

THE ANTS (HYMENOPTERA: FORMICIDAE) OF ALABAMA

Except where reference is made to the work of others, the work described in this thesis is my own or was done in collaboration with my advisory committee. This thesis does not contain proprietary or classified information.

Jason Allan Forster

Certificate of Approval:

Wayne E. Clark
Professor
Entomology and Plant Pathology

Michael L. Williams, Chair
Professor
Entomology and Plant Pathology

George Folkerts
Professor
Biological Science

Stephen L. McFarland
Dean
Graduate School

THE ANTS (HYMENOPTERA: FORMICIDAE) OF ALABAMA

Jason Allan Forster

A Thesis

Submitted to

The Graduate Faculty of

Auburn University

In Partial Fulfillment of the

Requirements for the

Degree of

Master of Science

Auburn, Alabama

August 8, 2003

THE ANTS (HYMENOPTERA: FORMICIDAE) OF ALABAMA

Jason Allan Forster

Permission is granted to Auburn University to make copies of this thesis at its discretion upon request of individuals or institutions and at their expense. The author reserves all publication rights.

Jason Allan Forster

Date

VITA

Jason Allan Forster was born August 23, 1975 in Anaheim, California to Edward and Sheila Forster. He graduated from Loara High School in 1993 and enlisted in the United States Navy. After serving four years in the Navy, Jason was honorably discharged and became a full time student, receiving a Bachelor of Science degree in Biology from the University of Alabama- Huntsville in April, 2002. After graduating, he spent a summer working as a field technician in Auburn University's Department of Wildlife Biology. Jason was accepted into the Entomology and Plant Pathology Department as a graduate student in August, 2002.

THESIS ABSTRACT

THE ANTS (HYMENOPTERA: FORMICIDAE) OF ALABAMA

Jason Allan Forster
Master of Science, August 8, 2005
(B.S., University of Alabama – Huntsville, 2002)

242 Typed Pages

Directed by: Michael L. Williams

This thesis presents the first statewide survey of the ant fauna of Alabama in over seventy years. Since the first state survey by L.C. Murphree (in the 1930's) to present, 154 species have been reported. Fifty-nine of the species presented are new records for the state. Specimens were collected from every county over a period of three years. Past collection records were also examined and incorporated into this thesis. Distribution data, natural history notes, and identification keys for all the species reported in Alabama are presented.

ACKNOWLEDGEMENTS

I would like to thank my advisor, Dr. Michael L. Williams, for accepting me as his student and for his support and guidance over the years. I want to extend my gratitude to my committee members: Dr. Wayne E. Clark and Dr. George Folkerts. I would also like to thank my friends and associates for their help and friendship while here at Auburn including: Nicholas Sharp, Nathan Burkett, Andy Boring, Demian Kondo, Elly Maxwell, Shawn Dash, Dr. Charles Ray, Dr. Gary Mullen, Dr. Arthur Appel, and Joe MacGown. I would especially like to thank Joe MacGown for sharing his data, insights and knowledge on the subject of ants and for assisting me in my identification efforts. Finally, special thanks to my parents and family for their care and understanding over the years.

Computer software used: Microsoft® Word 2000

TABLE OF CONTENTS

LIST OF TABLES AND MAPS	xi
LIST OF FIGURES	xviii
INTRODUCTION	1
MATERIALS AND METHODS	3
GENERAL MORPHOLOGY OF ANTS	7
GENERAL TAXONOMY OF ANTS	9
KEY TO THE SUBFAMILIES OF FORMICIDAE	12
SUBFAMILY AMBYLOPONINAE	14
Genus <i>Amblyopone</i>	14
SUBFAMILY DOLICHODERINAE	15
Genus <i>Dolichoderus</i>	17
Genus <i>Dorymyrmex</i>	21
Genus <i>Forelius</i>	25
Genus <i>Linepithema</i>	27
Genus <i>Tapinoma</i>	29
SUBFAMILY ECITONINAE	30
Genus <i>Neivamyrmex</i>	31
SUBFAMILY ECTATOMMINAE	34
Genus <i>Gnamptogenys</i>	34

SUBFAMILY FORMICINAE	35
Genus <i>Brachymyrmex</i>	37
Genus <i>Camponotus</i>	41
Genus <i>Formica</i>	58
Genus <i>Lasius</i>	68
Genus <i>Paratrechina</i>	72
SUBFAMILY MYRMICINAE	84
Genus <i>Aphaenogaster</i>	89
Genus <i>Crematogaster</i>	100
Genus <i>Cyphomyrmex</i>	107
Genus <i>Monomorium</i>	109
Genus <i>Myrmecina</i>	114
Genus <i>Myrmica</i>	115
Genus <i>Pheidole</i>	119
Genus <i>Pogonomyrmex</i>	135
Genus <i>Protomognathus</i>	137
Genus <i>Pyramica</i>	138
Genus <i>Solenopsis</i>	155
Genus <i>Stenamma</i>	170
Genus <i>Strumigenys</i>	172
Genus <i>Temnothorax</i>	173
Genus <i>Tetramorium</i>	181
Genus <i>Trachymyrmex</i>	184

SUBFAMILY PONERINAE	186
Genus <i>Cryptopone</i>	189
Genus <i>Hypoponera</i>	190
Genus <i>Odontomachus</i>	194
Genus <i>Ponera</i>	196
SUBFAMILY PROCERATIINAE	199
Genus <i>Discothyrea</i>	199
Genus <i>Proceratium</i>	200
SUBFAMILY PSEUDOMYRMECINAE	204
Genus <i>Pseudomyrmex</i>	205
RESULTS	209
DISCUSSION	210
REFERENCES	212

LIST OF TABLES AND MAPS

Table 1. List of the ants of Alabama	9
Map 1. County map of the state of Alabama	10
Map 2. <i>Amblyopone pallipes</i>	15
Map 3. <i>Dolichoderus plagiatus</i>	19
Map 4. <i>Dorymyrmex bureni</i>	22
Map 5. <i>Dorymyrmex flavus</i>	23
Map 6. <i>Dorymyrmex grandulus</i>	24
Map 7. <i>Dorymyrmex smithi</i>	25
Map 8. <i>Forelius</i> sp.	26
Map 9. <i>Linepithema humile</i>	27
Map 10. <i>Tapinoma sessile</i>	29
Map 11. <i>Neivamyrmex carolinensis</i>	32
Map 11. <i>Neivamyrmex nigrescens</i>	33
Map 12. <i>Gnamptogenys triangularis</i>	35
Map 13. <i>Brachymyrmex depilis</i>	39
Map 14. <i>Brachymyrmex musculus</i>	40
Map 15. <i>Brachymyrmex</i> sp.	41
Map 16. <i>Camponotus americanus</i>	46
Map 17. <i>Camponotus caryae</i>	47

Map 18. <i>Camponotus castaneus</i>	48
Map 19. <i>Camponotus chromaiodes</i>	49
Map 20. <i>Camponotus decipiens</i>	50
Map 21. <i>Camponotus discolor</i>	50
Map 22. <i>Camponotus floridanus</i>	51
Map 23. <i>Camponotus impressus</i>	52
Map 24. <i>Camponotus mississippiensis</i>	53
Map 25. <i>Camponotus nearcticus</i>	53
Map 26. <i>Camponotus pennsylvanicus</i>	55
Map 27. <i>Camponotus snellingi</i>	56
Map 28. <i>Camponotus socius</i>	57
Map 29. <i>Camponotus subbarbatus</i>	58
Map 30. <i>Formica integra</i>	62
Map 31. <i>Formica</i> new sp.	63
Map 32. <i>Formica pallidefulva</i>	64
Map 33. <i>Formica rubicunda</i>	65
Map 34. <i>Formica schaufussi dolosa</i>	66
Map 35. <i>Formica subintegra</i>	67
Map 36. <i>Formica subsericea</i>	68
Map 37. <i>Lasius alienus</i>	70
Map 38. <i>Lasius neoniger</i>	71
Map 39. <i>Lasius umbratus</i>	72
Map 40. <i>Paratrechina arenivaga</i>	75

Map 41. <i>Paratrechina bourbonica</i>	76
Map 42. <i>Paratrechina faisonensis</i>	77
Map 43. <i>Paratrechina parvula</i>	79
Map 44. <i>Paratrechina phantasma</i>	80
Map 45. <i>Paratrechina vividula</i>	81
Map 46. <i>Paratrechina wojciki</i>	82
Map 47. <i>Prenolepis imparis</i>	83
Map 48. <i>Aphaenogaster fulva</i>	93
Map 49. <i>Aphaenogaster lamellidens</i>	94
Map 50. <i>Aphaenogaster miamiana</i>	95
Map 51. <i>Aphaenogaster picea</i>	96
Map 52. <i>Aphaenogaster rudis</i>	97
Map 53. <i>Aphaenogaster tennesseensis</i>	97
Map 54. <i>Aphaenogaster treatae</i>	98
Map 55. <i>Aphaenogaster</i> sp.	99
Map 56. <i>Crematogaster ashmeadi</i>	102
Map 57. <i>Crematogaster lineolata</i>	103
Map 58. <i>Crematogaster minutissima</i>	104
Map 59. <i>Crematogaster missouriensis</i>	105
Map 60. <i>Crematogaster pilosa</i>	106
Map 61. <i>Crematogaster vermiculata</i>	107
Map 62. <i>Cyphomyrmex rimosus</i>	108
Map 63. <i>Monomorium minimum</i>	111

Map 64. <i>Monomorium pharaonis</i>	112
Map 65. <i>Monomorium viride</i>	113
Map 66. <i>Myrmecina americana</i>	114
Map 67. <i>Myrmica americana</i>	116
Map 68. <i>Myrmica pinetorum</i>	117
Map 69. <i>Myrmica punctiventris</i>	118
Map 70. <i>Pheidole adrianoi</i>	123
Map 71. <i>Pheidole bicarinata</i>	124
Map 72. <i>Pheidole crassicornis</i>	125
Map 73. <i>Pheidole dentigula</i>	126
Map 74. <i>Pheidole dentata</i>	127
Map 75. <i>Pheidole floridana</i>	128
Map 76. <i>Pheidole metallescens</i>	129
Map 77. <i>Pheidole moerens</i>	130
Map 78. <i>Pheidole morrisi</i>	131
Map 79. <i>Pheidole obscurithorax</i>	132
Map 80. <i>Pheidole</i> sp.	133
Map 81. <i>Pheidole tetra</i>	134
Map 82. <i>Pheidole tysoni</i>	135
Map 83. <i>Pogonomyrmex badius</i>	136
Map 84. <i>Protomognathus americanus</i>	137
Map 85. <i>Pyramica angulata</i>	144
Map 86. <i>Pyramica clypeata</i>	145

Map 87. <i>Pyramica creightoni</i>	146
Map 88. <i>Pyramica dietrichi</i>	146
Map 89. <i>Pyramica laevinasis</i>	147
Map 90. <i>Pyramica membranifera</i>	148
Map 91. <i>Pyramica metazytes</i>	149
Map 92. <i>Pyramica ohioensis</i>	149
Map 93. <i>Pyramica ornata</i>	150
Map 94. <i>Pyramica pergandei</i>	151
Map 95. <i>Pyramica pilinasis</i>	152
Map 96. <i>Pyramica pulchella</i>	152
Map 97. <i>Pyramica reflexa</i>	153
Map 98. <i>Pyramica rostrata</i>	154
Map 99. <i>Pyramica talpa</i>	154
Map 100. <i>Solenopsis carolinensis</i>	159
Map 101. <i>Solenopsis geminata</i> (distribution in the 1930's)	160
Map 102. <i>Solenopsis globularia littoralis</i>	161
Map 103. <i>Solenopsis invicta</i>	163
Map 104. <i>Solenopsis invicta x richteri</i>	164
Map 105. <i>Solenopsis molesta</i>	165
Map 106. <i>Solenopsis pergandei</i>	166
Map 107. <i>Solenopsis picta</i>	166
Map 108. <i>Solenopsis richteri</i>	167
Map 109. <i>Solenopsis tennesseensis</i>	168

Map 110. <i>Solenopsis tonsa</i>	169
Map 111. <i>Stenamma foveolocephalum</i>	171
Map 112. <i>Stenamma meridionale</i>	172
Map 113. <i>Strumigenys louisianae</i>	173
Map 114. <i>Temnothorax bradleyi</i>	176
Map 115. <i>Temnothorax curvispinosus</i>	177
Map 116. <i>Temnothorax longispinosus</i>	178
Map 117. <i>Temnothorax pergandei</i>	178
Map 118. <i>Temnothorax schaumii</i>	179
Map 119. <i>Temnothorax texanus</i>	180
Map 120. <i>Temnothorax tuscaloosae</i>	181
Map 121. <i>Tetramorium caespitum</i>	183
Map 122. <i>Tetramorium lanuginosum</i>	184
Map 123. <i>Trachymyrmex septentrionalis</i>	185
Map 124. <i>Cryptopone gilva</i>	189
Map 125. <i>Hypoponera opaciceps</i>	191
Map 126. <i>Hypoponera opacior</i>	192
Map 127. <i>Odontomachus brunneus</i>	195
Map 128. <i>Odontomachus ruginodis</i>	196
Map 129. <i>Ponera exotica</i>	197
Map 130. <i>Ponera pennsylvanicus</i>	198
Map 131. <i>Discothyrea testacea</i>	200
Map 132. <i>Proceratium chickasaw</i>	201

Map 133. <i>Proceratium croceum</i>	202
Map 134. <i>Proceratium pergandei</i>	203
Map 135. <i>Proceratium silaceum</i>	204
Map 136. <i>Pseudomyrmex ejectus</i>	206
Map 137. <i>Pseudomyrmex pallidus</i>	206
Map 138. <i>Pseudomyrmex seminole</i>	207

LIST OF FIGURES

Fig. 1. Worker of <i>Aphaenogaster tennesseensis</i>	8
Fig. 2. Terminal gastral segments of formicine ant with acidopore.....	13
Fig. 3. Terminal gastral segments of dolichoderine ant with slit.....	13
Fig. 4. Lateral view of <i>Dorymyrmex</i> sp. mesosoma and petiole.....	16
Fig .5. Lateral view of <i>Crematogaster</i> sp. petiole and gaster.....	85
Fig. 6. Lateral view of <i>Cryptopone gilva</i> head.....	188
Fig. 7. Lateral view of <i>Ponera</i> sp. petiole	188
Fig. 8. Lateral view of <i>Hypoponera</i> sp. petiole	188
Fig. 9. Lateral view of <i>Hypoponera opacior</i> petiole	191
Fig. 10. Lateral view of <i>Hypoponera opaciceps</i> petiole	191

INTRODUCTION

In the history of Alabama there has only been one statewide survey of ant species, L. C. Murphree accomplished this as his master's thesis at Mississippi State College, now called Mississippi State University (Murphree 1947). Although the thesis was completed in 1947 the actual collection of ants for this study probably took place in the early to mid 1930's as part of a United States Department of Agriculture survey of the range of the Argentine ant, *Linepithema humile* (Mayr), in which Murphree is credited by the leader of the survey for collecting specimens in Alabama (M.R. Smith 1936).

Murphree reported 47 species, but estimated that there were at least 125 species present in Alabama. It is likely that the low number of species he collected was due to his focus on urban areas, which tend to have a less diverse fauna than relatively undisturbed areas.

The only other published records come from a transect bait survey of the ants of Mobile County that was completed in 1976 (Glancey et al. 1976). In this study Glancey et al. collected 16 species of ants. Of the 40,211 specimens collected, 84.2% were red imported fire ants (RIFA), *Solenopsis invicta* Buren, and 13.1% were Argentine ants, *L. humile*, with the other 14 species ranking 1% or less of total specimens collected. This illustrates the foraging dominance of RIFA in highly infested areas.

Perhaps the most interesting results of both the above mentioned surveys are that they illustrate how the ant fauna changed from the 1930's to the 1970's. In the 1930's

Murphree reported that imported fire ant mounds were found in only five localities within Mobile County. Most likely these ants were *Solenopsis richteri* Forel (the black imported fire ant or BIFA). The BIFA is thought to have been introduced in 1918 with the RIFA following some 20 to 25 years later (Buren et al. 1974). The dominant ants in the Mobile area during Murphree's survey were documented as being *Solenopsis xyloni* McCook (the southern fire ant or SFA) and *Solenopsis geminata* (Fabricius) (the tropical fire ant or TFA). At that time *S. xyloni* was considered one of the most important economic pests in the southern states

This is the first statewide effort in 70 years to document the ant fauna of Alabama. After discovering that Joe MacGown (Mississippi State University) was independently producing a list of Alabama ants, we decided to share data in order to make our collection data more comprehensive. Ants were collected from all 67 counties in as many different habitats as possible.

