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United States (Coleoptera: Scarabaeoidea: Ochodaeidae)

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A new species of *Parochodaeus* Nikolajev from the southwestern United States (Coleoptera: Scarabaeoidea: Ochodaeidae)

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Abstract. A new species of *Parochodaeus* Nikolajev (Scarabaeoidea: Ochodaeidae) with extremely small adults is described from west Texas, *P. pixius* Paulsen. The species is compared with the sympatric *P. biarmatus* (LeConte), to which it is most similar in size.

Keywords. Systematics, Ochodaeidae, United States, new species

Introduction

The genus *Parochodaeus* Nikolajev (Scarabaeoidea: Ochodaeidae) is distributed in the New World from the Great Plains of the United States to central Argentina. Adults are most commonly encountered in dry, sandy areas; larvae are not known for any species of Nearctic ochodaeines. Among the Ochodaeidae, adults of *Parochodaeus* can be distinguished by their elytral locking mechanism consisting of acute elytral apices that interlock with two tubercles on the propygidium (Nikolajev 1995; Paulsen 2007). Some *Parochodaeus* are difficult to identify because the species exhibit considerable intra-specific variation, and this may suggest the presence of cryptic species. This is especially true for the taxa similar to *P. biarmatus* (LeConte), which are frequently identified to the '*P. biarmatus*-complex' in collections. It is likely that multiple taxa are present within this complex, and that additional species will be recognized in the future. In general, the distinguishing characters of specimens placed in the '*P. biarmatus*-complex' are their small size, relatively short elytral setae, and, most importantly, the irregularly dentate posterior margin of the metafemur (Fig. 1). In addition, all specimens of the complex examined are the only members of *Parochodaeus* that have lateral flange-like extensions of the abdominal sternites that reach the elytral margin.

In August 2006, my colleagues and I collected in west Texas using UV lights. During one collecting event in Culberson County, the small size of some ochodaeids was remarkable, even considering that *P. biarmatus* can be quite small and size variation of ochodaeids is often pronounced. Upon examination of the specimens, '*P. biarmatus*-complex' and the larger *P. pectoralis* (LeConte) were both present, but the smallest specimens could not be assigned to these species. These individuals lacked both the dentate posterior margin of the metatibia and the flanged abdominal sternites that are present on even the smallest individuals of *P. biarmatus*. Upon further examination, the size of the pronotal punctures was found to differ between the two taxa. This difference was illustrated by SEM (Fig. 2-3), which showed much larger, subocellate punctures in even the smallest specimens of *P. biarmatus* compared with fine punctures in the undetermined specimens. In addition, characters of the mentum, stridulatory peg, and male genitalia discussed below distinguish the two taxa. Due to these morphological differences, the species is described below as new.

Materials and Methods

Taxonomic Material. Specimens examined for this study, all of which were collected by the author in a single collecting event, are deposited in the following institutions and private collections.

CMNC	Canadian Museum of Nature, Ottawa, Canada
FMNH	Field Museum of Natural History, Chicago, IL, USA
FSCA	Florida State Collection of Arthropods, Gainesville, FL, USA

MJPC	M.J. Paulsen Collection, Lincoln, NE, USA
PKLC	Paul K. Lago Collection, Oxford, MS, USA
TAMU	Texas A&M Insect Collection, College Station, TX, USA
UNSM	University of Nebraska State Museum, Lincoln, NE, USA

Morphological Characters

Important characters for distinguishing species in the genus *Parochodaeus* include the armature of the legs and head, dorsal vestiture and punctation, stridulatory peg, first metatarsomere, and mentum. The leg armature may consist of teeth at the apex of the metafemora or metatibia, or the legs may be unarmed. Particularly important for species in *Parochodaeus* is the presence (*P. biarmatus*-complex) or absence of a toothed or serrate posterior margin on the distal half of the metafemur (Fig. 1). The dorsal vestiture can vary between species from short bristles to a longer, “shaggy” appearance. Each setose puncture may be associated with an anterior tubercle, and the surface between punctures can be tuberculate or smooth. The presence or absence of a stridulatory peg of the abdomen can be diagnostic, and to some extent the shape of the peg can be also when present. In one group of *Parochodaeus* species (*P. pectoralis*-complex *sensu* Carlson 1975) the first segment of the metatarsus is greatly enlarged and often curved. In this same group, the mentum may be strongly protuberant and form a downwardly pointing projection. The male external genitalia are weakly sclerotized and nondescript, with informative characters restricted to the sclerotized teeth and bristles of the internal sac. Unfortunately, the internal sacs are difficult to dissect if the specimens were collected directly into alcohol or were not recently collected.

