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Research Article

Distribution and Diversity of the Cryptic Ant Genus *Oxyepoecus* (Hymenoptera: Formicidae: Myrmicinae) in Paraguay with Descriptions of Two New Species

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We discuss the diversity and distribution of the ant genus *Oxyepoecus* in Paraguay. *Oxyepoecus inquilinus* is recorded for the first time, and new distribution data are given for *O. rastratus* and *O. vezenyii*. Published data for *O. bruchi*, *O. rastratus*, *O. reticulatus,* and *O. vezenyii* are summarized. Two new species are described (*O. bidentatus* n. sp. and *O. striatus* n. sp.), and a key to the workers of the seven Paraguayan *Oxyepoecus* species is provided. At Teniente Enciso National Park, four species cooccur. This locality appears as a promising site for studies documenting the biology of this poorly known ant genus, and because of the IUCN "vulnerable" Red List classification of *O. inquilinus*, the importance of the Teniente Enciso National Park for biological conservation is clearly established.

1. Introduction

Oxyepoecus [1] is a genus of cryptobiotic ants collected infrequently from Colombia to Chile [2–5]. The genus is a member of the tribe Solenopsidini in the subfamily Myrmicinae [6]. It currently includes 20 species [3, 4, 7], including two species described as new in this paper. Four *Oxyepoecus* species were previously recorded in Paraguay: *O. bruchi* [1], *O. rastratus* [8], *O. reticulatus* [7], and *O. vezenyii* [9, 10].

The genus is differentiated from other Solenopsidini by the 11-segmented antennae with a three-segmented apical club, the clypeus with four teeth, and the dentate propodeum [3]. In addition, the petiole and postpetiole nodes are high and often anteroposteriorly compressed [3].

The biology of the genus is poorly known, but three species (*O. inquilinus* [11], *O. daguerrei* [12], and *O. bruchi* [1]) are suspected to be inquilines of *Pheidole* or *Solenopsis* [1, 7, 11], although the exact nature of the relationship is unclear [3]. These three species are considered as "Vulnerable D2" [13], meaning they are suspected to be "facing a high risk of extinction in the wild in the medium-term future" because "their populations are characterized by an acute restriction in their area of occupancy (typically less than 100 km^2) or in the number of locations (typically fewer than five)." Due to the current rapid loss of biodiversity and uncertainty concerning the conservation status of social insects [14], data to increase our knowledge of threatened species are desperately needed.

Here, we report *Oxyepoecus inquilinus* for the first time from Paraguay and provide new distribution data for *O. vezenyii* and *O. rastratus*. Two new species are described.

2. Materials and Methods

The sampling of ant assemblages in the Chaco region of Paraguay was based on 560 Winkler and 720 pitfall samples collected between 2001 and 2004 in 11 localities along a 410 km transect beginning at Río Verde and ending at Fortín Mister Long close to the Bolivian border (Figure 1) [15, 16]. Sampling was always carried out at the end of the dry season (September–November). For Winkler extractions, the leaf litter present inside a one m^2 quadrat was collected and sifted

and its fauna was extracted for 24 h. Pitfall traps consisted of 70 mm diameter drinking cups, containing water and a drop of detergent, operating for at least 24 hours. Vegetation corresponds to relatively well-preserved xeromorphic forests [17]. Elevation, mean annual rainfall and temperature, mean maximal temperature of the warmest month, and mean minimal temperature of the coldest month are provided for each locality [16].

Specimens from the Paraguayan oriental region were collected following previous techniques [10]. Data were supplemented by the examination of existing museum material [10]. Finally, data from the literature and the online specimen database http://www.antweb.org/ were added in order to provide a complete overview of the diversity and distribution of *Oxyepoecus* in Paraguay.

3. Measurements and Indices

All measurements are in millimeters. The abbreviations are as follows.

TL: Total length from the anterior margin of the head (in vertical position) to the posterior edge of the gaster measured in lateral view.

HL: Head length, measured in full face view, from the anterior margin of the medial lobe of the clypeus to the posterior border of the head (excluding the mandibles).

HW: Head width, the maximum width of the head measured in full face view, excluding the eyes.

EL: Eye length, the maximum diameter of eye.

SL: Scape length, excluding the basal condyle.