Prior to this survey 47 species of ants were reported by Murphree with an additional 48 reported from literature sources including: Baroni-Urbani and de Andrade (2003), Bolton (2000), Creighton (1930,1950), Deyrup and Cover (2004), Dubois and Davis (1998), Johnson (1988b), MacKay (1993), Pass (1960), D.R. Smith (1979), M.R. Smith (1932, 1942), Snelling (1988, 1995), Trager (1984,1988), Trager et al. (2005), Umphrey (1996), Ward (1985), Watkins (1985) and Wilson (1950, 2003) All past literature records have been included as well as the more current collection data by personnel at both Auburn University and Mississippi State University. A total of 59 new state records are presented in this thesis bringing the total number of ant species recorded in Alabama to 154.

MATERIALS AND METHODS

During this survey, I collected specimens over the course of 3 years. The most extensive periods of collection were the summers of 2003 and 2004. Collections were made in every county of the state at least once, usually twice from different sites when possible. Map 1 illustrates the county boundaries in Alabama and each species throughout this work is accompanied by a distribution map (for species that have the distribution data available). Data from Joe MacGown (Mississippi State University) were also incorporated into this list and it should be noted that he had been independently making trips to Alabama previous to my project. Upon becoming aware of each other's activities we decided to share data to expand our knowledge base.

Ants were captured using a variety of methods including: soil and leaf litter sifting, hand collecting, baiting, Berlese funnel soil sampling, blacklight trapping and pit fall trapping. By far the most common and productive method was soil sifting and hand collecting.

Soil and leaf litter sampling was accomplished using a modified cat litter tray with $\frac{1}{4}$ inch wire mesh to separate soil and leaf litter dwelling arthropods from the substrate.

Hand collecting consisted of active searching for foraging ants. Stumps and logs were dissected using a hatchet and stems and twigs were split while looking for nests. Ants were collected using an aspirator or “pooter” (modified aspirator).

Baiting consisted of leaving various food items on card stock or smeared on tree trunks in order to attract foraging ants. Baits utilized include: peanut butter, grape jelly, tuna fish and cookie crumbs. Crumbled pecan sandies (a short bread type cookie) had the

best results and is what most professional myrmecologists use. Baits were also used to follow workers back to nests, in order to collect reproductives.

Berlese funnels were used to extract soil dwelling ants from their substrate. Leaf litter and top soil was collected in large bags and then placed in the funnels. The soil and litter is heated by a lamp causing arthropods in the soils to migrate down the funnel and into a collecting jar.

Blacklight trapping involved using a blacklight hanging in front of a white sheet to attract night-flying ants. This was mainly useful in collecting males.

Pitfall trapping utilized plastic cups buried in the soil and partially filled with propylene glycol (non-toxic engine coolant). These traps were left in the ground for 24 hours and then emptied and examined. In general pitfalls tend to collect the most abundant ants and arthropods in the vicinity and as such the use of these traps was limited in this survey.

All collected ants were labeled and preserved in 100% ethanol. It is preferable to use high ethanol concentrations to preserve the ants to maintain their rigidity in order to make mounting easier. Specimens were later sorted and mounted on paper points using water-soluble hide glue. Representatives have been deposited at both the Auburn University Entomological Museum and the Mississippi State Entomological Museum. Specimens were also obtained from faculty, graduate students, and extension agents from Auburn University, Mississippi State University and other institutions.

All specimens were identified using the latest keys from the literature and Ant Course 2003 (South West Research Station, AZ). Literature records have also been examined and are included where appropriate.

Abbreviations used in locality data:

AL# = State route

CR# = County road

CG = Campground

NF = National forest

SP = State park

NWR = National wildlife refuge

WMA = Wildlife management area



Map 1. The State of Alabama, U.S.A. illustrating counties. (Courtesy of the Dept of Geography, University of Alabama)

GENERAL MORPHOLOGY OF ANTS

As ants are usually identified to species using workers, it is usually helpful to collect workers whenever possible. Workers typically have a long first antennal segment, referred to as a scape, which is followed by the funiculus (usually with between 5 and 11 additional segments). Ants, like most hymenopterans, have the first abdominal segment fused to the thorax. This segment is referred to as the propodeum (or occasionally as the epinotum). The propodeum and the thorax together are referred to as the mesosoma (also called the alitrunk in older literature). Ants also have constrictions on the 2nd and the 3rd (depending on the subfamily) abdominal segment(s) forming the petiole (if the 3rd is constricted it is labeled the postpetiole). The remaining unconstricted abdominal segments are referred to as the gaster. Figure 1 illustrates the general body regions of ants as well as morphological nomenclature.

Winged ants are either queens or males. Queens usually have large eyes and ocelli in addition to an enlarged thoracic area and wing scars (if wings are absent). Males generally have shorter scapes and a reduced head with somewhat vestigial mandibles. They too have well developed eyes and ocelli.

Standard measurement terms and abbreviations:

CI: Cephalic index, HW x 100 divided by HL

EL: Eye length, Eye length, in full-face view

HL: Head length, length of head capsule excluding mandibles

HW: Head width, maximum width of head in full-face view, excluding eyes

MI: Mandibular index, ML x 100 divided by HL

ML: Mandibular length, maximum length of mandible, from base to tip

REL: Relative eye length, EL/HL

SI: Scape index, SL x 100 divided by HW

SL: Scape length, maximum length of antennal scape

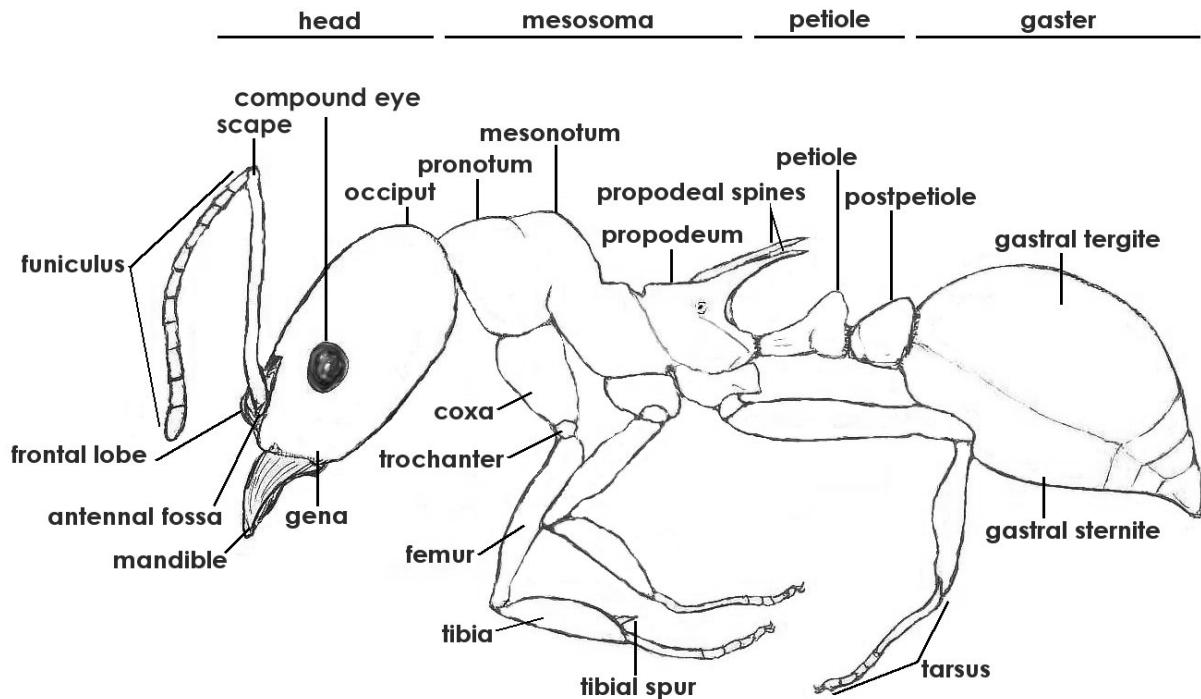


Fig. 1. Worker of *Aphaenogaster tennesseensis* with general morphological features indicated

GENERAL TAXONOMY OF ANTS

All ants belong to a single family, Formicidae, in the order Hymenoptera. There are a total of 21 extant subfamilies and 238 genera that are recognized (Bolton 2003). Nine subfamilies are represented in Alabama. Table 1 lists all species recorded in this work as well as the page number where that species is treated in the text.

The most commonly encountered subfamilies are the Myrmicinae, Formicinae and Dolichoderinae. Ponerines and Pseudomyrmecines are less commonly found in Alabama unless they are actively sought out. Rarely encountered subfamilies include the Amblyoponinae, Ecitoninae, Proceratiinae, and Ectatommatae.

The relationship between the subfamilies is unclear at the moment. Generally the Dolichoderinae and Formicinae are considered to be the most advanced and derived ants. Ponerines (including the Ectatommatae, Amblyoponinae, and Proceratininae) are considered to be primitive ants due to their predatory lifestyle and primitive behavior.

Members of the family Formicidae all share the following synapomorphies: eusocial; worker caste composed of wingless (and usually sterile) workers; reproductives are winged and shed their wings after mating; metapleural gland is present; geniculate antennae; and abdominal segment 2 forming a petiole. Some of these traits have been lost secondarily, but most species retain them. Presented in the following taxonomic sections are keys to the subfamilies, genera, and species of the ants recorded in Alabama with notes on their taxonomy, life history, and distribution.

Table 1. Species list of the ants of Alabama with page references

Subfamily Amblyoponinae , p. 14	Subfamily Formicinae (cont)
<i>Amblyopone pallipes</i> (Haldeman), p. 15	<i>Formica</i> n. sp., p.63
Subfamiliy Dolichoderinae , p. 15	<i>Formica pallidefulva</i> Latreille, p. 63
<i>Dolichoderus mariae</i> Forel, p. 19	<i>Formica rubicunda</i> Emery, p.64
<i>Dolichoderus plagiatus</i> (Mayr), p. 19	<i>Formica schaufussi dolosa</i> Buren, p. 65
<i>Dolichoderus pustulatus</i> Mayr, p. 20	<i>Formica subintegra</i> Wheeler, p.66
<i>Dolichoderus taschenbergi</i> (Mayr), p. 20	<i>Formica subsericea</i> Say, p. 67
<i>Dorymyrmex bureni</i> (Trager), p. 22	<i>Lasius alienus</i> (Foerster), p. 69
<i>Dorymyrmex flavus</i> McCook, p. 23	<i>Lasius flavus</i> (Fabricius), p. 70
<i>Dorymyrmex grandulus</i> (Forel), p. 24	<i>Lasius neoniger</i> Emery, p. 71
<i>Dorymyrmex smithi</i> Cole, p. 25	<i>Lasius umbratus</i> (Nylander), p. 72
<i>Forelius</i> sp., p. 26	<i>Paratrechina arenivaga</i> (Wheeler), p.75
<i>Linepithema humile</i> (Mayr), p. 27	<i>Paratrechina bourbonica</i> (Forel), p.76
<i>Tapinoma sessile</i> (Say), p. 29	<i>Paratrechina concinna</i> Trager, p. 77
Subfamily Ecitoninae , p. 30	<i>Paratrechina faisonensis</i> (Forel), p. 77
<i>Neivamyrmex carolinensis</i> (Emery), p. 32	<i>Paratrechina longicornis</i> (Latreille), p. 78
<i>Neivamyrmex nigrescens</i> (Cresson), p. 33	<i>Paratrechina parvula</i> (Mayr), p.79
<i>Neivamyrmex opacithorax</i> (Emery), p.34	<i>Paratrechina phantasma</i> Trager, p. 80
Subfamily Ectatomminae , p.34	<i>Paratrechina vividula</i> (Nylander), p. 80
<i>Gnamptogenys triangularis</i> (Mayr), p. 35	<i>Paratrechina wojciki</i> Trager, p.81
Subfamily Formicinae , p. 35	<i>Prenolepis imparis</i> (Say), p. 83
<i>Brachymyrmex depilis</i> Emery, p. 39	Subfamily Myrmicinae , p. 84
<i>Brachymyrmex musculus</i> Forel, p. 40	<i>Aphaenogaster floridana</i> Smith, p. 92
<i>Brachymyrmex</i> n. sp., p. 41	<i>Aphaenogaster fulva</i> Roger, p. 93
<i>Camponotus americanus</i> Mayr, p.45	<i>Aphaenogaster lamellidens</i> Mayr, p. 94
<i>Camponotus caryae</i> (Fitch), p.46	<i>Aphaenogaster miamiana</i> Wheeler, p. 95
<i>Camponotus castaneus</i> (Latreille), p. 47	<i>Aphaenogaster picea</i> (Wheeler), p. 96
<i>Camponotus chromaiodes</i> Bolton, p.48	<i>Aphaenogaster rudis</i> Enzmann, p. 96
<i>Camponotus decipiens</i> Emery, p.49	<i>Aphaenogaster tennesseensis</i> (Mayr), p. 97
<i>Camponotus discolor</i> (Buckley), p. 50	<i>Aphaenogaster treatae</i> Forel, p. 98
<i>Camponotus floridanus</i> (Buckley), p. 51	<i>Aphaenogaster(f-t-r comp.)</i> sp., p. 99
<i>Camponotus impressus</i> (Roger), p.52	<i>Crematogaster ashmeadi</i> Mayr, p. 102
<i>Camponotus mississippiensis</i> Smith, p. 52	<i>Crematogaster atkinsoni</i> Wheeler, p. 103
<i>Camponotus nearcticus</i> Emery, p. 53	<i>Crematogaster lineolata</i> (Say), p. 103
<i>Camponotus pennsylvanicus</i> (DeGeer), p.54	<i>Crematogaster minutissima</i> Mayr, p. 104
<i>Camponotus obliquus</i> Smith, p. 55	<i>Crematogaster missouriensis</i> Emery, p. 105
<i>Camponotus snellingi</i> Bolton, p. 56	<i>Crematogaster pilosa</i> Emery, p. 106
<i>Camponotus socius</i> Roger, p. 57	<i>Crematogaster vermiculata</i> Emery, p. 107
<i>Camponotus subbarbatus</i> Emery, p. 57	<i>Cyphomyrmex rimosus</i> (Spinola), p. 108
<i>Formica archboldi</i> Smith, p. 61	<i>Monomorium floricola</i> (Jerdon), p. 110
<i>Formica integra</i> Nylander, p. 62	<i>Monomorium minimum</i> (Buckley), p. 111
	<i>Monomorium pharaonis</i> (L.), p. 112

Subfamily Myrmicinae (cont)

- Myrmecina americana* Emery, p. 114
Myrmica americana Weber, p. 116
Myrmica pinetorum Wheeler, p. 117
Myrmica punctiventris Roger, p. 118
Pheidole adrianoi Naves, p. 123
Pheidole bicarinata Mayr, p. 123
Pheidole crassicornis Emery, p. 124
Pheidole davisi Wheeler, p. 125
Pheidole dentigula M.R Smith, p. 126
Pheidole dentata Mayr, p. 127
Pheidole floridana Emery, p. 128
Pheidole metallescens Emery, p. 129
Pheidole moerens Wheeler, p. 130
Pheidole morrisi Forel, p. 131
Pheidole obscurithorax Naves, p. 132
Pheidole (crassicornis gp) n. sp., p. 133
Pheidole tetra Creighton, p. 134
Pheidole tysoni Forel. Clay, p. 134
Pogonomyrmex badius (Lat.), p. 136
Protomognathus americanus (Em.), p. 137
Pyramica angulata (Smith), p. 144
Pyramica clypeata (Roger), p. 145
Pyramica creightoni (Smith), p. 145
Pyramica dietrichi (Smith), p. 146
Pyramica laevinasis (Smith), p. 147
Pyramica margaritae (Forel), p. 147
Pyramica membranifera (Emery), p. 148
Pyramica metazytes Bolton, p. 149
P. ohioensis (Kennedy&Schramm), p. 149
Pyramica ornata (Mayr), p. 150
Pyramica pergandei (Emery), p. 151
Pyramica pilinasis (Forel), p. 151
Pyramica pulchella (Emery), p. 152
Pyramica reflexa (Wesson), p. 153
Pyramica rostrata (Emery), p. 153
Pyramica talpa (Weber), p. 154
Solenopsis carolinensis Forel, p. 159
Solenopsis geminata (Fabricius), p. 160
S. globularia littoralis Creighton, p. 161
Solenopsis invicta Buren, p. 162
Solenopsis invicta X richteri, p. 164
Solenopsis molesta (Say), p. 164
Solenopsis pergandei Forel, p. 165
Solenopsis picta Emery, p. 166

