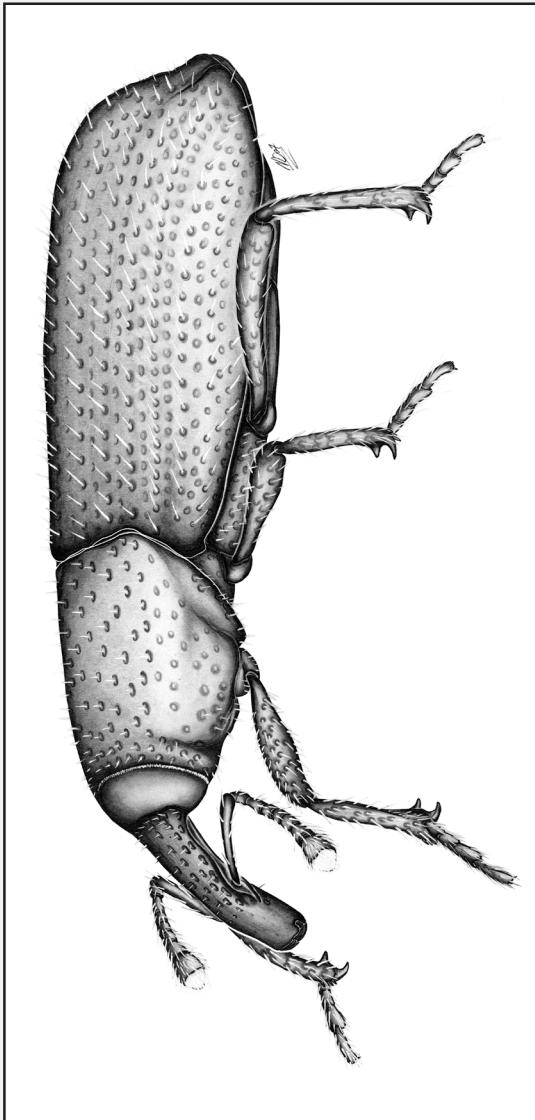


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Speleological Monographs, Number 7



Studies on the
**CAVE AND
ENDOGEAN
FAUNA**
of North America
Part V

Edited by James C. Cokendolpher
and James R. Reddell

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STUDIES ON THE
CAVE AND ENDOGEAN FAUNA
OF NORTH AMERICA,
PART V

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FURTHER ANTS (HYMENOPTERA: FORMICIDAE) FROM CAVES OF TEXAS

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ABSTRACT

An annotated list of the 41 species of ants recorded from caves in Texas is provided. Previously published records are given just by cave name and county; whereas new collections are recorded by cave name, date, and collectors. More detailed information about *Labidus coecus* and *Solenopsis invicta* is provided because these are the two main ant species found in caves of central and southern Texas (the area of largest limestone karst in the state).

At least 36 species of ants were recorded from Texas caves by Reddell and Cokendolpher (2001). Here, we further list an additional five species; one being an uncommon endogeal species (*Discothyrea testacea* Roger), which is the first record from the state of Texas and the furthest west for the species. A *Leptogenys* sp. is recorded for the first time from the U.S.A. Illustrations of this ant are provided; it has not been identified to species and may be undescribed. Photographs and records are provided showing ants preying on a variety of foods within caves, and a troglobitic spider eating an ant.

RESUMEN

Se presenta una lista de las 41 especies de hormigas registradas en cuevas en Texas. En reportes previos sólo es dado el nombre de la cueva y el condado; mientras que las nuevas colectas se registran con el nombre de la cueva, fecha, y colectores. Se proporciona más información detallada sobre *Labidus coecus* y *Solenopsis invicta* debido a que estas son las principales especies que se encuentran en las cuevas del centro y sur de Texas (la zona kárstica más grande del estado).

Al menos 36 especies de hormigas fueron registradas de cuevas de Texas por Reddell y Cokendolpher (2001). Aquí, reportamos cinco especies adicionales; una es una especie endogeal poco común (*Discothyrea testacea* Roger), que es el primer registro del estado de Texas y el límite occidental para la especie. Se registra *Leptogenys* sp. por primera vez de los E.U. Se proporcionan ilustraciones de esta hormiga, que no ha sido identificada a especie, y podría ser una especie aún no descrita. Incluimos fotografías y registros de hormigas consumiendo una variedad de alimentos adentro de las cuevas, y una araña troglobia comiendo una hormiga.

INTRODUCTION

With few exceptions (e.g., Roncin, et al., 2001; Roncin and Deharveng, 2003) ants reported from caves (Decu, et al., 1998; Reddell and Cokendolpher, 2001; Tinaut and Lopez, 2001; Wilson, 1962) are likely incidental or accidental, having little or no particular affinity for the cavernous habitat. Some ants use a cave entrance as a temporary place where it is cooler and moister. A few Ponerinae ants are food specialists eating terrestrial isopods, Collembola, spiders' eggs, etc., and therefore may find moist cave entrances filled with leaf litter as an ideal habitat. Only the Red Imported Fire Ant (*Solenopsis invicta* Buren) and the Subterranean Army Ant (*Labidus coecus* Latreille) appear to go deep inside caves to search for moisture and prey. The fire ant is such an efficient predator in caves that it has been cited as a threat and part of the reason some troglobitic arachnids were listed as endangered species (Longacre, 2000).

At least 36 species of ants were recorded from Texas caves by Reddell and Cokendolpher (2001). An addi-

tional five species found associated with caves are recorded. A *Leptogenys* species is recorded for the first time from the U.S.A. Illustrations of this ant are provided; it has not been identified to species. Photographs and records are provided showing ants preying on a variety of foods within caves, and a troglobitic spider eating an ant. Most of the species recorded only to genus by Reddell and Cokendolpher (2001) are identified to species in this article.

MATERIALS AND METHODS

Vouchers for observations and records have been deposited in the Texas Natural History Collection (Austin), Museum of Texas Tech University (Lubbock), and Illinois Natural History Survey (Urbana). Field samples were fixed/preserved in 70-80% ethanol. In the laboratory, some specimens were dabbed on tissue paper to dry the surface and then air-dried slightly more to see surface sculpture better.

The specimens for study with the electron microscope were air dried and attached to a temporary SEM stub coated with carbon tape. Both specimens were examined with a Hatachi S-4300SE/N. This scope is an environmental SEM and therefore the samples were not critical point dried or sputter coated. Both were examined while under 70 Pa of vacuum.

Notes on distribution of Texas ants follow information provided by O'Keefe, et al. (2000). We are following the arrangement of subfamilies used by Bolton (2003): Dolichoderinae, Formicinae, Ecitoninae, Ponerinae, Proceratiinae, and Myrmicinae

Subfamily Dolichoderinae *Forelius pruinosus* (Roger)

New record.—*Bexar County*: Pain in the Glass Cave (Camp Bullis), 28 Oct. 2004 (J. Krejca, P. Sprouse).

Comment.—This is the first record of this species from a cave in Texas and the first record of the species for Bexar County. It is otherwise widespread across Texas.

Liometopum apiculatum Mayr

Previous Cave Record (Reddell and Cokendolpher, 2001).—*Brewster County*: O.T.L. Cave.

Comment.—The species is widespread and nests arboreally.

Subfamily Formicinae *Camponotus decipiens* Emery

New Record: *Bell County*: Raining Rattler Cave (Fort Hood), 28 Nov. 2007 (M. Reyes).

Previous Cave Record (Reddell and Cokendolpher, 2001).—*Burnet County*: Simons Road Side Sink No. 1.

Comment.—This is the first record of the species in Bell County. It is reported from scattered counties across Texas.

Camponotus festinatus (Buckley)

New Record.—*Bexar County*: Eagles Nest Cave (Camp Bullis), 14 Dec. 2000 (J. Reddell, M. Reyes).

Previous Cave Record (Reddell and Cokendolpher, 2001).—*Sutton County*: Felton Cave.

Comment.—The species is a widespread soil nesting species in Texas.

Camponotus nearcticus Emery

New Records.—*Bell County*: Hackberry Cave (Fort Hood), 12 June 2004 (M. Reyes, M. Warton); Tweedledee Cave (Fort Hood), 5 June 2004 (M. Reyes, M. Warton). *Bexar County*: Bunny Hole (Camp Bullis), 12 Aug. 2004 (J. Reddell, M. Reyes); Root Canal Cave (Camp Bullis), 2 Aug. 2005 (J. Krejca). *Coryell County*: Sperry Cave (Fort Hood), 5 June 2006 (C. Pekins, J. Reddell, M. Reyes). *Kendall County*: Glen Rose Cave, 4 March 1999 (M. Reyes, M. Warton).

