer lobe absent, pygofer basal lobes elongated, adpressed to lateral pygofer, flattened, curving dorsally at slightly oblique angle, extending more than half pygofer length, distally with parallel sides rounded terminus, apex against lateral pygofer margin. Anal styles piceous with ground color margins, radiating short silvery pile, anal tube piceous with ground color anterior and posterior margins. Median uncus lobe with piceous base and dorsolateral fascia almost reaching terminus, dark ground color lateral margin distal to base and ground color dorsal ridge, uncus elongated, undivided, angled posteriorly from base, distal quarter of ventral surface very slightly angled toward sternite VIII, dorsal surface straight to distal curve when viewed from the side, widening laterally from base before tapering to rounded posterior margin, ventral surface ground color with piceous base, recurved, almost meeting along midline except for small hole near distal terminus for extension of aedeagus. Aedeagus castaneous with darker lateral fascia with a pair of small terminal spines extending from ochraceous lateral lobes, basal aedeagus tubular, dark castaneous.

Female is unknown.

Measurements (mm). $n=4\text{♂}$, mean (range). Length of body: 16.44 (15.85–17.15); length of fore wing: 18.76 (18.50–18.90); width of fore wing: 6.68 (6.30–7.00); length of head: 2.98 (2.90–3.05); width of head including eyes: 5.61 (5.50–5.75); width of pronotum including suprahumeral plates: 6.06 (6.00–6.15); width of mesonotum: 4.94 (4.80–5.15).

Song. ($n=1$ paratopotype from 15.CL.RM.CDM) Echemes lasting 0.53 s delivered at a rate of 1.11 s^{-1} . Male *C. pehuenchesensis* echemes are significantly longer than those of *C. oraria* (1-sample *t*-test, $P=5.23\times 10^{-3}$) and significantly shorter than those of *C. curacaviensis*, *C. partemporaria*, and *C. trifasciunca* (1-sample *t*-test,

$P=3.43 \times 10^{-7}$). The slow echeme rate is similar to that of *C. partemporaria* and *C. trifasciata* (1-sample *t*-test, $P=1.71 \times 10^{-1}$) and significantly faster than that of *C. curacaviensis* and *C. oraria* (1-sample *t*-test, $P=2.31 \times 10^{-2}$). The dominant frequency band of 10.17–11.29 kHz (mean dominant frequency=10.71 kHz) is at the upper end of variation for the genus.

Diagnosis. Another of the smaller of the *Chilecicada* species. This new species can be distinguished by having in combination a body length between 15.85–17.15 mm, fore wing length between 18.50–18.90 mm, fore wing basal cell about 4.20 times longer than broad, proximal fore wing basal cell ground color, no fascia separating the fore wing costa and radius + subcostal veins, an elongated meracanthus with a triangular terminus, ground color medial opercular margin, posteromedial operculum forming an obtuse angle, abdominal epipleurites lack a central spot, and an uncus that is ground color with a piceous base and dorsolateral fasciae not reaching distal terminus, the distal quarter curving to the terminus. It has a similar appearance to *C. trifasciunca* but is smaller and narrower.

Based on the single recording, the *C. pehuenchesensis* echeme duration may be longer than *C. oraria* and shorter than *C. curacaviensis*, *C. partemporaria*, *C. trifasciunca*, and probably *C. culenesensis*. The *C. pehuenchesensis* and *C. magna* songs may be indistinguishable. The high frequency may turn out to be diagnostic, and is approached only by certain songs of *C. partemporaria* and *C. trifasciunca*.

Distribution. The species is known from the type series collected in multiple localities in the Metropolitan Region of central Chile.

Chilecicada trifascia n. sp. Sanborn

Fig. 12 (morphology), Plate 1 (live habitus), Plate 5 (distribution)

Type material. Holotype. “14.CL.LI.TDF.430 / -34.9566, -70.4366 / 14. XII.2014 Piotr Lukasik” ♂ (UCMS). The code 14.CL.LI.TDF refers to Sierra del Vista area, -34.8258, -70.7418, O’Higgins Region, Chile. The GPS data on the specimen label are incorrect.

Etymology. The name is a combination of *tri-* (L. *tri-*, thrice) and *-fascia* (L. *fascia*, band, stripe) in reference to the three longitudinal piceous stripes on the postclypeus of this species.

Description. Ground color testaceous marked with piceous and castaneous with green costal margin, radius & subcostal vein and basal veins of fore wing, faded to ochraceous in holotype due to ethanol exposure. The green was diagnostic when fresh. Body covered with silvery pile.

Head. Head slightly wider than mesonotum, dorsal head piceous except ground color anterior margin of supra-antennal plate, anteromedial corner of vertex and posteriorly expanding mark on posterior half of epicranial suture, castaneous mark on posterior head posterior to posterior cranial depressions, short golden pile and longer white pile on dorsal head, long silvery pile posterior to eye. Ocelli rosaceous, eyes dark castaneous margined proximally with ground color. Gena piceous centrally and laterally with ground color anterior, medial and posteromedial margins along lorum, lorum piceous with ground color anterior and lateral margins, castaneous spot in middle, short white pile and radiating long white silvery pile on lorum and gena. Postclypeus ground color with piceous transverse grooves, central sulcus and longitudinal fascia connecting lateral transverse grooves, 12 transverse grooves, dorsum piceous, short silvery pile laterally, dorsally and within central sulcus. Anteclypeus piceous with ground color anterolateral margin and fascia on posterior carina near posterior margin, medial anterior margin castaneous, covered with short white pile. Mentum ground color with anteriorly expanding lateral castaneous mark, labium piceous, rostrum radiating long silvery pile, reaching to posterior of middle trochanters. Scape castaneous, remaining antennal segments piceous.

Thorax. Pronotum ground color, piceous fascia on either side of midline between anterior fissure and pronotal collar, anterior, lateral and posterior ambient fissures, all but medial paramedian fissure, and lateral fissures piceous, irregular longitudinal mark extending onto disk between paramedian and lateral fissures but not reaching lateral fissure, small piceous spots on disk just posterior to central paramedian fissure and anterior and posterior to middle of lateral fissure. Pronotal collar ground color with piceous expanding onto anterior half from ambient fissure, fascia from lateral ambient fissure to lateral margin, expanding posterolaterally to anterior margin of pronotal collar lateral angle. Pronotum with short white pile, denser in fissures. Mesonotum ground color, posterior to submedian sigilla and medial to lateral sigilla castaneous, submedian sigilla piceous, piceous fused anteromedially, lateral sigilla piceous, anchor-shaped piceous mark on central disk posterior to submedian sigilla, scutal depressions and

between anterior arms of cruciform elevation piceous fusing on midline with posterior of anchor-shaped mark, mark extends along anterior midline of cruciform elevation, anterior half of lateral cruciform elevation piceous, wing groove ground color with castaneous fasciae anteromedially and anterolaterally. Metanotum ground color with piceous anterior midline and anterolateral, mediolateral and posterolateral fasciae. Dorsum with sparse white pile, longer and denser between anterior arms of cruciform elevation, between anterior and posterior arms of cruciform elevation, and in wing groove. Ventral thoracic segments ground color except piceous on basisternum 2, medial anepisternum 2, central trochantin 2, meron 2, medial margin of katepimeron 2, all but margins of basisternum 3, all but margins of episternum 3 and trochantin 3. Ventral segments covered with dense short white pile.

Wings. Fore wings and hind wings hyaline with eight and six apical cells respectively. Venation ochraceous proximally, becoming piceous distally, costal margin and radius & subcostal vein ochraceous with castaneous spot on base, anal vein 2 + 3 piceous. Basal cell cloudy, about 3.86 times longer than broad. Pterostigma present. Basal membrane of fore wing orange mottled with red. Hind wing venation similarly colored except castaneous anal vein 2 and anal vein 3, castaneous spot on wing base. Basal plaga, anal cell 3 along anal vein 3 to terminal curve, anal cell 2 along anal veins 2 and 3 to terminal curve, proximal anal cell 1, proximal medial cell and proximal costal cell with orange mottled with red, infuscation in anal cell 3 and anal cell 2 bordering orange and red area.

Legs. Legs ground color, proximal coxae piceous, coxae, trochanters and femora striped with castaneous, fore tibiae with piceous spot proximally with castaneous fascia and distally castaneous, tibial spurs and tibial combs ground color proximally with castaneous tips, tarsi castaneous except piceous fore and middle metatarsus, dark ground color ventral and lateral mesotarsus with piceous distal piceous margin, and piceous distal pretarsus, pretarsal claws dark ground color base with piceous tips. Fore femora with primary spine almost upright, secondary spine triangular, upright, and small tertiary spine, primary and secondary spines ground color with piceous tips, tertiary spine ground color. Segments with short white pile and radiating long white pile. Male meracanthus ground color with piceous spot on base, base with parallel sides, extending as an elongated triangle reaching slightly beyond operculum posterior margin but not reaching anterior of sternite II.

Opercula. Male opercula ground color with piceous spot on lateral base and piceous medial margin, lateral margin angled slightly mediad, curved posterolateral margin, posterior margin straight but curled ventrally, rounded medial margin, anteromedial margin curving around meracanthus to base, posteriorly not reaching to anterior of sternite II, well separated medially reaching lateral meracanthus, covered with short white pile, long white pile radiating from operculum.

Abdomen. Abdominal tergite 1 with ground color anterior and posterior margins, transverse piceous fascia connecting to anterodorsal timbal cavity, tergite 2 with piceous interior timbal cavity, tergites 2–8 piceous anteriorly bordered posteriorly with castaneous and thin ground color posterior margins, lateral margin castaneous, tergites covered with short white pile, denser on lateral tergites, long white pile radiating from lateral tergite 7 and lateral and dorsal tergite 8. Timbal cover a thickened rim, timbal completely exposed with 13 long ribs and 11 intercalary ribs. Male sternite I ground color with piceous anterior margin, sternite II with small piceous spots on either side of midline near anterior margin, fusing on midline and extending to posterior margin, piceous spots on anterior margin in middle of tympanal cavity, auditory capsule piceous with greenish anterior margin, sternites III–VII castaneous with lighter posterior margin, sternite III with piceous anterior margin expanding into triangular spot on anterior midline. Epipleurites castaneous with piceous spot, spot becoming proportionately larger in posterior epipleurites. Sternite VIII castaneous, dorsal margin with slightly curved lateral margin and transverse posterior margin, V-shaped when viewed from posterior. Sternites and epipleurites with short white pile and radiating long white pile, longer on sternites VII and VIII.

Genitalia. Male pygofer piceous with ground color ventral margin, distal shoulder undeveloped, smoothly curved, not reaching to anal tube, dorsal beak absent, pygofer with short white pile dorsally and posteriorly. Upper pygofer lobe absent, pygofer basal lobes elongated, adpressed to lateral pygofer, flattened, curving dorsally at oblique angle, extending more than half pygofer length, widening to curved apex, apex convex laterally and concave medially forming a spoon-like terminus, apex against lateral pygofer margin. Anal styles piceous with ground color posterior margin, radiating short white pile, anal tube piceous with ground color posterior margin. Median uncus lobe piceous, elongated, undivided, angled posteriorly from base, distal half curved anteriorly, posterior surface curled medially, widening laterally from base before tapering to slightly notched posterior margin, small ridge on dorsal surface midline, ventral surfaces meeting medially except for slit on underside of curved portion for extension of aedeagus. Distal aedeagus not visible, basal aedeagus tubular, dark castaneous.