Subfamily Myrmicinae (cont)

- Solenopsis richteri* Forel, p. 167
Solenopsis tennesseensis Smith, p. 168
Solenopsis tonsa Thompson, p. 169
Solenopsis xyloni McCook, p. 169
Stenamma foveolocephalum Smith, p. 171
Stenamma meridionale Smith, p. 172
Strumigenys louisianae Roger, p. 173
Temnothorax bradleyi (Wheeler), p. 176
Temnothorax curvispinosus (Mayr), p. 176
Temnothorax longispinosus (Roger), p. 177
Temnothorax pergandei (Emery), p. 178
Temnothorax schaumii (Roger), p. 179
Temnothorax smithi (Baroni-Urbani), p. 180
Temnothorax texanus (Wheeler), p. 180
Temnothorax tuscaloosae (Wilson), p. 181
Tetramorium bicarinatum (Nylander), p. 182
Tetramorium caespitum (Linnaeus), p. 183
Tetramorium lanuginosum Mayr, p. 184
Trachymyrmex septentrionalis (McCook), p. 185
Subfamily Ponerinae, p. 186
Cryptopone gilva (Roger), p. 189
Hypoponera opaciceps (Mayr), p. 191
Hypoponera opacior (Forel), p. 192
Odontomachus brunneus (Patton), p. 195
Odontomachus ruginodis Smith, p. 195
Ponera exotica Smith. P. 197
Ponera pennsylvanica Buckley, p. 198
Subfamily Proceratiinae, p. 199
Discothyrea testacea Roger, p. 200
Proceratium chickasaw de Andrade, p. 201
Proceratium croceum (Roger), p. 202
Proceratium pergandei (Emery), p. 203
Proceratium silaceum Roger, p. 203
Subfamily Pseudomyrmecinae, p. 204
Pseudomyrmex ejectus (Smith), p. 206
Pseudomyrmex pallidus (Smith), p. 206
Pseudomyrmex seminole Ward, p. 207

KEY TO THE SUBFAMILIES OF FORMICIDAE

(Modified from Creighton 1950, Holldobler and Wilson 1990 and MacGown 2005)

- 1 Body with single reduced or isolated segment (petiole) between mesosoma (thorax fused with abdominal segment 1) and gaster. First gastral segment (abdominal segment 2) either entirely confluent with second gastral segment, or separated by narrow girdling impression.....2
- 1' Body with two reduced segments (petiole and post-petiole) between mesosoma and gaster; either both segments reduced or post-petiole somewhat larger than petiole; post-petiole distinctly smaller than 1st gastral segment (abdominal segment 3) and separated by extensive deep girdling.....7
- 2(1) Gaster lacking girdling impression between first and second gastral segment; sting is absent or vestigial, never apparent without dissection3
- 2' Gaster usually with distinct girdling impression between first and second gastral segment; sting present, usually conspicuous4
- 3(2) Acidopore present as semicircular to circular orifice at apex of gaster formed from hypopygium (last lower plate of the gaster), often projecting as nozzle and encircled with distinct fringe of hairs (fig. 2)Formicinae
- 3' Acidopore absent, opening at apex of gaster horizontal and slit-like, if hairs present, not forming encircling fringe (fig.3)Dolichoderinae

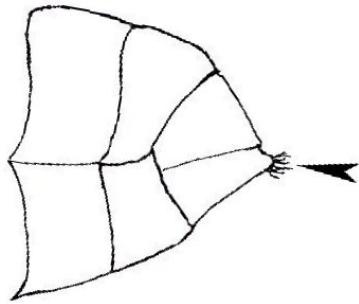


Fig. 2. Terminal gastral segments of formicine ant with acidopore

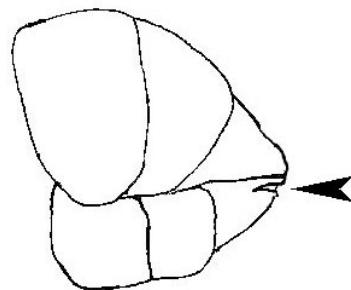


Fig. 3. Terminal gastral segments of dolichoderine ant with slit

- 4(2') Petiole broadly joined to gaster, separated dorsally and laterally by constriction only, petiole lacking free posterior face; helcium (articulation point between petiole and gastral segment 1) broad and attached high on gastral face (as seen in profile) Amblyoponinae
- 4' Petiole narrowly joined to gaster by thin junction, petiole usually with free posterior face; helcium narrow, attached near or below midpoint of gaster
- 5
- 5(4') Horizontal frontal lobes absent or reduced as seen in full face view, revealing antennal sockets; promesonotal suture absent Proceratiinae
- 5' Horizontal frontal lobes present, concealing antennal sockets; promesonotal suture usually present 6
- 6(5') Head and body covered with deep grooves or furrows; mandibles elongate, lacking teeth (one species, rare in Alabama) Ectatomminae
- 6' Head and body not covered by deep grooves; mandibles usually with teeth, at least apically (many common species) Ponerinae

- 7(1') Frontal carinae expanded laterally, partially or wholly covering antennal insertions when head viewed from above Myrmicinae
- 7' Frontal carinae narrow and not expanded laterally, antennal insertions fully exposed when head viewed from above 8
- 8(7') Eyes large, suboval or reniform, consisting of several hundred fine ommatidia; ocelli usually present Pseudomyrmecinae
- 8' Eyes vestigial or absent, if present consisting of single ocellus-like structure; ocelli absent Ecitoninae

SUBFAMILY AMBLYOPONINAE

This is a small subfamily composed of specialist predators that are closely related to the Ponerines. Only one species, *Amblyopone pallipes* (Haldeman), is found in Alabama.

Members of this subfamily have a petiole that is broadly joined to the gaster, separated dorsally and laterally by a constriction only; the petiole does not have a free posterior face. The helcium (articulation point between the petiole and gastral segment 1) is broad and attached high on gastral face (as seen in profile). These ants can be found worldwide.

Genus *Amblyopone* Erichson – Saw toothed ants

This genus can be found worldwide and is particularly diverse in Australia. *Amblyopone* ants are specialist predators of centipedes using their unique jaws to grip prey while stinging them.

Amblyopone species have long narrow mandibles with coarse teeth that appear to be double. These are fairly large ants, usually about 4mm in length. Members of this genus can be found worldwide, with 3 species occurring in the United States.

***Amblyopone pallipes* (Haldeman) – Common saw tooth ant**

This species is widely distributed throughout the US but is rarely collected. They prefer mesic areas and tend to forage in the leaf litter. *A. pallipes* has a sharp tooth or point on the side of the head near the mandibular insertion (Deyrup et al. 2003). This species is found in Quebec and south to Florida west through the central states to California (Deyrup et al. 2003)

Amblyopone pallipes was collected in the following localities in Alabama: **Bibb Co.** Glades Preserve, **Lauderdale Co.** Joe Wheeler SP, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn



Map 2. *Amblyopone pallipes*

SUBFAMILY DOLICHODERINAE

Dolichoderine ants have many distinctive traits that separate them from the other subfamilies of ants. Instead of a sting they have a horizontal slit at the tip of the abdomen. Dolichoderines have a distinctive odor usually described as rancid butter, rotten coconut

or even a blue cheese fragrance. A worker can be crushed in the field to rapidly determine if it is a member of this subfamily based on smell. This “dolichoderine odor” is the result of noxious chemicals produced by the ants and used defensively. All members of this subfamily have one node on the petiole, like the Formicinae, but they can be separated from that subfamily by their lack of an acidopore (see the subfamily Formicinae). Members of this subfamily can be found worldwide.

Most Dolichoderine ants tend honeydew-producing insects and scavenge for food. As a whole they tend to be referred to as “sugar ants” due to their fondness for foraging for sweet food items when invading human structures.

Key to the Alabama genera of Dolichoderinae (modified from Creighton 1950)

- 1 Declivitous face of propodeum strongly concave; integument stiff and brittle; mesosoma usually covered in heavy sculpturing *Dolichoderus*
- 1' Declivitous face of propodeum straight or nearly so; integument thin and flexible, smooth or at most finely sculptured 2
- 2(1') Propodeum with prominent, sharp, tooth-like protuberance projecting vertically at junction of basal and declivitous faces; third segment of maxillary palpus long, as long or longer than three succeeding segments together *Dorymyrmex*



Fig. 4. Lateral view of *Dorymyrmex* sp. mesosoma and petiole

- 2' Junction between basal and declivitous faces of propodeum unarmed, rounded or angular; third segment of maxillary palpus not long and notably shorter than three succeeding segments together 3
- 3(2') Scale (node) of petiole vestigial and 1st antennal segment after scape is about twice as long as 2nd segment; mesosoma lacking fine erect hairs (best seen on dry specimens against a black background) *Tapinoma sessile*
- 3' Scale (node) of petiole present (may be covered by overhanging gaster); mesosoma with or without erect hairs 4
- 4(3') Mesosoma lacking erect hairs; scale of petiole long, tip projecting beyond overhanging anterior face of gaster *Linepithema humile*
- 4' Mesosoma with several erect hairs; scale of petiole small, short and largely concealed by overhanging anterior face of gaster *Forelius*

Genus *Dolichoderus* Lund

These ants have small to large colonies and usually nest in the soil or in carton (composed of rough woven plant fibers) near plants. Plant roots or stems usually penetrate their nest chambers and serve as shelves for their brood. Members of this genus feed on honeydew and are generalist scavengers.

Dolichoderus ants have a distinctively concave propodeum (on the declivitous face). Also their integument is stiff and brittle with the mesosoma usually covered in heavy sculpturing. This genus can be found in the Neotropical, Nearctic, Palearctic, Australasian, Oriental and Indo-Australian regions. In the United States this genus is confined to the eastern half of the country.

Key to the genus *Dolichoderus* (modified from Creighton 1950)

- 1 Cephalic foveolae coarse, deep and close-set, surface between them forming reticulo-rugose pattern; antennal scapes with numerous short erect hairs on anterior surfaces *Dolichoderus plagiatus*
- 1' Cephalic foveolae shallow, often replaced on front and vertex by small punctures, foveolae well separated, surface between them delicately shagreened and never forming reticulo-rugose pattern; antennal scapes usually without erect hairs, rarely one or two present 2
- 2(1') Propodeum, seen from above, subquadrate, slightly or not longer than broad; color uniform brownish black or piceous *Dolichoderus taschenbergi*
- 2' Propodeum, seen from above, distinctly longer than broad; color varies but rarely uniform brownish-black or piceous, often bicolored or at least with mesosoma lighter than gaster 3
- 3(2') Dorsum of propodeum and mesonotum with coarse, deep, close-set foveolae forming reticulo-rugose pattern; mesopleurae smooth and shining *Dolichoderus pustulatus*
- 3' Dorsum of propodeum and mesonotum granulose or densely shagreened; foveolae, when present, shallow and obscure; mesopleurae in large part or entirely shagreened, subopaque or dull *Dolichoderus mariae*

***Dolichoderus mariae* Forel**

This species has large colonies with thousands of adults. *D. mariae* seems to prefer sandy soil and nests near clumps of grass.

The dorsum of the propodeum and mesonotum is granulose or densely shagreened and foveolae, when present, are shallow and obscure. The mesopleuron is partly or entirely shagreened and subopaque or dull.

Dolichoderus mariae is found in southern New England south to Gulf States and west to Illinois and Oklahoma (Creighton 1950). This species was reported in Alabama by MacKay (1993).

***Dolichoderus plagiatus* (Mayr)**

This species forms small colonies in the soil, in hollow stems or in rolled leaves (Creighton 1950). *D. plagiatus* has cephalic foveolae that are coarse, deep and close-set so that the surface between them forms a reticulo-rugose pattern. Their antennal scapes have numerous short erect hairs on their anterior surfaces.

Dolichoderus plagiatus is found in southern Ontario and New Brunswick south to Georgia and west to North Dakota, with most specimens collected in the Appalachian Mountains (Creighton 1950).



Map 3. *Dolichoderus plagiatus*

This species was collected in the following locality in Alabama: **DeKalb Co.**
DeSoto SP.

***Dolichoderus pustulatus* Mayr**

Nests of this species are small and formed above ground from woven plant fibers (carton), usually in a clump of vegetation.

The dorsum of the propodeum and mesonotum of this species has coarse, deep, close-set foveolae that form a reticulo-rugose pattern. The mesopleuron is smooth and shining. *Dolichoderus pustulatus* is found in southern Nova Scotia south to Florida and west to Texas and Illinois (Creighton 1950). This species was reported in Alabama by MacKay (1993).

***Dolichoderus taschenbergi* (Mayr)**

This species has large colonies and prefers to nest in sandy soils. It is rare in the southern extent of its ranges.

Dolichoderus taschenbergi has a propodeum that, seen from above, is subquadrate, and slightly or not at all longer than broad. The body of this ant is uniform brownish black or piceous. This species can be found from Nova Scotia west to Manitoba and south to the Gulf States (Creighton 1950) and was reported in Alabama by MacKay (1993).

Genus *Dorymyrmex* Mayr– Pyramid ants

This genus is only found in the New World and is most diverse in South America.

Dorymyrmex ants typically prefer open sunny areas and nest in the soil. Colonies are generally large and their nests are marked by small mounds of excavated soil. Workers will forage during the hottest periods of the day moving rapidly across the substrate collecting dead insects, honeydew and scavenged material. These ants do not seem bothered by other ants and will nest in the close vicinity of other aggressive species like *Pogonomyrmex* spp. (Creighton 1950) and *Solenopsis invicta* (personal observation).

It should be noted that Murphree (1947) refers to *Dorymyrmex pyramicus* Roger that was most likely *D. bureni* although this is uncertain without material to examine.

Dorymyrmex ants have a distinctive tooth-like protuberance projecting vertically at the junction of the basal and declivitous faces. Also the third segment of the maxillary palpus is long (as long or longer than the three succeeding segments together). Members of this genus can be found in the Nearctic and Neotropical regions.

Key to the genus *Dorymyrmex* (modified from Snelling 1995, MacKay 2005)

- 1 Mesonotal profile, in all or nearly all nest-mates, evenly convex or flat to weakly concave; color yellow or reddish yellow; propodeal tubercle blunt*Dorymyrmex bureni*
- 1' Mesonotal profile, in all or nearly all nest-mates, with distinct dorsal and posterior faces that meet in a more or less well-defined angle; color varies from yellowish to blackish; propodeal tubercle sharp or blunt2

- 2(1') Head relatively broad (CI over 90); vertex margin distinctly concave in frontal view, rarely straight; eye relatively small; color black to dark brown
- *Dorymyrmex smithi*
- 2' Head relatively narrow (CI usually less than 88, rarely 90); vertex margin straight or slightly convex; eye relatively large 3
- 3(2') Propodeal tubercle relatively prominent; color yellowish to reddish-yellow
- *Dorymyrmex flavus*
- 3' Propodeal tubercle relatively short, color brownish to yellowish
- *Dorymyrmex grandulus*

***Dorymyrmex bureni* (Trager)**

This species is extremely common in Alabama. These ants are found in open sunny areas and tend to be dominant in dry environments. They are aggressive when disturbed and will climb grass and shrubs to attack large intruders, however they are fairly harmless as they lack a sting and are too small to inflict a painful bite.

Dorymyrmex bureni nests may be found in close proximity to *S. invicta* mounds (within a meter or less). The author has observed *D. bureni* nests with rings of dead *S. invicta* outside of the nest, possibly



Map 4. *Dorymyrmex bureni*

indicating conflict or scavenging activity of these ants. The relationship between these two species is unknown.