Previous Cave Records (Reddell and Cokendolpher, 2001).—*Bexar County*: Backhole Cave (Camp Bullis). *Kendall County*: Glen Rose Cave.

Comment.—The species was previously recorded from Kendall County as *Camponotus* sp. (Reddell and Cokendolpher, 2001). These are the first identified records for the species in Bell, Coryell, and Kendall Counties. The species is widespread across Texas.

Camponotus sansabeanus (Buckley)

Previous Cave Records (Reddell and Cokendolpher, 2001).—*Hays County*: Ezell's Cave. *Williamson County*: Elm Water Cave.

Camponotus semitestaceus Snelling

Previous Cave Record (Reddell and Cokendolpher, 2001).—*Williamson County*: Yearwood Gold Mine Cave.

Camponotus texanus Wheeler

New Records.—*Bell County*: Collapse Sink (Fort Hood), 27 Nov. 2007 (M. Reyes); Herbert Cave (Fort Hood), 10 Sept. 1997 (L. J. Graves, M. Reyes); Leopard Frog Cave (Fort Hood), 8 Feb. 2006 (J. Reddell, M. Reyes); Price Pit Cave (Fort Hood), 20 July 2008 (J.

Reddell, M. Reyes); String Ball Sink (Fort Hood), 3 April 2007 (J. Reddell); Thumbs Up Cave (Fort Hood), 12 Nov. 2005 (M. Reyes). *Coryell County*: Chigoux's Cave (Fort Hood), 21 Nov. 1995 (J. Reddell, M. Reyes); 10 Sept. 1997 (J. Reddell, M. Reyes); Copperhead Cave (Fort Hood), 9 March 2005 (J. Reddell, M. Reyes).

Previous Cave Records (Reddell and Cokendolpher, 2001).—*Bell County*: Nolan Creek Cave (Fort Hood), Herbert Cave (Fort Hood). *Bexar County*: Encino Park Cave (=Here Today, Gone Tomorrow Cave), Headquarters Cave (Camp Bullis). *Coryell County*: Chigoux's Cave (Fort Hood).

Comment.—Some records of this species were earlier recorded as *Camponotus* sp. (Reddell and Cokendolpher, 2001). This is the first record of the species for Coryell County. The species is known from scattered localities across Texas.

Formica gnava Buckley

New Record.—*Sutton County*: Harrison Cave, 20 Nov. 2004 (J. Kennedy).

Previous Cave Record (Reddell and Cokendolpher, 2001).—*Hardeman County*: Campsey Cave.

Comment.—This is the first correctly identified record of the species from a cave in Texas. The species ranges from central to western Texas. Reddell and Cokendolpher, 2001) reported a *Formica* sp. (*fusca* group) which was identified by A.C. Cole, in 1964. That specimen is not currently available for restudy, but it is almost certainly *F. gnava* as this is the only *fusca* group member recorded from this region of Texas.

Paratrechina arenivaga (Wheeler)

New Records.—*Bexar County*: Canyon Ranch Shelf Cave, 9 Aug. 2002 (C. Collins, K. White). *Edwards County*: Deep Cave, 3 March 2005 (A. Gluesenkamp).

Comment.—This is the first record of the species from caves in Texas. These are the first records of the species in Bexar and Edwards Counties. The species is recorded from widely scattered localities across Texas.

Paratrechina terricola (Buckley)

New Records.—*Travis County*: Cortana Feature 4 and leaf litter, 9 Oct. 2007 (R. Myers, K. McDermid); Down Dip Sink, 5 April 2007 (P. Sprouse); Karst Feature F4, 26 Sept. 2006 (J. Krejca). *Val Verde County*: Stella's Cave, 28 April 2007 (J. Kennedy, M. Sisson).

Previous Cave Record (Reddell and Cokendolpher, 2001).—*Bexar County*: Droll Cave. *Sutton County*: Caverns of Sonora.

Comment.—The species is widespread in Texas.

Paratrechina vividula (Nylander)

New Record.—*Kinney County*: Baker's Crossing Cave, 30 April 1995 (A. Grubbs).

Previous Cave Records (Reddell and Cokendolpher, 2001 as *Paratrechina* spp.)—*Kinney County*: Baker's Crossing Cave. *Williamson County*: Beck Horse Cave, Priscilla's Cave.

Comment.—This is the first record of this species identified from caves in Texas and in Kinney and Williamson Counties. The species is widespread in Texas.

Subfamily Ecitoninae

Labidus coecus (Latreille)

Figs. 1-4

New Records.—*Bell County*: Dillo Sink (Fort Hood), 29 Oct. 2002 (M. Reyes, M. Warton); Endless Pit Cave (Fort Hood), 19 Jan. 2005 (M. Reyes); Legless Visitor Cave (Fort Hood), 22 Oct. 2005 (H. Johnson, M. Warton); Lost Chasm Cave (Fort Hood), 25 July 2007 (J. Reddell, M. Reyes); 20 July 2008 (J. Reddell, M. Reyes); Lunch Counter Cave (Fort Hood), 10 April 2002 (J. Reddell, M. Reyes); 31 January 2007 (S. J. Taylor, J. K. Krejca, C. Pekins, T. Marston, R. Myers); Missing Chasm Cave (Fort Hood), 4 Feb. 2005 (J. Fant); Squiggles Sink (Fort Hood), 30 Jan. 2005 (J. Fant, M. Reyes); Tres Dedos Cave (Fort Hood), 28 Nov. 2007 (M. Reyes). *Bexar County*: Accident Sink (Camp Bullis), 26 Oct. 2004 (C. Thibodaux, C. Murray); Bunny Hole (Camp Bullis), 31 March 1995 (J. Reddell, M. Reyes); Cannonball Cave (Camp Bullis), 15 April 2002 (J. Reddell, M. Reyes, G. Veni); Cross the Creek Cave (Camp Bullis), 21 Aug. 2005 (J. Reddell, M. Reyes); Darling's Pumpkin Hole (Camp Bullis), 9 May 2005 (J. Reddell, M. Reyes); Dos Viboras Cave (Camp Bullis), 27 May 2005 (A. Gluesenkamp, J. Krejca); Flach's Cave (Camp Bullis), 6 March 2008 (P. Sprouse, K. McDermid); Isocow Cave (Camp Bullis), 17 May 2005 (A. Gluesenkamp, J. Krejca); Porcupine Parlor Cave (Camp Bullis), 29 March 2001 (G. Veni); Power Line Karst Feature D-16 (Camp Bullis), 15 Jan. 2002 (L. J. Graves); Strange Little Cave (Camp Bullis), 31 July 2006 (J. Krejca); Up the Creek Cave (Camp Bullis), 25 Oct. 2005 (J. Reddell, M. Reyes). *Medina County*: Nisbet Cave, 4 March 2001 (G. Veni, R.M. Waters). *Travis County*: Karst Feature F-14, Ribelin Ranch, 22, 28 Nov. 2001 (M. Warton). *Williamson County*: Little Surprise Cave, 9 Jan. 2004 (J. Fant, J. Reddell, M. Reyes); Testudo Tube, 14 Jan. 2005 (J. Krejca, P. Sprouse); Shaman Cave, Sun City, 22 July 2007 (J. Reddell, M. Reyes).

Previous Cave Records (Reddell and Cokendolpher, 2001).—*Bell County*: Camp 6 Cave No. 1 (Fort Hood), Soldiers Cave (Fort Hood). *Bexar County*: Dirtwater Cave, Poor Boy Baculum Cave (Camp Bullis), Root Canal Cave (Camp Bullis), Stevens Ranch Trash Hole Cave; Strange Little Cave (Camp Bullis). *Burnet County*: Longhorn Caverns. *Coryell County*: Briar Cave (Fort Hood), Egypt Cave (Fort Hood), Frank's Cave, Rocket River Cave System (Fort Hood), Saltpeter Cave (Fort Hood). *Hays County*: Ezell's Cave. *Kendall County*: Pfeiffer's Water Cave. *Kerr County*: Seven Room Cave. *Medina County*: Lutz Cave. *Menard County*: Powell's Cave. *Sutton County*: Caverns of Sonora. *Travis County*: Contortionist Cave, Ireland's Cave, Weldon Cave. *Val Verde County*: Emerald Sink. *Williamson County*: Beck Crevice Cave, Beck Sewer Cave, Cricket Cave, Fern Bluff Cave, LakeLine Mall Well, Testudo Tube.