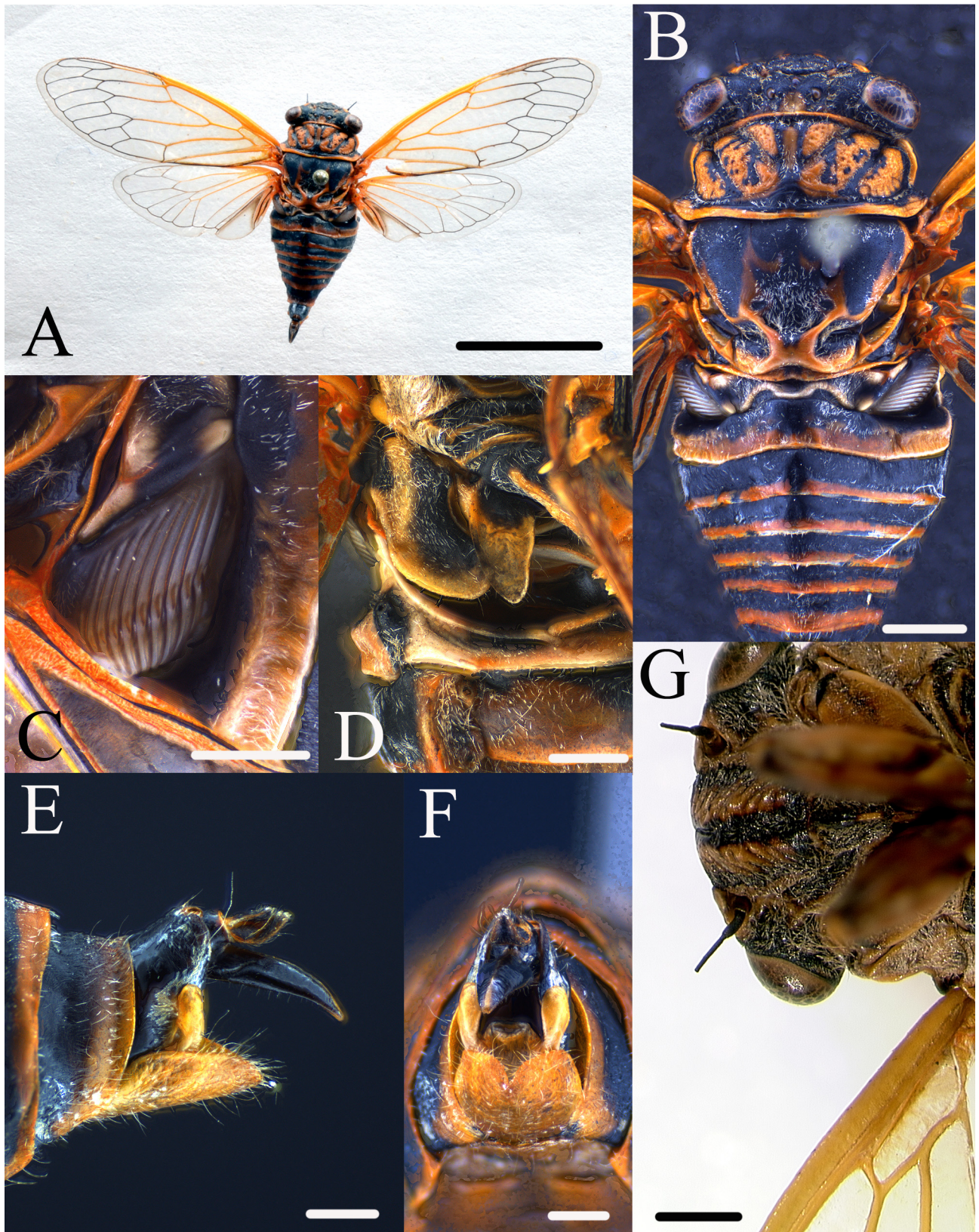


FIGURE 12. *Chilecicada trifascia* n. sp.: A, Holotype male habitus; B, holotype male dorsum; C, holotype male timbal; D, holotype male operculum; E, holotype male lateral view of genitalia; F, holotype male posterior view of genitalia; G, holotype male ventral view of postclypeus illustrating three longitudinal fascia. Scale bar: A, 2 cm; B, 2 mm; C–G, 1 mm.

Female is unknown.

Measurements (mm). n=1♂. Length of body: 17.05; length of fore wing: 18.00; width of fore wing: 6.35; length of head: 2.55; width of head including eyes: 5.55; width of pronotum including suprahumeral plates: 5.60; width of mesonotum: 5.35.

Song. Unknown.

Diagnosis. This new species can be distinguished from all known species of *Chilecicada* by the three piceous longitudinal fascia on the ventral postclypeus. In addition, this new species can be distinguished by having in combination a body length about 17.05 mm, fore wing length about 18.00 mm, fore wing basal cell about 3.86 times longer than broad, ground color proximal fore wing basal cell, no fascia separating the fore wing costa and radius + subcostal veins, an elongated meracanthus with parallel-sided base and triangular terminus, a piceous mark on the medial opercular margin, posteromedial operculum margin straight and curved ventrally, abdominal epipleurites with a central spot, and an uncus that is piceous with ground color tip with the distal third curving to the terminus.

Distribution. The species is known only from the holotype collected in the area of Sierra del Vista, O'Higgins Region, central Chile.

Chilecicada trifasciunca n. sp. Sanborn and Cole

Fig. 13 (morphology), Plate 1 (live habitus), Plate 3 (song), Plate 4 (wing flick), Plate 5 (distribution)

Chilecicada occidentis (in part) non Walker: 345.

Type material. Holotype. "14.CL.RM.CEY.517.2 / -33.78776, -70.181615 / 16.XII.2014 Piotr Lukasik" ♂ (UCMS). Paratypes. "14.CL.RM.CAV.512.1/ -33.8233, -70.1220 / 16.XII.2014 Piotr Lukasik" 1♂ (UCMS); "14.CL.RM.CAV.512.2/ -33.8233, -70.1220 / 16.XII.2014 Piotr Lukasik" 1♂ (UCMS); "14.CL.RM.CAV.511/ -33.8233, -70.1220 / 16.XII.2014 Piotr Lukasik" 1♀ (AFSC); "14.CL.RM.CAV.512.2/ -33.8233, -70.1220 / 16.XII.2014 Piotr Lukasik" 1♂ (AFSC); "14.CL.RM.CEY.515 / -33.7878, -70.1816 / 16.XII.2014 Piotr Lukasik" 1♂ (MNNC); "15.CL.ML.LMT.723 / -34.9691, -70.9461 / 19.XII.2015 C.V., K.N., P.L. // Seq." 1♂ (UCMS); "15.CL.RM.CDM.600 / -33.8192, -70.1322 / 5.XII.2015 Piotr Lukasik" 1♂ (UCMS); "CHILE: R. Colorado / 40 Km. E. Santiago / 2 Jan. 1983 / R. L. Brown" 2♂ (AFSC). The code 14.CL.RM.CEY refers to Cajón del Maipo, Camino Embalse el Yeso 2 (sitio alto), Región Metropolitana, Chile and is the type locality for the species. The code 14.CL.RM.CAV refers to the side of the road Camino Al Volcán, 3.5 km E from the village El Volcan, Cajón del Maipo, Metropolitan Region, Chile. The code 15.CL.RM.CDM refers to the side of the road Camino Al Volcán, 3.5 km E from the village of El Volcán, Cajón del Maipo, -33.8233, -70.1220, Metropolitan Region, Chile. The GPS data on the label are incorrect. Finally, the code 15.CL.ML.LMT refers to the view point near the village of La Montana, Maule Region, Chile collected by Claudio Veloso, Katherine Nazario and Piotr Łukasik.

Etymology. The name is a combination of *tri-* (L. *tri-*, thrice) and *-fasci-* (L. *fascia*, band, stripe) and *-unca* (L. *uncus*, hook) in reference to the three ground color stripes characteristic of the male uncus of this species.

Description. Ground color testaceous heavily marked with piceous, ochraceous costal margin, radius & subcostal vein and basal veins of fore wing, tinged with green in some paratypes. Costal margin, radius & subcostal vein and basal veins of fore wing probably faded from green to ochraceous due to ethanol exposure in type series. Body covered with silvery pile.

Head. Head slightly wider than mesonotum, dorsal head piceous except ground color supra-antennal plate anterior margin, mark extending along anteromedial and anterolateral margin in holotype and some paratypes, anteromedial corner of vertex and medioposterior head with mark extending laterally to posterior epicranial suture angled anterolaterally to anterior of piceous posterior cranial depressions forming spots in mark where it bends posterolaterally to terminate on posterior dorsolateral head, mark reduced so posterior cranial depressions not surrounded by ground color in some paratypes, short silvery pile on dorsal head, denser long silvery pile posterior to eye. Ocelli rosaceous, ochraceous in some paratypes, eyes dark castaneous margined proximally with ground color. Gena piceous centrally margined by ground color on medial, anterior and posteromedial margins along lorum, lorum piceous with ground color lateral margin and central fascia splitting piceous into two large spots, central fascia absent in some paratypes, short white pile and radiating long white pile on lorum and gena. Postclypeus ground color with piceous transverse grooves and central sulcus, mark in central sulcus extending to posterior margin in some paratypes, 12 transverse grooves, dorsum piceous posterior to transverse grooves, long silvery pile

radiating from postclypeus, short white pile along lateral margin. Anteclypeus with ground color carina, anterior, lateral and posterior margins, piceous laterally with piceous extending across anterior carina in some paratypes, covered with short white pile and radiating long white pile. Mentum ground color with lateral U-shaped castaneous fascia pointing distally, expanding to cover most of mentum in some paratypes, labium piceous, rostrum radiating long silvery pile, reaching to posterior coxae. Scape ground color, remaining antennal segments piceous.

Thorax. Pronotum ground color, piceous fasciae on either side of midline between anterior fissure and pronotal collar, expanding laterally into triangular mark along anterior and posterior fissures, fissures piceous, irregular longitudinal mark extending onto disk between paramedian and lateral fissures but not reaching lateral fissure, small piceous spots on disk just posterior to central paramedian fissure and anterior and posterior to middle of lateral fissure, spots expanded or reduced in some paratypes, mark extending from ambient fissure forming fascia on lateral disk, expanding along lateral fissure in some paratypes. Pronotal collar ground color with piceous margin along ambient fissure, anterior half of lateral angle of pronotal collar piceous, reduced to angled piceous fascia from lateral ambient fissure along anterior margin of pronotal collar lateral angle and may extend to posterolateral corner of lateral angle in some paratypes. Pronotum with short silvery pile in fissures in some paratypes. Mesonotum ground color, submedian sigilla piceous, piceous fused anteromedially, lateral sigilla piceous with slightly mottled posterior region anteriorly fusing with submedian sigilla, small longitudinal piceous mark lateral to lateral sigilla, larger and fusing with lateral sigilla in some paratypes, anchor-shaped piceous mark on central disk posterior to submedian sigilla, expanding posteriorly to include scutal depressions and area between anterior arms of cruciform elevation, mark extends as castaneous triangle on anterior midline of cruciform elevation margin, anterior half of lateral cruciform elevation and anterior side of base of posterior arm piceous, mark on anterior to posterior arm absent in some paratypes, wing groove ground color with piceous fasciae anteromedially and anterolaterally connected anteriorly by transverse fascia. Metanotum ground color with piceous spot on anterior midline, piceous anterolateral, mediolateral and posterolateral fasciae, smoothly curved concavity in dorsal posterior margin. Dorsum with silvery pile between anterior arms of cruciform elevation, between anterior and posterior arms of cruciform elevation, and long silvery pile in wing groove. Ventral thoracic segments ground color except piceous on basisternum 2, posterior katepisternum 2, medial anepisternum 2, lateral spot on trochantin 2, anterior margin and lateral meron 2, basisternum 3, transverse fascia on posterior episternum 3 and medial spot on trochantin 3, piceous reduced in some paratypes. Ventral segments covered with short white pile and radiating long white pile.

Wings. Fore wings and hind wings hyaline with eight and six apical cells respectively. Venation ochraceous, tinged with green in some paratypes, proximally, becoming piceous distally, piceous fascia along anterior basal cell, piceous fascia on anterior costal margin slightly longer than basal cell, costal margin and radius & subcostal vein separated by piceous fascia proximally or as far as node in some paratypes, cubitus posterior piceous, distal posterior of anal vein 2 + 3 piceous, entire anal vein 2 + 3 piceous in some paratypes, piceous spot on wing base. Basal cell about 3.88 times longer than broad. Pterostigma present. Basal membrane of fore wing gray mottled with orange with darker posterior margin. Hind wing venation similarly colored except piceous median vein and castaneous anal vein 2 and anal vein 3, piceous spot on wing base. Basal plaga, anal cell 3 along anal vein 3 to terminal curve, anal cell 2 along anal veins 2 and 3 to terminal curve, proximal anal cell 1, proximal medial cell and proximal costal cell with gray mottled with orange, infuscation in anal cell 3 and anal cell 2 bordering gray and orange area and base of cubital cell 1 and cubital cell 2.

Legs. Legs ground color, coxae, trochanters and femora striped with piceous, tibiae with piceous spot proximally, fore tibiae thickly striped with piceous anteriorly and piceous distally, middle tibiae with thinner fasciae and lesser amount of terminus piceous, hind tibiae with shorter distal fascia and lacking terminal mark, tibial spurs and tibial combs ground color with castaneous tips, tarsi piceous except ground color lateral mesotarsus and proximolateral pretarsus, pretarsal mark extending across dorsal surface in hind tarsi, pretarsal claws castaneous with piceous tips. Fore femora with primary spine angled to femur, secondary spine upright with curving proximal base, longest, and small tertiary spine, all spines piceous. Proximal segments with short white pile, all segments radiating long silvery pile. Male meracanthus ground color with piceous spot on base, elongated, with parallel sides proximally becoming triangular distally, reaching beyond operculum posterior margin but not reaching posterior of sternite I. Female meracanthus similarly shaped and colored, reaching to anterior of sternite III.

