Zootaxa 3802 (4): 515–552
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3802.4.6
http://zoobank.org/urn:lsid:zoobank.org:pub:4A83AAAE-6F0B-4173-A066-DBBCFBC3BDD5

A review of the Nearctic *Odontomachus* (Hymenoptera: Formicidae: Ponerinae) with a treatment of the males

JOE A. MACGOWN[1,5], BRENDON BOUDINOT[2], MARK DEYRUP[3] & D. MAGDALENA SORGER[4]

[1]*Mississippi Entomological Museum, Mississippi State, MS*
[2]*University of California Davis, Davis, CA*
[3]*Archbold Biological Station, Lake Placid, FL*
[4]*North Carolina State University, Raleigh, NC*
[5]*Corresponding author. E-mail: jmacgown@entomology.msstate.edu*

Table of contents

Abstract

The ant genus *Odontomachus* Latreille in the United States is reviewed. Six species are treated: *O. brunneus* (Patton), *O. clarus* Roger, *O. desertorum* Wheeler **stat. nov.**, *O. relictus* Deyrup and Cover, *O. ruginodis* M.R. Smith, and *O. haematodus* (Linnaeus), a new record for North America. The spread of *O. haematodus* is documented, and its identity is clarified. The genus is diagnosed for species in the Nearctic region for all castes, and worker- and male-based keys are presented. The workers and males of all six species are described and figured, including the first male descriptions for *O. haematodus* and *O. desertorum*. This represents the first study of species-level variation in *Odontomachus* male genitalia, and one of the first of such studies of the Ponerinae for any biogeographic region. A discussion of the utility of the male sex for *Odontomachus* taxonomy is provided.

Key words: taxonomy, trap-jaw ants, alien species, invasive, identification, keys, genitalia

Introduction

Trap-jaw ants in the genus *Odontomachus* Latreille (Hymenoptera: Formicidae: Ponerinae) are large, conspicuous ants that can be recognized by the peculiar shape of the head, long linear mandibles, large tapering petiole, and obvious sting. The highly specialized head morphology constitutes a trap-jaw mechanism that the ants use primarily for catching prey (Patek et al. 2006). Males are more generalized and may be recognized in the Nearctic

Accepted by J. Longino: 22 Apr. 2014; published: 28 May 2014

Acknowledgments

We extend our gratitude to two anonymous reviewers for constructive comments that greatly improved the manuscript; and to John Longino for encouraging expansion of this work. Reviewer 1 and Stefan Cover are particularly thanked for prompting BEB to examine the *O. clarus* complex in greater detail. For valuable loans of material, we thank Rick Hoebeke (University of Georgia), Doug Booher (University of California, Los Angeles), Victoria Bayless (Louisiana State University), Andy Suarez (University of Illinois at Urbana-Champaign), William MacKay (University of Texas, El Paso), John Longino (University of Utah), Giar-Ann Kung (LACM), and Stefan Cover and Jignasha Rana (MCZ) ; for collections of specimens, we thank Heath Richter (Mobile, AL), Dan Suiter (GA), Lloyd Davis (FL), Archie Nelson (Jackson Co., MS), Fred Larabee (University of Illinois at Urbana-Champaign), and others. Thanks to Barry Bolton and the AntCat community (http://www. AntCat.org/) community for taxonomic catalog resources. This article is approved for publication as Journal Article No. J- 12474 of the Mississippi Agricultural and Forestry Experiment Station. This research was supported in part by the National Institute of Food and Agriculture, United States Department of Agriculture, under Project No. MIS-012040 and the USDA-ARS Areawide Management of Imported Fire Ant Project (Richard L. Brown, Principal Investigator).

References

Anonymous (2013) *Navajo Ant Project*. Available from: http://nap.entclub.org. (accessed 30 April 2013)

Adams, B.J., Chen, X. & Hooper-Bui, L.M. (2010) *Odontomachus clarus* Roger (Hymenoptera: Formicidae) reported in Kisatchie National Forest, Louisiana. *Midsouth Entomologist*, 3, 104–105.