Comment.—The map of Endless Pit Cave (Fig. 5) shows the locations for *Labidus coecus* during a visit. The ants were coming from a crawlway and were attracted towards a rotting coachwhip snake [*Masticophis flagellum* (Shaw)] at the bottom of the dropdown pit. Ants were observed feeding on mermithid nematodes (Fig. 3), *Ceuthophilus secretus* Scudder crickets and a hothouse millipede [*Oxidus gracilis* (Koch)]. *Helicodiscus* snail, *Cambala* and *Siphonophora* millipedes were left alone, despite being in very close proximity. Ants were emerging from the clay bank near the stream passage in the very bottom of the cave. They were also traveling from the stream passage where it becomes too low to crawl.

In Shaman Cave, Sun City, Williamson County, Texas, the ants were present by the thousands. They were along a trail that terminated at the top of a small pit about 25 m from the entrance and 5 m below the ground surface. They were coming from the wall.

The subterranean army ant *L. coecus* is distributed widely across the Americas from Texas in the north, extending south through the tropics to Paraguay. Relatively little is known about the biology of this species. Perfecto (1992) provides one of the most detailed accounts, wherein raids by this species on other ants (*Dorymyrmex* sp., *Pheidole* sp., *Pheidole radoszkowskii* Mayr, *Solenopsis geminata* (Fabricius), and *Brachy-myrmex patagonicus* Mayr (reported as *B. musculus* Forel- see MacGown, et al., 2007) in Costa Rica are documented. Other than these limited observations, and occasional collections of this species from caves (Kempf, 1961; Lewis, 1974; Reddell and Cokendolpher, 2001), we remain largely ignorant of the biology of this species. For some ant taxa, pronounced vertical stratification of nests allows colonies to move brood vertically in the tunnels through soils in response to daily fluctuations in abiotic



Figs. 1-2.—*Labidus coecus* (Latreille) in Endless Pit Cave (Fort Hood), Bell County, Texas (images by C. E. Pekins). 1, Ant tunnel portals into the clay bank that is perched slightly above the stream passage (the bank with the coyote scratch marks). 2, Another trail was in the stream passage below the portal where it becomes too low to crawl.



Figs. 3-4.—*Labidus coecus* (Latreille) in Endless Pit Cave (Fort Hood), Bell County, Texas (images by C. E. Pekins). 3, Attacking/ carrying a mermithid nematode (likely emerged from *Ceuthophilus* cricket) to the colony for feeding. 4, Attacking/ carrying *Ceuthophilus* cricket to colony.

conditions, provides a range of conditions for the storage of resources, and provides the queen a safe refuge from predators (Hölldobler and Wilson, 1990; Cole, 1994).

Moisture is considered critical for ant colony success (Johnson, 2000, 2001) and deep nests in arid environments may also be an adaptation for harvesting condensation or channeling surface water. Higher levels of soil moisture occur in nests of some ants than at similar depths in surrounding soils (MacMahon, et al., 2000).

We have observed *L. coecus* in shallow and deep cave environments in central Texas. On 15 Feb. 2004, the manager (Bill Sawyer) of a show cave (Caverns of Sonora) in central Texas reported seeing ants deep within the cave Caverns of Sonora, Sutton County, Texas (20 Feb. 2004, 25m deep in a cave). Two of us (S. J. T., J. K. K.) visited the cave on 20 Feb. 2004 and found that there were large numbers (over 200 individuals) of *L. coecus* in the cave at a depth of 21 to 25 m below the surface. Depth was determined by examination of a detailed map of the cave. The ants were associated with moist speleothems and shallowly (1-3 mm) pooled water. The environment around Sonora, Texas, is arid, with annual average precipitation is 57 cm of rainfall per year

(www.idcide.com/weather/tx/sonora.htm). Consequently, little surface moisture is available during much of the year. The ants were associated with a 6 cm diameter shaft drilled between 1957 and 1960 from the surface during development of the show cave to facilitate the transfer of concrete into the cave for tour trail construction. After construction, the shaft was sealed at the surface, but the conduit is still used to bring electrical wires for lighting into the cave. When the ants were first observed in the cave, several days before our visit, they appeared to be utilizing the shaft to move into and out of the cave. At the time of our visit, many of the ants were dead (cause unknown) and the drill hole no longer contained ants moving along a trail.

On 9 August 2001, we visited Big Red Cave (Fort Hood), Coryell County, Texas, where we observed a small aggregation of *L. coecus* feeding on a camel cricket, *Ceuthophilus secretus* Scudder (Fig. 4).

In the case of *L. coecus*, however, there are numerous reports of utilization of cave habitats (Reddell and Cokendolpher, 2001; Kempf, 1961). But our observation is particularly noteworthy in pointing to the capacity of these ants to move deep below the surface of the ground, perhaps in search of moisture. The access in this

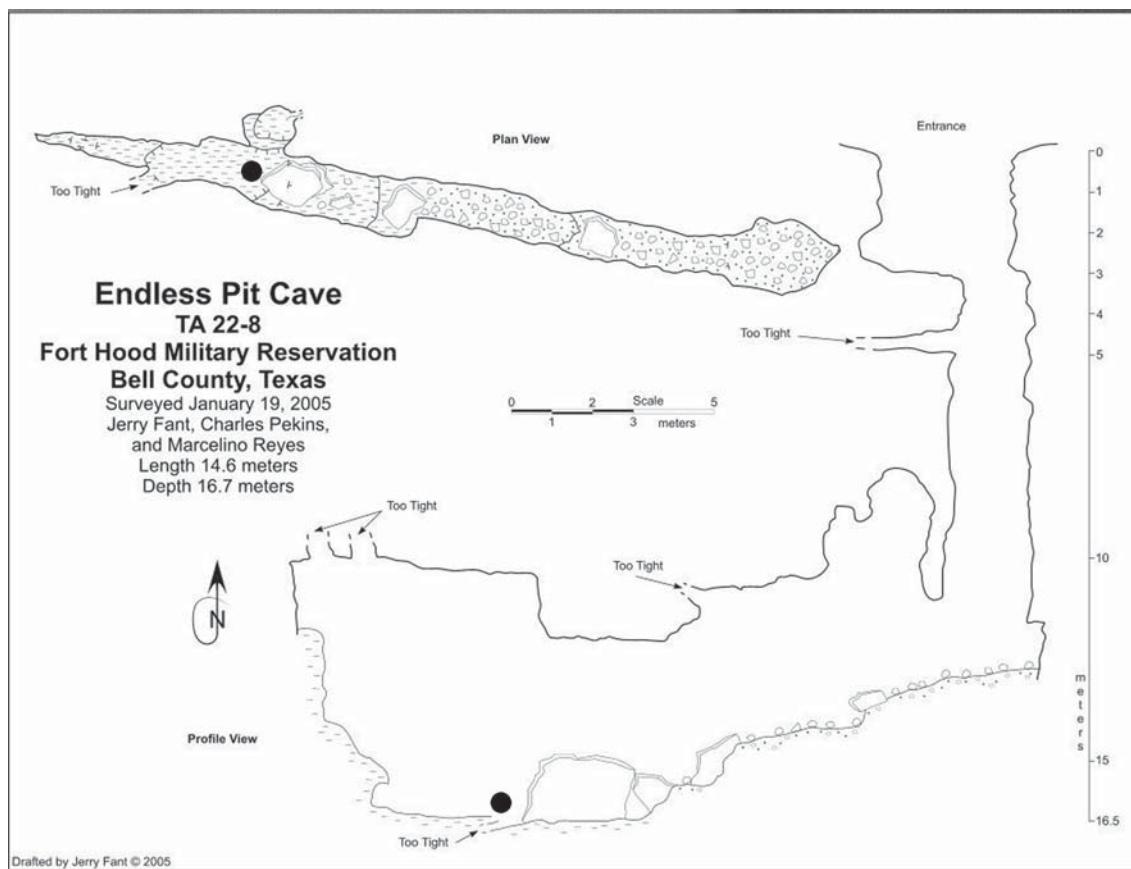


Fig. 5.—Map of Endless Pit Cave, Bell County, Texas, showing the collection site of *Labidus coecus* (Latreille) about 16 meters below the surface (map drafted by J. Fant).

case was via a man-made conduit, but in karstic terrane the subsurface is typically characterized by the presence of numerous fissures, joints and other mesocavernous spaces (Howarth 1983) in the “milieu souterrain superficial” (Juberthie, et al., 1980, 1981; Juberthie and Decu, 2004). Utilization of such fissures, commonly enlarged by the action of water (Klimchouk, et al., 2000), could allow access to moisture in an otherwise quite arid environment.