Taxonomic Treatment

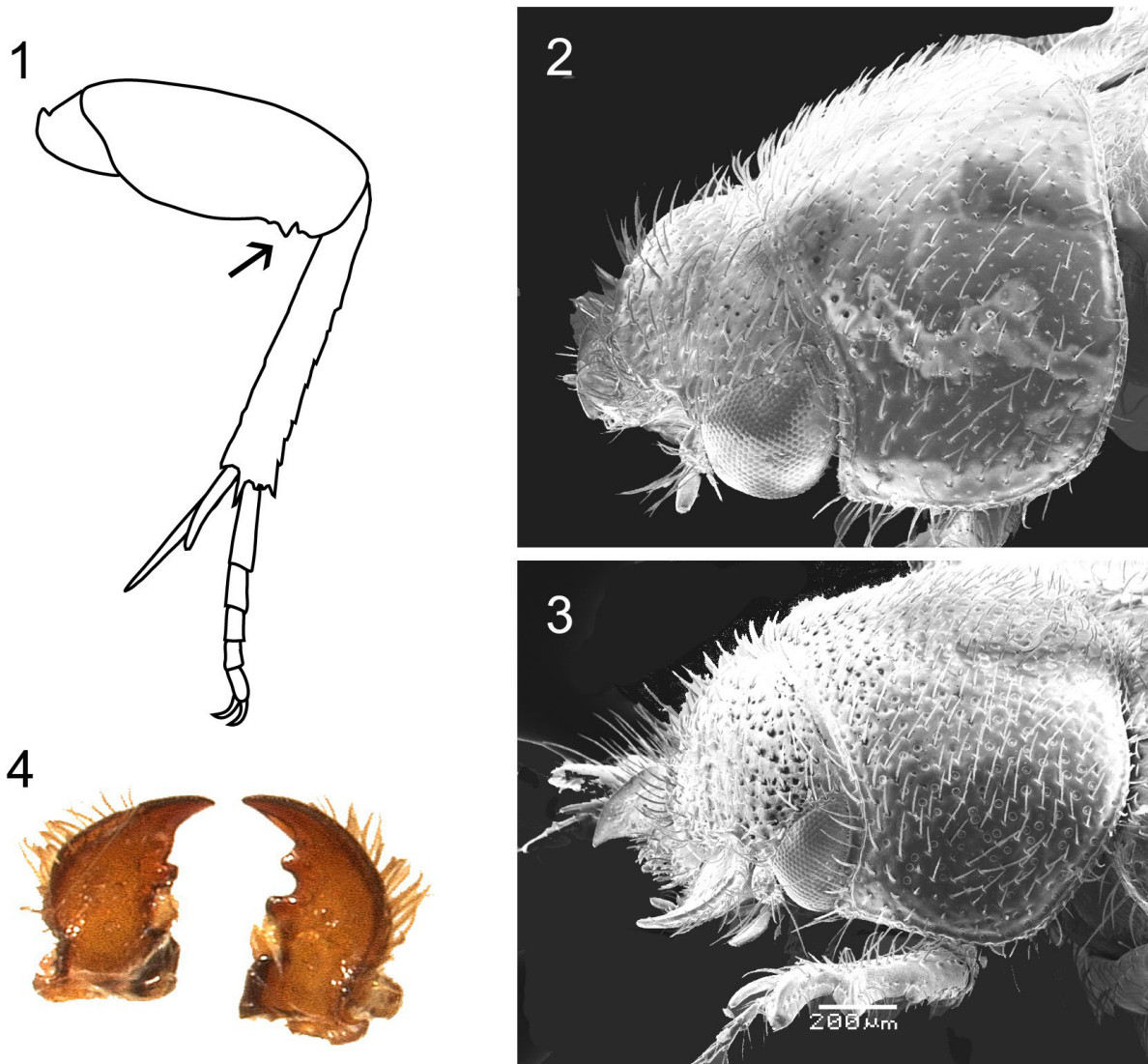
Parochodaeus pixius Paulsen, new species

(Figures 2, 4, 5)

Type material. Holotype male (TAMU) labeled: a) “USA: TEXAS: CULBERSON Co./ Pine Springs, UV light, N31.877° / W104.825°; 1763m; 19.VIII.2006 / MJ Paulsen, AD Smith, R Smith”; b) red holotype label “*Parochodaeus / pixius* Paulsen ♂/ HOLOTYPE”. Allotype female (TAMU) labeled: a) as holotype; b) red allotype label “*Parochodaeus / pixius* Paulsen ♀/ ALLOTYPE”. 12 paratypes deposited at CMNC, FMNH, FSCA, MJPC, PKLC, UNSM labeled: a) as holotype; b) yellow paratype label “*Parochodaeus / pixius* Paulsen / PARATYPE”.