Antweb (2013) *Antweb*. Available from: http://www.antweb.org (accessed 5 May 2013)

Bolton, B. (2014) *An online catalog of the ants of the world*. Available from: http://www.antweb.org/world.jsp (accessed 30 March 2013)

Boudinot, B.E. (2013) The male genitalia of ants: musculature, homology, and functional morphology (Aculeata, Hymenoptera, Formicidae). *Journal of Hymenoptera Research*, 30, 29–49. http://dx.doi.org/10.3897/jhr.30.3535

Boudinot, B.E. & Fisher, B.L. (2013) A taxonomic revision of the *Meranoplus* F. Smith of Madagascar (Hymenoptera: Formicidae: Myrmicinae) with keys to species and diagnosis of the males. *Zootaxa*, 3635 (4), 301–339. http://dx.doi.org/10.11646/zootaxa.3635.4.1

Boudinot, B.E., Sumnicht, T.P. & Adams, R.M.M. (2013) Central American ants of the genus *Megalomyrmex* Forel (Hymenoptera: Formicidae): six new species and keys to workers and males. *Zootaxa*, 3732 (1), 1–82. http://dx.doi.org/10.11646/zootaxa.3732.1.1

Brown, W.L. (1976) Contributions toward a reclassification of the Formicidae. Part VI. Ponerinae, tribe Ponerini, subtribe Odontomachiti. Section A. Introduction, subtribal characters Genus *Odontomachus. Stutia Entomologica*, 19, 67–171.

Buckley, S.B. (1866) Descriptions of new species of North American Formicidae. *Proceedings of the Entomological Society of Philadelphia*, 6, 152–172.

Cerquera, L.M & Tschinkel, W.R. (2010) The nest architecture of the ant *Odontomachus brunneus. Journal of Insect Science*, 10, 1–12. http://dx.doi.org/10.1673/031.010.6401

Crawley, W.C. (1916) Ants from British Guiana. *Annals and Magazine of Natural History*, 17, 366–378. http://dx.doi.org/10.1080/00222931608693799

Creighton, W.S. (1950) The Ants of North America. *Bulletin of the Museum of Comparative Zoology*, 104, 1–585.

De Geer, C. (1773) *Mémoires pour servir à l'histoire des insectes*. Tome troisième. Pierre Hesselberg, Stockholm, 696 pp.

Deyrup, M. & Cover, S. (2004) A new species of *Odontomachus* ant (Hymenoptera: Formicidae) from inland ridges of Florida, with a key to *Odontomachus* of the United States. *Florida Entomologist*, 87, 136–144. http://dx.doi.org/10.1653/0015-4040(2004)087[0136:ansooa]2.0.co;2

Deyrup, M., Cover, S. & Davis, L. (2000) Exotic ants in Florida. *Transactions of the American Entomological Society*, 126, 293–325.

Deyrup, M., Trager, J. & Carlin, N. (1985) The genus *Odontomachus* in the southeastern United States (Hymenoptera: Formicidae). *Entomological News*, 96, 188–195.

Emery, C. (1893) Notice sur quelques fourmis des îles Galapagos. *Annales de la Société Entomologique de France*, 62, 89–92.

Emery, C. (1895) Beiträge zur Kenntniss der nordamerikanischen Ameisenfauna. (Schluss). Zoologische Jahrbücher. *Abteilung für Systematik, Geographie und Biologie der Tiere*, 8, 257–360.

Emery, C. (1899) Intorno alle larve di alcune formiche. *Rendiconti delle Sessioni della Reale Accademia delle Scienze dell'Istituto di Bologna* (n.s.), 3, 93.

Emery, C. (1911) Hymenoptera. Fam. Formicidae. Subfam. Ponerinae. *Genera Insectorum*, 118, 1–125.