Our observations suggest that further investigation into the use of underground habitats by ants may be warranted. Future work measuring the productivity of colonies with and without access to moisture at depth may determine if this under-studied resource provides a benefit to ants in arid ecosystems.

Labidus coecus was collected in both 2002 and 2007 in Lunch Counter Cave (Taylor, et al., 2008), the second occurrence (2 specimens) as part of the stomach contents of a cave-inhabiting salamander, *Plethodon albagula* (Grobman).

Neivamyrmex fallax Borgmeier

Previous Cave Record (Reddell and Cokendolpher, 2001).—*Travis County*: Cotterell Cave.

Comment.—Presumably an accidental. The species occurs in the southcentral U.S.A. and south in Mexico and Guatemala.

Neivamyrmex opacithorax (Emery)

New Record.—*Bexar County*: 50 Bucket Cave, 6 March 2008 (P. Sprouse, K. McDermid).

Comment.—Presumably an accidental. This is the first record of this species from Bexar County and the first record for Texas caves.

Subfamily Ponerinae

Hypoponera inexorata (Wheeler)

New Record.—*Bexar County*: Hold Me Back Cave (Camp Bullis), 26 July 2006 (J. Krejca, R. Myers).

Previous Cave Record(Reddell and Cokendolpher, 2001).—*Williamson County*: Deliverance Cave No. 1.

Comment.—This is apparently the first record for the species in Bexar County. It is certainly an accidental and is reported to be widespread across Texas.

Hypoponera opaciceps (Mayr)

New Records.—*Bexar County*: Leon Hill Cave (Camp Bullis), 24 May 2003 (J. Reddell, M. Reyes), Berlese of leaf litter; Kamikazi Cricket Cave, no date (A.G. Grubbs).

Previous Cave Record (Reddell and Cokendolpher, 2001).—*Bexar County*: Stealth Cave.

Comment.—The species occurs throughout North America, often nesting in soil and rotten wood. This species is considered by some authorities to be introduced. Indeed, it seems to typically inhabit disturbed areas and is often found in conjunction with other introduced species.

Hypoponera opacior (Forel)

New Records.—*Bell County*: Snail Shell Sink (Fort Hood), 3 April 2007 (J. Fant, J. Reddell, M. Reyes). *Bexar County*: Genesis Cave, 2 Dec. 2004 (A. Gluesenkamp, P. Sprouse); Twin Cedar Cave, Government Canyon State Natural Area, 27 April 2003 (M. Miller). *Travis County*: 3-Holer Cave, 1 May 1992 (J. Reddell, M. Reyes). *Williamson County*: Lobo’s Lair, 13 Sept. 1991 (J. Reddell, M. Reyes), Berlese of litter; Pussy Cat Cave, 6 June 1991 (D. Allen, W. Elliott).

Previous Cave Records (Reddell and Cokendolpher, 2001).—*Bexar County*: Eagles Nest Cave, Strange Little Cave, Voight’s Bat Cave. *Coryell County*: Porter Cave, (Fort Hood). *Uvalde County*: Indian Creek Cave.

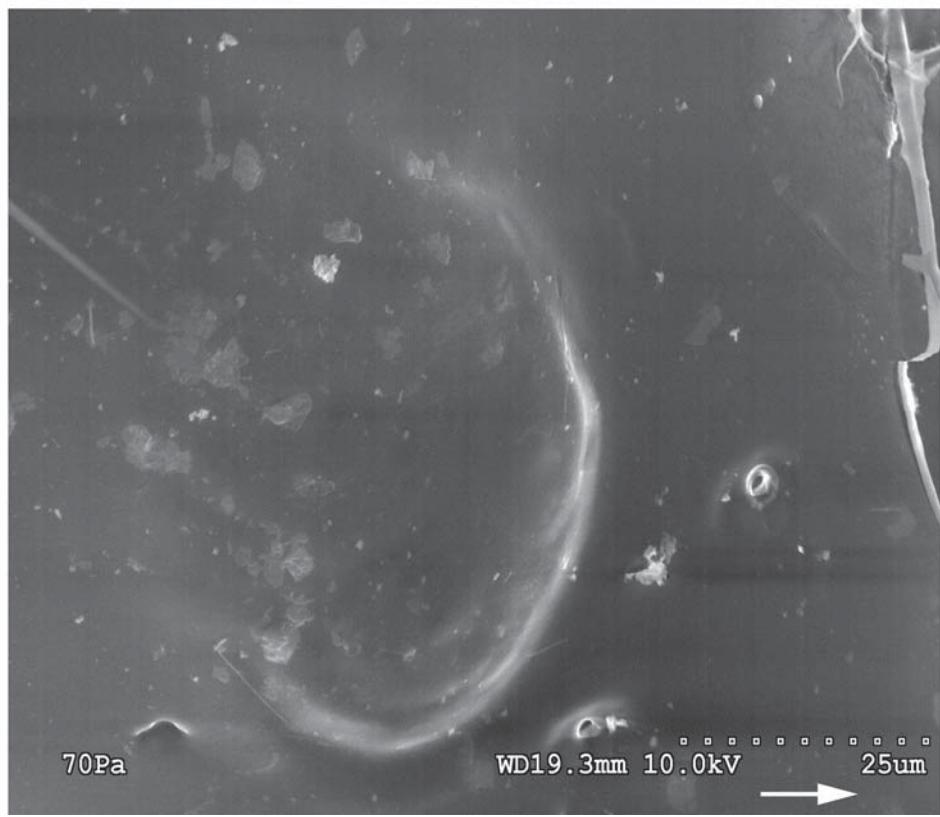
Comment.—These are apparently the first records of the species from Williamson County. The species is widespread across Texas.

Leptogenys sp.

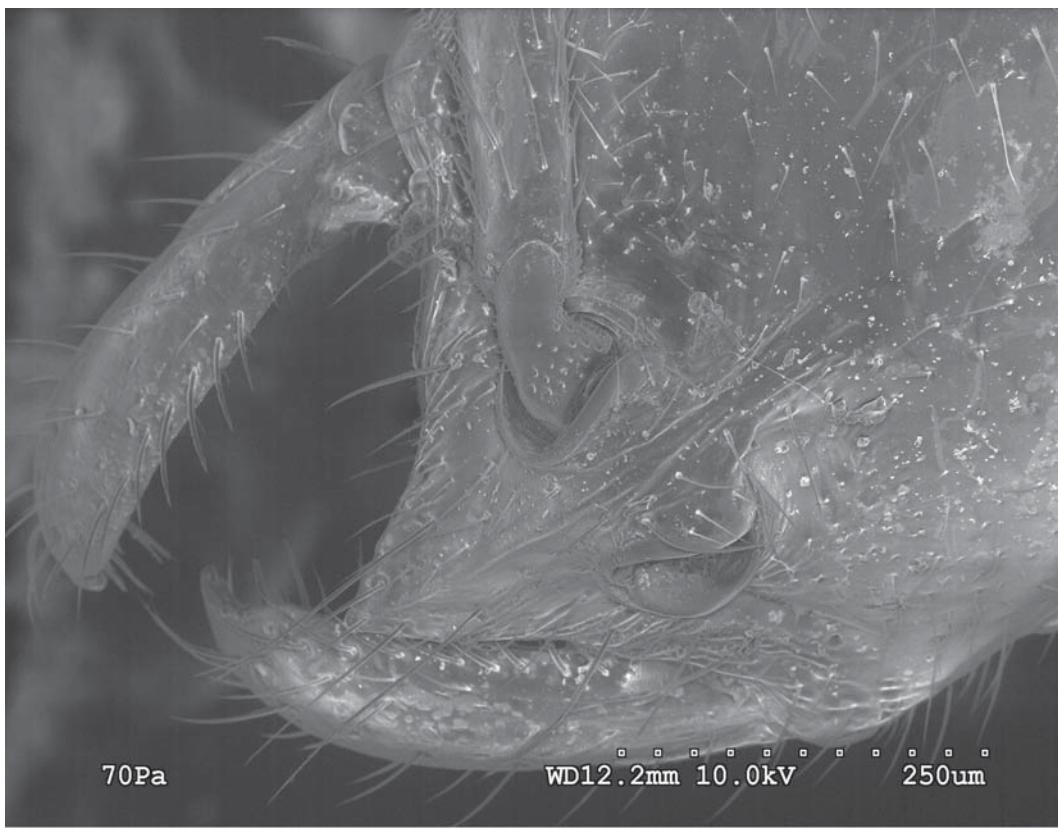
Figs. 6-9

New records.—*Val Verde County*: Judge’s Chamber Cave, 15 Oct. 2005 (M. Sanders).