PL: Petiole length, the maximum length of the node measured in dorsal view, starting at the base of the anterior face and ending at the base of the posterior edge.

PW: Petiole width, the maximum width of the node measured in dorsal view.

PPL: Postpetiole length, the maximum length of the node measured in dorsal view, as above.

PPW: Postpetiole width, the maximum width of the node measured in dorsal view.

WL: Weber's length, measured from the anterior edge of the pronotum to the posterior edge of the metapleural lobe.

CI: Cephalic index, HW/HL $\times$ 100.

SI: Scape index, SL/HL $\times$ 100.

The terminology is based on [18].

Holotypes, paratypes, and voucher specimens have been deposited at the Royal Belgian Institute of Natural Sciences, Brussels, Belgium, (RBINS), the University of Texas at El Paso (CWEM), the Alexander L. Wild personal collection (ALWC), the Museum of Comparative Zoology, Harvard University (MCZC), the Los Angeles Country Museum, Los Angeles, California, USA (LACM) and the "Museo Nacional de Historia Natural del Paraguay", San Lorenzo, Paraguay (INBP).

4. Results

The following species of *Oxyepoecus* were collected in Paraguay (Figure 1).

4.1. Oxyepoecus bidentatus. Delsinne and Mackay, n. sp. (Figures 2 and 3).

Diagnosis. Its worker morphology places this species within the *rastratus* species-group [4]. The reticulate-costulate dorsal surface of the head (Figures 2(a) and 2(d)) and the well-defined subpostpetiolar process, forming a pair of prominent blunt teeth (Figure 3), separate *O. bidentatus* from all the other species of *Oxyepoecus*. The gyne and male are unknown.

Description of the Worker. Measurements of holotype, paratypes ($n = 2$) between parentheses: TL 1.94 (1.86–1.90), HL 0.52 (0.51–0.55), HW 0.44 (0.42–0.46), EL 0.07 (0.06-0.07), SL 0.32 (0.32–0.35), PL 0.07 (0.07–0.11), PW 0.17 (0.19–0.23), PPL 0.09 (0.08–0.12), PPW 0.22 (0.25–0.28), WL 0.63 (0.60–0.64), CI 85 (83-84), and SI 62 (63-64).

Lateral clypeal teeth are well developed, directed anteriorly; eye small, about 16–18 ommatidia, five ommatidia in greatest diameter; scape in repose failing to reach posterior border of head by about two maximum widths; sides of head nearly straight, parallel; frontovertexal margin slightly convex; pronotal shoulder gently angulate, marked with striae; notopropodeal (=metanotal) groove indistinct; propodeal angles developed, with two medium-sized acute teeth; subpetiolar process well-developed, lobe-like, directed ventrally; subpostpetiolar process well-developed, forming pair of blunt teeth, directed ventrally; nodes of petiole and postpetiole high and dorsally rounded, compressed anteroposteriorly; in lateral view, petiolar node higher than postpetiolar node; as seen from above, postpetiole much broader than petiole.

Long erect hairs abundant on clypeus, vertex, dorsum of mesosoma, petiole, postpetiole, all surfaces of gaster; mandibles, antennae, legs, and dorsal surface of head with abundant shorter semierect hairs.

Mandibles smooth and shiny, with few scattered punctures; head dorsum reticulate-costulate, lateral costulae attain compound eye and posteriorly vertexal margin; dorsopronotum and mesonotum longitudinally costate; dorsopropodeum transversely costate (about 10–12 costae on dorsal face), anterior half of the lateropronotum mostly smooth and glossy, sometimes with faint longitudinal costae; posterior half of the lateropronotum, mesopleuron and lateropropodeum covered by sparse longitudinal costae; nodes of petiole and postpetiole transversely costate; gaster smooth and glossy with sparse punctures.

Body Color. Concolorous Reddish Brown.

Etymology. From Latin, *bidens*, referring to the subpostpetiolar process forming a pair of well-defined teeth.