Guérin-Méneville, F.E. (1844) *Iconographie du règne animal de G. Cuvier, ou représentation d'après nature de l'une des espèces les plus remarquables, et souvent non encore figurées, de chaque genre d'animaux. Insectes*. J. B. Baillière, Paris, 576 pp.
http://dx.doi.org/10.5962/bhl.title.10331
Krushelnycky, P.D., Loope, L.L. & Reimer, N.J. (2005) The ecology, policy, and management of ants in Hawaii. *Proceedings of the Hawaiian Entomological Society*, 37, 1–25.
Larabee, F.J. & Suarez, A.V. (2014) The evolution and functional morphology of trap-jaw ants (Hymenoptera: Formicidae). *Myrmecological News*, 20, 25–36.
Latreille, P.A. (1802) *Histoire naturelle des fourmis, et recueil de mémoires et d'observations sur les abeilles, les araignées, les faucheurs, et autres insectes*. Impr. Crapelet (chez T. Barrois), Paris, xvi + 445 pp.
Latreille, P.A. (1804) Tableau méthodique des insectes. *In*: *Société de Naturalistes et d'Agriculteurs 1804. Nouveau dictionnaire d'histoire naturelle. Tome 24.* Déterville, Paris, pp. 129–200.
Linnaeus, C. (1758) *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I. Editio decima, reformata*. L. Salvii, Holmiae [= Stockholm], 824 pp.
MacGown, J.A. (2010) *Camponotus planatus* (Hymenoptera: Formicidae), an exotic carpenter ant found in Mississippi. *Journal of the Mississippi Academy of Sciences*, 55, 187–188.
McGlynn, T.P. (1999) The worldwide transfer of ants: Geographical distribution and ecological invasions. *Journal of Biogeography*, 26, 535–548.
http://dx.doi.org/10.1046/j.1365-2699.1999.00310.x
Ogata, K. (1987) A generic synopsis of the poneroid complex of the family Formicidae in Japan (Hymenoptera). Part I. Subfamilies Ponerinae and Cerapachyinae. *Esakia*, 25, 97–137.
Olivier, A.G. (1792) *Encyclopédie méthodique. Histoire naturelle. Insectes. Tome 6. (pt. 2)*. Panckoucke, Paris, pp. 369–704.
Osorio-Pérez, K., Barberena-Arias, M.F. & Aide, T.M. (2007) Changes in ant species richness and composition during plant secondary succession in Puerto Rico. *Caribbean Journal of Science*, 43, 244–253.
Patek, S.N., Baio, J.E., Fisher, B.L. & Suarez, A.V. (2006) Multifunctionality and mechanical origins: Ballistic jaw propulsion in trap-jaw ants. *Proceeding of the National Academy of Sciences of the United States of America*, 103, 12787–12792.
http://dx.doi.org/10.1073/pnas.0604290103
Patton, W.H. (1894) Habits of the leaping-ant of southern Georgia. *American Naturalist*, 28, 618–619.
Petralia, R.S. & Vinson, S.B. (1980 ["1979"]) Comparative anatomy of the ventral region of ant larvae, and its relation to feeding behavior. *Psyche*, 86, 375–394. [Cambridge]
Retzius, A.J. (1783) *Caroli de Geer. Genera et species insectorum e generosissimi auctoris scriptis extraxit, digessit, Latine quoad partem reddidit, et terminologiam insectorum Linneanam addidit*. Cruse, Lipsiae [= Leipzig], 220 pp.
http://dx.doi.org/10.5962/bhl.title.35661
Roger, J. (1861) Die *Ponera*-artigen Ameisen (Schluss). *Berliner Entomologische Zeitschrift*, 5, 1–54.
Schmidt, C. (2013) Molecular phylogenetics of ponerine ants (Hymenoptera: Formicidae: Ponerinae). *Zootaxa*, 3647 (2), 201–250.
http://dx.doi.org/10.11646/zootaxa.3647.2.1
Smith, F. (1858) *Catalogue of Hymenopterous Insects in the Collection of the British Museum. Part VI. Formicidae. British Museum*, *London*, 216 pp.
Smith, D.R. (1979) Superfamily Formicoidea. *In*: Krombein, K.V., Hurd, P.D. Jr., Smith, D.R., & Burks, B.D. (Eds.), *Catalog of Hymenoptera in America North of Mexico. Vol. 2. Apocrita (Aculeata).* Smithsonian Institution Press, Washington, D.C., xvi + pp. 1323–1467.
Smith, M.R. (1937) ("1936") The ants of Puerto Rico. *Journal of Agriculture of the University of Puerto Rico*, 20, 819–875.
Smith, M.R. (1939) A study of the subspecies of *Odontomachus hæmatoda* (L.) of the United States (Hymenoptera: Formicid). *Journal of the New York Entomological Society*, 47, 125–130.
Stitz, H. (1916) Formiciden. *Ergebnisse der Zweiten Deutschen Zentral-Afrika Expedition*, 1, 369–405.
Stitz, H. (1925) Ameisen von den Philippinen, den malayischen und ozeanischen Inseln. *Sitzungsberichte der Gesellschaft Naturforschender Freunde zu Berlin*, 1923, 110–136.
Taylor, R.W. & Wilson, E.O. (1962 ["1961"]) Ants from three remote oceanic islands. *Psyche* 68, 137–144.
http://dx.doi.org/10.1155/1961/87982
Wheeler, W.M. (1902) A consideration of S. B. Buckley's "North American Formicidae." *Transactions of the Texas Academy of Sciences*, 4, 17–31.
Wheeler, W.M. (1905) The ants of the Bahamas, with a list of the known West Indian species. *Bulletin of the American Museum of Natural History*, 21, 79–135.
Wheeler, W.M. (1908) The ants of Texas, New Mexico and Arizona. (Part 1.). *Bulletin of the American Museum of Natural History*, 24, 399–485.
Wheeler, W.M. (1914) Ants collected by W. M. Mann in the state of Hidalgo, Mexico. *Journal of the New York Entomological Society*, 22, 37–61.
Wheeler, W.M. (1915) Some additions to the North American ant-fauna. *Bulletin of the American Museum of Natural History*, 34, 389–421.
Wheeler, W.M. (1934) Ants from the islands off the west coast of Lower California and Mexico. *Pan-Pacific Entomologist*, 10, 132–144.