Comment.—Unlike all other members of this genus in North America, the worker of this species has a tiny eye without obvious facets. It is about half the size and lighter in color than *Leptogenys elongata* (which occurs in other Texas caves). It is not uncommon for other Ponerinae genera to have tiny/missing eyes. These ants are primarily found under covering objects (wood, rock, etc.) or in rotten wood or in the upper soil/litter layers. Because other members of this genus are known to feed upon terrestrial isopods, it is possible that this small species does the same. But, the mandibles are not dentate like *L. elongata* suggesting that they might not capture prey that is heavily armored. Roncin and Deharveng (2003) described what might be the first troglobitic ant from Laos. It is a very elongate and pale colored *Leptogenys*. The Texas species has the reduced eyes like a troglobite, but none of the other characters typical are present: female alate, size smaller, appendages not elongated, pigment dark.



Figs. 6-7.—Unknown *Leptogenys* sp. from Judge's Chamber Cave, Val Verde County, Texas. 6, lateral aspect. 7, closeup of eye rudiment, arrow points anteriorly (SEM micrographs by J. C. Cokendolpher).



Figs. 8-9.—Unknown *Leptogenys* sp. from Judge's Chamber Cave, Val Verde County, Texas; 8, anterior view of frons, base of antennae (left side detached), and mandibles. 9, lateral view of petiole (SEM micrographs by J. C. Cokendolpher).

Leptogenys elongata (Buckley)

New Records.—*Bell County*: Boulder Garden Cave (Fort Hood), 24 Sept. 2004 (J. Fant, M. Reyes, M. Warton); Pekins Cave (Fort Hood), 13 March 2004 (J. Fant, J. Reddell, M. Reyes); Pump House Cave (Fort Hood), 28 Aug. 2004 (J. Fant, M. Reyes); Rock Wall Sink (Fort Hood), 5 Dec. 2002 (M. Reyes, M. Warton); Southern Cross Cave (Fort Hood), 21 Aug. 2003 (C. Pekins, J. Reddell, M. Reyes). *Bexar County*: Low Priority Cave (Camp Bullis), 1 Nov. 2000 (J. Reddell, M. Reyes); Strange Little Cave, 13 July 2006 (J. Krejca); 31 July 2006 (J. Krejca); Up the Creek Cave, 25 Oct. 2005 (J. Reddell, M. Reyes). *Coryell County*: Formation Cave (Fort Hood), 29 Aug. 2005 (C. Pekins, J. Reddell, M. Reyes).

Previous Cave Records (Reddell and Cokendolpher, 2001).—*Bell County*: Big Ash Tree Sink (Fort Hood), Big Crevice (Fort Hood), Chimney Windows Cave (Fort Hood), Seven Mile Mountain Cave (Fort Hood). *Bexar County*: Backhole Cave (Camp Bullis), John Wilson Ranch Cave no. 3, Kamikazi Cricket Cave, Skull Cave. *Coryell County*: Brokeback Cave (Fort Hood), Cornelius Cave (Fort Hood). *Stonewall County*:

Aspermont Bat Cave. *Travis County*: Tooth Cave. *Williamson County*: Forest Trail Pit.

Comment.—This widespread species occurs in the southeastern U.S.A. and Texas (<http://www.cs.unc.edu/~hedlund/ants/>). This ant species is locally abundant in southeastern Texas. Workers generally forage singly and feed largely, if not exclusively, on terrestrial isopods.

Odontomachus clarus Roger

New record.—*Bexar County*: Boneyard Pit (Camp Bullis), 1 Aug. 2005 (J. Krejca, P. Sprouse).

Previous Cave Record (Reddell and Cokendolpher, 2001).—*Bexar County*: Platypus Pit (Camp Bullis).

Comment.—The species is widespread in Texas and considered an accidental in caves.

Pachycondyla harpax (Fabricius)

New Records.—*Bexar County*: Voges Cave (Camp Bullis), 6 March 2001 (G. Veni). *Comal County*: Quantum Leap Cave, Kuhn Ranch, 2 Oct. 2005 (A. Gluesenkamp, N. Parker).



Fig. 10.—*Discothyrea testacea* Roger from litter collected from the surface above Headquarters Cave, Bexar County, Texas; lateral aspect (SEM micrograph by J. C. Cokendolpher).

Previous Cave Record (Reddell and Cokendolpher, 2001).—*Medina County*: Weynand Cave.

Comment.—The species occurs throughout eastern and southern Texas. Elsewhere, it is found in Louisiana, south to Brazil, and the West Indies.

Subfamily Proceratiinae

Discothyrea testacea Roger

Fig. 10

New Record.—*Bexar County*: surface above Headquarters Cave (Camp Bullis); Berlese Funnel extraction of leaf litter, quadrat HQ36, 28 May 2007 (Zara Environmental).

Comment.—The discovery of this small ant in leaf litter is the first of this rarely collected ant encountered in the state of Texas. The western most record before our finding was: Zwolle N. Toledo Bend State Park, Sabine Parish, off LA 3229, 17 June 2003, sifting leaf litter (Dash 2005). The recorded distribution is from the southeastern U.S.A.: NC south to FL, west through GA, AL, MS, AR, LA, OK (Carter, 1962; Dash, 2005; Deyrup, 2003; General and Thompson, 2007; Ipser, et al., 2004; MacGown and Brown, 2006; MacGown and Forster, 2005; Smith and Wing, 1955; Smith, 1979). An illustration is provided (Fig. 10) so future researchers might more easily recognize this genus. It is likely to be more common than reported as it is tiny and easily missed without careful sorting or Berlese Funnel extractions.

Proceratium compitale Ward

Previous Cave Records (Reddell and Cokendolpher, 2001).—*Sutton County*: Caverns of Sonora. *Val Verde County*: Emerald Sink, Seminole Sink. *Terrell County*: Blackstone Cave. *Uvalde County*: Barn-Sized Fissure Cave.

Comment.—The species is a cryptic, likely subterranean predator that was only known from the type specimen at the time of Ward's 1988 revision.

Proceratium pergandei (Emery)

New records.—*Bexar County*: Cross the Creek Cave (Camp Bullis), 21 Oct. 2004 (J. Reddell, M. Reyes); Up the Creek Cave (Camp Bullis), 25 Oct. 2005 (J. Reddell, M. Reyes), queen.

Comment.—This is the first record for the species in Bexar County. It has not previously been recorded from any cave in Texas. The species is otherwise known only from Cameron, Houston, and San Jacinto Counties. This is a species thought to specialize by preying on spider eggs.

Subfamily Myrmicinae

Atta texana (Buckley)

Previous Cave Records (Reddell and Cokendolpher, 2001).—*Bandera County*: Fog Fissure. *Bexar County*: Jabba's Giant Sink (Camp Bullis).

Comment.—*Atta* are conspicuous above ground foraging ants that harvest leaves to grow fungus. The large subterranean nests of this species may result in their presence in caves.

