



Figure 1. oblique dorsal view of head. A, *Anochetus madagascariensis*. B, *Odontomachus coquereli*.
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In this study, we used CO1 barcode sequences to associate worker, queen and male castes. We conclude that DNA barcoding will enable species delimitation, linking a greater range of the morphological diversity in ants (castes and sex), and further will provide a set of molecular characters that improve species delimitation and identification while making these hypotheses transparent and reproducible.

Methods

This revision is primarily based on arthropod surveys in Madagascar that included over 6,000 leaf litter samples, 4,000 pitfall traps, and 8,000 additional hand collecting events throughout Madagascar from 1992 through 2006 [5]. Also included are specimens from museums in Genoa, Geneva, Paris, London, Berlin, Tervuren, and Basel and the extensive collection of Gary D. Alpert located at the MCZC. Overall, this revision included the study of approximately 1,700 specimens of *Anochetus* and *Odontomachus* from 1014 recorded collecting events from throughout Madagascar with additional samples from Comoros and Seychelles. Roy Snelling (LACM) provided the records of *O. similimus* from his work on the ants of Seychelles. Samples were selected for CO1 sequencing throughout the geographic range of each species. In total, 501 specimens were sequenced. Specimens examined from Madagascar are listed by increasing latitude within provinces.

All species and type material examined in this study have been imaged and are available on AntWeb (www.antweb.org). Material was deposited at the California Academy of Sciences, San Francisco (CASC); British Museum of Natural History, London (BMNH); and Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts (MCZC). All sequences, oligonucleotides and electropherograms are deposited in BOLD (www.barcodinglife.org), and sequence data has been deposited on Genbank.

In accordance with section 8.6 of the ICZN's International Code of Zoological Nomenclature, we have deposited copies of this article at the following five publicly accessible libraries: Natural History Museum, London, UK; American Museum of Natural History, New York, USA; Museum National d'Histoire Naturelle, Paris, France; Russian Academy of Sciences, Moscow, Russia; Academia Sinica, Taipei, Taiwan. The three new species names established herein have been prospectively registered in ZooBank [6–8], the official online registration system for the ICZN. The ZooBank publication LSID (Life Science Identifier) for the new species described herein can be viewed through any standard web browser by appending the LSID to the prefix "http://zoobank.org/".

New specific names in this work are attributive genitive nouns and thus invariant. Each specimen discussed below is uniquely identified

with a specimen-level code (e.g. CASENT0003099) affixed to each pin. In addition, each specimen may include a collection code, which is a field number that uniquely identifies collecting events (e.g. BLF01652). Collection codes, when available, are associated with a collector and follow the collector's name.

Digital color images were created using a JVC KY-F75 digital camera and Syncrosopy Auto-Montage (v 5.0) software. All measurements were taken at 80× power with a Leica MZ APO microscope using an orthogonal pair of micrometers, recorded to the nearest 0.001 mm, and rounded to two decimal places for presentation. When more than one specimen was measured, minimum and maximum measurements and indices are presented. Measurements follow those used by Brown [1,2]. Abdominal segments are noted by "A" and the segment number, such as A2 for the petiole and A3 for the first gastral segment.

Abbreviations used:

- HL Head length: measured in full-face view; maximum longitudinal length from the anteriormost portion of the projecting mandible joint (the dorsal socket where the mandible turns) to the midpoint of a line across the posterior margin. (male: including ocelli)
- HW Head width: *Anochetus*: maximum width of head; *Odontomachus*: HW (across upper eye margin): maximum width of head measured across posterior margin of eyes; HW (across vertex): maximum width of head measured across temporal prominences. In *O. coquereli*, which lacks temporal prominences, the measurement is taken across the part of the vertex at which the sides are nearly parallel near or a little behind the midlength of the head. (male: including eyes)
- ML Mandible length: The straight-line length of the mandible at full closure, measured in the same plane for which the HL measurement is taken (full face view), from the mandibular apex to the anterior clypeal margin, or to the transverse line connecting the anterior most points in those taxa where the margin is concave medially.
- EL Eye length: maximum length of eye as measured normally in oblique view of the head to show full surface of eye.
- SL Scape length: maximum chord length excluding basal condyle and neck.
- WL Weber's length (Mesosoma length): in lateral view of the mesosoma, diagonal length from posteroventral corner of propodeum to the farthest point on anterior face of pronotum, excluding the neck.
- PW Pronotum width: in dorsal view, maximum width of pronotum.
- FL Femur length: Maximum length of hind femur.
- CI Cephalic index: $HW/HL \times 100$.
- SI Scape index: $SL/HW \times 100$.
- MI Mandible Index: $ML/HL \times 100$.

Specimens of *Anochetus* and *Odontomachus* were examined from the following collections:

- BMNH Natural History Museum, London, U. K.
- CASC California Academy of Sciences, San Francisco, CA, USA
- LACM Los Angeles County Museum, Los Angeles, CA, USA
- MCZC Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA
- MHNG Muséum d'Histoire Naturelle, Geneva, Switzerland
- MNHN Muséum National d'Histoire Naturelle, Paris, France
- MRAC Musée Royal de l'Afrique Centrale, Tervuren, Belgium
- MSNG Museo Civico de Historia Natural "Giacomo Doria", Genoa, Italy
- NHMB Naturhistorisches Museum, Basel, Switzerland