This species has a smooth mesonotal profile that is evenly convex or flat to weakly concave. *D. bureni* is yellow or reddish yellow and has a blunt propodeal tubercle. The range of this ant extends from Maryland south to Florida and west to Texas (Snelling 1995).

Dorymyrmex bureni was collected in the following counties in Alabama:

Barbour Co. Blue Springs SP, **Bibb Co.** Pondville, **Blount Co.** Oneonta, **Clarke Co.** Grove Hill, **Coffee Co.** Hwy 51, 2mi N of Enterprise, **Covington Co.** Conecuh NF: Conecuh Trail, **Dallas Co.** 2mi W of Orville, **Escambia Co.** 2mi E of Flomaton, **Geneva Co.** Hacoda, **Hale Co.** Lake Payne CG, **Houston Co.** Dothan, **Lamar Co.** Vernon, **Lee Co.** Auburn, **Lowndes Co.** Woodruff Lake, Prairie Creek CG, **Macon Co.** Tuskegee NF, **Marengo Co.** Chickasaw SP, **Monroe Co.**, **Perry Co.** 1mi. N of Heidberger, **Russell Co.** CR22 and AL51, **Sumter Co.** Coatopa, **Tuscaloosa Co.** Lake Lurleen SP, **Wilcox Co.** Roland Cooper CG

***Dorymyrmex flavus* McCook**

This species nests in soil with its entrances marked by small mounds of soil. *D. flavus* has a relatively narrow head (CI usually



Map 5. *Dorymyrmex flavus*

less than 88, rarely 90) and vertex margin is straight or slightly convex. The eye is relatively large and the propodeal tubercle is relatively prominent. The body is yellowish to reddish-yellow

Dorymyrmex flavus is found in Alabama, Florida, Texas and California (Snelling 1995) probably across the southern US. This species was collected in the following counties in Alabama: **Baldwin Co.** Fort Morgan, **Conecuh Co.** Conecuh NF, **Mobile Co.** Mobile

***Dorymyrmex grandulus* (Forel)**

This is a typical soil dwelling *Dorymyrmex* ant that is apparently rare within its range. It was not collected during this survey. *D. grandulus* has a relatively narrow head (CI usually less than 88, rarely 90) and the vertex margin is straight or slightly convex. The eye is relatively large while the propodeal tubercle is relatively short. Color is brownish to yellowish. This species is found in Georgia (Isper et al. 2004), Florida (Deyrup 2003) and Alabama. *Dorymyrmex grandulus* was reported in **Mobile Co.** by Trager (1988).



Map 6. *Dorymyrmex grandulus*

Dorymyrmex smithi Cole

This species is a temporary parasite of *D. bureni* and possibly other *Dorymyrmex* species. Foundling nests with mixed workers are rare but the author found a colony with about 50/50 enslaved workers in a dirt parking lot close to Funchess Hall (Auburn University, Auburn, AL). All other collections came from pure *D. smithi* colonies.

Dorymyrmex smithi has a relatively broad head (CI over 90) with the vertex margin distinctly concave in frontal view, rarely straight. The eye relatively small and the propodeal spine is typically well developed. This species is black to dark brown.

This ant is found in North Carolina south to Florida and west to North Dakota and Texas (Snelling 1995).

This species was collected in the following counties in Alabama: **Baldwin Co.** Bay Minette, **Geneva Co.** 2mi E of Hartford, **Lee Co.** Auburn University, **Macon Co.** Tuskegee NF, **Mobile Co.** Mobile



Map 7. *Dorymyrmex smithi*

Genus *Forelius* - Emery

This is a small New World genus with only a few species in North America. These ants are typically found in xeric areas and will forage during high temperatures. They mainly feed on honeydew and scavenged material.

These ants look similar to *L. humile* but can be separated by examining the mesosoma that has several fine erect hairs. Also the scale of the petiole is small, short and largely concealed by the overhanging anterior face of the gaster. Color ranges from dark brown to deep orange. This genus is found throughout the Nearctic and Neotropical regions.

***Forelius* sp.**

This species is most likely *F. pruinosis* (Roger) and potentially another species or complex of species that cannot be reliably distinguished at this point (this seems to be the species Murphree refers to as *Iridomyrmex pruinosis analis* Andre in his 1947 thesis). These ants show a great deal of variability in color which indicates that this might be a complex, but that has not been answered and this species has not been studied to any satisfactory degree. Only after this genus is revised will positive identification be possible.



Map 8. *Forelius* sp.

This genus is in disarray; it is difficult to identify precisely what species this is. Representatives of this species (or species complex) are found across the United States

This *Forelius* sp. was collected in the following Alabama counties: **Baldwin Co.**, Fort Morgan, **Bibb Co.** Glades Preserve, **Blount Co.** Oneonta, **Butler Co.** Pine Apple,

Clay Co. Taladega NF, Chinnabee trail, **Cleburne Co.** Choctawhatchee WMA, **Colbert Co.** Freedom Hills, **Cullman Co.** 2mi N of Cullman, **Dallas Co.** Carlowville, **Fayette Co.** Wolfcreek WMA, **Jackson Co.** Paint Rock River, **Lamar Co.** Vernon, **Lawrence Co.** Bankhead NF, **Lee Co.** Auburn, **Limestone Co.** Gipsey, **Lowndes Co.** Prairie Creek CG, **Macon Co.** Tuskegee NF, **Morgan Co.** Wheeler NWR, **Pickens Co.** Cochrane, **Russell Co.** CR22 and AL51, **Tuscaloosa Co.** Sipsey WMA, **Walker Co.** Townley, **Winston Co.** Smith Lake CG

Genus *Linepithema* Mayr

This genus is from South America but members are found worldwide especially in subtropical and tropical regions. These ants are generalists but prefer sweet food items.

***Linepithema humile* (Mayr) – Argentine ant**

This is a major pest ant in the United States that was first noticed in New Orleans in 1881 (Foster 1908). It is a native of Argentina (hence the common name) and has since spread throughout the southern US, stretching from Florida to California with isolated introductions to greenhouses and other human structures around the country. *L. humile* generally prefers moist, warm areas and will nest in virtually any



Map 9. *Linepithema humile*

habitat including in the soil, in piles of wood or debris, in leaf litter, or in potted plants.

This species will also readily move indoors and nest under flooring or in wall voids.

Colonies can be massive with 11,000 to 64,000 adults (Holldobler and Wilson 1990) and *L. humile* is extremely aggressive towards other ant species, effectively displacing all but the smallest species in highly infested areas (Ward 1987). This species however is highly gregarious to conspecifics and will generally adopt other *L. humile* ants from other colonies.

New colonies are founded by “budding”: Instead of engaging in mating flights the queens mate in the nest and then leave with a group of workers to found a new nest. All colonies are polygynous usually with several to hundreds of queens.

These ants form long extensive trails and go through great lengths to reach food items, when disturbed they have a tendency to swarm all over the intruder, but due to their small size they can inflict no harm to humans. However, it is fairly unsettling to have large numbers of Argentine ants rapidly crawling about your skin.

Linepithema humile has a mesosoma that lacks erect hairs and the scale of the petiole is long with the tip projecting beyond the overhanging anterior face of the gaster. This species is concolorous blackish brown to grayish.

This species is found worldwide throughout the tropics and subtropics. In the US this species is found throughout the south, from Georgia to southern California, with isolated introduction throughout the US.

Linepithema humile was collected in the following counties in Alabama: **Baldwin Co.** 2mi. S of Bay Minette, **Barbour Co.** Blue Springs SP, **Bibb Co.** Glades Preserve, **Coffee Co.** 1mi. N of Enterprise, **Conecuh Co.** Evergreen, **Covington Co.** 3mi S of

Andalusia, **Dallas Co.** 2mi W of Selma, **Greene Co.** Boligee, **Lowndes Co.** Prairie Greek CG, **Marengo Co.** Fosque Creek CG, **Mobile Co.** Saraland, **Monroe Co.** Claibourne Lake, **Shelby Co.** Birmingham, **Tuscaloosa Co.** Tuscaloosa, **Walker Co.** Townley, **Wilcox Co.** Roland Cooper CG, **Winston Co.** Smith Lake

Genus *Tapinoma* Foerster

This is a large genus of ants with only three members (one introduced) in North America. These ants are fond of sweet substances and will nest in a variety of environments. Members of this genus can be found worldwide.

***Tapinoma sessile* (Say) –Odorous house ant**

This species is a fairly successful native ant that was probably much more common before the introduction of the Argentine ant (*L. humile*). It prefers similar habitats to that invasive ant however; *T. sessile* has a much larger range in North America ranging from southern Canada to northern Mexico. Colonies are polygynous and typically have several thousand members with a large colony containing 10,000 adults. This species will commonly invade houses in search of food.



Map 10. *Tapinoma sessile*

Tapinoma sessile superficially looks similar to *L. humile* but can be separated by the following characters: the scale (node) of petiole is vestigial and 1st antennal segment after scape is about twice as long as 2nd segment.

This species is found in southern Canada south to northern Mexico, and throughout the US.

Tapinoma sessile was collected in the following counties in Alabama: **Etowah Co.** Gadsden, **Lauderdale Co.** Rogersville, **Lawrence Co.** Joe Wheeler SP, **Limestone Co.** 1mi. N of Decatur, **Macon Co.** Tuskegee NF, **Madison Co.** Huntsville, **Tuscaloosa Co.** Sipsey WMA

SUBFAMILY ECITONINAE – New World army ants

The army ants are an interesting group that typically forage in columns and consume prey that they encounter on their “raids”. In Alabama this subfamily is represented by one genus, *Neivamyrmex*, which preys on the brood of other ants.

North American army ants are much more cryptic than their African and South America cousins. They are smaller and usually only active at night, often overlooked but fairly widespread.

These ants have exposed antennal insertions (full face view) and their eyes are vestigial or absent, if present consisting of a single ocellus-like structure, ocelli are also absent. Members of this subfamily are found in the Nearctic and Neotropical regions.

Genus *Neivamyrmex* Borgmeier

This genus has the typical nomadic army ant behavior and members are active nocturnally, nesting under stones or other objects during the day. These ants specialize on the brood of other ants.

Workers can be identified by the traits of the subfamily since this is the only genus found in Alabama. Males (sometimes more commonly collected than the workers) are identified by their larger wasp-like appearance and their subgenital plate that has three apical teeth.

Key to the genus *Neivamyrmex* (from Creighton 1950, Watkins 1985, MacGown 2005)

Key to workers:

- 1 Upper surface of head opaque, densely granulate *Neivamyrmex nigrescens*
- 1' Head mostly shining and lacking granulate sculpture 2
- 2(1') Petiolar node elongate, nearly twice as long as broad ... *Neivamyrmex opacithorax*
- 2' Petiolar node subquadrate, about as broad as long *Neivamyrmex carolinensis*

Key to males:

- 1 Mandibles sickle shaped, slender and gradually tapering apically
..... *Neivamyrmex carolinensis*
- 1' Mandibles spatulate shaped, distal half as broad or broader than basal half 2
- 2(1') Gaster black to blackish brown; setae on ventral side of petiole short (shorter than width of metatibia), white and directed posteroventrally; just above antennal fossa, prominent swelling is present *Neivamyrmex nigrescens*

- 2' Gaster reddish brown, setae on ventral side of petiole long (hairs longer than width of metatibia), golden and erect; area above antennal fossa with transverse swelling only weakly developed or absent *Neivamyrmex opacithorax*

Neivamyrmex carolinensis (Emery)

This species nests in the soil or under stones and has large colonies of up to 50,000 adults (MacKay and MacKay 2002). Males can be collected during mating flights in May and June.

Workers of this species have a petiolar node that is subquadrate, about as broad as long. Males have mandibles that are sickle shaped, slender and gradually tapering apically.

Neivamyrmex carolinensis is found throughout the southeastern US west to Arizona and Kansas (MacKay and MacKay 2002). This species was collected in the following counties of Alabama: **Chilton Co.** (M.R. Smith 1942), **Choctaw Co.** (M.R. Smith 1942), **Etowah Co.** (M.R. Smith 1942), **Pickens Co.** (M.R. Smith 1942)



Map 11. *Neivamyrmex carolinensis*

Neivamyrmex nigrescens (Cresson)

This is the most common army ant in the United States. *N. nigrescens* nests in the soil or under objects when bivouacking. Males can be collected at light traps from August to November (MacKay and MacKay 2002).

Workers can be identified by the opaque, densely granulate upper surface of their heads. Males have black to blackish brown gasters and just above the antennal fossa, a prominent swelling is present. The setae on the ventral side of the petiole is short (shorter than width of metatibia), white and directed posteroventrally.

This species is found in the southern half of the US, from Virginia west to California (MacKay and MacKay 2002). *Neivamyrmex nigrescens* was collected in the following counties in Alabama: **Calhoun Co.** Colwell, **Cherokee Co.** Little River Canyon, **Clay Co.** (M.R. Smith 1942), **Cullman Co.** no locality given, **Jefferson Co.** (M.R. Smith 1942), **Lauderdale Co.** Joe Wheeler SP, **Lee Co.** Auburn, **Madison Co.** Huntsville, **Mobile Co.** (M.R. Smith 1942), **Morgan Co.** (M.R. Smith 1942)



Map 11. *Neivamyrmex nigrescens*

***Neivamyrmex opacithorax* (Emery)**

This species has a wide distribution in the US, however collections in Alabama are rare with only one being reported by Watkins in 1985. Males can be found at blacklights between September and December (MacKay and MacKay 2002).

Workers of this species have an elongate petiolar node that is nearly twice as long as broad. Males have a reddish brown gaster and the area above the antennal fossa has only a weakly developed swelling (or entirely absent). The setae on the ventral side of the petiole are longer than the width of metatibia, golden and erect.

This species is found throughout most of the US according to MacKay and MacKay (2002) and was reported in Alabama by Watkins (1985).

SUBFAMILY ECTATOMMINAE

Members of this subfamily may be found worldwide but are typically more concentrated and diverse in the New World tropics and in Australia. Ectatommines range from omnivorous foragers to specialist predators. There is only one species of this subfamily found in Alabama, *Gnamptogenys triangularis* (Mayr) and it is exceedingly rare. These ants look similar to Ponerines but can be separated by the following traits: the head and body is covered with deep grooves or furrows and the mandibles are elongate and lack teeth.

Genus *Gnamptogenys* Roger – Grooved ants

This is a large genus of ants that are mostly found in tropical regions except for Africa (Bolton 1995). Only two species are found in the US and they are relatively rare.

Gnamptogenys triangularis (Mayr)

This species is thought to be a specialist predator on millipedes. It is highly resistant to cyanide (which is typically found in the defensive secretions of millipedes) (Deyrup et al. 2003). This is an introduced ant from Central America.

Gnamptogenys triangularis has a heavily grooved body and head and is blackish brown. Workers are about 5mm in length and have small spines on the propodeum.

In the US this ant has only been collected in Florida and Alabama, it is native to Panama and Bolivia (Deyrup et al. 2003). This species was collected in **Mobile Co.** Mobile by Lloyd Davis (pers. comm.).



Map 12. *Gnamptogenys triangularis*

SUBFAMILY FORMICINAE

The family Formicidae takes its name from the observation that certain ants produce formic acid (H_2COOH). There is a common misconception that all ants produce formic acid, however only ants in the subfamily Formicinae are known to synthesize the acid for use in defense (Holldobler and Wilson 1990). Another unique character of the formicines is the replacement of the sting with an acidopore. This acidopore is a

morphological structure at the tip of the abdomen that serves as a nozzle for expelling formic acid.

Formicines nest in the soil, in logs or in plant cavities. Most Formicines are generalist predators and scavengers although several show a preference for sugary baits. This subfamily contains many members that are the most common and dominant ants in temperate areas.

Ants in this subfamily all have a single node on the petiole. They also have an acidopore that is present as a semicircular to circular orifice at the apex of the gaster formed from the hypopygium (last lower plate of the gaster), this is most often projecting as a nozzle and encircled with a distinct fringe of hairs. Formicines can be found worldwide.