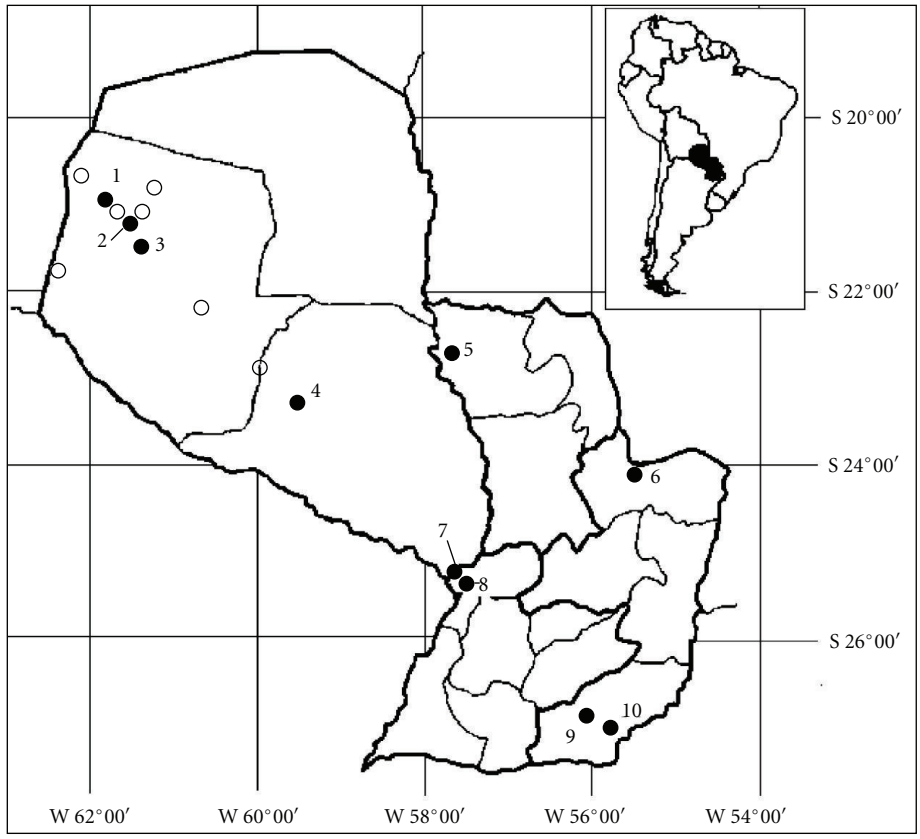


Figure 1: Distribution of *Oxyepoecus* in Paraguay. In this country, seven species have been reported: *O. bidentatus* n. sp. (collected at localities 2, 3, 4), *O. bruchi* (7), *O. inquilinus* (1, 2), *O. rastratus* (2, 3, 6, 10), *O. reticulatus* (9), *O. striatus* n. sp. (4), and *O. vezenyii* (2, 3, 5, 8). Localities are (1) Nueva Asunción, (2) Teniente Enciso National Park, (3) Garrapatal, (4) Río Verde, (5) Puerto Max, (6) Reserva Natural del Bosque Mbaracayú, (7) San Lorenzo, (8) Luque, (9) Santa María, and (10) Pastoreo. For information, localities of the Paraguayan dry Chaco sampled by Delsinne et al. [15, 16] but where no *Oxyepoecus* species were collected are also shown on the picture (empty symbols).

Distribution. Oxyepoecus bidentatus was found in three localities of the Paraguayan dry Chaco (Figure 1). Because the maximal distance between localities was 340 km, *O. bidentatus* is suspected to be widely distributed in xeromorphic Chacoan forests, even if rarely found.

Type Series

Holotype worker. Paraguay: Presidente Hayes: Río Verde, Lat: S 23.22, Long: W 59.20, 15-16.X.2003, Delsinne T., 24-hour pitfall sample (specimen number 29272, SIDbase [19], RBINS). Images of the holotype are available at http://projects.biodiversity.be/ants.

Paratype workers. Paraguay: Presidente Hayes: Río Verde, Lat: S 23.22, Long: W 59.20, 15-16.X.2003, Delsinne T., one worker, 24-hour pitfall trap, specimen number 32013, MCZC; Boquerón: T. Enciso N.P., Lat: S 21.21, Long: W 61.66, 03–05.XI.2001, Leponce M., five workers in three Winkler samples, RBINS, INBP, specimen numbers 7598, 7683, 7684, 7698, and 32605 (scanning electron microscope (SEM) pictures of the specimen number 7684 are available at http://projects.biodiversity.be/ants); Boquerón: Garrapatal, Lat: S 21.45, Long: W 61.49, 05-06.XI.2001, Leponce M., one worker, Winkler sample, specimen number 24606, RBINS.