Aphaenogaster texana Wheeler

New Records.—*Bandera County*: Can Creek Cave No. 2, Lost Maples State Natural Area, 30 Oct. 2000 (J. Reddell, M. Reyes). *Bell County*: Boulder Garden Cave (Fort Hood), 24 Sept. 2004, (J. Fant, M. Reyes, M. Warton); Collapse Sink (Fort Hood), 16 July 2008 (J. Reddell, M. Reyes); Dumpty Cave (Fort Hood), 29 Aug. 2004 (M. Reyes, M. Warton); Falling Water Shelter Cave (Fort Hood), 15 Oct. 2003 (J. Reddell); Finger Mountain Cave (Fort Hood), 20 Oct. 2006 (J. Reddell, M. Reyes); Hope Well Sink (Fort Hood), 2 April 2006 (J. Fant, M. Reyes); Legless Visitor Cave (Fort Hood), 19 May 2007 (J. Fant, J. Reddell, M. Reyes); Loop Joint Cave (Fort Hood), 3 May 2000 (J. Reddell, M. Reyes); Price Pit Cave (Fort Hood), 25 Aug. 2003 (C. Pekins, J. Reddell); 20 July 2008 (J. Reddell, M. Reyes); Skeeter Cave (Fort Hood), 25 Aug. 2003 (C. Pekins, J. Reddell); Sleepy Hollow Cave (Fort Hood), 1 June 2005 (J. Reddell); Thumbs Up Cave (Fort Hood), 12 Nov. 2005 (M. Reyes). *Bexar County*: Hold Me Back Cave (Camp Bullis), 19 May 2005 (J. Krejca, R. Myers); 2 Oct. 2007 (K. McDermid). *Coryell County*: Dionne Cave (Fort Hood), 3 June 2003 (J. Reddell, M. Reyes); Loop-Around Cave, 16 July 1993 (J. Reddell, M. Reyes).

Previous Cave Records (Reddell and Cokendolpher, 2001).—*Bell County*: Bumelia Well Cave (Fort Hood), Creek Bed Sink (Fort Hood). *Brewster County*: O.T.L. Cave. *Coryell County*: Loop-Around Cave (Fort Hood).

Comment.—This species is here recorded for the first time from caves in Bandera, Bexar, and Coryell Counties. This is the first record of the species in Coryell County.

Crematogaster laeviuscula Mayr

New Records.—*Bell County*: Cedar Log Cave (Fort Hood), 4 June 2008 (J. Reddell, M. Reyes); Talking Crows Cave (Fort Hood), 21 July 2008 (J. Reddell, M. Reyes). *Bexar County*: Backhole Cave (Camp Bullis), 29 May 2006 (P. Sprouse); Boneyard Pit (Camp Bullis), 12 Oct 2004 (J. Krejca, P. Sprouse); 25 July 2006 (J.

Krejca, R. Myers); Headquarters Cave (Camp Bullis), 9 Aug. 2005 (J. Krejca, R. Myers); Hold Me Back Cave (Camp Bullis), 26 July 2006 (J. Krejca, R. Myers); MARS Pit (Camp Bullis), 4 Aug. 2005 (J. Krejca, R. Myers); Pain in the Glass Cave (Camp Bullis), 28 Oct. 2004 (J. Krejca, P. Sprouse); Phil's Line Cave, Iron Horse Canyon, 7 April 2005 (M. Warton). *Travis County*: Enfield Sinkhole, 18 June 1991 (W. Elliott, C. Ladd), founding queen. *Williamson County*: Priscilla's Cave, on gate, 6 June 1996 (W. Elliott); Holler Hole Cave, Sun City, 21 May 2008 (J. Reddell, M. Reyes).

Previous Cave Records (Reddell and Cokendolpher, 2001).—*Bell County*: Septum Pit Cave (Fort Hood). *Hardeman County*: Campsey Cave. *Edwards County*: Devil's Sinkhole. *Sutton County*: Felton Cave. *Edwards County*: Deep Cave, *Travis County*: Enfield Sinkhole, Wildflower Cave. *Williamson County*: Priscilla's Cave.

Comment.—Some records of this species were previously recorded as *Crematogaster* sp. and *Crematogaster* (*Crematogaster*) sp. prob. *laeviuscula* (Reddell and Cokendolpher, 2001).

Cyphomyrmex rimosus (Spinola)

New Record.—*Travis County*: Karst Feature F4, 26 Sept. 2006 (J. Krejca).

Previous Cave Record (Reddell and Cokendolpher, 2001).—*Bexar County*: Up the Creek Cave.

Comment.—This is the first record of the species from a cave in Travis County. The species ranges from eastern Texas to Uvalde County. This species feeds on fungus gardens, which it provisions with dead insects and plant material.

Monomorium sp. prob. *cyaneum* Wheeler

Previous Cave Record (Reddell and Cokendolpher, 2001).—*Bexar County*: Bullis Hole (Camp Bullis).

Monomorium minimum (Buckley)

Previous Cave Records (Reddell and Cokendolpher, 2001).—*San Saba County*: Gorman Cave. *Travis County*: Whirlpool Cave. *Williamson County*: Stonewall Ranch Cave.

Myrmecina americana Emery

New Records.—*Bell County*: Big Crevice (Fort Hood), 13 May 1999 (J. Reddell, M. Reyes), Berlese of leaf litter; Trapper Sink (Fort Hood), 28 Aug. 2004 (J. Fant, M. Reyes). *Bexar County*: Backhole Cave (Camp Bullis), 26 Oct. 2001 (J. Krejca, P. Sprouse), 31 July

2007 (J. Krejca). *Coryell County*: Porter Cave (Fort Hood), 31 March 2004 (C. Pekins, J. Reddell), Berlese of leaf litter.

Previous Cave Records (Reddell and Cokendolpher, 2001).—*Bell County*: Big Crevice (Fort Hood); Keilman Cave (Fort Hood). *Bexar County*: Charley's Hammer Hole (Camp Bullis). *Coryell County*: Copperhead Cave No. 2 (Fort Hood), Porter Cave (Fort Hood). *Travis County*: Trapjaw Sink; Wade Sink.

Comment.—The species ranges from eastern Texas to Brewster County in the West. It typically nests underneath logs or in areas with deep leaf litter.

Oligomyrmex longii (Wheeler)

Previous Cave Record (Reddell and Cokendolpher, 2001).—*Bell County*: Viper Den Cave (Fort Hood).

Pheidole spp.

New Records.—*Bell County*: Awesome Entrance Cave (Fort Hood), 24-25 Sept. 2004 (J. Fant, M. Reyes, M. Warton); Dumpty Cave (Fort Hood), 29 Aug. 2004 (M. Reyes, M. Warton); Falling Turtle Cave (Fort Hood), 3 Oct. 2004 (J. Fant, C. Murray, M. Warton); Green Carpet Cave (Fort Hood), 10 Oct. 2004 (J. Fant, C. Murray, M. Reyes, M. Warton); Ostracod Spring (mophead below spring outlet) (Fort Hood), 30 July 2007 (C. Pekins, J. Reddell, M. Reyes); Skeeter Cave (Fort Hood), 3 June 2001 (J. Reddell); 25 Aug. 2003 (C. Pekins, J. Reddell). *Bexar County*: B-52 Cave (Camp Bullis), 31 July 2008 (K. McDermid); Get a Rope Cave, 23 Sept. 2000 (G. Veni); Vera Cruz Shaft, 1 June 2007 (J. Krejca). *Terrell County*: The Crack, 23 Nov. 2001 (L. McNatt, C. Savvas).

Previous Cave Records (as *Pheidole* spp., Reddell and Cokendolpher, 2001).—*Bexar County*: Platypus Pit (Camp Bullis). *Burnet County*: Longhorn Caverns. *Edwards County*: Punkin Cave. *Travis County*: Dobie Shelter, Jester Estates Well Trap No. 9. *Val Verde County*: Diablo Cave.

Comment.—These records are based only on minor workers.

Pheidole dentata Mayr

Previous Cave Record (Reddell and Cokendolpher, 2001).—*Bexar County*: Cave of the Bearded Tree.

Pheidole hyatti Emery

New Record.—*Bell County*: Streak Cave, 15 July 2008 (J. Reddell, M. Reyes).

Previous Cave Record (as *Pheidole* sp., Reddell and Cokendolpher, 2001).—*Bell County*: Streak Cave.

Comment.—This is the first record of this species from a cave in Texas. The species is widespread in Texas.

Pheidole porcula Wheeler

New Record.—*Bexar County*: Vera Cruz Shaft, 1 June 2007 (J. Krejca).

Comment.—This is the first record of this species from a cave in Texas. This is apparently the first record of the species in Bexar County. It is largely restricted to western Texas.

Pogonomyrmex barbatus (F. Smith)

Previous Cave Records (Reddell and Cokendolpher, 2001).—*Edwards County*: Dunbar Cave. *Williamson County*: Shaman Cave.