Key to the Alabama genera of Formicinae (modified from Creighton 1950)

- 1 Antenna 9-segmented, very small ants 1-2 mm in length *Brachymyrmex*
- 1' Antenna 12-segmented, small to large ants 3+ mm in length..... 2
- 2(1') Profile of mesosoma continuous and evenly convex, propodeum not depressed below level of promesonotum and metanotal region at most slightly impressed (normally not impressed); antennal sockets situated well behind posterior clypeal margin *Camponotus*
- 2' Profile of mesosoma discontinuous and not evenly convex, with propodeum depressed below level of promesonotum and metanotal area moderately to strongly impressed; antennal sockets situated close to posterior margin of clypeus 3

- 3(2') Frontal carinae short but distinct, each carina a small ridge with moderately to sharply angulate summit; basal face of propodeum generally longer than declivitous face; mandibles with 7 or more teeth; ocelli present.....*Formica*
- 3' Frontal carinae indistinct or absent, if present, each carina small and ridge like with distinctly rounded summit; either declivitous face of propodeum is markedly longer than basal face and mandibles with 7+ teeth, or propodeum faces approximately equal in length and mandibles with 5-6 teeth; ocelli absent or indistinct4
- 4(3') Mandibles with 7+ teeth; antennal scape exceeds occipital border by no more than 2-3 times maximum scape diameter, usually less; declivitous face of propodeum longer than basal face, both faces meeting in distinct upward facing peak....*Lasius*
- 4' Mandibles with 5-6 teeth; antennal scape passes occipital border by at least 4-5 times maximum scape diameter5
- 5(4') Mesonotum, in dorsal view, severely constricted giving mesosoma distinctive "hour-glass" shape; pilosity not coarse or bristle-like, erect hairs mostly slender and golden or brownish (generally collected during cool weather)*Prenolepis*
- 5' Mesonotum, in dorsal view, weakly constricted; mesosoma lacking "hour-glass" appearance; erect hairs usually coarse, bristle-like and dark brown or black in color*Paratrechina*

Genus *Brachymyrmex* Mayr – Rover ants

This genus is easy to recognize due to its small size and 9-segmented antenna. Identification to the species level is extremely difficult though and this genus is in

considerable disarray and in need of revision. Two species are recognized, but it is difficult to determine if these are proper species or complexes. I have included another record of a species that is most likely new (Joe MacGown, pers. comm.)

These small ants are common in Alabama and can be found in just about any environment, usually nesting in the soil, under objects or in rotting wood or plant cavities. The main food item of these ants is thought to be honeydew from tended hemiptera. The generic name *Brachymyrmex* is derived from the word “brachy” which is Greek for short, in other words these are the “short ants”.

Brachymyrmex ants are small (1-2mm in length) and have antennae with 9-segments. This genus can be found throughout the world.

Key to the genus *Brachymyrmex* (modified from Wheeler and Wheeler 1978)

- 1 Concolorous yellow to reddish-yellow; no erect hairs on thoracic dorsum; pubescence on gaster dense; workers 1 $\frac{1}{2}$ -2mm long.....*Brachymyrmex depilis*
- 1' Concolorous dusky reddish-brown to blackish; thoracic dorsum with 6-8 stout hairs about 0.1mm long; pubescence on gaster not concealing shining surface; workers 1 $\frac{1}{4}$ -1 $\frac{1}{2}$ mm long*Brachymyrmex musculus*

Brachymyrmex depilis Emery

This species is thought to be native to North America; it is not commonly collected, probably due to its small size. Nests are typically found under stones or logs. *B. depilis* tends subterranean aphids and mealybugs for honey dew.

This species is concolorous yellow to reddish-yellow and lacks erect hairs on the thoracic dorsum. The pubescence on the gaster is dense. Workers are 1 ½ -2mm long.

Brachymyrmex depilis is found throughout the continental United States.

This species was collected in the following Alabama counties: **Baldwin Co.** Bay Minette, **Barbour Co.** Eufala, **Bibb Co.** Blue Girth Creek, **Clay Co.** Chinnabee Lake, **Dallas Co.** Carlowville, **DeKalb Co.** DeSoto SP, **Escambia Co.** 1mi E of Flomaton, **Henry Co.** 2mi N of Abbeville, **Jackson Co.** Paint Rock River, **Macon Co.** Tuskegee NF, **Mobile Co.** (Murphree 1947), **Pickens Co.** Cochrane, **Tuscaloosa Co.** Tuscaloosa, **Winston Co.** Smith Lake



Map 13. *Brachymyrmex depilis*

Brachymyrmex musculus Forel

This species (or complex) is common in southern Alabama. Occasionally these ants are accidentally brought into homes via potted plants and can become minor pests, although the species does not seem to fair well indoors. This is probably an introduced species but due to the state of this genus it is difficult to say with any certainty.



Brachymyrmex musculus is concolorous dusky reddish-brown to blackish and the thoracic dorsum has 6-8 stout hairs about 0.1mm long. The pubescence on the gaster does not conceal the shining surface. Workers are 1 $\frac{1}{4}$ -1 $\frac{1}{2}$ mm long.

This species is found in Costa Rica and Mexico. In the US it has been collected in Florida, Alabama, and Louisiana (Wheeler and Wheeler 1978).

This ant was collected in the following counties of Alabama: **Baldwin Co.** 1mi S of Bay Minette, **Barbour Co.** Eufala,, **Butler Co.** Pine Apple, **Choctaw Co.** Bolinger, **Clarke Co.** Grove Hill, **Coffee Co.** Enterprise, **Conecuh Co.** Evergreen, **Covington Co.** Solon Dixon Center, **Dale Co.** Daleville, **Dallas Co.** Selma, **Escambia Co.** 2mi W of Flomaton, **Geneva Co.** 2mi W of Hacoda, **Henry Co.** 2mi N of Abbeville, **Houston Co.** Dothan, **Lee Co.** Auburn, **Lowndes Co.** Prairie Creek CG, **Macon Co.** Tuskegee NF, **Marengo Co.** Chickasaw SP, **Marion Co.** Hamilton, **Mobile Co.** Saraland, **Monroe Co.**

Claiborne Lake Project, **Montgomery Co.** Montgomery, **Shelby Co.** Childersburg,
Sumter Co. Livingston, **Tuscaloosa Co.** Tuscaloosa, **Washington Co.** Chatom, **Wilcox**
Co. Roland Cooper CG

***Brachymyrmex* sp.**

This is a potentially new species that was collected by Joe MacGown in Alabama and Mississippi (Joe MacGown, pers.comm.). This species has not been described, but probably will be once more data are collected. Morphologically this ant is similar to *B. depilis* but with less erect hairs on mesosoma.

This species was collected in Alabama in the following locality: **Tuscaloosa Co.** Lake Lurleen.



Map 15. *Brachymyrmex* sp

Genus *Camponotus* Mayr- Carpenter ants

With approximately 1000 recognized members worldwide, this is one of the most diverse genera of ants in the world (Wilson 1976b). Representatives of the genus can be found nesting in virtually any habitat and are quite common. They can be of minor economic importance if they invade households due to wood damage that some species can cause. Some *Camponotus* species tunnel into wood, hence the common name of the

carpenter ants. The scientific name of this genus is derived from the Greek terms of “campo” meaning bent or flexible and “notum” meaning back, this is in reference to the distinctively concave shape of the mesosoma of these ants.

Camponotus species have a mesosoma that, in profile, is continuous and evenly convex, with the propodeum not depressed below the level of the promesonotum and with the metanotal region at most slightly impressed (normally not impressed at all). The antennal sockets are situated well behind the posterior clypeal margin. *Camponotus* ants are all strongly to weakly polymorphic. It should be noted that *Camponotus (Colobopsis) pylartes fraxinicola* was mentioned by Murphree (1947) as occurring in Alabama but is not included here due to questions of the validity of this species.

Key to the genus *Camponotus* (modified from Creighton 1950, and Snelling 1988)

- 1 Head of major circular in cross section and distinctly truncated in front, truncated portion consisting of clypeus and adjacent parts of gena with mandibles forming ventral segment (subgenus *Colobopsis*) 2
- 1` Head of major not circular in cross section and not truncated in front 4
- 2(1) Length of major worker 3.75mm or less *Camponotus obliquus*
- 2` Length of major worker 4.5mm or greater 3
- 3(2') Angle where side of head meets truncated anterior face is surmounted by narrow flange; sculpture of anterior face consisting of small shallow punctures and reticulation; area within flange notably concave *Camponotus mississippiensis*

- 3' Angle where side of head meets truncated anterior face is serrate or blunt but not surmounted by distinct flange; sculpture on anterior face consists of coarse punctures and deep reticulations *Camponotus impressus*
- 4(1') Scapes and legs with numerous, long, coarse, brownish or golden erect hair; head and mesosoma ferruginous red, gaster black (subgenus *Myrmothrix*)
..... *Camponotus floridanus*
- 4' Erect hairs on scapes and legs (when present) fine, short and usually whitish 5
- 5(4') Anterior border of clypeus feebly projecting, depressed in middle and with narrow median notch, behind which is short triangular impression; length of major workers 8mm or less (subgenus *Myrmentoma*) 6
- 5' Clypeus usually without a median notch, when notch present there is no triangular impression behind it; larger ants with majors usually 8mm or more in length 11
- 6(5) Area between eye and base of mandible with conspicuous suberect to erect short hairs arising from coarse oval foveae 7
- 6' Area between eye and base of mandible without suberect or erect short hairs (except some near base of mandibles) and conspicuously punctuate, but lacking coarse oval foveae 9
- 7(6) Clypeus with long erect hairs along and adjacent to margins (none as short as those between eye and mandible); few (1-3) to no hairs across central surface of clypeus *Camponotus subbarbatus*
- 7' Clypeus with long erect hairs along the margins and numerous shorter hairs across central surface 8

- 8(7') Erect hairs of clypeus of varying lengths, shortest about as long as those between eye and mandible; integument light to dark brown *Camponotus caryae*
- 8' Erect hairs of clypeus distinctly long and short, short hairs shorter than those between eye and mandible; head, mesosoma, petiole and appendages red, gaster blackish *Camponotus discolor*
- 9(6') Clypeus approximately as long as broad and with 2-4 long erect hairs along margin above tentorial pits; head, mesosoma, and appendages red to yellowish red; clypeus dull and densely tessellate, not roughened; occipital margin distinctly concave in front view *Camponotus decipiens*
- 9' Clypeus distinctly broader than long and with 4-10 (usually more than 6) erect hairs along margins above tentorial pits; color varies but if head and mesosoma reddish, at least gastral tergum 1 also reddish or yellowish or clypeus is distinctly roughened or occipital margin straight 10
- 10(9') Head and mesosoma usually brownish to blackish, if somewhat reddish then gaster is wholly black; occipital margin straight to weakly concave
..... *Camponotus nearcticus*
- 10' Head, mesosoma appendages and first 1-2 gastral terga yellowish to yellowish red; occipital margin slightly to moderately concave *Camponotus snellingi*
- 11(5') Clypeus with relatively smooth face, not carinate; antennal fossae deep; head of major worker (excluding mandibles) usually broader than long (subgenus *Camponotus*) 12

- 11' Clypeus with a central ridge (carina); antennal fossae shallow; head of major worker (excluding mandibles) usually longer than broad (subgenus *Tanamyrmex*)
..... 14
- 12(11) Cheeks (near base of mandibles) with numerous (6-10) erect hairs; Gaster with sparse fine appressed hairs; mesosoma and gaster typically brownish orange to brown, head is dark brown *Camponotus americanus*
- 12' Cheeks without erect hairs or few (1-3) present; gaster densely covered with coarse golden appressed hairs; coloration is completely black or black with brownish-red to red 13
- 13(12')Appressed gastral pubescence extends less than half length of hair past edge of tergite; body concolorous black *Camponotus pennsylvanicus*
- 13' Appressed gastral pubescence extends more than half length of hair past edge of tergite; body usually black with brownish red to red aspects (varies but red coloration can be found on the tergum 1, mesosoma, and appendages)
..... *Camponotus chromaiodes*
- 14(11')Occipital corners with numerous erect hairs; dorsum of gaster completely opaque usually with dark transverse stripes *Camponotus socius*
- 14' Occipital corners without erect hairs; dorsum of gaster feebly to strongly shining usually without dark transverse stripes *Camponotus castaneus*

***Camponotus (Camponotus) americanus* Mayr**

This common carpenter ant nests in the soil. This species closely resembles *C. castaneus* but distinguished by the erect hairs on the cheek.

This species is typically brownish-orange to brown while the head is dark brown. The cheeks (near base of mandibles) have numerous (6-10) erect hairs and the gaster has sparse fine appressed pubescence.

Camponotus americanus is found in southern Ontario south to Georgia and west to Texas (Creighton 1950) and Kansas (Dubois 1994).

This species was collected in the following counties in Alabama: **Calhoun Co.** Colwell, **Clay Co.** Talladega NF: Chinnabee Trail, **Cleburne Co.** Choctawhatchee WMA, **Coffee Co.** 2mi N of Enterprise, **Colbert Co.** Freedom Hills, **Cullman Co.** 2mi N of Cullman, **DeKalb Co.** DeSoto SP, **Etowah Co.** Gadsden, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn, **Tallapoosa Co.** Lake Martin, **Winston Co.** Smith Lake



Map 16. *Camponotus americanus*

Camponotus (Myrmecoma) caryae (Fitch)

This species nests under bark of trees, logs and stumps. Rarely, these ants invade wooden structures and cause damage. They are considered nocturnal and are thought to feed mainly on honeydew and nectar. It is speculated that *C. caryae* is associated with hickory trees (Creighton 1950) although little is truly known of the habits of these ants. Although they seem to have a wide range they are not commonly collected and the only record of them in Alabama is from Murphree (1947).

Camponotus caryae has erect hairs on the clypeus that are of varying lengths and the shortest is about as long as those found between the eye and the mandible. This species is concolorous light to dark brown.

This species is found from New York (Snelling 1988) south to Florida (Deyrup 2003) and west to Kansas (Dubois 1994).

This species was collected in Alabama in **Jefferson Co.** Birmingham (Murphree 1947).



Map 17. *Camponotus caryae*

Camponotus (Tanaemyrmex) castaneus (Latreille)

This ant nests in the soil or in rotting wood. It is generally not considered a pest but it may occur in houses while foraging for food and may potentially damage structures with wood that is starting to rot.

This species lacks erect hairs on the occipital corners and the dorsum of the gaster is feebly to strongly shining, usually without dark transverse stripes. *C. castaneus* is concolorous red to reddish-brown.

Camponotus castaneus is found in southern New England south to Florida and west to Texas (Creighton 1950).

This species was collected in the following Alabama counties: **Baldwin Co.** Bay Minette, **Barbour Co.** Blue Springs SP, **Bibb Co.** Glades Preserve, **Covington Co.** Solon Dixon Center, **Houston Co.** Chattahoochee SP, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn, **Limestone Co.** 1mi N of Decatur, **Lowndes Co.** Woodruff Lake, **Macon Co.** Tuskegee NF, **Mobile Co.** Mobile, **Morgan Co.** Hartselle, **Shelby Co.** Childersburg, **Wilcox Co.** Roland Cooper CG



Map 18. *Camponotus castaneus*

***Camponotus (Camponotus) chromaiodes* Bolton – Red carpenter ant**

This species may nest in the soil or in rotten logs. Occasionally *C. chromaiodes* may nest in wood structures or in rotting trees. This ant is common in Alabama and similar in its life history to *C. pennsylvanicus*.

Camponotus chromaiodes can look similar to *C. pennsylvanicus* but can be separated by examining the appressed gastral pubescence which extends more than half of the length of the hair past the edge of the tergite. These ants are usually black with reddish coloration on its mesosoma and appendages.

This species is found in the northeastern US west to Illinois and south to Alabama and Mississippi.

Camponotus chromaiodes was collected in the following counties of Alabama: **Butler Co.** Pine Apple, **Calhoun Co.** Colwell, **Clarke Co.** Carlton, **Coosa Co.** Kellyton, **Covington Co.** Solon Dixon Center, **Dallas Co.** Selma, **DeKalb Co.** DeSoto SP, **Franklin Co.** Bear Creek, **Lamar Co.** Vernon, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn, **Lowndes Co.** Prairie Creek CG, **Macon Co.** Tuskegee NF, **Madison Co.** Huntsville, **Marion Co.** Hamilton, **Monroe Co.** Hybart, **Sumter Co.** Livingston, **Tuscaloosa Co.** Tuscaloosa,



Map 19. *Camponotus chromaiodes*

Camponotus (Myrmecoma) decipiens Emery

This species may be found nesting in rotting stumps or logs. *C. decipiens* is similar to *C. caryae* and little is known about its habits.