Comparison. Oxyepoecus bidentatus is the only species of the genus to have both the dorsal surface of the head entirely covered by sculpture and a bidentate subpostpetiolar process. The anterior subpostpetiolar process of *O. bruchi* of the *vezenyii* species-group is also prominent and bidentate [1, 3], but the dorsal surface of the head is mainly smooth and shining except for two patches of fine, longitudinal rugulae which do not reach posteriorly to the vertex margin nor laterally to the compound eye. Criteria separating *O. bidentatus* from other species of the *rastratus* species-group are the mesopleuron and lateropropodeum covered by longitudinal costae (and not reticulate as for *O. myops, O. rosai,* and *O. reticulatus*), and the presence of a reticulate-costulate sculpture on the dorsal surface of the head reaching posteriorly to the vertexal margin and laterally to the compound eye.

Biology. The fact that workers were extracted from leaf litter (Winkler method) or were collected in pitfall samples, while

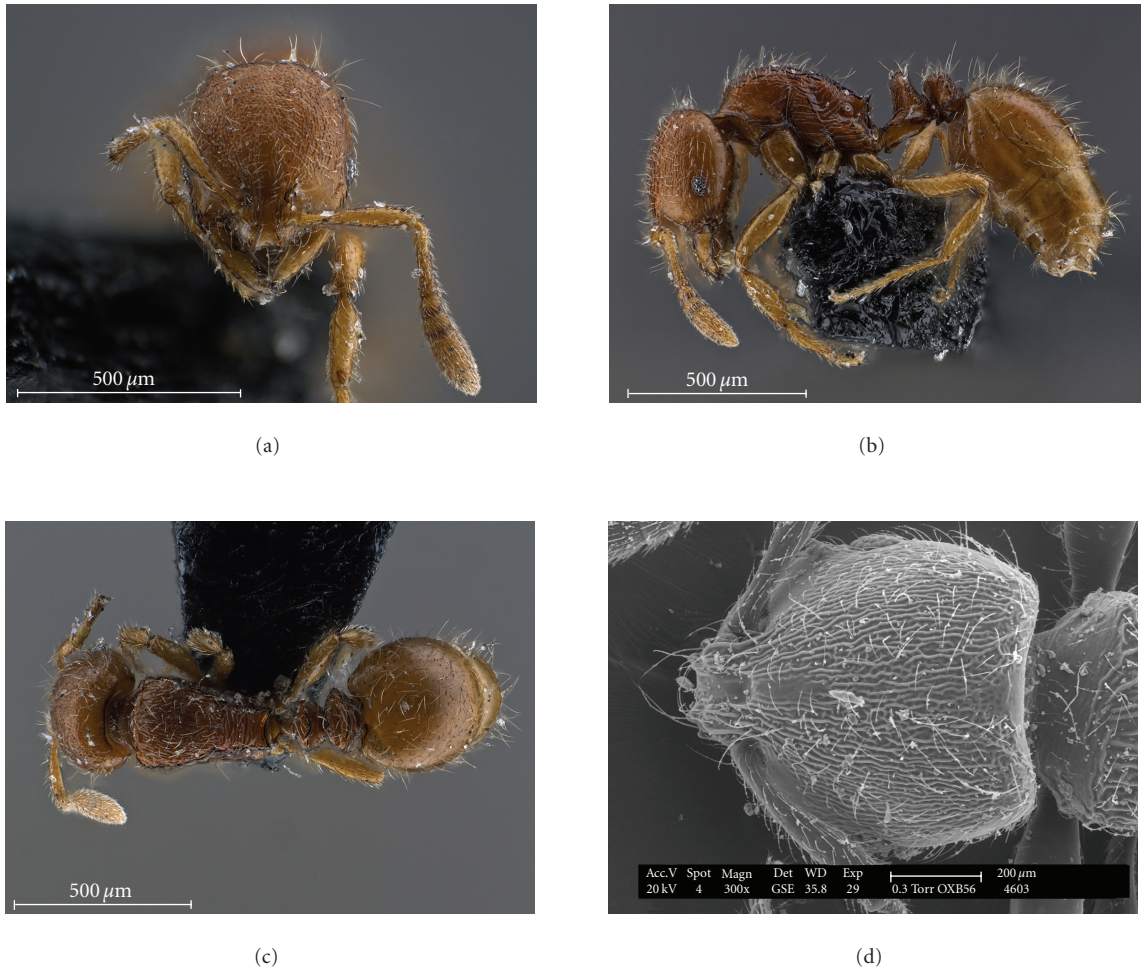


Figure 2: *Oxyepoecus bidentatus* Delsinne and Mackay, n. sp.; holotype worker (number 29272): in frontal (a), lateral, (b) and dorsal views (c); paratype worker (number 7684): detail of the vertex sculpture (d). Note the dorsal surface of the head entirely reticulate-costulate (a, d) and the subpostpetiolar process bidentate (b).

no gynes were found, suggests that this species nests in the soil, but workers forage in the leaf litter when abiotic conditions are favorable. Localities where the species was found have a mean annual rainfall and temperature ranging from 593 to 887 mm and from 23 to 25°C, respectively [16].

4.2. Oxyepoecus bruchi [1]. Paraguay: Central: San Lorenzo, Lat: S 25.33, Long: W 57.55, 4.X.1979, Vaucher C., one worker, specimen code CASENT0178098, ALWC. The specimen has been imaged and is available on AntWeb (http://www.antweb.org/).