Type locality. USA: Texas: Culberson County: Pine Springs.

Description, holotype male. **Length:** 3.5 mm. **Width:** 1.7 mm. **Color:** Reddish brown, shiny. **Head:** Surface lacking tubercles or carinae, punctate; punctures fine to coarse, with short setae. Clypeus subtrapezoidal, short (length equal to 1/5 width). Antennae with ten antennomeres. Mandibles rounded externally, apices acute and each with 1-2 peg-like internal teeth (Fig. 4). Mentum broadly concave for entire length (anteriorly emarginated in *P. biarmatus*). **Pronotum:** Surface shiny, tuberculate, punctate between tubercles; tubercles weak, setose; punctures fine (Fig. 2), lacking setae. **Elytra:** Surface shiny, slightly wrinkled. Striae with elongate, moderate punctures. Intervals with 2-3 irregular rows of small, setose tubercles; setae short, erect. **Legs:** Metafemur with posterior margin entire (not toothed in distal half). Metatibia straight, narrow (>4× longer than wide) expanding gradually to apex. **Abdomen:** Sternites 1-5 shiny, sparsely punctate in basal half only; punctures setose; setae decumbent. Sternite 6 more densely punctate. Posterolateral margin of sternites contiguous with pleurite, not expanded (sternites lacking lateral flange that contacts elytral margin as in *P. biarmatus*-complex). Stridulatory peg narrow, not strongly sclerotized. **Male genitalia:** Internal sac with groups of small spinules only, lacking hooks, barbs, or serrate plates *sensu* Carlson (1975).



Figures 1-4. *Parochodaeus* spp. 1) Ventral view of left hindleg of *Parochodaeus biarmatus*. Arrow indicating toothed posterior margin of the metatibiae. 2) Pronotal punctation in *Parochodaeus pixius* n.sp., with fine punctures between the setae. 3) Pronotal punctation in *Parochodaeus biarmatus*, with large punctures between the setae. 4) Mandibles of *P. pixius*.

Description, allotype female. *Length:* 3.5 mm. *Width:* 1.7 mm. Differs from male holotype in the following external characters: **Head:** Clypeus longer, length about equal to $\frac{1}{4}$ width. **Abdomen:** Sternite 6 shiny, less densely punctate.

Description, variation in paratypes. *Length:* 2.6 – 4.0 mm. *Width:* 1.5 – 1.8 mm. Differs from holotype in the following external characters: **Head:** Mandibles occasionally with 1 inner tooth reduced.

Distribution. UNITED STATES: TEXAS: Culberson Co.: Pine Springs (13).

Temporal Distribution. August (13).

Diagnosis. Adults of *P. pixius*, although externally nondescript (Fig. 5), can be separated from the '*P. biarmatus*-complex' by the lack of teeth on the hind margin of the metafemur and the fine, rather than coarse, punctures scattered between the setose punctures of the pronotum (Fig. 2). In addition,



Figure 5. Dorsal habitus of *P. pixius*. Scale bar = 2 mm. Inset with actual size of *Parochodaeus* spp. from the type locality, from left: *P. pectoralis*, *P. biarmatus*, and *P. pixius*.

the abdominal sternites lack the lateral flange that reaches the elytral margin as in *P. biarmatus*.

Etymology. The name is a Latinized form of the English word ‘pixie’, meaning small, and is masculine in gender.

Remarks. Specimens are known only from a single collecting event on HWY 62 near the Guadalupe Mountains. Two subsequent attempts to collect specimens at the same locality in August 2010 produced none. I have not located additional specimens in other collections studied thus far, including most major North American collections. This argues that the species is either temporally or geographically restricted. If the species is geographically restricted to a small, relatively dry area with high seasonality it could suggest that adult activity is strongly influenced by recent precipitation events. As such, it is possible that the species may be active for only a short period and the timing of the 2006 collecting event was coincidental. However, this specificity is not found with most *Parochodaeus* species, which are generally widespread and active from late spring until early fall. Another possibility is that the area sampled is not ideal and the actual habitat is located within the nearby Guadalupe Mountains National Park, potentially at higher elevation. Due to the park’s protected status, these higher elevations were not investigated and the species’ distribution within the park remains unknown. As for all other Nearctic ochodaeines larvae remain unknown.

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