Opercula. Male opercula ground color with piceous spot on lateral base, lateral margin straight, obtusely angled posterolateral margin, posterior margin straight, obtusely angled posteromedially, medial margin rounded, anteromedial margin obliquely angled to base, not reaching to anterior of sternite II posteriorly, well separated

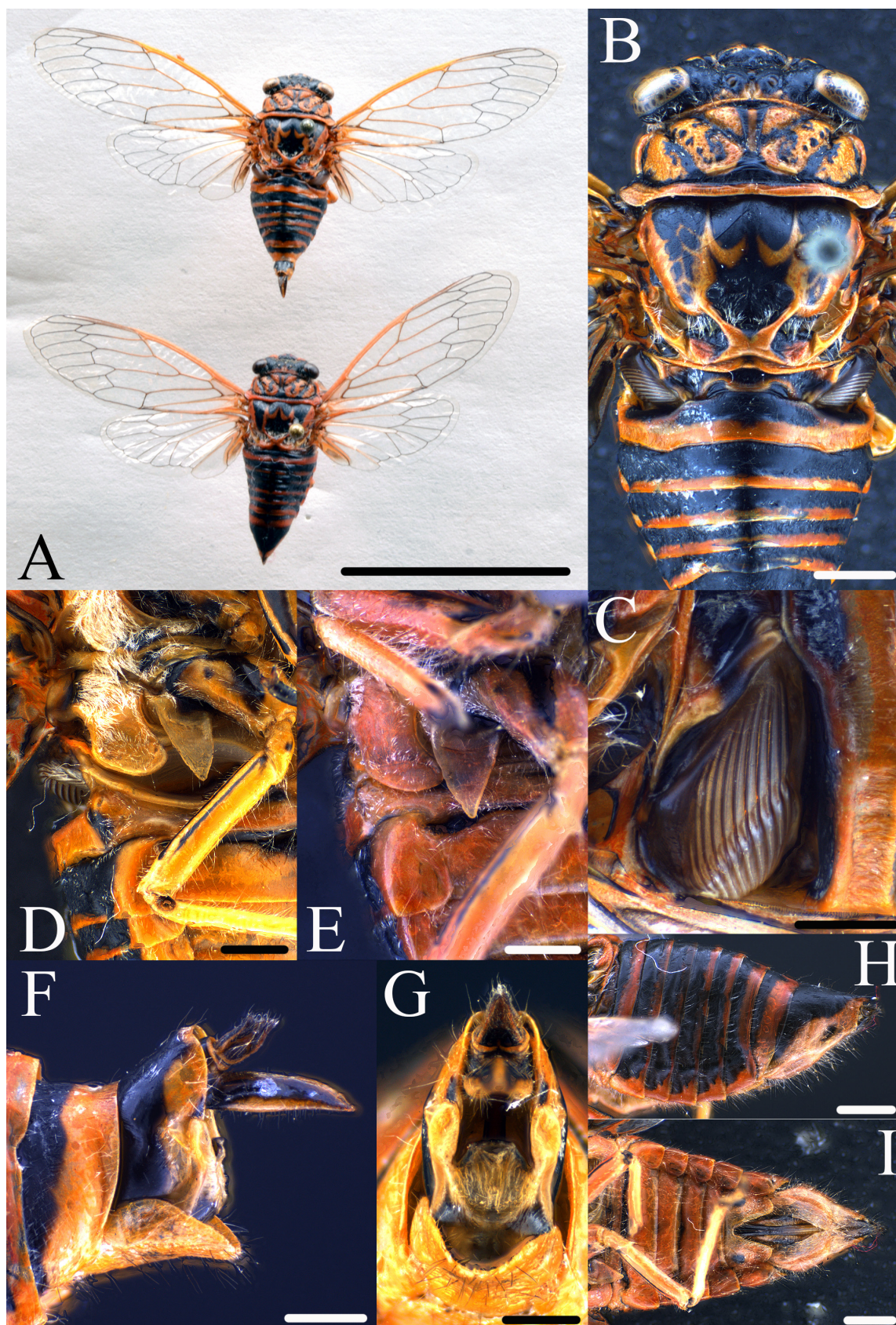


FIGURE 13. *Chilecicada trifasciunca* n. sp.: A, Holotype male and paratype female habitus; B, holotype male dorsum; C, holotype male timbal; D, holotype male operculum; E, paratype female operculum; F, paratype male lateral view of genitalia; G, paratype male posterior view of genitalia; H, paratype female lateral view of genitalia; I, paratype female ventral view of genitalia. Scale bar: A, 2 cm; B, 2 mm; C–G, 1 mm; H–I, 2 mm.

medially not reaching lateral base of meracanthus, covered with short white pile, long silvery pile radiating from operculum margin. Female operculum similarly colored and shaped but only reaching just past half the length of the meracanthus to the posterior of sternite II.

Abdomen. Abdominal tergite 1 with ground color anterior margin, anterolateral and posterolateral corners, with transverse piceous fascia narrowing laterally and dark ground color dorsoposterior margin, tergite 2 piceous anterodorsally between timbal cavity medial margins, piceous within timbal cavity and small spot on lateral margin, remainder of tergite ground color, tergites 3–8 piceous bordered posteriorly with dark ground color, ground color proportion increasing in posterior tergites until becoming half of tergite 8, tergites covered with sparse, short silvery pile, longer pile radiating from lateral tergites 5–8. Timbal cover a thickened rim, timbal completely exposed with 13 long ribs and 11 intercalary ribs. Male sternite I ground color, sternite II testaceous with ground color anterolateral margin, small transverse piceous fascia on either side of midline and along anteromedial margin posterior to tympanal cavity and small spot on piceous auditory capsule, sternite III dark ground color with piceous anterior margin, piceous expanding medially, sternites IV–VII dark ground color. Epipleurites dark ground color. Sternite VIII ground color, dorsal margin with curve near base forming a slightly obtuse angle, V-shaped when viewed from posterior. Sternites and epipleurites with short silvery pile and radiating long silvery pile, longer on medial sternites I and II and on sternites VII and VIII. Female sternite VII dark ground color with large anterolateral piceous spots, single, deep, V-shaped notch almost reaching anterior margin, posterolateral margin on either side of notch semicircular connecting to straight lateral margin. Female abdominal segment 9 ground color ventrally, piceous dorsally, dorsoanteriorly, dorsolaterally, on stigma, dorsal beak piceous, covered with short silvery pile and radiating long silvery pile ventrally. Dorsal beak not as long as castaneous margined with ground color anal styles. Posterior margin of abdominal segment 9 straight.

Genitalia. Male pygofer ground color ventral and posterior margins, ground color dorsal midline in some paratypes, piceous dorsally and dorsolaterally, piceous spot on ventral base posterior to distal terminus of basal pygofer lobe, and piceous anteroventral margin, distal shoulder undeveloped, smoothly curved, not reaching to distal anal tube, dorsal beak absent, pygofer with short silvery pile on dorsolateral posterior. Upper pygofer lobe absent, pygofer basal lobes elongated, adpressed to lateral pygofer, flattened, curving dorsally at slightly oblique angle, extending more than half pygofer length, expanding distal to bend to spoon-shaped terminus, apex against lateral pygofer margin. Anal styles piceous with ground color margins, radiating short silvery pile, anal tube piceous with ground color posterior margin. Median uncus lobe with piceous base, castaneous dorsolateral fascia almost reaching terminus, ground color lateral margin distal to base and ground color dorsal ridge, uncus elongated, undivided, angled posteriorly from base, distal quarter of ventral surface angled toward sternite VIII, dorsal surface sinuate when viewed from the side, widening laterally from base before tapering to pointed posterior margin, ventral surface slightly recurved, almost meeting along midline except for small hole near distal terminus for extension of aedeagus, radiating long golden pile. Aedeagus castaneous with darker lateral fascia with a pair of small terminal spines extending from ochraceous lateral lobes, basal aedeagus tubular, dark castaneous.

Female gonocoxite IX piceous with ground color ventral margin, gonapophysis IX castaneous, gonapophysis X piceous. Ovipositor sheath reaching slightly beyond dorsal beak to middle of anal styles. Long golden pile radiating from ovipositor sheath.

Measurements (mm). $n=8\sigma$, 2ϕ , mean (range). Length of body: σ 18.94 (18.05–19.60), ϕ 17.80 (17.20–18.40); length of fore wing: σ 20.51 (20.00–20.85), ϕ 19.93 (19.55–20.30); width of fore wing: σ 7.33 (6.70–7.60), ϕ 7.53 (7.50–7.55); length of head: σ 3.12 (3.00–3.20), ϕ 2.98 (2.95–3.00); width of head including eyes: σ 6.16 (5.90–6.50), ϕ 5.88 (5.80–5.95); width of pronotum including suprahumeral plates: σ 7.04 (6.50–7.50), ϕ 7.18 (7.15–7.20); width of mesonotum: σ 5.79 (5.50–6.00), ϕ 5.68 (5.60–5.75).

Song. ($n=2$ 1 paratype from Maule Region, La Montana and 1 paratype from Metropolitana Region, Camino Al Volcan) Echeme of 0.57 ± 0.05 s duration at a rate of 1.12 ± 0.44 s⁻¹. The echemes are significantly longer than those of *C. oraria* and shorter than those of *C. partemporaria* (MANOVA, $P=1.12\times10^{-3}$). The echeme rate tends to be slower than *C. curacaviensis* but the difference is not significant (MANOVA, $P=9.00\times10^{-1}$). The dominant frequency band lies between 8.96 and 11.76 kHz (mean dominant frequency= 10.59 ± 0.37 kHz).

Diagnosis. This new species can be distinguished by having in combination a body length between 17.20–19.60 mm, fore wing length between 19.55–20.85 mm, fore wing basal cell about 3.88 times longer than broad, a piceous mark along the proximal fore wing basal cell, a piceous fascia separating the fore wing costa and radius + subcostal veins that can extend partially or completely to node, an elongated meracanthus with parallel-sided base

and triangular terminus, medial opercular margin ground color, posteromedial operculum forming an obtuse angle, abdominal epipleurites lack a central spot, and an uncus that has a piceous base, castaneous dorsolateral fascia not reaching the terminus and ground color lateral and dorsal fasciae with the distal quarter curving to the terminus whose dorsal surface is sinuate when viewed from the side.

C. trifasciunca sings with the common slow rate ($\sim 1\text{ s}^{-1}$) medium duration echeme ($\sim 0.5\text{ s}$) song type similar to *C. culenesensis*, *C. curacaviensis*, *C. magna*, *C. oraria*, *C. partemporaria*, and *C. pehuenchesensis*. The echemes are of an intermediate duration, longer than *C. magna*, *C. oraria*, *C. pehuenchesensis*, shorter than *C. partemporaria*, and perhaps indistinguishable from *C. culenesensis*. The slow echeme rate may separate *C. trifasciunca* from the faster rates in *C. oraria*, *C. curacaviensis*, and perhaps *C. culenesensis*.

Distribution. The species is known from the type series collected in multiple localities in the Maule and Metropolitana Regions of central Chile.

Chilecicada viridicitata n. sp. Sanborn and Cole

Fig. 14 (morphology), Plate 1 (live habitus), Plate 3 (song), Plate 5 (distribution)

Type material. Holotype. “CHILE. Región O’Higgins: / Colcahgüa Pr.; Comuna de San / Fernando; Camino a Termas del / Flaco, I-45, 37 km east of San / Fernando, / 34.77050S, 70.67348W, 784 m. / 22-XII-2018. JA Cole, FA / Calderon, C Veloso leg. S18-15 // JCR181222_19 // JAC000003274” ♂ (LACM). Paratypes. “CHILE. Región O’Higgins: Provincia / de Colcahgüa; Comuna de San / Fernando; Parrot Colony along / Termas del Flaco road, 26 km NW of / Termas del Flaco at La Rufina, / 34.79815S, 70.60658W, 945 m. / 24-XII-2018. JA Cole, FA Calderon / C Veloso leg. S18-18 // 181224-08” 1♂ (MNNC); “CHILE. Región O’Higgins: Provincia / de Colcahgüa; Comuna de San / Fernando; Parrot Colony along / Termas del Flaco roas, 26 km NW of / Termas del Flaco at La Rufina, / 34.79815S, 70.60658W, 945 m. / 24-XII-2018. JA Cole, FA Calderon / C Veloso leg. S18-18 // 181224-10” 1♂ (AFSC); “CHILE. Región O’Higgins: / Colcahgüa Pr.; Comuna de San / Fernando, Parrot Colony along / Termas del Flaco Road, 26 km / northwest of Termas del Flaco at / La Rufina, / 34.79815S, 70.60658W, 945 m. / 24-XII-2018. JA Cole, FA / Calderon, C Veloso leg. S18-18 // JAC000003275” 1♀ (LACM) “14.CL.LI.CLT.469 / -34.7412, -70.7566 / 15.XII.2014 Piotr Lukasik” 1♂ (UCMS). The code 14.CL.LI.CLT refers to the side of the road towards Termas del Flaco, O’Higgins Region, Chile.

Etymology. The name is a combination of *viridi-* (L. *viridis*, green) in reference to the bright green basal fore wing venation of live specimens and *-citata* (L. *citatus*, quick, rapid, speedy) in reference to the rapidly produced echemes in the song of the species.

Description. Ground color testaceous marked with castaneous and piceous, costal margin, radius & subcostal vein and basal veins of fore wing ochraceous due to ethanol exposure, vibrant green in live specimens. Pronotum, mesonotum and metanotum with greenish tinge in one paratype and in live specimens. Body covered with silvery pile.