4.3. Oxyepoecus inquilinus [11]. Paraguay: Boquerón: T. Enciso N.P., Lat: S 21.21, Long: W 61.66, 03–05.XI.2001, Leponce M., two workers from one Winkler sample, specimen numbers 7617, and 7619, RBINS (SEM photographs of the specimen number 7617 are available at http://projects.biodiversity.be/ants); Boquerón: Nueva Asunción, Lat: S 20.70, Long: W 61.93, 02–06.XI.2001, Leponce M., two workers in two four-day pitfall traps, specimen numbers 30660, 30678, RBINS.

4.4. Oxyepoecus rastratus [8]. Paraguay: Canindeyú: Reserva Natural del Bosque Mbaracayú, Jejuimi, Lat: S 24.1, Long: W 55.53, 02.V.1996, Wild A., seven workers and one dealate queen, collection code AW0129, ALWC, INBP, LACM (nest in red rotting log; wood was too hard for a full excavation; one chamber uncovered with gyne and brood), humid subtropical tall forest, one worker and the dealate gyne have been imaged and are available on AntWeb (http://www.antweb.org/), specimen codes CASENT0178099 and CASENT0178100, respectively; Boquerón: Teniente Enciso National Park, Lat: S 21.21, Long: W 61.66, 03–05.XI.2001, Leponce M., 28 workers and one gyne in eight Winkler samples, worker numbers 7302, 7303, 7746, 7633, 7634, 32602, 7646, 7647, 7674, 23778, 7669, 25221, 405701, RBINS, INBP, CWEM, gyne number 7662, RBINS (SEM photographs of the specimen number

23778 are available at http://projects.biodiversity.be/ants); Boquerón: Garrapatal, Lat: S 21.45, Long: W 61.49, 05-06.XI.2001, Leponce M., one worker, Winkler sample, specimen number 25221, RBINS.

In addition, data from the literature [4] include: Paraguay: Itapúa: Pastoreo, Lat: S 25.38, Long: W 55.83, 03.X. 1974, Duelli P., collection code 399, three workers.

4.5. Oxyepoecus reticulatus [7]. Paraguay: Itapúa: Santa María, no specific location information, 25.X.1982, Baud F., three workers, ALWC, one worker has been imaged and is available on AntWeb (http://www.antweb.org/), specimen number CASENT0178101.

4.6. Oxyepoecus striatus. Mackay and Delsinne, n. sp. (Figure 4).

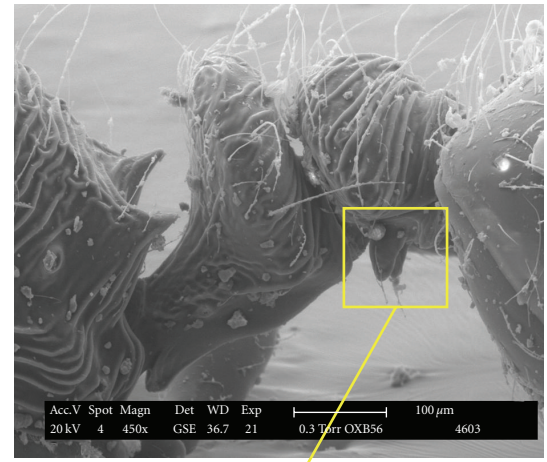
Diagnosis. Its worker morphology places this species within the *vezenyii* species-group [3]. The worker is a small specimen with longitudinal striae covering the promesonotum (Figures 4(c) and 4(d)) and transverse striae on the dorsopropodeum. The clypeal teeth are well defined and sharp. The gyne and male are unknown.