Comment.—This is an accidental.

Pogonomyrmex comanche Wheeler

Previous Cave Record (Reddell and Cokendolpher, 2001).—*Travis County*: Fossil Cave.

Comment.—This is an accidental.

Solenopsis geminata (Fabricius)

New Record.—*Travis County*: Toucasia Cave, 5 June 2003 (M. Sanders, C. Abbruzzese).

Previous Cave Records (Reddell and Cokendolpher, 2001).—*Bexar County*: Kamikazi Cricket Cave. *Travis County*: Featherman's Cave. *Williamson County*: Squaw Cave.

Solenopsis invicta Buren

Figs. 11-12

New Records.—*Bandera County*: Can Creek Cave No. 3, Lost Maples State Natural Area, 20 July 2000 (J. Reddell, M. Reyes); Harvestman Annex Cave, Hill Country State Natural Area, 20 July 2000 (J. Reddell, M. Reyes). *Bell County*: Big Crevice (Fort Hood), 6 June 2000 (J. Reddell, M. Reyes), Berlese of leaf litter; Cinco de Mayo Cave (Fort Hood), 6 May 2004 (J. Reddell, M. Reyes); Collapse Sink (Fort Hood), 16 July 2008 (J. Reddell, M. Reyes); Diamondback Cave (Fort Hood), 25 Aug. 2004 (J. Reddell); Dumpty Cave (Fort Hood), 29 Aug. 2004 (M. Reyes, M. Warton); Falling Hammer Cave (Fort Hood), 4 May 2004 (M. Reyes); Hackberry Cave (Fort Hood), 18 Sept. 2004 (J. Fant, M. Reyes); Hidden Pit Cave (Fort Hood), 18 Aug. 2003 (C. Pekins,

J. Reddell, M. Reyes); Hope Well Sink (Fort Hood), 16 May 2006 (J. Reddell); Newby Cave (Fort Hood), 31 January 2007 (S. J. Taylor, J. K. Krejca, C. Pekins, T. Marston, R. Myers); Plethodon Cave (Fort Hood), 25 May 2004 (J. Reddell, M. Reyes); Price Pit Cave (Fort Hood), 6 May 1999 (J. Reddell, M. Reyes), 20 July 2008 (J. Reddell, M. Reyes), 25 Aug. 2003 (C. Pekins, J. Reddell); Runoff Cave (Fort Hood), 26 May 2004 (J. Reddell, M. Reyes); Slotsky Pit Cave (Fort Hood), 6 June 2004 (M. Reyes, M. Warton); Talking Crows Cave (Fort Hood), 21 July 2008 (J. Reddell, M. Reyes); Trapper Sink (Fort Hood), 28 Aug. 2004 (J. Fant, M. Reyes); Vine Cave (Fort Hood), 18 June 2004 (J. Reddell, M. Reyes); Weep Hole Cave (Fort Hood), 14 Nov. 2002 (M. Reyes, M. Warton). *Bexar County*: Backhole Cave (Camp Bullis), 31 July 2007 (J. Krejca); Spring 4C-18 (middle) (Camp Bullis), 18 April 2001 (J. Reddell, M. Reyes), out of mophead; Spring 5D-1 (Camp Bullis), 31 May 2007 (P. Sprouse); Spring 7-49 (Camp Bullis), 14 April 2001 (J. Reddell, M. Reyes), out of mophead; Spring 9-161 (Camp Bullis), 31 May 2007 (J. Krejca); 40mm Cave (Camp Bullis), 21 July 2006 (J. Krejca); Accident Sink (Camp Bullis), 26 Oct. 2004 (C. Thibodaux, C. Murray); 9 May 2005 (J. Reddell, M. Reyes); Ailor Hill Cave (Camp Bullis), 26 May 2003 (B. Shade, G. Veni); B-52 Cave, Zone 1 (Camp Bullis), 8 Oct. 2003 (J. Krejca, P. Sprouse); Bone Pile Cave, Government Canyon State Natural Area, 12 Sept. 2001 (G. Veni); Bunny Hole (Camp Bullis), 10 Aug. 2006 (J. Reddell, M. Reyes); Cowbell Cave, no date (A.G. Grubbs); Crownridge Canyon Cave, 13 Nov. 2002 (G. Veni); 19 Nov. 2002 (J. Reddell, M. Reyes); Genesis Cave, 2 Dec. 2005 (A. Gluesenkamp, P. Sprouse); Mastodon Pit, 3 April 2002 (K. White); Obvious Little Cave, 14 June 2001 (J. Cokendolpher); Plethodon Pit, Stone Oak Karst Fauna Region, 12 Sept. 1999 (K. White); Power Pole 60 Feature (Camp Bullis), 20 April 2003 (J. Reddell, M. Reyes); 24 May 2003 (J. Reddell, M. Reyes); Power Line Karst Feature F-3, 16 Jan. 2002 (L. J. Graves); Root Toupee Cave (Camp Bullis), upper level, 14 Aug. 2007 (J. Reddell); Sewer Line Karst Feature F-3, 16 Jan. 2002 (L. J. Graves); Strange Little Cave (Camp Bullis), 31 Aug. 2006 (J. Krejca); Twin Cedar Cave, Government Canyon State Natural Area, 27 April 2003 (M. Miller). *Comal County*: Bufo Cave, Guadalupe River State Park, 14 May 2002 (J. Krejca, C. Lee, W. Russell). *Coryell County*: Big Red Cave (Fort Hood), 14 June 1999 (J. Krejca, P. Sprouse); Lucky Day Cave (Fort Hood), 12 March 2003 (J. Fant, M. Reyes); New Cave (Fort Hood), 20 June 2000 (J. Reddell, M. Reyes); Rocket River Cave System (B. R.'s Secret Cave) (Fort Hood), 31 March 2004 (J. Krejca); Sperry Cave (Fort Hood), 5 June 2006 (C. Pekins, J. Reddell, M. Reyes). *Llano*



Figs. 11-12.—*Solenopsis invicta* Buren from Big Red Cave (Fort Hood), Coryell County, Texas (images by J. Krejca and S. Taylor). 11, Eating a *Leiobunum townsendi* Weed: harvestman (10 August 2002). 12, Eating a *Ceuthophilus secretus* Scudder camel cricket (9 August 2001).

County: Riley Mountain Cave no. 1, 16 March 2006 (J. Krejca). *Sutton County*: Harrison Cave, 20 Nov. 2004 (J. Kennedy). *Travis County*: Cortana Cave, 3 Oct. 2007 (J. Krejca); Cortana Feature 2, 25 Sept. 2007 (P. Sprouse, K. McDermid); Cortana Feature 4, 25 Sept. 2007 (P. Sprouse, K. McDermid); Cortana Feature 4, leaf litter, 9 Oct. 2007 (R. Myers, K. McDermid); Cortana Feature 11, 25 Sept. 2007 (P. Sprouse, K. McDermid); Cortana Feature 12, 25 Sept. 2007 (P. Sprouse, K. McDermid); 9 Oct. 2007 (R. Myers, K. McDermid); Cortana Feature 12, leaf litter, 9 Oct. 2007 (R. Myers, K. McDermid); Cortana Feature 13, leaf litter, 9 Oct. 2007 (R. Myers, K. McDermid); Flint Ridge Cave, 29 Oct. 2004 (J. Krejca, M. Kirkpatrick, M. Sanders); Garden Hoe Cave, 22 May 2007 (J. Krejca); Karst Feature F4, 26 Sept. 2006 (J. Krejca); Karst Feature F10, 2 Oct. 2006 (A. Gluesenkamp); Karst Feature F10, 4 Oct. 2006 (J. Krejca); Rock Joint Sink, 4 Sept. 2002 (M. Reyes, M. Warton); Webb Root Cave, Webb Tract, 18 May 2005 (L. J. Graves, C. Thibodaux). *Williamson County*: Beck Crevice Cave, 3 June 1996 (J. Reddell, M. Reyes); Chigger Cave, 1 June 2001 (J. Reddell); Cobb Drain Cave, 1 June 2001 (L. J. Graves, J. Reddell, M. Reyes); Dead Dauber Cave, 20 May 2003 (J. Reddell, M. Reyes); Persimmon Sink, 3 Nov. 2005 (J. Reddell, M. Reyes).