Wheeler, W.M. & Wheeler, J. (1952) The ant larvae of the subfamily Ponerinae-Part II. *American Midland Naturalist*, 48, 604–672.
http://dx.doi.org/10.2307/2422200
Wilson, E.O. (1964) The ants of the Florida Keys. *Breviora*, 210, 1–14.
Yoshimura, M. & Fisher, B.L. (2012) A revision of the Malagasy endemic genus *Adetomyrma* (Hymenoptera: Formicidae: Amblyoponinae). *Zootaxa*, 3341, 1–31.
Yoshimura, M. and Fisher, B.L. (2014) *Mystrium* in the Malagasy region with description of six new species and remarks on *Amblyopone* and *Stigmatomma* (Hymenoptera, Formicidae, Amblyoponinae). *Zookeys*, 394, 1–99.
http://dx.doi.org/10.3897/zookeys.394.6446

APPENDIX 1. Specimen records of *O. desertorum* and *O. haematodus* examined.

Odontomachus desertorum. **United States: Arizona:** *Maricopa* Co., Mesa nr. McDowell & Val Vista, 33.46833 -111.75667, 22 June 2005, J. Weser, desert backyard, under bushes, foraging under bushes (2 workers, 2 males) [MCZC]; *Pima* Co., Tuscon, Near University of Arizona, 32.23210 -110.95538, 1 August 1951(1 male) [LACM]. **Mexico: Sonora:** R. Yaqui, Hwy 15, 27.366667 N -110.166667 W, +/- 3km, 10 m elevation 7.viii.1985 Ginter Ekis coll. (1male) [UCDC]; 9 km NNE Punta Narragansett, Isla Tiburón, 28 deg 57' N 112 deg 13' W, 5 m elev. 15.xii.1997 P.S. Ward#13465-2, ex spider middens under stone, Sonoran desert (3 workers) [UCDC]