Head. Head slightly wider than mesonotum, dorsal head piceous except ground color supra-antennal plate anterior margin, reduced to lateral half or extending along medial margin in some paratypes, anteromedial corner of vertex and medioposterior head with mark extending lateral to posterior cranial depressions, mark extending anteriorly into posterior epicranial suture, mark extends anteriorly to surround piceous posterior cranial depression forming a spot on either side of ground color mark in some paratypes, short silvery pile on dorsal head, denser long silvery pile posterior to eye. Ocelli rosaceous, eyes dark castaneous with lighter margin. Gena piceous except ground color medial and anterior margins, lorum piceous with ground color anteromedial and posteromedial margins, short silvery pile and radiating long silvery pile on lorum and gena. Postclypeus ground color with piceous transverse grooves and central sulcus, piceous expanding along posterior margin in some paratypes, 12 transverse grooves, dorsum piceous, long silvery pile radiating from postclypeus, short silvery pile along lateral margin. Anteclypeus piceous with ground color carina, anterior and medial posterior margins, transverse piceous band across anterior carina, expanded with additional mark across posterior carina in some paratypes, covered with short white pile and radiating long silvery pile. Mentum castaneous, labium castaneous at base becoming piceous, rostrum radiating long silvery pile, reaching to posterior of middle trochanters. Scape ground color, remaining antennal segments piceous.

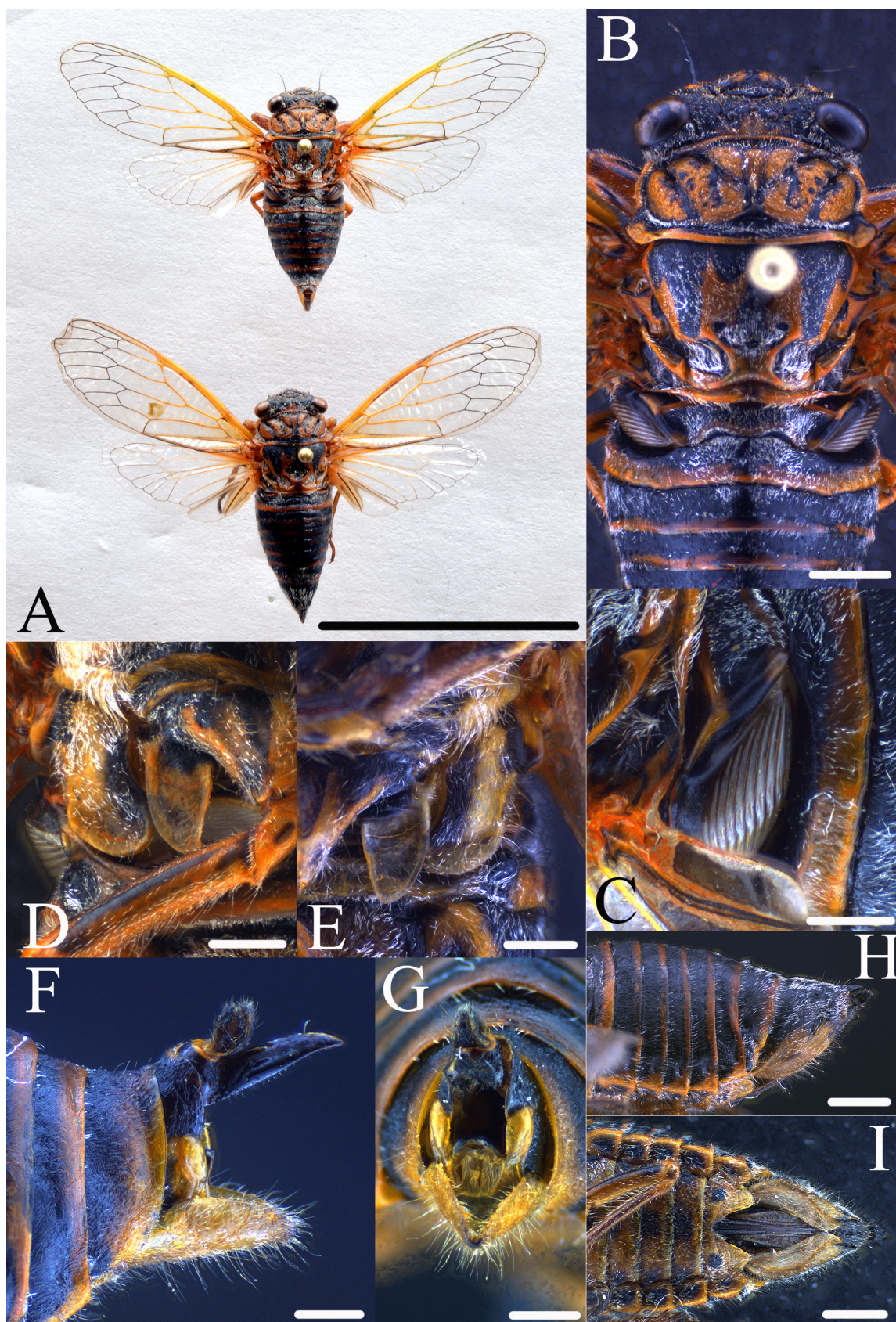


FIGURE 14. *Chilecicada viridicitata* n. sp.: A, Holotype male and paratype female habitus; B, holotype male dorsum; C, holotype male timbal; D, holotype male operculum; E, paratype female operculum; F, paratype male lateral view of genitalia; G, paratype male posterior view of genitalia; H, paratype female lateral view of genitalia; I, paratype female ventral view of genitalia. Scale bar: A, 2 cm; B, 2 mm; C–G, 1 mm; H–I, 2 mm.

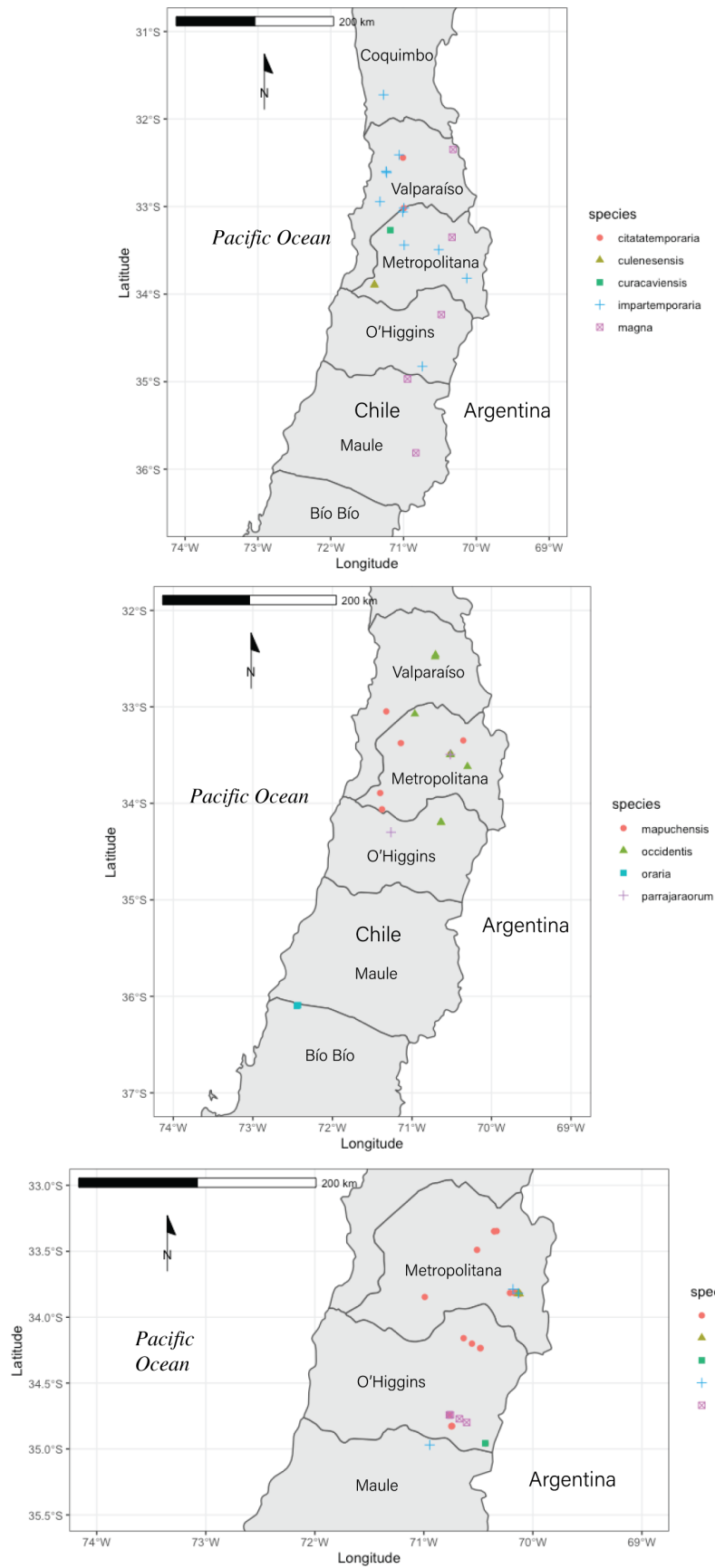


PLATE 5. Distribution of *Chilecicada* from records reported in this work.

Thorax. Pronotum ground color, piceous fascia on either side of posterior midline, along entire midline and fusing medially in anterior fissure in paratypes, fusing in posterior ambient fissure, fissures piceous, posterior paramedian and anterior lateral fissures ground color in some paratypes, mark in lateral fissure expanding onto lateral disk and medial margin of lateral pronotal collar, reduced in some paratypes, irregular longitudinal mark extending onto disk between paramedian and lateral fissures but not reaching lateral fissure, small piceous spots on disk anterior and posterior to middle of lateral fissure, additional spots just posterior to central paramedian fissure, spots expanded or reduced in some paratypes. Pronotal collar ground color with piceous anterior margin continuous with ambient fissure mark, transverse piceous mark from lateral ambient fissure to anterolateral margin of pronotal collar lateral angle, mark reduced in one paratype. Pronotum with short silvery pile, denser in fissures. Mesonotum ground color, submedian sigilla piceous, piceous fused anteromedially, lateral sigilla piceous mark extending laterally from anterior sigilla not reaching lateral margin, reduced to spot in some paratypes, central fascia expanding posteriorly, forming anchor-shaped mark in some paratypes, piceous between anterior arms of cruciform elevation, piceous scutal depressions, fusing to piceous mark between anterior arms of cruciform elevation in some paratypes, mark extends along anterior midline of cruciform elevation, mark extending over anterior of cruciform elevation midline in some paratypes, cruciform elevation castaneous in some paratypes, posterior of anterior arm and anterior half of lateral cruciform elevation piceous, wing groove ground color with piceous fasciae anteromedially and anterolaterally connected by transverse fascia anteriorly. Metanotum ground color with castaneous midline, piceous laterally with ground color margin. Dorsum covered with silvery pile, denser between anterior arms of cruciform elevation, between anterior and posterior arms of cruciform elevation, and long silvery pile in wing groove. Ventral thoracic segments ground color except piceous on basisternum 2, posterior katapisternum 2, lateral trochantin 2, meron 2, basisternum 3, transverse fascia on posterior episternum 3 and medial margin of trochantin 3, piceous expanded in some paratypes. Ventral segments covered with short silvery pile and radiating long silvery pile.

Wings. Fore wings and hind wings hyaline with eight and six apical cells respectively, several paratype hind wings with additional crossveins in apical cells. Venation greenish proximally, becoming piceous distally, small piceous spot on base extending along anteroproximal basal cell, anal vein 2 + 3 piceous. Basal cell about 3.14 times longer than broad. Pterostigma reduced but present. Basal membrane of fore wing orange mottled with red. Hind wing venation similarly colored except green extending into vein separating apical cells and castaneous anal veins 2 and 3, piceous spot on wing base. Basal plaga, anal cell 3 along anal vein 3 to terminal curve, anal cell 2 along anal veins 2 and 3 to terminal curve, proximal anal cell 1, posterior to cubitus posterior, proximal medial, radial and costal cells with orange mottled with red, infuscation in anal cell 3 and anal cell 2 bordering orange and red area.

Legs. Legs ground color, tinged with green in some paratypes, coxae, trochanters and femora striped with piceous, femora striped additionally with castaneous, stripes reduced in some paratypes, tibiae with piceous spot proximally, castaneous anterior side, mark not reaching proximal terminus in hind tibiae, tibial spurs and tibial combs ground color with castaneous tips, tarsi castaneous with piceous distal segmental margins except ground color proximal mesotarsus and metatarsus of hind tarsi, pretarsal claws dark ground color with piceous tips. Fore femora with primary spine almost perpendicular to femur, secondary spine upright, longest, with broad base, and very small tertiary spine, spines ground color, primary and secondary spines with piceous tips. Proximal segments with short silvery pile, all segments radiating long silvery pile. Male meracanthus ground color with piceous spot on base, an elongated triangle with lateral margin distally curving mediad, reaching slightly beyond operculum posterior margin not reaching posterior of tympanal cavity. Female meracanthus similarly shaped and colored, reaching to anterior of sternite III.

Opercula. Male opercula ground color with piceous spot on lateral base and piceous along medial margin, piceous expanded in some paratypes, lateral margin straight, obtusely angled posterolateral margin, posterior margin straight, smoothly curved posteromedial margin rounded, anteromedial margin curved to base, not reaching to anterior of sternite II posteriorly, well separated medially barely reaching lateral meracanthus, covered with short silvery pile, long silvery pile radiating from operculum margin. Female operculum similarly colored and shaped reaching to anterior of sternite II.