In this species, the clypeus is approximately as long as broad and with 2-4 long erect hairs along the margin above the level of the tentorial pits. The head, mesosoma, and appendages are red to yellowish red while the gaster is black. The clypeus is dull and densely tessellate but not roughened. The occipital margin is distinctly concave in front view.

Camponotus decipiens is found in northern Florida west to Texas and north to North Dakota (Snelling 1988).

This species was collected in the following Alabama counties: **Clay Co.** Talladega NF, **Fayette Co.** Wolfcreek WMA, **Lee Co.** Auburn, **Limestone Co.** 1mi N of Decatur, **Lowndes Co.** Prairie Creek CG, **Madison Co.** Huntsville, **Marengo Co.** Demopolis



Map 20. *Camponotus decipiens*

Camponotus (Myrmentoma) discolor (Buckley)

Nests of this species are found in plant cavities, under bark, in logs or in stumps. *C. discolor* seems to be associated with hickory, willow, and cottonwood (Snelling 1988).

This species has erect hairs on the clypeus that are distinctly long and short, the short hairs are shorter than those between the eye and the mandible. The head, mesosoma, petiole and appendages are red



Map 21. *Camponotus discolor*

while the gaster is blackish.

Camponotus discolor is found in Texas east to South Carolina and north to North Dakota. This species was collected in the following counties of Alabama: **Pickens Co.** Cochrane, **Baldwin Co.** Fairhope (Murphree 1947).

***Camponotus (Myrmothrix) floridanus* (Buckley) –Florida carpenter ant**

This species nests in trees, stumps or logs, usually soft rotting wood is preferred. If their nest is disturbed these ants will tenaciously attack the aggressor by biting and spraying formic acid. The Florida carpenter ant rarely nests in man-made structures but it may become a pest by foraging indoors.

This ant is much hairier than most species of *Camponotus*. The scape and legs have numerous, long, coarse, brownish or golden erect hairs. The gaster is black while the rest of the body is ferrugineous red.

Camponotus floridanus is found in coastal North Carolina (Carter 1962) south to Florida (Deyrup 2003) and west through southern Alabama, and Mississippi.

This species was collected in the following counties: **Baldwin Co.** Bay Minette, **Geneva Co.** Hartford, **Mobile Co.** Mobile, **Tallapoosa Co.** Eumuckfa Creek



Map 22. *Camponotus floridanus*

Camponotus (Colobopsis) impressus (Roger)

This species nests in twigs, stems or galls. The majors have a truncated phragmatic head that they utilize to block the entrances to their nests and the angle between the side of the head and the truncate anterior face is sharp and serrate. The punctures on the head of the major are deep and coarse. In all castes the head and thorax is reddish brown, while the gaster is piceous brown

Camponotus impressus is found in Florida north to South Carolina (Van Peft and Gentry 1985) and west to Kansas (Dubois 1994) and Texas. It is also found in the Bahamas (Deyrup 1998).

This species was collected in the following counties in Alabama: **Bibb Co.** Glades Preserve, **Lee Co.** Auburn



Map 23. *Camponotus impressus*

Camponotus (Colobopsis) mississippiensis M. R. Smith

This species nests in twigs or galls and is similar to *C. impressus* in appearance and life history. The majors have phragmatic heads and there is a flange or rim where the side of head meets the truncated anterior face and the area within the flange is notably concave. There is also sculpture on the anterior face consisting of small shallow punctures and fine reticulation.

Camponotus mississippiensis is found in North Carolina (Carter 1962) south to Alabama through Louisiana (Moser and Blum 1960) and north to Illinois (Dubois and LaBerge 1988)

This species was found in the following counties in Alabama: **Lawrence Co.** Joe Wheeler SP, **Lowndes Co.** Prairie Creek CG



Map 24. *Camponotus mississippiensis*

Camponotus (Myrmecoma) nearcticus Emery

These ants nest arboreally in plant cavities and also in stumps and logs. Little is known about their life history. The head and mesosoma of this species is usually brownish to blackish, but if somewhat reddish than the gaster is wholly black. The occipital margin is straight to weakly concave

Camponotus nearcticus is found throughout Quebec and Ontario and the United States, it is most common in northeastern US (Snelling 1988).



Map 25. *Camponotus nearcticus*

This species was collected in the following counties in Alabama: **Coosa Co.**
Kellyton, Lauderdale Co. 1mi S of Rogersville, **Lawrence Co.** Wheeler SP, **Lee Co.**
Auburn, Lowndes Co. Prairie Creek CG, **Morgan Co.** Hartselle, **Shelby Co.**
Childersburg

***Camponotus (Camponotus) pennsylvanicus* (DeGeer) – Black carpenter ant**

Nests of this ant may be found in dead or living trees as well as wooden structures ranging from telephone poles to buildings. Mature colonies can be large with 2000-2500 adults (Holldobler and Wilson 1990). The black carpenter ant tends honeydew producers and scavenges for dead insects and plant material. These ants usually forage during the day but will shift to nocturnal foraging when the weather becomes too hot (Klotz 1984). This species is extremely common throughout the eastern US and can be found throughout Alabama.

Camponotus pennsylvanicus can be a major pest due to damage caused to buildings and by foraging in homes. This species may bite but generally avoids confrontation.

This species is concolorous black with distinctive golden hairs covering its gaster. The appressed gastral pubescence extends less than half of the length of the hair past the edge of the tergite.

Camponotus pennsylvanicus is found in New Brunswick and Quebec south into the eastern United States, the western border is New Mexico (MacKay and MacKay 2002)

This species was collected in the following Alabama counties: **Barbour Co.** Blue Springs SP, **Bibb Co.** 1 mi S of Pondville, **Blount Co.** Oneonta, **Cleburne Co.** Choccolocco WMA, **Dallas Co.** Selma, **Escambia Co.** 2mi E of Flomaton, **Greene Co.** Epes, **Hale Co.** Payne Lake CG, **Jackson Co.** Paint Rock River **Lauderdale Co.** Rogersville, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn, **Limestone Co.** Gipsey, **Lowndes Co.** Lowndesboro, **Marengo Co.** Chickasaw SP, **Mobile Co.** (Glancey et al. 1976), **Morgan Co.** Wheeler NWR, **Pickens Co.** Cochrane, **Tuscaloosa Co.** Uni. of Ala.- Tuscaloosa, **Wilcox Co.** Roland Cooper CG



Map 26. *Camponotus pennsylvanicus*

***Camponotus (Colobopsis) obliquus* M. R. Smith**

This small carpenter ant has majors with phragmatic (truncated) heads and is similar to *C. impressus* in habits and morphology. The majors of this species are small (Length of 3.75mm or less). This ant is only known from Alabama and Mississippi. This species was reported in Alabama by D.R. Smith (1979).

Camponotus (Myrmentoma) snellingi Bolton

These are common ants that will nest in living or dead trees as well as stumps and logs. This species looks similar to *C. nearcticus* but can be separated based on color. This species' head, mesosoma appendages and first 1-2 gastral terga are yellowish to yellowish-red. The occipital margin is slightly to moderately concave

Camponotus snellingi is found in Florida west to Texas and north to Tennessee and North Carolina (Snelling 1988)



Map 27. *Camponotus snellingi*

This species was collected in the following counties in Alabama: **Colbert Co.** Freedom Hills, **DeKalb Co.** DeSoto SP, **Lawrence Co.** Bankhead NF, **Lee Co.** Auburn, **Hale Co.** Payne Lake CG, **Marengo Co.** Chickasaw SP, **Monroe Co.** Hybart, **Morgan Co.** Hartselle, **Tuscaloosa Co.** Uni. of Ala.-Tuscaloosa, **Walker Co.** Townley

Camponotus (Tanaemyrmex) socius Roger

These ants nest in trees, stumps or logs especially in sandy coastal habitats. It is possible that *C. socius* is an invasive ant. The most distinctive characteristic of this species is the dorsum of the gaster that is completely opaque and usually has dark transverse stripes. Also the occipital corners have numerous erect hairs.

Camponotus socius is found in Florida (Deyrup 2003) north to North Carolina (Carter 1962) and west to Louisiana (Moser and Blum 1960), this species has also been collected from Brazil (Creighton 1950).

This species was collected in the following counties in Alabama: **Baldwin Co.** Bay Minette, **Mobile Co.** Mobile



Map 28. *Camponotus socius*

Camponotus (Myrmentoma) subbarbatus Emery

This species is common in the eastern United States that nests in plant cavities, logs and stumps. Like other species in the subgenus *Myrmentoma*, little is known of its habits.

The clypeus of this ant has long erect hairs along and adjacent to margins (none as short as those between the eye and mandible) and a few (1-3) to no hairs across the central surface of the clypeus.

Camponotus subbarbatus is found in the New England states south to Georgia and west to Ohio (Snelling 1988).

This species was collected in the following counties in Alabama: **Bibb Co.** 1 mi S of Pondville, **Lawrence Co.** Joe Wheeler SP, **Macon Co.** Tuskegee NF, **Tuscaloosa Co.** Sipsey WMA



Map 29. *Camponotus subbarbatus*

Genus *Formica* Linnaeus – Field ants

Formica is the most diverse genus of ants in North America. These ants tend to be dominant in cool temperate regions. Species of *Formica* are found throughout Alabama with the greatest abundance in the Appalachian mountain region.

Some species in North America and Europe produce large earthen mound nests but all of our Alabama species nest in the ground or occasionally in or under rotting stumps or logs. These ants are generalist predators and scavengers that also consume honeydew and nectar. A few species in this genus are known to enslave other species of *Formica* and regularly raid neighboring nests. Like all formicines this genus lacks a

functional sting but several species are aggressive biters that will spray bite wounds with formic acid.

Formica are most commonly confused with *Camponotus* ants. Both are medium to large and occur in similar habitats. *Formica*, however, do not have the distinctively convex mesosomal profile and usually have 3 obvious and distinct ocelli on the dorsum of their head. Also their frontal carinae is short but distinct, each carina is a small ridge with a moderately to sharply angulate summit. The basal face of the propodeum is generally longer than the declivitous face and their mandibles have 7 or more teeth.

Members of this genus are found in the Nearctic, Neotropical, Palaearctic, Oriental and Indo-Australian regions.

Key to the genus *Formica* (modified from Creighton 1950)

- 1 Anterior margin of clypeus with median, concave impression which may be narrow and notch-like or broad and shallow; facultative slave-makers, often found in mixed colonies with other *Formica* sp. slaves (subgenus *Sanguinea*) 2
- 1' Anterior margin of clypeus lacking median concave impression, margin is evenly convex or angularly projecting in middle 3
- 2(1) Dorsum of thorax entirely devoid of erect hairs or with few fine, short, inconspicuous erect hairs on pronotum only; scale of petiole with blunt crest *Formica subintegra*
- 2' Dorsum of pronotum and mesonotum with conspicuous erect hairs (usually on epinotum also); scale of petiole with sharp crest *Formica rubicunda*

- 3(1') Antennal scape short, less than 1 ¼ length of head (including clypeus); epinotum distinctly angular and not rounded from above (subgenus *Formica*) 4
- 3' Antennal scape long, more than 1 ¼ length of head (including clypeus); epinotum rounded from above with angle between basal and declivitous faces poorly marked (subgenus *Pallidefulva*) 5
- 4(3) Bicolored with ferruginous head, thorax and appendages and black gaster; frontal area usually shining (*Rufa* group) *Formica integra*
- 4' Concolorous black or blackish-brown; frontal area usually opaque (Fusca group)
..... *Formica subsericea*
- 5(3') Gaster shiny with sparse, short appressed pubescence; mesosoma dorsum without erect hairs or with small cluster on the mesonotum and/or few erect hairs elsewhere; color highly variable, ranging from bright tawny or coppery yellow (south) to dark brown *Formica pallidefulva*
- 5' First gastral tergite with appressed pubescence of medium to high density, average distance between individual appressed hairs approximately equaling average length of hair to much less; mesosoma dorsum with several to many erect hairs on pronotum, mesonotum and propodeum (often most numerous on latter)
..... 6
- 6(5') Gaster less densely pubescent; first gastral tergite with appressed setae separated by about ¾ - 1 times average length; mesosoma and gastral integument somewhat shining, with diffuse sculpture; mesosoma dorsal integument more shining to quite smooth; color bright reddish-yellow or with gaster little darker (gaster of this species sometimes stains black in mounted specimens); erect hairs of gastral

- dorsal surface curved and tapering, length of longest 0.20 – 0.30 mm
-*Formica* new species
- 6' Gaster with dense pubescence, first gastral tergite with appressed hairs separated by about $\frac{1}{2}$ or less than average length; mesosoma dorsum feebly or not all shining propodeum often with conspicuous pubescence; mesosoma and gastral integument dulled by fine, but notable sculpture.....7
- 7(6') Reddish-brown to light reddish; mesosoma and gastral integument dulled or velvety with dense pubescence, in larger workers appearing matte in dorsal or oblique dorsal view; numerous erect hairs on all dorsal surfaces, those on first tergite usually long, tapering and typically curved.....*Formia schaufussi dolosa*
- 7' Dark brown to blackish brown; with fine coriaceous sculpture on mesosoma and foveolae on gastral dorsal surface; erect hairs shorter and fewer, at least on mesosoma, erect hairs may be blunt-tipped and without notable curvature, even on first gastral tergite*Formica archboldi*

***Formica archboldi* M. R. Smith (*pallidefulva* group)**

This species may be found in sand hills with nests usually at the bases of grass clumps. *F. archboldi* is most common in peninsular Florida. It was not collected in Alabama during this survey and is probably relatively rare in the state.

This ant is dark brown to blackish brown, with fine coriaceous sculpture on the mesosoma and foveolae on gastral dorsal surface. Erect hairs are short and sparse, at least on mesosoma. The erect hairs may be blunt-tipped and without notable curvature, even on first gastral tergite.

Formica archboldi is found in Georgia (Ipser et al. 2004) and Florida (Deyrup 2003). This species was reported in Alabama by D.R. Smith (1979).

***Formica integra* Nylander (*rufa* group)**

This species nests in the soil or in rotten stumps or logs. It may be found in open areas or at the edges of forests. This ant can be found throughout Alabama except on the coastal plain. *Formica integra* is bicolored with a ferruginous head, thorax and appendages and a black gaster. The frontal area is usually shiny.

This ant is found in Nova Scotia south to northern Georgia and Alabama and west to South Dakota (Creighton 1950).

This species was collected in the following counties in Alabama: **Blount Co.** Locust Fork, **Clay Co.** Talladega NF: Chinnabee Trail, **DeKalb Co.** DeSoto SP, **Etowah Co.** Gadsden, **Franklin Co.** Dismal Canyon, **Lee Co.** Auburn, **Morgan Co.** Hartselle **Randolph Co.** Wedowee



Map 30. *Formica integra*

Formica new species (*pallidefulva* group)

This species has been described by Trager et al. (2005, in press). This ant has the gaster not densely pubescent, the first gastral tergite with appressed setae separated by $\frac{3}{4}$ - 1 times their average length. The erect hairs of the gastral dorsal surface curved and tapering, the longest are 0.20 – 0.30 mm in length. The mesosoma and gastral integument are somewhat shiny, with diffuse sculpture while the mesosoma dorsal integument slightly shinier to smooth. This ant is bright reddish-yellow with the gaster darker.



Map 31. *Formica* new sp.

This species has been collected in the following counties in Alabama: **Bibb Co.** Glades Preserve, **Butler Co.** Pine Apple, **Lowndes Co.** Prairie Creek CG, **Tuscaloosa Co.** Tuscaloosa

Formica pallidefulva Latreille (*pallidefulva* group)

This species is common in the north portion of Alabama. Nests are cryptic and difficult to find but they can be located under the bark of logs or in rotting wood or in the soil. Colonies are small and the ants are timid and will abandon their nest and brood when disturbed, although they usually attempt to sneak back later (Creighton 1950).