Odontomachus haematodus. **United States: Alabama**: *Baldwin Co.*: Bay Minette, 14 June 2003, J. Forster (2 workers) [AUEM]; Blakeley Park, 30°43'55"N 87°55'08"W, 7 Aug. 2013, J.A. MacGown, nest in oak-magnolia litter (1 worker) [MEM]; same date except, 30°43'57"N 87°54'46"W, 7 Aug. 2013, J.A. MacGown, nest in litter at base of pine tree in mixed pine hardwood forest (1 dealate queen, 39 workers) [MEM], same data except, 30°44'50"N 87°55'23"W, 8 Aug. 2013, at peanut butter bait on Quercus sp. in bottomland forest (1 worker) [MEM]; Bon Secour NWR, H. Richter (1 worker) [MEM], same data except, 30°13'43"N 87°49'51"W, 21 June 2001, J.A. MacGown, blacklight and MV lamp in foredunes (1 male) [MEM], same data except, 30°13'43"N 87°49'51"W, 29 March 2007, J.A. MacGown, J.G. Hill, in foredunes (12 workers) [MEM], same data except, 30°13'43"N 87°49'51"W, 3 April 2005, J.A. MacGown, under rotting log under scrub oak tree in foredunes (1 worker) [MEM], same data except, 30°14'10"N 87°49'49"W, J.A. MacGown, J.G. Hill, in hind dunes (1 worker) [MEM], same data except, 30°14'48"N 87°49'45"W, 3 April 2005, J.A. MacGown (8 workers) [MEM]; Byrnes Lake, 11 Oct. 2001, J.McCredie (1 worker) [MEM]; Daphne, Village Point Park, 12 June 2012, H. Richter (4 workers) [MEM]; Weeks Bay NERR, 30°24'58"N 87°49'10'W, 4 Aug. 2000, R.L. Brown, blacklight/boxtrap in pitcher plant bog, William H. Cross Expedition (2 males) [MEM], same data except, 3 Aug. 2000, T.L. Schiefer, blacklight trap in mixed forest near estuary, W.H. Cross Expedition (5 males) [MEM]; Weeks Bay NERR, 30°25'03"N 87°49'50"W, 1 Aug. 2000, D.M. Pollock, blacklight trap in mixed forest near estuary, W.H. Cross Expedition (1 male) [MEM], same data except, 1 Aug. 2000, J.A. MacGown, blacklight trap in mixed forest near estuary, W.H. Cross Expedition (1 male) [MEM], same data except, 1 Aug. 2000, T.L. Schiefer, blacklight trap in mixed forest near estuary, W.H. Cross Expedition (5 males) [MEM], same data except, 4 Aug. 2000, 4 Aug. 2000, J.A. MacGown, blacklight trap in mixed forest near estuary, W.H. Cross Expedition (1 male) [MEM], same data except, 4 Aug. 2000, R.L. Brown, at tree seep in mixed forest near estuary, W.H. Cross Expedition (4 workers) [MEM], same data except, 4 Aug. 2000, T.L. Schiefer, blacklight trap in mixed forest near estuary, W.H. Cross Expedition (1 male) [MEM], same data except, 5 Aug. 2000, T.L. Schiefer, blacklight trap in mixed forest near estuary, W.H. Cross Expedition (3 males) [MEM], same data except, 6 Aug. 2000, T.L. Schiefer, blacklight trap in mixed forest near estuary, W.H. Cross Expedition (1 male) [MEM], same data except, 1-8 Aug. 2000, J.A. MacGown, B. Smith, pitfall traps in mixed forest near estuary, W.H. Cross Expedition, (54 workers) [MEM], same data except, 20 June 2001, J.A. MacGown, blacklight trap in mixed forest near estuary, W.H. Cross Expedition (3 males) [MEM], same data except, 20 June 2001, T.L. Schiefer blacklight & M.V. lamp in mixed forest near estuary, W.H. Cross Expedition (6 males) [MEM], same data except, 23 June 2001, J.A. MacGown, blacklight trap in mixed forest near estuary, W.H. Cross Expedition (3 males) [MEM], same data except, 23 June 2001, J.A. MacGown, on mushroom on tree in mixed forest near estuary, W.H. Cross Expedition (2 workers) [MEM], same data except, 25 June 2001, T.L. Schiefer, blacklight trap in mixed forest near estuary, W.H. Cross Expedition (1 male) [MEM], same data except, 21-25 June 2001, J.A. MacGown, pitfall traps in mixed forest near estuary, W.H. Cross Expedition, (2 workers) [MEM], same data except, 6 April 2003, R.L. Brown, bottomland marsh (7 workers) [MEM], same data except, 2 April 2005, J.A. MacGown, under rotting log in mixed forest near estuary (1 dealate queen, 43 workers) [MEM], same data except, 2 April 2005 (25 workers) [MEM], J.A. MacGown, under rotting log in mixed forest near estuary (1 dealate queen, 43 workers) [MEM], same data except, 3 April 2005, R.L. Brown, under bark of Pinus. sp. stump in mixed forest near estuary (2 workers) [MEM]; Weeks Bay NERR, 30°25'08"N 87°49'05"W, 13 April 2013, Jaeger, colony in tree hole at edge of parking log and pitcher plant bog (4 workers) [MEM]; Weeks Bay NERR, 30°25'08"N 87°49'50"W, 13 April 2013, C. Jaeger, colony under PVC piping at dormitory at edge of mixed estuarine forest (3 workers) [MEM]; no locality data, May, R. Wingard, ex lawn (1worker) [AUEM], no locality data, June, R. Wingard, ex lawn (1worker) [AUEM], no locality data, summer, E. Benson (1 worker) [AUEM]. *Escambia Co.*: 1.25 mi NW of Atmore, 31°01'52"N 87°30'42"W, 1-22 July 2013, A. Van Hoogmoaed, Lindgren Funnel trap with ethanol/Alpha pinene UHR Lure (1 dealate queen, 1 alate