Abdomen. Abdominal tergite 1 piceous with ground color anterior and posterior margins, tergite 2 piceous anterodorsally between timbal cavities, piceous within timbal cavity, castaneous dorsally with ground color posterolateral margin, tergites 3–8 piceous anteriorly bordered posteriorly with castaneous dorsally with ground color lateral posterior margins, amount of castaneous increasing and ground color decreasing in posterior tergites, tergites covered with short silvery pile, longer pile radiating from lateral tergites 4–8, missing in some paratypes.

Timbal cover a thickened rim, timbal completely exposed with 13 long ribs and 11 intercalary ribs. Male sternite I ground color, sternite II testaceous with ground color anterior margin, small transverse piceous fascia on either side of midline near anterior margin angled posteromedially and fusing on posterior margin, second transverse fascia on anterior margin in middle of tympanal cavity, auditory capsule piceous, sternites III–VII testaceous, central castaneous mark in some paratypes, sternite III with piceous fascia on anterior margin expanding into spot on midline and small piceous spot on anterolateral corner. Epipleurites testaceous with central castaneous spot. Sternite VIII testaceous with castaneous anterior margin, dorsal margin with curve near base forming an obtuse angle, V-shaped when viewed from posterior. Sternites and epipleurites with short silvery pile and radiating long silvery pile, denser on posterior sternites. Female sternite VII testaceous with large anterolateral piceous spots, single, deep, large V-shaped notch reaching posterior margin of sternite VI, posterolateral margin on either side of notch curved anterolaterad to straight lateral margin. Female abdominal segment 9 ground color ventrally, piceous dorsally and laterally castaneous posteriorly, dorsal beak piceous, covered with short silvery pile and radiating long silvery pile ventrally. Dorsal beak not as long as piceous anal styles. Posterior margin of abdominal segment 9 straight.

Genitalia. Male pygofer piceous except ground color ventrally and ground color dorsoposterior margin, distal shoulder undeveloped, smoothly curved, not reaching to anal tube, dorsal beak absent, pygofer with short silvery pile. Upper pygofer lobe absent, pygofer basal lobes elongated, adpressed to lateral pygofer, flattened, angled dorsally at oblique angle, extending more than half pygofer length, widening distal to angle before tapering to leaf-like apex, apex against lateral pygofer margin. Anal styles piceous margined with ground color, radiating short silvery pile, anal tube piceous with ground color anterior and posterior margins. Median uncus lobe piceous, elongated, undivided, angled posteriorly from base, distal third curving toward sternite VIII, widening laterally from base before tapering to transverse posterior margin, small ground color ridge on dorsal surface midline, ventral surface piceous, ventral surfaces recurved, almost meeting along midline expanding to small hole near distal terminus for extension of aedeagus, radiating silvery pile. Aedeagus castaneous, basal aedeagus tubular, dark castaneous, terminus not visible in type series.

Female gonocoxite IX castaneous with ground color ventral margin, gonapophysis IX castaneous, gonapophysis X piceous. Ovipositor sheath not reaching to tip of dorsal beak. Long golden pile radiating from ovipositor sheath.

Measurements (mm). $n=4\text{♂}$, 1♀ , mean (range). Length of body: ♂ 17.11 (16.70–17.55), ♀ 17.65; length of fore wing: ♂ 17.85 (17.15–18.40), ♀ 18.15; width of fore wing: ♂ 6.66 (6.45–6.85), ♀ 6.60; length of head: ♂ 2.86 (2.7–2.95), ♀ 2.70; width of head including eyes: ♂ 5.59 (5.35–5.80), ♀ 5.65; width of pronotum including suprahumeral plates: ♂ 5.93 (5.60–6.30), ♀ 6.05; width of mesonotum: ♂ 5.21 (4.90–5.50), ♀ 5.05.

Song. ($n=7$: holotype, 2 paratypes, and 4 uncaptured males from Maule Region, Colchagua Pr.) A unique combination of a brisk $9.50\pm0.37\text{ s}^{-1}$ repetition rate of short echemes of duration $0.07\pm0.00\text{ s}$. The dominant frequency band is 9.87–12.03 kHz (mean dominant frequency= $10.92\pm0.19\text{ kHz}$).

Diagnosis. Another of the smaller of the *Chilecicada* species. This new species can be distinguished by having in combination a body length between 16.70–17.65 mm, fore wing length between 17.15–18.40 mm, fore wing basal cell about 3.14 times longer than broad, ground color proximal fore wing basal cell, no fascia separating the fore wing costa and radius + subcostal veins, a triangular meracanthus, a piceous mark on the medial opercular margin, semicircular posteromedial operculum, abdominal epipleurites with a central spot, and a narrow uncus that is piceous with ground color dorsal fascia with the distal third bent. The rapid echeme song resembles the songs of *C. citatetemporaria* and *C. occidentis* but is half the rate of those species.

Distribution. The species is known from the type series collected in multiple localities in the Metropolitana and O'Higgins Regions of central Chile.

Morphological key to the species of *Chilecicada*

- | | | |
|---|---|------------------------------|
| 1 | Fore wing basal cell length greater than 3.95 times width | 2 |
| - | Fore wing basal cell length less than 3.95 times width | 4 |
| 2 | Fore wing basal cell length about 4.00 times width, piceous fascia separating fore wing costa and radius & subcostal veins, abdominal epipleurites with central spot | <i>C. mapuchensis</i> n. sp. |
| - | Fore wing basal cell length greater than 4.10 times width, no piceous fascia separating fore wing costa and radius & subcostal veins, abdominal epipleurites without central spot | 3 |
| 3 | Fore wing basal cell length about 4.50 times width, fore wing length greater than 19.8 mm, body length greater than 17.5 mm, proximal basal cell lacking piceous mark, meracanthus triangular | <i>C. oraria</i> n. sp. |

-	Fore wing basal cell length about 4.20 times width, fore wing length less than 19 mm, body length less than 17.5 mm, proximal basal cell with piceous mark, meracanthus elongated with parallel sided base and triangular terminus	 <i>C. pehuenchesensis</i> n. sp.
4	Postclypeus with piceous longitudinal fasciae in central sulcus and along lateral margins	 <i>C. trifascia</i> n. sp.
-	Postclypeus with piceous longitudinal fascia only in central sulcus	 5
5	Proximal basal cell without piceous mark	 6
-	Proximal basal cell with piceous mark	 8
6	Fore wing basal cell length about 3.50 times width, fore wing length greater than 20.5 mm, piceous mark along medial opercular margin	 <i>C. curacaviensis</i> n. sp.
-	Fore wing basal cell length less than 3.20 times width, fore wing length less than 20.5 mm, medial opercular margin lacking piceous mark	 7
7	Fore wing basal cell length about 2.78 times width, piceous fascia separating fore wing costa and radius & subcostal veins, meracanthus elongated with parallel sided base and triangular terminus, posteromedial opercular margin forming an obtuse angle	 <i>C. occidentis</i>
-	Fore wing basal cell length about 3.14 times width, no piceous fascia separating fore wing costa and radius & subcostal veins, meracanthus triangular, posteromedial opercular margin straight	 <i>C. viridicitata</i> n. sp.
8	Body length less than 17 mm	 9
-	Body length greater than 17 mm	 10
9	Fore wing basal cell length about 3.67 times width, posteromedial opercular margin straight, abdominal epipleurites with central spot	 <i>C. citatatorporaria</i> n. sp.
-	Fore wing basal cell length about 3.00 times width, posteromedial opercular margin forming an obtuse angle, abdominal epipleurites lacking central spot	 <i>C. impartoraria</i> n. sp.
10	Abdominal epipleurites without central spot	 11
-	Abdominal epipleurites with central spot	 12
11	Fore wing basal cell length about 3.50 times width, medial opercular margin barely medial to anteromedial margin	 <i>C. partoraria</i> n. sp.,
-	Fore wing basal cell length about 3.88 times width, medial opercular margin extended to meracanthus	 <i>C. trifasciunca</i> n. sp.,
12	Fore wing basal cell length about 3.75 times width, medial opercular margin ground color, meracanthus elongated with parallel sided base and triangular terminus	 <i>C. magna</i> n. sp.
-	Fore wing basal cell length less than 3.75 times width, medial opercular margin piceous, meracanthus triangular	 13
13	Fore wing basal cell length about 3.70 times width, fore wing length 20.75 mm or greater, terminus of male uncus bent, posteromedial opercular margin forming an obtuse angle	 <i>C. parrajaraorum</i> n. sp.
-	Fore wing basal cell length about 3.50 times width, fore wing length 20.75 mm or shorter, terminus of male uncus straight, posteromedial opercular margin straight	 <i>C. culenesensis</i> n. sp.

Bioacoustics. The fine structure of timbalization is remarkably conserved: pulse rates (MANOVA, $P=7.44 \times 10^{-1}$) and syllable rates (MANOVA, $P=6.61 \times 10^{-2}$) were not significantly different among species (character definitions illustrated in Plate 2A). Rather, higher order temporal characters varied among *Chilecicada* species. Multivariate analysis of echeme duration (MANOVA, $P=5.89 \times 10^{-8}$) and echeme rate (MANOVA, $P=2.2 \times 10^{-16}$) produced clusters of four song types (Fig. 15): type 1) medium echeme duration (0.25–1.0 s) and slow echeme rate (0.5–1.7 s⁻¹) in *C. culenesensis*, *C. curacaviensis*, *C. magna*, *C. oraria*, *C. partoraria*, *C. pehuenchesensis*, and *C. trifasciunca*; type 2) long echeme duration (>1 s) and slow echeme rate (<0.7 s⁻¹) in *C. impartoraria*; type 3) short echeme duration (0.07–0.08 s) and medium echeme rate (8–10 s⁻¹) in *C. viridicitata*; and type 4) short echeme duration (<0.05 s) and fast echeme rate (>16 s⁻¹) in *C. citatatorporaria* and *C. occidentis*. Although mean dominant frequency distributions of most species were variable, some species were divided among high (*C. impartoraria*, *C. citatatorporaria*, and *C. viridicitata*) and low (*C. oraria* and *C. partoraria*) frequency distributions (MANOVA, $P=7.78 \times 10^{-8}$; Fig. 16).

Pulse rate (MANOVA, $P=7.15 \times 10^{-1}$), syllable rate (MANOVA, $P=7.39 \times 10^{-1}$), and mean dominant frequency (MANOVA, $P=3.09 \times 10^{-1}$) showed no relationship with temperature. Significant temperature by species interactions were found initially for echeme duration (MANOVA, $P=6.17 \times 10^{-5}$). When partitioned by species the *C. impartoraria* echeme duration showed a positive relationship with temperature (GLM, $P=4.28 \times 10^{-2}$, $R^2=32.30\%$; Fig. 17). Removal of *C. impartoraria* rendered the temperature by species interaction nonsignificant for the remainder of *Chilecicada* (MANOVA, $P=3.21 \times 10^{-1}$).

Male *Chilecicada* relied on crypsis and remained stationary for long periods, rarely flying even when disturbed; *C. citatatorporaria* and *C. impartoraria* did not attempt to fly even when captured, and *C. occidentis* occasionally flew short distances when disturbed but males also dropped to the ground. *Chilecicada* males sang in aggregations from mid morning (1043 h) to late afternoon (1758 h) and called repeatedly from the same perches. Shortly after an echeme was initiated a male would often lift the abdomen, which was correlated with an increase

in echeme amplitude (Plate 2C). Perch height was different among sympatric *C. occidentis* and *C. partemporaria* at Peñaolén: the former perched on low bushes and forbs, while the latter tended to perch 2m or above on acacia and other trees. In addition to timbalization, wing flicks (Plate 4) were observed in six *Chilecicada* species: *C. citatemporaria* (n=1), *C. impartemporaria* (n=3), *C. magna* (n=1), *C. partemporaria* (n=3), *C. pehuenchesensis* (n=1), and *C. trifasciunca* (n=1). Males inserted wing flicks within the interecheme intervals of their songs. Females were observed neither within the vicinity of wing flicking males nor to flick their own wings.