Previous Cave Records (Reddell and Cokendolpher, 2001).—Bell County: Camp 6 Cave No. 1 (Fort Hood), Camp 6 Cave No. 2 (Fort Hood), Canyon Side Sink (Fort Hood), Coyote Den Cave (Fort Hood), Figure 8 Cave (Fort Hood), Flapjack Cave (Fort Hood), Hanging Stump Cave (Fort Hood), Herbert Cave (Fort Hood), Jagged Walls Cave (Fort Hood), Lunch Counter Cave (Fort Hood), Medusa Cave (Fort Hood), Monkey Walk Cave No. 2 (Fort Hood), Mystery Rock Sink (Fort Hood), Newby Cave (Fort Hood), Owl Mountain Cave (Fort Hood), Peep in the Deep Cave (Fort Hood), Price Pit Cave (Fort Hood), Rock Ring Sink (Fort Hood), Root Sink (Fort Hood), Talking Crows Cave (Fort Hood), Valentine Cave (Fort Hood), Violet Cave (Fort Hood). *Bexar County*: B. J. Pit, Backhole Cave (Camp Bullis), Bone Pile Cave (Government Canyon State Park), Bullis Hole (Camp Bullis), Zone 2, Buzzard Egg Cave (Camp Bullis), Caracol Creek Coon Cave, Cross the Creek Cave (Camp Bullis), Dangerfield Cave (Camp Bullis), Eagles Nest Cave (Camp Bullis), Elmore Cave, Flying Buzzworm Cave (Camp Bullis), Goat Cave (Government Canyon State Park), Government Canyon Bat Cave (Government Canyon State Park), Haz Mat Pit (Camp Bullis), Headquarters Cave (Camp Bullis), Isocow Cave (Camp Bullis), John Wagner Ranch Cave No. 3, Kamikazi Cricket Cave, Linda's First Cave Find, Logan's Cave, Lone Gunman Pit (Camp Bullis), Madla's Drop Cave, MARS Cave (Camp Bullis), MARS Pit (Camp Bullis), Mastodon Pit, Mattke Cave, Meusebach

Flats Cave (Camp Bullis), NBC Cave (Camp Bullis), Poison Ivy Pit, Ponytail Pit (Camp Bullis), Poor Boy Ranch Cave, Pot-Bellied Stove Cave, Rattlesnake Cave, Record Fire 1 Pit (Camp Bullis), Robbers Cave, Root Toupee Cave (Camp Bullis), SARA Site 4 Cave (Camp Bullis), Scorpion Cave, Sink Hole, Stahl Cave (Camp Bullis), Stevens Ranch Cave No. 1, Stevens Ranch Trash Hole Cave, Strange Little Cave (Camp Bullis), Surprise Sink (Government Canyon State Park), Three Fingers Cave, Two Raccoon Cave, Vera Cruz Shaft (Camp Bullis), Winston's Cave (Camp Bullis), World News Cave, Wurzbach Bat Cave, Young Cave No. 1. *Comal County*: Camp Bullis Cave No. 1 (Camp Bullis), Ebert Cave, Fischer Pit. *Coryell County*: Cicurina Sink (Fort Hood), Egypt Cave (Fort Hood), Ingram Cave (Fort Hood), Mixmaster Cave (Fort Hood), Porter Cave (Fort Hood), Shults Cave (Fort Hood). *Hays County*: Antioch Cave, Autumn Woods Well. *Kendall County*: Covered Hole, Pfeiffer's Water Cave. *Travis County*: Balcones Sink, Bulldozer Cavern, Cave Z, Central Sink, Disbelievers Cave, District Park Cave, Driskill Cave, Enfield Sinkhole, Five Pocket Cave, Flint Ridge Cave, Fossil Garden Cave, Gallifer Cave, Geode Cave, Hawk Tract Well Trap No. 1, 3, 5, 7, Hole in the Road, Homestead Cave, Japygid Cave, Jest John Cave, Jollyville Jewel Cave, Kretschmarr Salamander Cave, Lamm Cave, M.W.A. Cave, Midden Sink, Moss Pit, Outhouse Hole Sink, Rock Top Cave, Singletary Cave, Spyglass Cave, Stoneworks Sink, Three-Holer Cave, Tight Pit Cave, Tooth Cave, Two Trunks Cave, Weldon Cave, Weldon Windmill Cave, Whirlpool Cave, Yaupon Ridge Cave. *Williamson County*: Agave Cave, Avery Avenue Cave, Bat Well, Beck Bat Cave, Beck Bridge Cave, Beck Cowcatcher Cave, Beck Creek Cave, Beck Pride Cave, Beck Rattlesnake Cave, Beck Salamander Cave, Beck Tex-2 Cave, Beck's Beside Road Cave, Big Oak Cave, Blue Wasp Cave, Bone Cave, Borgarigmie Cave, Broken Plate Cave, Buttercup Blow Hole Cave, Cannibal Lector Cave, Cat Cave, Cat Hollow Bat Cave, Chagas Cave, Circle Sink Cave, Coon Crawl Cave, Crescent Cave, Deliverance Cave No. 1, Dion Cave, Do Drop In Cave, Dragon Fly Cave, East Fork Fissure, Eclipse Cave, Electro-Mag Cave, Fence-Line Cave, Fern Cave, Fire Ant Cave, Flat Rock Cave, Flathead Cave, Flint Wash Cave, Floral Cave, Formation Forest Cave, Fortune 500 Cave, Gasch Cave, Godwin's Goat Grave Cave, Good Omen Spring, Hawk Tract Well Trap No. 2, Holler Hole Cave, Jackhammer Cave, Joker Cave, Knife Cave, Ku Klux Klan Cave, LakeLine Cave, LakeLine Mall Well Trap No. 2, 3, 6, Leaning Tree Cave, Lineament Cave, Lorffing's Unseen Rattler Cave, Man-With-A-Spear Cave, Medicine Man Cave, Mushroom Cave, Mustard Cave, Nostromos Cave, O'Connor Cave, Ominous Entrance Cave, On Campus Cave, Overlooked Cave, Paleospring Cave, Pow Wow

Cave, Priscilla's Cave, Pussy Cat Cave, Quinceñera Cave, Raccoon Cave, Red Crevice Cave,, Scoot Over Cave, Shaman Cave, Shawnee Pit Cave, Short Stack Cave, Sierra Vista Cave, Spiny Tortilla Cave, Sting Cave, Temples of Thor Cave, Testimony Cave, Testudo Tube, Texella Cave, The Chimney, Thin Roof Cave, Turner Goat Cave, Undercut Cave, Undertaker Cave, Ute Cave, Valley Cave, Varicose Cave, Villa de Indios Cave, Village Idiot Cave, Walsh Pasture Cave, Wigglewise Cave, Wild Card Cave, Williams Cave No. 1, Zee End Cave.

Comment.—These are the first records of the species from caves in Bandera and Sutton Counties. The record from Newby Cave (Bell County) is from the stomach of a salamander, *Plethodon albagula*. It is considered a trogloxene. The red imported fire ant, or *S. invicta*, is certainly the most important introduced pest ant in the U.S.A. Decades of research on fire ants have shown them to be efficient predators of wildlife (Figs. 11-12). Whereas this can be useful in controlling certain plant pests, fire ants do not seem to serve any useful purpose in or around karst, except as an occasional meal for salamanders and spiders (Fig. 13). Numerous publications have been written on these ants and two nice books are provided by Taber (2000) and Tschinkel (2006).

Solenopsis texana Emery

Previous Cave Record (Reddell and Cokendolpher, 2001).—*Bell County*: Big Crevice (Fort Hood).

Solenopsis xyloni McCook

Previous Cave Records (Reddell and Cokendolpher, 2001).—*Bexar County*: Braken Bat Cave. *Val Verde County*: Seminole Sink. *Williamson County*: Hanging Branch Cave.

Temnothorax obturator (Wheeler)

New Record.—*Bell County*: Runoff Cave, 14 March 1992 (J. Reddell, M. Reyes), Berlese of leaf litter.

Previous Cave Record (Reddell and Cokendolpher, 2001).—*Bell County*: Runoff Cave.

Comment.—The specimens were previously recorded as *Leptothorax* sp. (Reddell and Cokendolpher, 2001).

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Fig. 13.—*Eidmanella rostrata* Gertsch (Nesticidae) spider eating an ant, probably *Solenopsis invicta* Buren in a cave in northern Bexar County (August 2004, image by J. Krejca).

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