The gaster of this ant is shiny with sparse, short appressed pubescence while the mesosoma dorsum completely lacks erect hairs or has a small cluster on the mesonotum

and/or a few erect hairs elsewhere. The color of this species ranges from bright tawny or coppery yellow (south) to dark brown in the northern extent of its range in the US.

Formica pallidefulva is found in Florida west to Texas north to New York (Creighton 1950).

This species was collected from the following counties in Alabama: **Clay Co.** Talladega NF: Chinnabee Trail, **Cleburne Co.** Choctawhatchee WMA , **DeKalb Co.** DeSoto SP, **Fayette Co.** Clear Creek, **Lauderdale Co.** Rogersville, **Lawrence Co.** Oak Grove, **Limestone Co.** 1mi N of Decatur, **Macon Co.** Tuskegee NF, **Marion Co.** Hamilton, **Morgan Co.** Hartselle, **Tuscaloosa Co.** Tuscaloosa.



Map 32. *Formica pallidefulva*

Formica rubicunda Emery (*sanguinea* group)

This species nests in the soil usually under or near large rotting logs. *Formica rubicunda* is a slave-raiding species of *Formica*. These ants will raid colonies of *Formica altipetens* Wheeler, *F. bradleyi* Wheeler, *F. fossaceps* Buren, *F. fusca* L., *F. lasioides* Emery, *F. lepida* Wheeler, *F. montana* Emery, *F. neoclara* Emery, *F. neogagates* Emery, *F. neorufibarbis* Emery, *F. obscuriventris clivia* Creighton, *F. pallidefulva nitidiventris* Emery, *F. schaufussi* Mayr, *F. subsericea* Say (D.R. Smith 1979).

Formica rubicunda queens found their colonies by forcing their way into new or young host nests and driving off the workers. The queen than eats some of the host brood and allows others to emerge as adults that accept her as queen. She also starts laying her own workers who will raid other nests when more slaves are needed.

This species is similar to *F. subintegra* but the dorsum of the pronotum and the mesonotum has conspicuous erect hairs (usually on the epinotum too) and the scale of petiole has a sharp crest as seen in profile.

This species is found in southern Ontario south into New England and west to Colorado and south throughout the Appalachians (Creighton 1950). In Alabama this ant was only collected in **DeKalb Co.** DeSoto SP.



Map 33. *Formica rubicunda*

***Formica schaufussi dolosa* Buren (*pallidefulva* group)**

This ant form nests in the soil or under objects, usually in open fields. Like most species in the *pallidefulva* group this ant is extremely timid. This species is reddish-brown to light reddish. The mesosoma and gastral integument is dull or velvety with dense pubescence, in larger workers this appears matte in dorsal or oblique dorsal view. There are numerous erect hairs on all dorsal surfaces, those on first tergite usually long, tapering and typically curved.

Formica schaufussi dolosa is found in Florida west to Texas and north to southern Virginia (Creighton 1950).

This species was collected in Alabama in the following counties: **Blount Co.** Highland Lake, **Butler Co.** Pine Apple, **Clay Co.** Talladega NF: Chinnabee Trail, **DeKalb Co.** DeSoto SP, **Lawrence Co.** Joe Wheeler SP, **Lowndes Co.** Prairie Creek CG, **Mobile Co.** (Glancey et al. 1976), **Sumter Co.** Livingston



Map 34. *Formica schaufussi dolosa*

Formica subintegra Wheeler (*sanguinea* group)

This is a slave-raiding species similar to *F. rubicunda*. I found a column of these ants raiding a mature colony of *F. subsericea* near a trail in the Talladega National Forest in June. The workers of *F. subsericea* were vigorously defending their nest but had little impact on the raiding ants. Many female alates evacuated the nest but there was no sign of brood being removed or of workers fleeing. Upon following the raiding column to the parent nest it was found to go up the side of a hill and down the other side to a nest under a rotten log. The column was over 200 feet long and the returning raiding ants were mainly carrying pupae with the occasional larvae.

Formica subintegra have been observed raiding the nests of *F. subsericea*, *F. fusca*, *F. montana*, *F. neogagates*, *F. schaufussi*, and *F. pallidefulva nitidiventris*.

The dorsum of the thorax of this species is entirely devoid of erect hairs or a few fine, short, inconspicuous erect hairs are present on the pronotum only. In profile the scale of petiole has a blunt crest.

Formica subintegra is found in eastern Canada south to New England and throughout the Appalachian Mountains and west to Wisconsin (Creighton 1950).

This species was only collected in Alabama in **Clay Co.** Talladega NF: Chinnabee Trail.



Map 35. *Formica subintegra*

***Formica subsericea* Say (*fusca* group)**

These ants can be found in woodlands nesting in the soil. *F. subsericea* are timid, typically do not defend their nest against aggressors or slave making ants and are commonly enslaved by other species of *Formica*. This species is concolorous black or blackish-brown; and the frontal area usually opaque.

Formica subsericea is found in Quebec, Ontario, and New Brunswick south into eastern US as far west as Utah (Allred 1982).

This species was collected in Alabama in the following counties: **Barbour Co.** Blue Springs SP, **Cherokee Co.** Little River Canyon, **Coosa Co.** Kellyton, **DeKalb Co.** DeSoto SP, **Etowah Co.** Gadsden, **Lawrence Co.** Joe Wheeler SP, **Lowndes Co.** Prairie Creek CG , **Madison Co.** Huntsville, **Shelby Co.** 1mi S of Birmingham



Map 36. *Formica subsericea*

Genus *Lasius* Fabricius

Ants of this genus are common and widespread throughout the United States. These ants nest in the soil or in rotting wood and are generalist scavengers that have close relationships with many honeydew-producing insects, most are thought to tend subterranean root scales and aphids.

The declivitous face of the propodeum of these ants is distinctly longer than the basal face, both faces meet in a distinct upward facing peak. The mandibles have 7 or more teeth and the antennal scape is relatively short (exceeding the occipital border by no more than 2-3 times the maximum diameter of the scape, usually less). This genus can be found in the Nearctic, Palaearctic, Neotropical, Oriental and Indo-Australian regions.

Key to the genus *Lasius* (modified from Creighton 1950)

- 1 Maxillary palpus long, at least last three segments subequal in length; eyes large with approximately 200 facets; brownish to blackish in color 2
- 1' Maxillary palpus short, the last three segments successively decreasing in length; eyes small with 100 facets or less, usually many less; yellow in color 3
- 2(1) Antennal scapes without erect or suberect hairs; promesonotal suture unimpressed or faintly impressed, dorsum of promesonotum forming single even convexity
..... *Lasius alienus*
- 2' Antennal scapes with numerous erect or suberect hairs; promesonotal suture slightly but distinctly impressed, dorsum of promesonotum not forming single even convexity *Lasius neoniger*
- 3(1') Eyes with six or less facets in greatest diameter; queens more than twice as long as workers *Lasius flavus*
- 3' Eyes with 10-12 facets in greatest diameter; queens less than twice as long as workers *Lasius umbratus*

***Lasius alienus* (Foerster) –Cornfield ant**

This species is common in or near wooded areas. *L. alienus* are known to collect the eggs of the corn root aphid, *Anuraphis maidiradicis* (Forbes), and store them throughout the winter. During the spring the ants place the aphids on plants and tend them for honeydew (Forbes 1908). This species is mainly attracted to sweets but is also predacious on other insects. This ant is more common in the northwestern extent of its range where it commonly invades homes and is considered a major pest species.

Brood occur in the nests between May and August with reproductives occurring June to September (MacKay and MacKay 2002) and with mating flights between August and September (Forbes 1908).

This species looks similar to *L. neoniger* but can be separated by the following characters: the antennal scapes lack erect or suberect hairs and the promesonotal suture is unimpressed or faintly impressed with the dorsum of promesonotum forming a single even convexity. *Lasius alienus* is found in southern Canada throughout the entire US. Not found in xeric regions.

This species was found in the following counties of Alabama: **Barbour Co.** Blue Springs CG, **Bibb Co.** Blue Girth Creek, **Butler Co.** 1mi N of Greenville, **Jackson Co.** Paint Rock River, **Lauderdale Co.** Joe Wheeler SP, **Macon Co.** Tuskegee NF, **Madison Co.** Uni. of Ala. Tuscaloosa, **Marion Co.** Hamilton, **Monroe Co.** Claiborne Lake CG, **Morgan Co.** Hartselle, Wheeler NWR

***Lasius flavus* (Fabricius) –Yellow meadow ant**

This species typically nests under stones or in the soil. *L. flavus* is almost entirely subterranean and tends aphids that feed on the roots of grasses. This ant was not collected during this survey and is probably rare, but common throughout much of the US and



Map 37. *Lasius alienus*

Europe. *L. flavus* has small eyes with six or fewer facets in its greatest diameter. The queens are more than twice as long as workers. This ant is found in southern Canada and all of the US except Florida; also found in Europe and Asia. It was reported in Alabama by D.R. Smith (1979).

***Lasius neoniger* Emery**

This species occurs in open areas, such as lawns, agricultural fields and prairies. Nests are found in the soil with crater like entrances. These ants are similar to (and often confused with) *L. alienus*. Both occur throughout the US and both can be household pests. In Alabama *L. neoniger* is not commonly collected, and probably has a scattered distribution around urban areas.



Map 38. *Lasius neoniger*

Lasius neoniger has numerous erect or suberect hairs on its antennal scapes. The promesonotal suture is slightly but distinctly impressed, with the dorsum of the promesonotum not forming a single even convexity. This ant is found in southern Alaska along the coast into southern Canada and throughout the US.

This species was collected in the following counties in Alabama: **Limestone Co.** 1mi N of Decatur, **Madison Co.** Uni of Ala. Huntsville

***Lasius umbratus* (Nylander)**

These ants are social parasites that may parasitize *L. alienus*, *L. neoniger*, and *L. niger* colonies when new queens are founding colonies (MacKay and MacKay 2002). This species nests under stones and logs and tends aphids.

This species is yellow and has eye with 10-12 facets in greatest diameter and queens that are less than twice as long as workers. *Lasius umbratus* is found in southern



Map 39. *Lasius umbratus*

Canada and the entire US; also throughout Europe and Asia.

This species was collected in the following Alabama counties: **Covington Co.** Solon Dixon Center, **Lawrence Co.** Joe Wheeler SP, **Macon Co.** Tuskegee NF

Genus *Paratrechina* Motschoulsky

This genus is common and widely distributed throughout the US and the world. These ants are generalist scavengers that will tend honeydew-producing insects. Several members of *Paratrechina* are tramp species that readily invade human buildings and can be extremely pestiferous.

These are small to medium sized ants with scapes relatively long, passing the occipital border by at least 4-5 times the maximum diameter of the scape. *Paratrechina*

resemble and are closely related to *Prenolepis* but can be separated by the following features: the mesonotum, in dorsal view, weakly constricted and mesosoma lacks “hour-glass” appearance, while erect hairs are usually coarse and bristle-like and dark brown or black in color.

Key to the genus *Paratrechina* (modified from Trager 1984 and MacGown 2005)

- 1 Scapes at least twice as long as head; legs are also long relative to body size; body weakly shining black or gray with bluish reflections; pubescence sparse, short and barely visible (most likely only found as a household pest in Alabama)
..... *Paratrechina longicornis*
- 1' Scapes less than twice as long as head; legs of normal lengths; color varies but never with bluish reflections; shiny or dull, if dull then due to dense pubescence
..... 2
- 2(1') Color yellow to pale whitish; nests found in sandy soil or sand dunes and surrounded by conspicuous crater in clearing between vegetation 3
- 2' Color uniformly dark colored or bicolored; nests found in more mesic areas and usually less conspicuous, under logs, rocks, or leaf litter 4
- 3(2) Color yellow with gaster infuscated posteriorly; erect hairs on thorax flexuous and dark brown (darker than body); scapes have 5-17 (usually 7-12) erect and suberect hairs; usually found in sandy areas *Paratrechina arenivaga*
- 3' Color yellow or whitish with gaster only slightly darker (if at all); thoracic pilosity nearly straight and same color as body or only slightly darker; scapes

- have 0-4 (usually 1-3) erect and suberect hairs; found in sandy coastal areas
-*Paratrechina phantasma*
- 4(2') Scapes with 4 or less bristle-like erect or suberect hairs5
- 4' Scapes with 4 or more bristle-like erect or suberect hairs (usually at least 7)6
- 5(4) Usually bicolored, thorax yellowish to reddish-brown, head and gaster darker, and middle and hind coxae pale (much lighter than fore coxae or rest of legs); scapes with 1-4 erect hairs; eyes either reaching sides of head or only failing to do so by 1-2 facets (in full face view)*Paratrechina wojciki*
- 5' Usually uniform dark brown, at most weakly bicolored; appendages somewhat lighter or yellowish, middle and hind coxae not contrastingly pale compared with fore coxae; scapes lack erect hairs; eyes failing to reach sides of head by about $\frac{1}{4}$ eye width (in full face view)*Paratrechina parvula*
- 6(4') Thorax and gaster covered with short stout pubescence; body is dull brown to blackish*Paratrechina bourbonica*
- 6' Thorax and gaster with pubescence greatly reduced, appearance shiny7
- 7(6') Body uniform dark brown, appendages only somewhat lighter; dense row of longitudinally aligned pubescence found on the anterior edge of propodeum; front of pronotum and mesonotum with some dilute pubescence; head with shallow hairy punctures and dense pubescence which is mostly aligned along long axis of head*Paratrechina concinna*
- 7' Middle and hind coxae and/or thorax and legs lighter than gaster and head; promesonotum with pubescence either lacking or sparse, propodeum often lacking pubescence as well; head smooth and shining or weakly and irregularly punctate

- beneath pubescence; pubescence on head may or may not be dilute and is not parallel to long axis of head 8
- 8(7) Pubescence of head dilute, in preoccipital area most spaces between pubescent setae (not larger bristle like erect hairs) as wide as length of setae or wider; anterior ½ of head (except occasionally frons) lacking pubescence
..... *Paratrechina vividula*
- 8' Pubescence of head is dense, in preoccipital area most spaces between pubescent setae are no wider than length of setae and usually less
..... *Paratrechina faisonensis*

***Paratrechina arenivaga* (Wheeler)**

This ant nests in the soil, usually in well-drained sandy areas. A small crater of excavated soil typically surrounds the entrance. *P. arenivaga* is normally nocturnal and they will tend hemipterans and collect dead insects for food (MacKay and MacKay 2002).

This species is yellow with the gaster infuscated posteriorly. The erect hairs on thorax are flexuous and dark brown while the scapes have 5-17 (usually 7-12) erect and suberect hairs.



Map 40. *Paratrechina arenivaga*

Paratrechina arenivaga is found in Florida (Deyrup 2003) west to Texas (Wheeler and Wheeler 1985) north to Kansas (Dubois 1994).

This species was collected in the following counties in Alabama: **Baldwin Co.** no locality given, **Bibb Co.** Blue Girth Creek, **Blount Co.** Oneonta, **Choctaw Co.** Butler, **Lee Co.** Chewacla SP, **Marion Co.** Hamilton

Paratrechina bourbonica (Forel)

This is a tramp ant species probably native to Southeast Asia and introduced worldwide by commerce. This ant has scapes that have 4 or more erect or suberect hairs. The thorax and gaster is covered with short stout pubescence and the body is dull brown to blackish color.

Paratrechina bourbonica can be found in Florida (Deyrup 2003) and possibly other localized introductions; also found throughout the world in tropical and subtropical areas.

This species was collected in Alabama in the following counties: **Bibb Co** Brent, **Mobile Co.** (Trager 1984)



Map 41. *Paratrechina bourbonica*

***Paratrechina concinna* Trager**

This species can be found in marshes, drainage ditches, rotting wood, cow dung and in pastures.

Paratrechina concinna has a uniform dark brown body with appendages that are only somewhat lighter. A dense row of longitudinally aligned pubescence can be found on the anterior edge of the propodeum while the front of pronotum and the mesonotum has at least some dilute pubescence. The head has shallow hairy punctures and dense pubescence that is mostly aligned along the long axis of the head.

This species is found in Florida (Deyrup 2003) and was reported in Alabama by Trager (1984).

***Paratrechina faisonensis* (Forel)**

This is a common collected species in Alabama. Colonies can be found in almost any wooded area, especially mesic areas. They nest in rotten wood or shallowly in soil under leaf litter. It is common to find partially sclerotized workers tending the brood in colonies of *P. faisonensis*, these nurse workers are pale white and can be quite numerous.