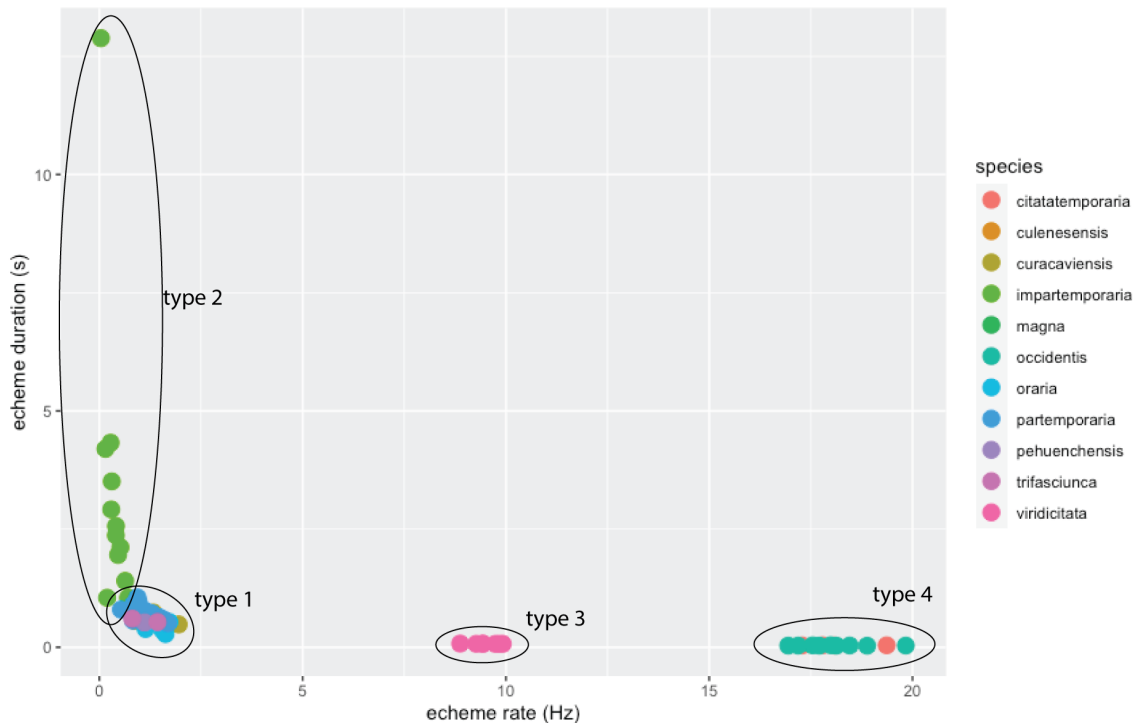


FIGURE 15. *Chilecicada* song types numbered on a scatterplot of echeme duration vs. echeme rate: type 1) medium duration, slow rate; type 2) long duration, slow rate; type 3) short duration, medium rate; type 4) short duration, fast rate.

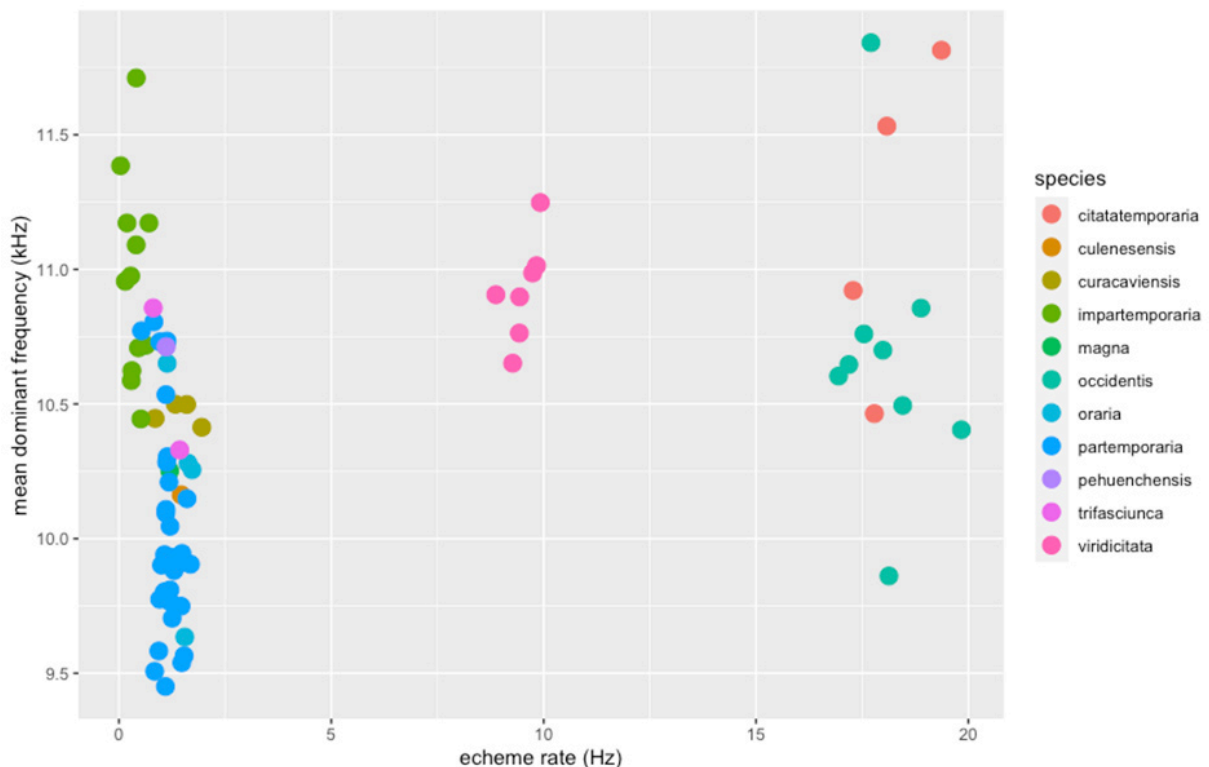


FIGURE 16. *Chilecicada* songs resolved on a scatterplot of mean dominant frequency vs. echeme rate.

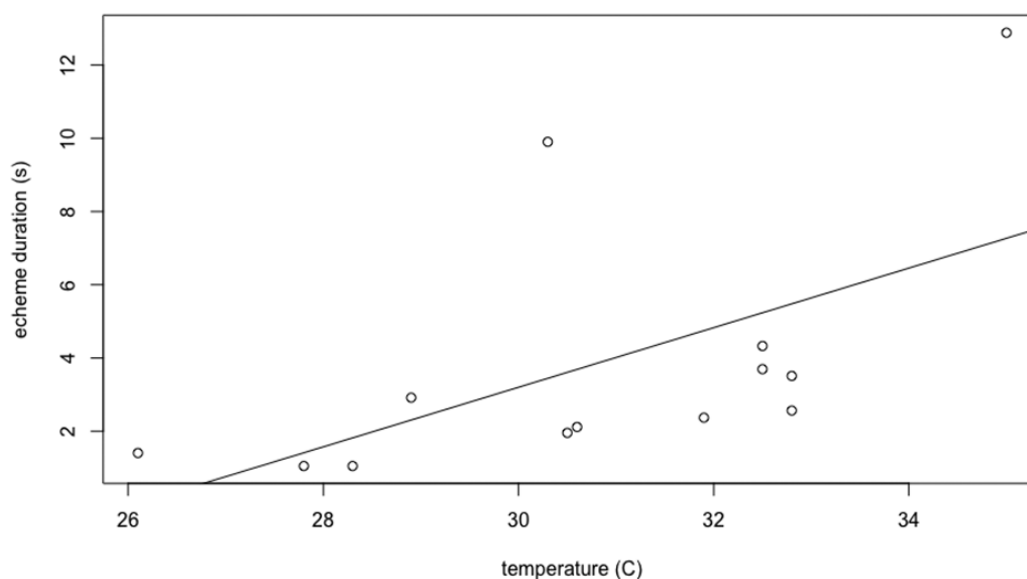


FIGURE 17. Positive relationship between echeme duration and ambient temperature in *Chilecicada impartemporaria*.

Molecular phylogenetics. Molecular voucher accessions and collecting data are found in Supp. Table 1. Four independent runs resulted in identical topologies (Fig. 18), and MCMC chains converged given the average standard deviation of split frequencies of 0.005146, which falls below the minimum threshold of 0.02. A monophyletic *Chilecicada* received 1.0 posterior probability. *C. viridicitata* is monophyletic and sister to all other *Chilecicada*. Two exemplars that fall into other clades make *C. impartemporaria* polyphyletic. *C. curacaviensis* form a grade leading up to a clade of mixed taxa. All but one *C. occidentis* exemplar form a clade. Two clades of *C. partemporaria* correspond to a geographic break: the totopotype from Santiago belongs to a clade of Santiago and Cordillera Province exemplars, while the other contains exemplars from the south in Cachapoal and Colchagüa provinces (Fig. 19). Sister to the northern *C. partemporaria* clade is toptype *C. culenesensis* from Melipilla Province west of Santiago (Fig. 19). Each clade consists of a single song type (Fig. 18), barring the intrusion of the two wandering *C. impartemporaria* that bring type 2 songs into clades consisting of type 1 and type 4 songs, respectively. Genetic distance between *C. viridicitata* and the remainder of *Chilecicada* is on the order of 9.5% - 11%, for an estimated divergence time of 8-14 Ma (Supp. Table 2).

Discussion

What historically has been considered to be a single species has been shown to be a complex of at least 14 species. The 13 new taxa described here represent a 61.9% increase in the Chilean cicada diversity (Sanborn 2021). The addition of the new species brings the known Chilean cicada fauna diversity to 34 described species, five genera, four tribes and two subfamilies with a 31 of the 34 species (91.2%) endemic to Chile.

Where we have detailed observations and sample sizes of specimen-associated recordings, the songs of syntopic *Chilecicada* species are of widely divergent song types, for example *C. occidentis* (type 4) and *C. partemporaria* (type 1; Fig. 15) at Peñalolén, Región Metropolitana, Provincia de Santiago, and *C. partemporaria* (type 1) and *C. viridicitata* (type 3) along Termas del Flaco Road, Provincia Colchagüa, Región O'Higgins. Such observations are consistent with a reproductive isolating function of song (Alexander 1962a; b). The preponderance of species with type 1 songs, and their geographic clustering around Región de Metropolitana (Plate 5), makes it possible that sympatry exists between *Chilecicada* species that lack song divergence. This possibility deserves detailed population-level study.

Wing flicking (Plate 4) occurs during courtship in many cicadas (e.g. Cooley & Marshall 2001; Marshall & Hill 2009). The function of wing flicking in *Chilecicada* is unknown; wing flicking was not observed during courtship situations or between nearby individuals that could visually perceive the signal. Mating was only observed once, however, thus we cannot rule out that wing flicking is a part of courtship and mating, rather we can only conclude

that it does occur as a component of calling in the absence of females or other males. By alternating timbalization with wing flicking, a male may alternate a primarily airborne signal with substrate vibration. *Chilecicada* seldom fly, thus a substrate-borne signal may orient individuals found on the same plant. Our preliminary observations on wing flicking suggest species-specificity of this signal type, which may enhance mate recognition where timbal signals are similar.

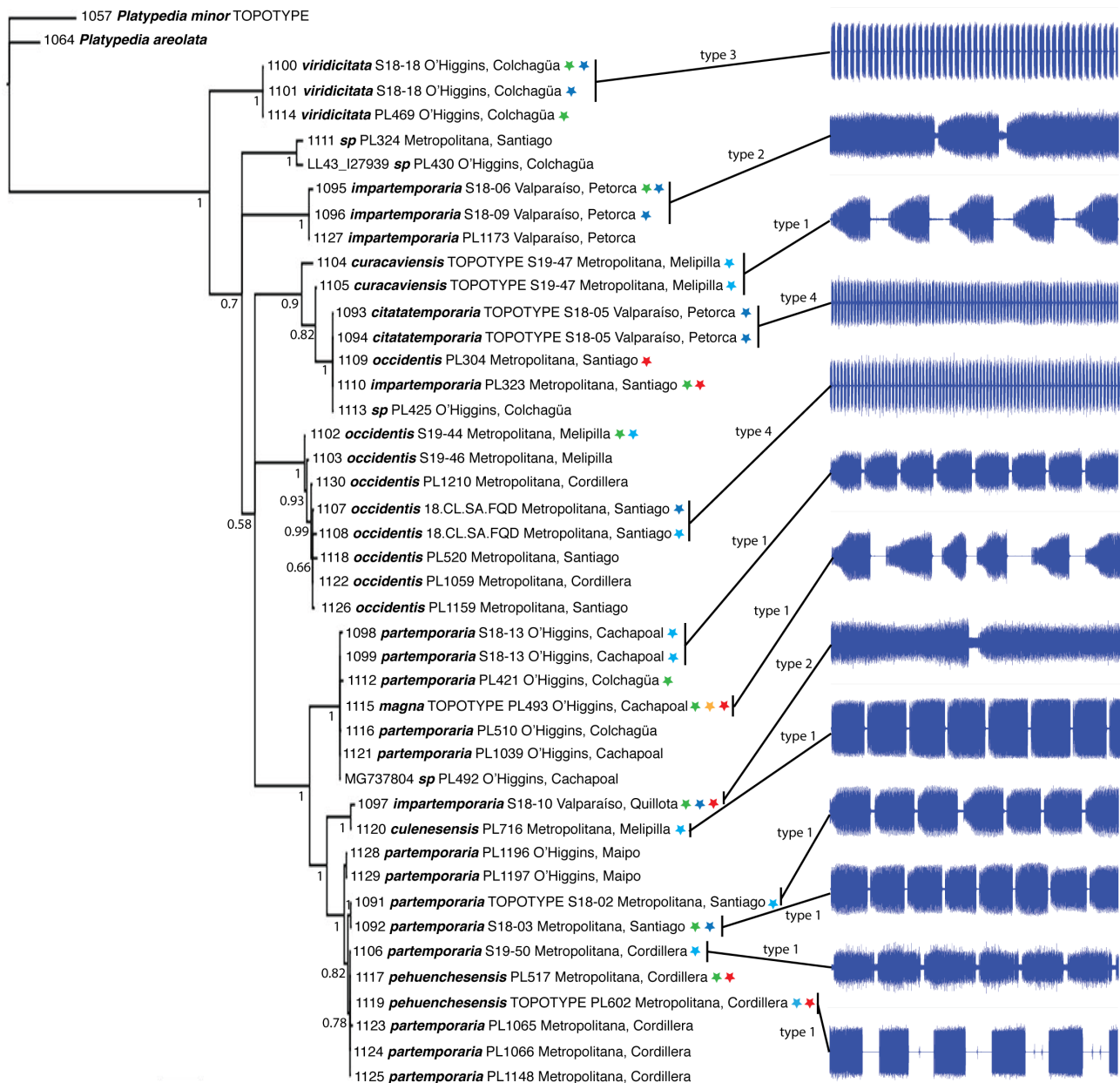


FIGURE 18. COI gene tree. Numbers at nodes are posterior probabilities. Shown to the right are 5 s calling song oscillograms. Green stars are morphologically determined vouchers, dark blue stars are molecular vouchers that were recorded, light blue stars are recordings applied from the same population as the molecular voucher, orange star is a recording applied to the terminal from another population, and red stars are possible instances of mitochondrial capture or incomplete lineage sorting.