Description of the Worker. Measurements of holotype; paratypes ($n = 2$) between parentheses: TL 1.58 (1.6-1.7), HL 0.46 (0.46–0.48), HW 0.35 (0.35-0.36), EL 0.05 (0.07-0.07), SL 0.29 (0.29–0.31), PL 0.06 (0.06-0.06), PW 0.16 (0.17-0.18), PPL 0.08 (0.09-0.09), PPW 0.19 (0.21-0.22), WL 0.51 (0.49–0.51); CI 76 (75-76), SI 63 (62–65).

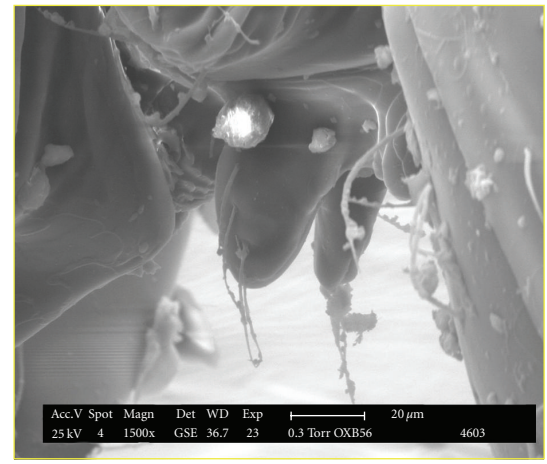
Mandible with four teeth, with diastema (gap) between basal and subbasal teeth; lateral clypeal teeth well-developed but small, not lobe-like, directed anteriorly; eye small, with about 18 ommatidia, five ommatidia in greatest diameter; scape in repose failing to reach posterior border of head by about two maximum widths; sides of head nearly straight, parallel, frontovertexal margin slightly convex; pronotal shoulder slightly marked with stria; inferior pronotal process well developed; notopropodeal groove poorly developed; propodeal angles developed, acute; subpetiolar process well developed, lobe-like, directed ventrally, anterior and posterior faces of petiole nearly parallel; two subpostpetiolar angles present, anterior and posterior faces of postpetiole nearly parallel; as seen from above, postpetiole much broader than petiole, postpetiole slightly angulate laterally.

Erect hairs abundant on mandibles, clypeus, dorsal surface of head, dorsum of mesosoma, petiole, postpetiole, all surfaces of gaster, legs with semierect hairs; appressed pubescence sparse, few hairs noticeable on head and gaster.

Mandibles smooth and shiny, with few scattered punctures, most of dorsum of head with scattered coarse punctures, medial area smooth and glossy, mesonotum with longitudinal parallel striae, dorsopropodeum with fine transverse striae, lateropronotum mostly smooth and glossy, mesopleuron and lateropropodeum striolate, nodes of petiole and postpetiole smooth and glossy, posterior face of postpetiole transversely striolate, gaster smooth and glossy.



(a)



(b)

Figure 3: *Oxyepoecus bidentatus* Delsinne and Mackay, n. sp.; paratype worker (number 7684): detail of petiole and postpetiole (a) and detail of the bidentate subpostpetiolar process (b).

Body color. Concolorous Medium Reddish Brown.

Etymology. From Latin, *stria*, referring to the striae covering the dorsum of the mesosoma.

Distribution. Known only from the type locality.

Type Series

Holotype worker. Paraguay: Presidente Hayes: Río Verde, Lat: S 23.22, Long: W 59.20, 15-16.X.2003, Delsinne T., 24-hour pitfall sample, specimen number 32606, MCZC.

Paratypes. Same data as holotype, three workers, in three 24-h pitfall samples, specimen numbers 29523, 29531, 29667, RBINS, INBP. Images of the specimen number 29531 are available at http://projects.biodiversity.be/ants.