queen, 1 male) [MEM]. *Mobile Co*.: Mobile, 1 June 1956 [no collector information] (3 workers) [USNM]; Mobile, 22 March 2003, T. Toliver (2 workers) [AUEM]; Mobile, 20 May 1974, E.C. Ward, (2 workers) [AUEM]; Mobile, July 2007, C. Hesselein, (2 workers) [AUEM]; Mobile, 13 June 2003, J. Forster (4 workers) [AUEM]; Mobile, 30°34'39"N 88°12'09"W, 9 July 2013, G. Kalb, colony in rotted pecan stump in yard in residential neighborhood (3 workers) [MEM]; Mobile, 30°42'43""N 88°07'44"W, 12 June-2 July 2013, A. Van Hoogmoaed, Lindgren funnel trap (1 alate queen) [MEM]; Prichard, Chickasobogue Park, 28 June 2012, H. Richter, base of dead pine tree (2 workers) [MEM]; Theodore, 20 June 2012, Richter, nest at base of tree (1worker) [MEM]. **Florida:** *Escambia Co.*: Perdido Bay Golf Club, N30 19.553' W087 25.584, 11 Nov. 2005, L.R. Davis, Jr., in litter at base of pine tree (1 worker, 1 male) [Lloyd Davis private collection]. **Louisiana:** *Orleans Parish*: New Orleans, Audubon Zoo, 25 Sept. 2009, F. Larabee (1 worker) [MEM]. **Mississippi:** *Greene Co.*: Deaton Preserve, 31°00'04"N 88°42'08"W, 12 May 2006, J.A. MacGown, J.G. Hill, nest in soil and wood at base of thin-leaved Quercus sp. (30 workers) [MEM]. *Jackson Co.*: 2 mi NNE Call Town, 30°31'27"N 88°32'34"W, 20 June-25 July 2006, D.W. Haynes, Lindgren funnel trap baited with Typosan (1 worker) [MEM]; 3 km W Moss Point, 30°24'43"N 88°33'58"W, 29 Oct. 2009, J. Benigno (17 workers) [MEM]; Forts Lake Rd. X I-10, 88.41645 N 30.52996W, 12 Sept. 2007, S. Chandler (3 workers) [MEM]; Grand Bay Savanna, 30°25'39"N 88°25'30"W, 1 May 2004, J.G. Hill, coastal savannah (2 workers) [MEM]; Grand Bay Savanna, 30°22'07"N 88°26'21"W, 1 May 2004, J.A. MacGown, in soil on shell midden (2 workers) [MEM]; Moss Point, 30°27'04"N 88°32'52"W, 1 Oct. 2013, A. Nelson, colony in leaf litter at base of pecan tree in residential neighborhood (3 workers) [MEM]; Moss Point, T6S R5W Sec. 6, 14 Dec. 2002, J.G. Hill (3 workers) [MEM]; Moss Point, 19 May 2010, C. Whittington, (1 worker) [MEM]; Pascagoula, 30°31'13"N 88°32'31"W, 9 Sept. 2013, S. Jones, in yard in residential neighborhood (1 worker) [MEM]; Pascagoula, 30°21'35"N 88°31'07"W, 22 Sept. 2000, M. Riggins (5 workers) [MEM]; [locality unknown], 3 Nov. 2008, S. Pendleton (6 workers) [MEM]; 1.5 mi NE Escatawpa, 30°27'23"N 88°31'21"W, 27 April-16 May 2006, D.W. Haynes, Lindgren funnel trap baited with Typosan (1 alate queen) [MEM].