The positive linear relationship between temperature and echeme duration of *C. impartemporaria* songs (Fig. 17) was unexpected. Rates of muscle contraction in ectothermic animals depend on temperature; thus, rate-related song characters in a variety of insects increase linearly with temperature (Walker 1975), and song characters at different temporal scales may have distinct temperature relationships (Walker 1962). Cicadas are relatively large and can thermoregulate, so ambient temperature affects song production less than in smaller insects (see review in Sanborn 2005). Ambient temperature has been shown to influence song temporal patterns in some cicada species (Popov *et al.* 1997; Quartau *et al.* 2000; Fonseca & Revez 2002; Sanborn *et al.* 2011) while these parameters are

independent of ambient temperature in other species (Popov 1975; Gogala *et al.* 1996; Villet *et al.* 2003; Chatfield-Taylor & Cole 2019; Simon *et al.* 2019) that thermoregulate to maintain their acoustic behavior (see review in Sanborn 2002).

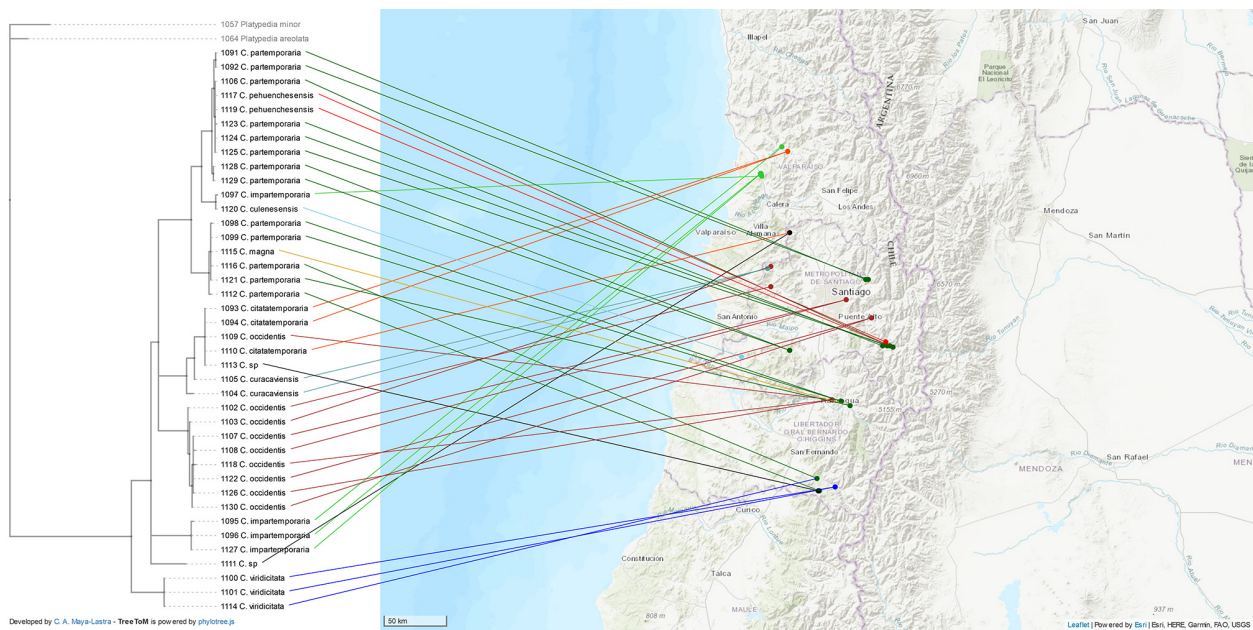


FIGURE 19. Mapped COI gene tree. COI barcode tree from Fig. 18 visualized against a map of specimen localities using web application TreeToM (See methods). Colors represent described species.

Pulse and syllable rates held constant across a range of ambient temperatures, as predicted if *C. impartemporaria* males thermoregulate. However, timbalization lasted longer at higher ambient temperatures. Why might this relationship occur? Females are known to exert directional sexual selection on echeme (= bout) duration in several insects (e.g. Galliard & Shaw 1996; Greenfield & Roizen 1993; Hedrick 1986), but prolonged sound output may increase risk of detection by predators (Hedrick 1999). Cicadas enjoy enhanced escape response at high ambient temperatures, particularly in desert environments (Heath & Wilkin 1970; Sanborn *et al.* 1992). Therefore, males may employ risky signaling strategies more successfully at higher ambient temperatures.

The COI gene tree in general recovered clades that correspond to the morphologically and acoustically identified species described in this work (Fig. 18). A few instances of incongruence may be explained by mitochondrial capture (Banker *et al.* 2017; Marshall *et al.* 2011). One such instance is *C. impartemporaria*, in which exemplars that were both morphologically and acoustically determined were polyphyletic. Exemplar 1097 did not group with the *C. impartemporaria* clade although they share the same geographic region (Fig. 19), type 2 mating song (Fig. 18), and morphology, but instead grouped with *C. culenesensis*. Both 1097 *C. impartemporaria* and *C. culenesensis* were found southwest of Santiago on the south side of Cuesta el Melón, while the remaining *C. impartemporaria* exemplars were all collected on the north side (Fig. 19), where they may be geographically isolated from *C. culenesensis* and other *C. partemporaria* lineages. Mitochondrial capture may also explain a mixed clade that consists of *C. impartemporaria* and *C. occidentis* with morphologically and acoustically determined topotypes of *C. citatemporaria* (Fig. 18).

Two allopatric *C. partemporaria* clades subsumed various other species: a *C. partemporaria* + *C. magna* clade located South West of Santiago (Figs. 18–19), and a *C. partemporaria* + *C. pehuenchesensis* clade located northeast of Santiago. A single exemplar of *C. culenesensis* found west of Santiago is sister to the northern *C. partemporaria* + *C. magna* clade. All three of these clades present species that are morphologically similar and express the same type 1 song, (save for the aberrant inclusion of *C. impartemporaria* 1097 with a type 2 song). Lack of geographical separation or song or mtDNA genetic divergence calls into question the species status of *C. magna* and *C. pehuenchesensis* according to the biological and phylogenetic species concepts (Coyne & Orr 2004).

A deep split between *C. viridicollata* and the rest of *Chilecicada* was followed by two consecutive radiations of three extant lineages each (Figs. 18–19). A rough estimate of the age of the root of *Chilecicada* (8–14 Ma given

9.5–11% sequence divergence; Supp. Table 2) is surprisingly old given the homogeneity of the genus compared to, for example, the similarly divergent but much more morphologically diverse *Kikihia*-*Maoricicada*-*Rhodopsalta* cicada radiation in New Zealand (Arensburger *et al.* 2004, Buckley *et al.* 2006, Marshall *et al.* 2008, Ellis *et al.* 2015, Bator *et al.* 2021). This pattern is consistent with neoendemic radiation of a paleoendemic lineage (Cole & Chiang 2016). Additional study with larger numbers of individuals and localities and more genes will be necessary for understanding the evolution of this interesting group of cryptic species. At present, its geographic distribution is restricted to a relatively small region of Chile but more populations may be discovered in the future.

Acknowledgments

D. Marshall and L. Popple made suggestions to improve the manuscript. F. Calderon, S. Chiswell, S. Downing, E. Gordon, and K. Nazario assisted with field work and curation of specimens. R. Brown (MEMC), R. Davidson (CMNH), L. Dietz and R. Blinn (NCSU), S. Halbert and J. Brambila (FSCA), S. Heydon (UCDC), G. Parsons (MSUC), and M. Webb (BMNH) provided specimens or access to their collections. Field collections were supported by the National Geographic Society Committee for Research and Exploration Grant 9760-15 to P.L. JAC, MS, CV, CS, and E. Gordon were supported by NSF grant DEB 1655891. The Keck Biotechnology Center at Pasadena City College provided facilities and support for DNA barcoding.

References

- Alexander, R.D. (1962a) Evolutionary change in cricket acoustical communication. *Evolution*, 16, 443–467.
<https://doi.org/10.1111/j.1558-5646.1962.tb03236.x>
- Alexander, R.D. (1962b) The role of behavioral study in cricket classification. *Systematic Zoology*, 11, 53–72.
- Araya-Salas, M. & Smith-Vidaurre, G. (2017) warbleR: an R package to streamline analysis of animal acoustic signals. In: Golding, N. (Ed.), *Methods in Ecology and Evolution*, 8, pp. 184–191.
<https://doi.org/10.1111/2041-210X.12624>
- Arensburger, P., Buckley, T.R., Simon, C., Moulds, M., & Holsinger, K.E. (2004) Biogeography and phylogeny of the New Zealand cicada genera (Hemiptera: Cicadidae) based on nuclear and mitochondrial DNA data. *Journal of Biogeography*, 31, 557–569.
<https://doi.org/10.1046/j.1365-2699.2003.01012.x>
- Baker, E. & Chesmore, D. (2020) Standardisation of bioacoustic terminology for insects. *Biodiversity Data Journal*, 8 (e54222), 1–32.
<https://doi.org/10.3897/BDJ.8.e54222>
- Banker, S.E., Wade, E.J. & Simon, C. (2017) The confounding effects of hybridization on phylogenetic estimation in the New Zealand cicada genus *Kikihia*. *Molecular Phylogenetics and Evolution*, 116, 172–181.
<https://doi.org/10.1016/j.ympev.2017.08.009>
- Bator, J., Marshall, D.C., Hill, K.B.R., Cooley, J.R., Leston, A., & Simon, C. (2021) Phylogeography of the endemic red-tailed cicadas of New Zealand (Hemiptera: Cicadidae: *Rhodopsalta*), and molecular, morphological and bioacoustical confirmation of the existence of Hudson’s *Rhodopsalta microdon*. *Biological Journal of the Linnean Society*, zlab065, 1–26.
<https://doi.org/10.1093/zoolinneab/zlab065>
- Buckley, T.R., Cordeiro, M., Marshall, D.C. & Simon, C. (2006) Differentiating between hypotheses of lineage sorting and introgression in New Zealand alpine cicadas (*Maoricicada* Dugdale). *Systematic Biology*, 55, 411–425.
<https://doi.org/10.1080/10635150600697283>
- Chatfield-Taylor, W. & Cole, J.A. (2019) Noisy neighbours among the selfish herd: a critical song distance mediates mate recognition within cicada emergences (Hemiptera: Cicadidae). *Biological Journal of the Linnean Society*, 128, 854–864.
<https://doi.org/10.1093/biolinnean/blz132>
- Cole, J.A. & Chiang, B.H. (2016) The Nearctic Nedubini: the most basal lineage of katydids is resolved among the paraphyletic “Tettigoniinae” (Orthoptera: Tettigoniidae). *Annals of the Entomological Society of America*, 109, 652–662.
<https://doi.org/10.1093/aesa/saw030>
- Cooley, J.R. & Marshall, D. (2001) Sexual signaling in periodical cicadas, *Magicalcica* spp. (Hemiptera: Cicadidae). *Behaviour*, 138, 827–855.
<https://doi.org/10.1163/156853901753172674>
- Coyne, J.A. & Orr, H.A. (2004) *Speciation*. Sinauer Associates, Sunderland, xiii + 546 p.
- Distant, W.L. (1905) Rhynchotal notes XXX. *Annals and Magazine of Natural History*, Series 7, 15, 304–319.
<https://doi.org/10.1080/03745480509443047>