Figure 4: *Oxyepoecus striatus* Mackay and Delsinne, n. sp.; paratype worker (number 29531): in frontal (a), lateral, (b) and dorsal views (c, d). Note the longitudinal striae covering the promesonotum (c, d).

Comparison. This species is a member of the *vezenyii* species-group [3] defined principally in having a predominantly smooth and glossy dorsum of the head. It is very similar to the relatively common *O. vezenyii*, but can be easily distinguished as the promesonotum of *O. vezenyii* is nearly completely smooth and glossy (the dorsopropodeum of *O. vezenyii* has transverse striae as in *O. striatus*).

Oxyepoecus striatus appears most similar to *O. browni*, which has a similar sculptured promesonotum, short posterior propodeal face, moderately well-developed costulae between the frontal carinae, and a large lobe-like subpetiolar process. *Oxyepoecus striatus* can be separated as being smaller; the clypeal teeth are well defined, sharp, and directed anteriorly (not lobe-like and directed inward). The frontal lobes are more widely spaced than those of *O. browni* (separated by 0.11 mm) and the head is covered by coarse punctures (except for the smooth medial area).

Biology. The specimens were collected in three separate pitfall samples. The mean annual rainfall and temperature of the locality where the species was found were 887 mm and 23°C, respectively [16].

4.7. Oxyepoecus vezenyii [10]. Paraguay: Boquerón: T. Enciso N.P., Lat: S 21.21, Long: W 61.66, 03–05.XI.2001, Leponce M., 23 workers and five gynes in 12 Winkler samples, worker numbers 7692, 7726, 7737, 7738, 7744, 7690, 7691, 7599, 32603, 32604, 7659, 7660, RBINS, INBP, CWEM, (SEM photographs of the specimen number 7737 are available at http://projects.biodiversity.be/ants), gyne numbers 7753, 7731, 22806, 7661, 7618, RBINS; Boquerón: Garrapatal, Lat: S 21.45, Long: W 61.49, 05-06.XI.2001, Leponce M., one worker, Winkler sample, specimen number 24598, RBINS; Central: Luque, Lat: S 25.27, Long: W 57.57, 11.VIII-6.X. 1982, Kochalka J., Pitfall trap, sample code IBN230, two workers, one of them has been imaged and is available on AntWeb (http://www.antweb.org/), specimen code CASENT0178102, ALWC.

In addition, the type specimen (worker) was collected in Paraguay (Concepción: Puerto Max Forel) [9].

5. Key to the Workers of Oxyepoecus in Paraguay

(1) Cephalic dorsum entirely sculptured (Figure 2(a); 2).

(1′) Cephalic dorsum completely smooth or with at least a smooth median frontal stripe (Figure 4(a); 4).

(2) Mesopleuron and lateropropodeum covered by longitudinal costae (Figure 4(b); 3).

(2′) Mesopleuron and lateropropodeum irregularly reticulate and punctuate *O. reticulatus*.

(3) Cephalic dorsum with dense costulae, subpostpetiolar process shaped as transverse crest, triangular in side view, not bidentate *O. rastratus*.

(3′) Cephalic dorsum with reticulated costulae, subpostpetiolar process prominent and bidentate (Figure 3) *O. bidentatus* n.sp.

(4) Eyes large, with more than 40 ommatidia in total *O. inquilinus*.

(4′) Eyes small, with about 20 ommatidia in total (Figure 4(b); 5).

(5) Subpostpetiolar process prominent and bidentate with anteriormost process much larger than posterior tooth *O. bruchi*.

(5′) Subpostpetiolar process with two subparallel crests of approximately equal size (Figure 4(b); 6).

(6) Promesonotum nearly entirely smooth and glossy *O. vezenyii*.

(6′) Promesonotum covered with longitudinal striae (Figures 4(c) and 4(d)) *O. striatus* n. sp.

6. Discussion

Seven *Oxyepoecus* species are recorded from Paraguay. Two of them are new species described in this paper: *O. bidentatus* and *O. striatus* from the *rastratus* and *vezenyii* species-groups, respectively. These species-groups now include eight and 12 species, respectively. *Oxyepoecus bidentatus* was found in three localities, 20 to 340 km away from each other, indicating that this species may be widely distributed within the Paraguayan dry Chaco. *Oxyepoecus striatus* is only known from the type locality.