- Ellis, E.A., Marshall, D.C., Hill, K.B., Owen, C.L., Kamp, P.J. & Simon, C. (2015) Phylogeography of six codistributed New Zealand cicadas and their relationship to multiple biogeographical boundaries suggest a re-evaluation of the Taupo Line. *Journal of Biogeography*, 42, 1761–1775.
<https://doi.org/10.1111/jbi.12532>
- Folmer, O., Black, M., Hoeh, W. & Vrijenjoek, R. (1994) DNA primers for amplification of mitochondrial cytochrome c oxidase subunit I from diverse metazoan invertebrates. *Molecular Marine Biology and Biotechnology*, 3, 294–299.
- Fonseca, P.J. & Revez, M.A. (2002) Song discrimination by male cicadas *Cicada barbara lusitanica* (Homoptera, Cicadidae). *Journal of Experimental Biology*, 205, 1285–1292.
<https://doi.org/10.1242/jeb.205.9.1285>
- Galliard, P.L. & Shaw, K.C. (1996) The effect of variation in parameters of the male calling song of the katydid, *Amblycorypha parvipennis* (Orthoptera: Tettigoniidae), on female phonotaxis and phonoresponse. *Journal of Insect Behavior*, 9, 841–855.
<https://doi.org/10.1007/bf02208973>
- Gogala, M., Drosopoulos, S. & Trilar, T. (2008) *Cicadetta montana* complex (Hemiptera, Cicadidae) in Greece - a new species and new records based on bioacoustics. *Mitteilungen aus dem Museum für Naturkunde im Berlin, Deutsche Entomologische Zeitschrift*, 55, 91–100.
<https://doi.org/10.1002/mmnd.200800006>
- Gogala, M., Drosopoulos, S. & Trilar, T. (2009) Two mountains, two species: new taxa of the *Cicadetta montana* species complex in Greece (Hemiptera: Cicadidae). *Acta Entomologica Slovenica*, 17, 13–28.
<https://doi.org/10.1002/mmnd.200800006>
- Gogala, M., Popov, A.V. & Ribaric, D. (1996) Bioacoustics of singing cicadas of the western Palaearctic: *Cicadetta tibialis* (Panzer)(Cicadoidea: Tibicinidae). *Acta Entomologica Slovenica*, 4, 45–62.
- Greenfield, M.D. & Roizen, I. (1993) Katydid synchronous chorusing is an evolutionarily stable outcome of female choice. *Nature*, 364, 618–620.
<https://doi.org/10.1038/364618a0>
- Heath, J.E. & Wilkin, P.J. (1970) Temperature responses of the desert cicada, *Diceroprocta apache* (Homoptera: Cicadidae). *Physiological Zoology*, 43, 145.
<https://doi.org/10.1086/physzool.43.3.30155525>
- Hedrick, A.V. (1986) Female preference for male calling bout duration in a field cricket. *Behavioral Ecology and Sociobiology*, 19, 73–77.
<https://doi.org/10.1007/bf00303845>
- Hedrick, A.V. (1999) Crickets with extravagant mating songs compensate for predation risk with extra caution. *Proceedings of the Royal Society of London, Series B*, 267, 671–675.
<https://doi.org/10.1098/rspb.2000.1054>
- Hertach, T. (2007) Three species instead of only one: distribution and ecology of the *Cicadetta montana* species complex (Hemiptera: Cicadoidea) in Switzerland. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 80, 37–61.
- Hill, K.B.R., Marshall, D.C., Moulds, M.S. & Simon, C. (2015) Molecular phylogenetics, diversification, and systematics of *Tibicen* Latreille 1825 and allied cicadas of the tribe Cryptotympanini, with three new genera and emphasis on species from the USA and Canada (Hemiptera: Auchenorrhyncha: Cicadidae). *Zootaxa*, 3985 (2), 219.
<https://doi.org/10.11646/zootaxa.3985.2.3>
- Huelsenbeck, J.P. & Ronquist, F. (2001) MRBAYES: Bayesian inference of phylogeny. *Bioinformatics*, 17, 754–755.
<https://doi.org/10.1093/bioinformatics/17.8.754>
- Lanfear, R., Calcott, B., Ho, S.Y.W. & Guindon, S. (2012) PartitionFinder: combined selection of partitioning schemes and substitution models for phylogenetic analyses. *Molecular Biology and Evolution*, 29, 1695–1701.
<https://doi.org/10.1093/molbev/mss020>
- Lanfear, R., Frandsen, P.B., Wright, A.M., Senfeld, T. & Calcott, B. (2016) PartitionFinder2: new methods for selecting partitioned models of evolution for molecular and morphological phylogenetic analysis. *Molecular Biology and Evolution*, 34, 772–773.
<https://doi.org/10.1093/molbev/msw260>
- Latreille, P.A. (1802) s.n. In: *Histoire naturelle, générale et particulière des crustacés et des insectes. Ouvrage faisant suite à l'histoire naturelle générale et particulière, composée par Leclerc de Buffon, et rédigée par C.S. Sonnini, member de plusieurs sociétés savantes. Familles naturelles des genres*. F. Dufast, Paris, pp. i–xii + 13–467.
- Maddison, W.P. & Maddison, D.R. (2015) Mesquite: a modular system for evolutionary analysis. Version 3.04. Available from: <http://mesquiteproject.org> (accessed 8 November 2021)
- Marshall, D.C. & Hill, K.B.R. (2009) Versatile aggressive mimicry of cicadas by an Australian predatory katydid. *PLoS One*, 4, 1–8.
<https://doi.org/10.1371/journal.pone.0004185>
- Marshall, D.C., Hill, K.B.R., Cooley, J.R. & Simon, C. (2011) Hybridization, mitochondrial DNA phylogeography, and prediction of the early stages of reproductive isolation: lessons from New Zealand cicadas (genus *Kikihia*). *Systematic Biology*, 60, 482–502.
<https://doi.org/10.1093/sysbio/syr017>

- Marshall, D.C., Moulds, M., Hill, K.B.R., Price, B.W., Wade, E.J., Owen, C.L., Goemans, G., Marathe, K., Sarkar, V., Cooley, J.R., Sanborn, A.F., Kunte, K., Villet, M.H. & Simon, C. (2018) A molecular phylogeny of the cicadas (Hemiptera: Cicadidae) with a review of tribe and subfamily classification. *Zootaxa*, 4424 (1), 1–64.
<https://doi.org/10.11646/zootaxa.4424.1.1>
- Maya-Lastra, C.A. (2020) TreeToM, simple tool for visualizing phylogenetic trees onto a map. Available from: <https://camayal.info/wa/treetom/> (accessed 1 November 2021)
- Miller, M., Pfeiffer, W. & Schwartz, T. (2010) Creating the CIPRES Science Gateway for inference of large phylogenetic trees. *IEEE, Proceedings of the 2010 Gateway Computing Environments Workshop, New Orleans, Louisiana*, 8 pp.
- Moulds, M.S. (2005) An appraisal of the higher classification of cicadas (Hemiptera: Cicadoidea) with special reference to the Australian fauna. *Records of the Australian Museum*, 57, 375–446.
<https://doi.org/10.3853/j.0067-1975.57.2005.1447>
- Moulds, M.S. (2012) A review of the genera of Australian cicada (Hemiptera: Cicadoidea). *Zootaxa*, 3287 (1), 1–262.
<https://doi.org/10.11646/zootaxa.3287.1.1>
- Otte, D. (1970) A comparative study of communicative behavior in grasshoppers. *Miscellaneous Publications, Museum of Zoology, University of Michigan*, 141, 1–168.
- Popov, A.V. (1975) The structure of the tymbals and the characteristics of the sound signals in singing cicadas (Homoptera, Cicadidae) in the southern regions of the USSR. *Entomological Review, Washington*, 54, 7–35.
- Popov, A.V., Beganovic, A. & Gogala, M. (1997) Bioacoustics of singing cicadas of the western Palaearctic: *Tettigetta brullei* (Fieber 1876) (Cicadoidea: Tibicinidae). *Acta Entomologica Slovenica*, 5, 89–101.
- Quartau, J.A., Seabra, S. & Sanborn, A. (2000) Effect of ambient air temperature on some temporal parameters of the calling song of *Cicada orni* Linnaeus, 1758 (Hemiptera: Cicadidae) in Portugal. *Acta Zoologica Cracoviensia*, 43, 193–198.
- Ronquist, F. & Huelsenbeck, J.P. (2003) MRBAYES 3: Bayesian phylogenetic inference under mixed models. *Bioinformatics*, 19, 1572–1574.
<https://doi.org/10.1093/bioinformatics/btg180>
- Ronquist, F., Teslenko, M., van der Mark, P., Ayres, D.L., Darling, A., Höhna, S., Larget, B., Liu, L., Suchard, M.A. & Huelsenbeck, J.P. (2012) MrBayes 3.2: efficient Bayesian phylogenetic inference and model choice across a large model space. *Systematic Biology*, 61, 539–542.
<https://doi.org/10.1093/sysbio/sys029>
- Sanborn, A.F. (2002) Cicada thermoregulation (Hemiptera, Cicadoidea). *Denisia*, 4, 455–470.
- Sanborn, A.F. (2005) Acoustic signals and temperature. In: Drosopoulos, S. & Claridge, M.F. (Eds.), *Insect sounds and communication: physiology, behaviour, ecology and evolution*. CRC Press, Boca Raton, Florida, pp. 111–125.
<https://doi.org/10.1201/9781420039337.ch7>
- Sanborn, A.F. (2014) A new genus and a new tribe of cicada from South America (Hemiptera: Cicadoidea: Cicadidae) with a note on the taxonomic position of *Ahomana* Distant, 1905. *Proceedings of the Entomological Society of Washington*, 116, 339–348.
<https://doi.org/10.4289/0013-8797.116.3.339>
- Sanborn, A.F. (2021) A new species, genus and tribe of cicada (Hemiptera: Cicadoidea: Cicadidae: Tibicininae) from Chile with a list of Chilean cicada fauna. *Zootaxa*, 4952 (1), 87–100.
<https://doi.org/10.11646/zootaxa.4952.1.5>
- Sanborn, A.F., Heath, J.E. & Heath, M.S. (1992) Thermoregulation and evaporative cooling in the cicada *Okanagodes gracilis* (Homoptera: Cicadidae). *Comparative Biochemistry and Physiology A: Physiology*, 102, 751–757.
[https://doi.org/10.1016/0300-9629\(92\)90736-a](https://doi.org/10.1016/0300-9629(92)90736-a)
- Sanborn, A.F., Noriega, F.G. & Phillips, P.K. (2002) Thermoregulation in the cicada *Platypedia putnami* var. *lutea* with a test of a crepitation hypothesis. *Journal of Thermal Biology*, 27, 365–369.
[https://doi.org/10.1016/s0306-4565\(02\)00004-9](https://doi.org/10.1016/s0306-4565(02)00004-9)
- Sanborn, A.F., Simões, P.C., Phillips, P.K. & J.A. Quartau, J.A. (2011) Thermoregulation and the influence of body temperature on calling song parameters in *Cicada orni* (Hemiptera: Cicadidae). *European Journal of Entomology*, 108, 365–369.
<https://doi.org/10.14411/eje.2011.045>
- Scopoli, J.A. (1772) Observations zoologicae. *Annus Historico-Naturalis*, 5, 70–128.
- Simon, C., Frati, F., Beckenbach, A., Crespi, B., Liu, H. & Flook, P. (1994) Evolution, weighting and phylogenetic utility of mitochondrial gene sequences and a compilation of conserved polymerase chain reaction primers. *Annals of the Entomological Society of America* 87, 651–701.
<https://doi.org/10.1093/aesa/87.6.651>
- Simon, C., Gordon, E.R.L., Moulds, M.S., Cole, J.A., Haji, D., Lemmon, A.R., Lemmon, E.M., Kortyna, M., Nazario, K., Wade, E.J., Meister, R.C., Goemans, G., Chiswell, S.M., Pessacq, P., Veloso, C., McCutcheon, J.P. & Łukasik, P. (2019) Off-target capture data, endosymbiont genes and morphology reveal a relict lineage that is sister to all other singing cicadas. *Biological Journal of the Linnean Society*, 128, 865–886.
<https://doi.org/10.1093/biolinnean/blz120>
- Sokal, R.R. & Rohlf, F.J. (2000) *Biometry*. 3rd Edition. W.H. Freeman and Company, New York, xx + 887 pp.
- Sueur, J. & Puissant, S. (2007) Similar look but different song: a new *Cicadetta* species in the *montana* complex (Insecta, Hemiptera, Cicadidae). *Zootaxa*, 1442 (1), 55–68.

<https://doi.org/10.11646/zootaxa.1442.1.5>

- Villet, M.H., Sanborn, A.F. & Phillips, P.K. (2003) Endothermy and chorusing behaviour in the African platypleurine cicada *Pycna semiclara* (Hemiptera: Cicadidae). *Canadian Journal of Zoology*, 81, 1437–1444.
<https://doi.org/10.1139/z03-119>
- Wade, E.J., Hertach, T., Gogala, M., Trilar, T. & Simon, C. (2015) Molecular species-delimitation methods recover most song-delimited cicada species in the European *Cicadetta montana* complex. *Journal of Evolutionary Biology*, 28, 2318–2336.
<https://doi.org/10.1111/jeb.12756>
- Walker, F. (1850) 1 *List of the specimens of homopterous insects in the collection of the British Museum*. British Museum Trustees, London, 260 pp.
<https://doi.org/10.5962/bhl.title.9063>
- Walker, T.J. (1962) Factors responsible for intraspecific variation in the calling songs of crickets. *Evolution*, 16, 407–428.
<https://doi.org/10.1111/j.1558-5646.1962.tb03234.x>
- Walker, T.J. (1975) Effects of temperature on rates of poikilotherm nervous systems: evidence from the calling songs of meadow katydids (Orthoptera: Tettigoniidae: *Orchelimum*) and reanalysis of published data. *Journal of Comparative Physiology*, 101, 57–69.
<https://doi.org/10.1007/bf00660119>