Oxyepoecus rastratus was documented from South and South-East Brazil and from Eastern Paraguay [4]. Its presence at T. Enciso N.P. increases its range nearly 700 km to the West. In addition, samples in the dry Chaco and in the Paraná forest suggests that this species may be present in a variety of biomes.

Oxyepoecus reticulatus has been recorded in a dozen localities in South and Southeastern Brazil, mainly in relatively dry forests [4]. The Paraguayan data increase its distribution by nearly 360 km to the West.

Oxyepoecus bruchi was collected in 1948 and 1953 in Argentina (Córdoba and Tucumán provinces) and more recently (2003) in Brazil (Palhoça, Santa Catarina State) [3, 4, 7]. Only one specimen was collected in 1979 in Paraguay (Central). Although the species was rarely collected, its distribution seems potentially large. Nevertheless, *O. bruchi* appears locally rare, justifying its vulnerable status [13]. This species is suspected to be an inquiline of the ants *Pheidole rosae* (named *Ph. silvestrii* in [7]) and *Ph. obtusopilosa* [1, 7, 11], but these species were not present in our samples and, to our knowledge, have not been collected in Paraguay [10].

Oxyepoecus inquilinus was sampled in two localities of the Paraguayan dry Chaco. In the literature, *O. inquilinus* was reported from two savanna localities of the Brazilian Cerrado [7], one Brazilian pasture [4], one anthropogenic area (i.e., the "Jardin del Instituto Miguel Lillo") from the Argentinean Tucumán province [11], and one locality in the Bolivian Beni Department [7]. In addition, one worker closely related to *O. inquilinus* was collected in a savanna-morichal habitat from Colombia, but its specific status awaits further investigation [2]. Finally, *O. inquilinus* was recently sampled in a Valdivian forest of Chile [5]. If the identity of the Colombian specimen is confirmed, *O. inquilinus* is the most broadly distributed species of the genus. In fact, its Colombian and Chilean localities represent both the northernmost and southernmost limits of distribution for the entire genus. Although data are insufficient to determine the exact requirements of this species, *O. inquilinus* seems to be present both in open and closed habitats, in degraded and pristine ecosystems, and in dry and wet areas. The distribution of this species seems large but discontinuous, and *O. inquilinus* is apparently locally rare, justifying its vulnerable status [13]. *O. inquilinus* is suspected to be inquiline in *Pheidole radozskowskii* nests [11]. At T. Enciso N.P., the same Winkler sample collected two workers of *O. inquilinus* and 11 workers of *Ph. radozskowskii*. However, at Nueva Asunción the latter was not recorded in our 60 Winkler and 60 pitfall samples, suggesting that *O. inquilinus* is not restricted to this host species.

With the exception of the Paraguayan type specimen [9], *Oxyepoecus vezenyii* is exclusively known from Brazil where it was sampled in different ecosystems over a large spatial scale [3, 4]. The presence of this species in the Paraguayan dry Chaco increases its range nearly 400 km to the West.

In this study, *Oxyepoecus* individuals were mainly collected using the Winkler extraction method. This technique is highly effective for sampling minute and cryptic ant species which were previously suspected to be rare before the development of the method [20, 21]. This may be the case for *Oxyepoecus* species [3]. Nevertheless, in dry forests the Winkler sampling is strongly influenced by the rainfall regime, and a recent rainfall may increase its efficiency both in terms of species collected and species occurrences [15]. Teniente Enciso National Park was the single locality of the dry Chaco sampled a day after a rainfall. This bias may be the reason why a relatively large number of *Oxyepoecus* species and individuals were collected in this park and just a few in the other dry Chacoan localities. We hypothesize that using the Winkler method during the rainy season of the Paraguayan dry Chaco (December–April) [22] will increase the probability of collecting *Oxyepoecus*.

Oxyepoecus ants appear diversified and well established at Teniente Enciso National Park, where 58 individuals

representing four species were collected during a single sampling session (03–05.XI.2001). This locality may hence constitute a promising reference site to undertake studies concerning these poorly known myrmicinae. Moreover, the presence of *O. inquilinus* at T. Enciso N.P. emphasizes the biological conservation importance of this park.

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