The middle and hind coxae and/or the thorax and legs of this species are lighter than



Map 42. *Paratrechina faisonensis*

the gaster and the head. The pubescence of the head is dense and in the preoccipital area most of the spaces between pubescent setae are no wider than the length of the setae and usually less.

Paratrechina faisonensis is found in the southeastern US: New Jersey south to Arkansas and Florida (Trager 1984).

This species was collected in the following counties of Alabama: **Barbour Co.** Blue Springs SP, **Bibb Co.** Pondville, **Blount Co.** Oneonta, **Butler Co.** Pine Apple, **Calhoun Co.** Jacksonville, **Chilton Co.** 1mi N of Mapleville, **Clay Co.** Talladega NF: Chinnabee Trail, **Colbert Co.** Bear Creek, **Conecuh Co.** Evergreen, **Coosa Co.** Kellyton, **Covington Co.** Solon Dixon Center, **Dallas Co.** Selma, **DeKalb Co.** DeSoto SP, **Escambia Co.** 2 mi E of Flomaton, **Greene Co.** 1mi N of Epes, **Henry Co.** Abbeville, **Lamar Co.** Vernon, **Lauderdale Co.** Rogersville, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn, **Lowndes Co.** Prairie Creek CG, **Macon Co.** Tuskegee NF, **Madison Co.** Uni. of Ala. Huntsville, **Mobile Co.** Mobile, **Perry Co.** Heiberger, **Shelby Co.** Childersburg, Sumter, **Tallapoosa Co.** Lake Martin, **Tuscaloosa Co.** Sipsey WMA, **Wilcox Co.** Roland Cooper CG, **Winston Co.** Natural Bridge

Paratrechina longicornis (Latreille) –Crazy ant

This species is a major pest in tropical regions of the world. *P. longicornis* was considered wide-spread in urban areas and collected in several localities in 1947 by Murphree. However, this ant does not seem to have established in Alabama. This species prefers to nest in the soil and is commonly transported (accidentally) in potted plants.

Paratrechina longicornis has unusually long scapes (at least twice as long as the head) and long slender legs. The body is also weakly shiny black or gray with bluish reflections and pubescence sparse, short and barely visible.

This species is established in Florida, possibly found in scattered sites across the US; found worldwide in tropical regions. *P. longicornis* was reported in Alabama by Murphree (1947), however this ant has not been recorded since that survey.

Paratrechina parvula (Mayr)

This species can typically be found either in or near wooded areas nesting is logs, stumps, or in the soil (Trager 1984). *P. parvula* is usually uniform dark brown, or at most weakly bicolored. Its appendages are somewhat lighter or yellowish, but the middle and hind coxae are not contrastingly pale compared with the fore coxae. The scapes lack erect hairs and the eyes fail to reach the sides of the head by about $\frac{1}{4}$ of their width (in full face view).



Map 43. *Paratrechina parvula*

Paratrechina parvula is found in southern New York west to Iowa and Texas, and south to Florida (Creighton 1950). This species was collected in the following counties in Alabama: **Bibb Co.** Brent, **DeKalb Co.** DeSoto SP, **Russell Co.** Tobert Lake

Paratrechina phantasma Trager

This species is similar in its habits to *P. arenivaga* except it seems limited to coastal areas of Florida, Alabama and possibly other Gulf states. This ant is highly tolerant of cold temperatures and will forage nocturnally year round (Trager 1984).

This ant is yellow or whitish with its gaster only slightly darker (if at all). The thoracic pilosity is nearly straight and about the same color as the body or only slightly darker, and the scapes have 0-4 (usually 1-3) erect and suberect hairs.

Paratrechina phantasma is found in Florida (Deyrup 2003) and coastal Alabama. It has only been collected in **Baldwin Co.** Bon Secour NWR.



Map 44. *Paratrechina phantasma*

Paratrechina vividula (Nylander)

This is probably an introduced species (possibly from South America or the Caribbean) that can be found nesting in vacant lots, farm fields, parks, beaches, and other disturbed localities.

This species is similar to *P. faisonensis* but can be separated by the following features. The pubescence on the head is dilute, in the preoccipital area most of the spaces between the pubescent setae (not the larger bristle like erect hairs) are as wide as the

length of the setae or wider and the anterior ½ of the head (except occasionally the frons) lacks pubescence.

Paratrechina vividula is found in Florida (Deyrup 2003) and Georgia (Ipser et al. 2004) west to Mississippi (MacGown 2005). It has possibly been introduced to other areas around the country.

This species was collected in the following counties in Alabama: **Baldwin Co.**, Bay Minette, **Bibb Co.** Blue Girth Creek, **Calhoun Co.** Colwell, **Cherokee Co.** Little River Canyon, **Dallas Co.** 1 mi W of Selma, **Fayette Co.** Wolf Creek WMA, **Franklin Co.** Bear Creek, **Hale Co.** Payne Lake, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn, **Limestone Co.** Gipsey, **Lowndes Co.** Lowndesboro, **Marion Co.** Hamilton, **Montgomery Co.** Montgomery, **Morgan Co.** Hartselle, **Sumter Co.** Coatopa, **Tuscaloosa Co.** Sipsey WMA, **Wilcox Co.** Roland Cooper CG



Map 45. *Paratrechina vividula*

Paratrechina wojciki Trager

This species may be found throughout Florida in a variety of habitats including rotting wood, under stones, or in grass clumps. In the north of its range it is typically found in xeric areas while in the south it is found in mesic habitats also (Trager 1984).

Paratrechina wojciki is usually bicolored, with the thorax yellowish to reddish-brown and the head and gaster darker. The middle and hind coxae are pale and much lighter than the fore coxae or the rest of the legs. The scapes have 1-4 erect hairs and the eyes either reach the sides of the or only fail to do so by 1-2 facets (in full face view).

This species is only known from Florida and coastal Alabama. It was reported in **Mobile Co.** by Trager (1984).



Map 46. *Paratrechina wojciki*

Genus *Prenolepis* Mayr

This is a small genus with about 10 species worldwide and only one, *Prenolepis imparis*, found in North America. Typically these ants live in the soil and consume honeydew.

In this genus the mesonotum, in dorsal view, is severely constricted giving the mesosoma a distinctive “hour-glass” shape. Body pilosity is not coarse or bristle-like, erect hairs are mostly slender and golden or brownish. Members of this genus are found in the Nearctic, Palearctic, Neotropical, Oriental and Indo-Australian regions.

Prenolepis imparis (Say) – False honey pot ant

This species is found throughout the US. It is adapted to cold weather and presumably avoids competition with other ant species by staying active during the cooler times of the year and aestivating through the warmer summer months. *P. imparis* can usually be found foraging in temperatures between 7°-15°C and reach peak activity in high humidity (80-100 %) (Talbot 1943). Colonies are large ranging from 560 to over 10,000 adults and contain multiple queens (Tschinkel 1987). Nests are found in soil and are 2.5-3.6 meters deep (Tschinkel 1987).



Map 47. *Prenolepis imparis*

The common name of this species is the false honey pot ant due to the distended gasters of some ants that remain in the nest. These ants act as repletes storing energy for periods of inactivity. Unlike other species that store energy as sugars in their repletes (hence the term “honey pot”) this species stores energy in the form of fats.

Prenolepis imparis was collected in the following counties in Alabama:

Chambers Co. Chambers Co. Public Lake, **Clay Co.** Talladega NF; Chinnabee Trail, **DeKalb Co.** DeSoto SP, **Lauderdale Co.** 2mi S of Rogersville, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn, **Macon Co.** Tuskegee NF, **Morgan Co.** Hartselle, **Sumter Co.** Coatopa, **Talladega Co.** Talladega NF, **Tallapoosa Co.** Lake Martin, **Winston Co.** Natural Bridge

SUBFAMILY MYRMICINAE

The Myrmicinae is the most diverse subfamily of ants in Alabama with 16 genera containing 84 species, over half the total number of ant species found in the state. On the generic level there is a huge amount of variety in the morphology and behavior of these ants. This subfamily owes its name to the genus *Myrmica*, which refers to the Greek term for ant: “myrmeco”.

Many myrmicines are generalist predators or scavengers however there are several groups that are specialist predators that feed on collembola and other soil dwelling arthropods. Some species obtain nutrients from “harvesting” seeds and are important in seed dispersal. Others tend fungal gardens as their sole source of food.

Myrmicines have a well-developed postpetiole. They can be distinguished from other ants with developed postpetioles by their laterally expanded frontal carinae that partially or completely cover the antennal sockets. Myrmicines usually have a sting although in some genera this is absent or modified.

This subfamily has a worldwide distribution. Representatives of the subfamily Myrmicinae can be found throughout the world on all continents except Antarctica.

Key to the Alabama genera of Myrmicinae (modified from Holldobler and Wilson 1990, Bolton 1994)

1	Antenna with six segments.....	2
1'	Antenna with ten or eleven.....	3
1''	Antenna with twelve segments.....	9

- 2(1) Mandibles elongate and linear; apex of mandible with distinct fork of two inwardly directed spiniform teeth *Strumigenys*
- 2' Mandibles triangular or subtriangular, with masticatory margin dentate and lacking apical fork of inward directed spiniform teeth *Pyramica*
- 3(1') Antenna with ten segments including distinct two segmented club; clypeus usually bicarinate with carinae diverging towards anterior clypeal margin and frequently terminating as teeth projecting beyond margin; propodeum always lacking spines or teeth *Solenopsis*
- 3' Antenna with eleven segments, clypeus usually not bicarinate, propodeum with or without spines or teeth 4
- 4(3') Postpetiole attached to anterior dorsal surface of first gastral segment (fig. 5); in dorsal view, gaster more or less heart-shaped and capable of being flexed so that it points forward over mesosoma; gastric dorsum, in profile, concave, flat or at most feebly convex, in contrast to the strongly convex ventral surface
- *Crematogaster*

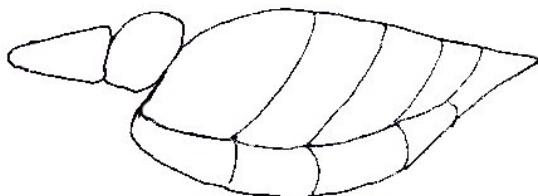


Fig. 5. Lateral view of *Crematogaster* sp. gaster and petiole

- 4' Postpetiole attached to anterior end of first gastric segment (not to anterior dorsal surface); gaster more or less oval or tear drop shaped in dorsal view and not capable of being flexed forward over mesosoma; gastric dorsal and ventral

- surfaces approximately equally convex when viewed in profile or ventral surface
less convex than dorsal 5
- 5(4') With head in profile, diagonal supraocular carina present, which runs forward
from above eye and down toward mandible insertion; supraocular carina
independent of and distinct from any other sculpture that may be present; head
and body with spines or tubercles; antenna lacking distinct two or three jointed
club 6
- 5' With head in profile, supraocular carina absent; longitudinal components of
sculpture may run above eye toward mandible insertion but none form sharply
differentiated carina; head and body usually lacking tubercles but spines maybe
be present 7
- 6(5) Promesonotum with blunt tubercles; frontal lobes expanded laterally covering
side of head (as seen in full face view) and projecting forward, anteriorly reaching
or over lapping anterior margins of clypeus; gaster without tubercles
..... *Cyphomyrmex rimosus*
- 6' Promesonotum with spines and teeth; frontal lobes expanded laterally but not
projecting forward to anterior margin of clypeus; gaster with tubercles
..... *Trachymyrmex septentrionalis*
- 7(5') Frontal carinae short, not extending posteriorly past eye *Temnothorax* (in part)
- 7' Frontal carinae long, extending posteriorly past eye and almost reaching vertex
..... 8
- 8(7') In dorsal view lateral portions of posterior clypeal border with distinctive, roughly
semicircular emargination adjacent to each antennal insertion; emargination is

- ridge-like and drops off sharply on posterior side to give image that antenna is inserted into a deep pit; mandibles with 6-7 teeth *Tetramorium* (in part)
- 8' In dorsal view lateral portions of posterior clypeal border lacking distinctive, semicircular emargination adjacent to each antennal insertion; antennae do not appear to be inserted in deep pits (as above); mandibles with 4 teeth
..... *Protomognathus americanus*
- 9(1'') In profile, petiole short and subcylindrical lacking anterior peduncle and with rudimentary node; humeri moderately to sharply angulate; propodeum armed with 2 pairs of spines *Myrmecina americana*
- 9' Petiole distinctly nodiform; humeri usually rounded; propodeum unarmed or armed with 1 pair of spines..... 10
- 10(9') Petiolar node set off sharply from long, distinctive anterior peduncle, node in side view roughly triangular; beard-like hairs (psammophore) present on the gula
..... *Pogonomyrmex badius*
- 10' Anterior peduncle sometimes long, often short or absent; node in side view varies in shape often roughly rectangular; true psammophore absent, although few scattered erect hairs may be present on gula 11
- 11(10') Dorsum of mesosoma flattened or convex, but without impression sutures (small transverse ridge may be present on propodeal dorsum) 12
- 11' Dorsum of mesosoma variously shaped in profile, never forming continuous surface, outline always interrupted by one or more sutural impressions 13
- 12(11) Frontal carinae long, extending rearward past eye and reaching or almost reaching vertex, and/or clypeus longitudinally rugulose; posterior lateral portions of

- clypeus that borders antennal sockets forming thin, vertical ridge to create impression of a deep pit surrounding socket; antennae with 3 segmented apical club *Tetramorium* (in part)
- 12' Frontal carinae short, not extending past eye and never nearly reaching vertex; clypeus not conspicuously longitudinally rugulose; posterior lateral portions of clypeus not forming ridge that gives impression of a pit surrounding antenna sockets *Temnothorax* (in part)
- 13(11') Mandibles with 3-4 teeth; clypeus usually with 2 longitudinal carinae (sometimes weak, rarely absent) that often end as teeth on anterior margin; antenna with 3 segmented apical club; propodeum unarmed *Monomorium*
- 13' Mandibles with 5 or more teeth; apical antennal club absent or present; propodeum usually bearing teeth or spines 14
- 14(13') Antenna with 3 or 4 segmented apical club 15
- 14' Antenna lacking distinct apical club, terminal segments enlarging towards apex 17
- 15(14) Apical antennal club 4 segmented; clypeus usually with 2 longitudinal carinae that do not form teeth on anterior margin; workers monomorphic *Stennama*
- 15' Apical antennal club 3 segmented, often distinct; workers monomorphic or dimorphic; clypeus always lacking 2 longitudinal carinae 16
- 16(15') Workers monomorphic; metanotal impression prominent, forming valley between promesonotum and propodeum, at about same elevation in profile; basal face of propodeum in profile convex; mandibles with 5 teeth or denticles *Temnothorax pergandei*

- 16' Workers dimorphic; majors with large heads; minors with propodeum usually distinctly lower in elevation than pronotum, mesonotum often as high as pronotum and separated from propodeum by distinct step; basal face of propodeum in profile flat; mandibles with 6 or more teeth or denticles
-*Pheidole*
- 17(14') In profile, metanotal region weakly to moderately impressed; propodeum barely differentiated from remainder of mesosoma, at most slightly depressed below level of promesonotum in profile; antennal scapes often bent abruptly near base (up to 90 degrees) and bearing more or less obvious lamina at bend*Myrmica* (in part)
- 17' Metanotal impression variable; propodeum usually strongly differentiated from rest of mesosoma and always depressed below level of pronotum (in profile) with mesonotum forming more or less gradual slope connecting the two; antennal scape not abruptly bent at base, rarely with lamina*Aphaenogaster*

Genus *Aphaenogaster* Mayr

Ants in the genus *Aphaenogaster* are common in the wooded areas of Alabama. Many of our species can be found nesting in rotten logs or stumps, although some are thought to be arboreal. A few species will form underground nests, however most southeastern species appear to nest either partially or entirely above ground. Colonies range in size from a few hundred adults to a few thousand (Holldobler and Wilson 1990). Many species vigorously defend their nests and exhibit stinging behavior but apparently cannot penetrate human skin.

Aphaenogaster species are mainly carnivorous and scavenge or hunt for insects, however most will supplement their diet with honeydew or nectar (Wheeler and Wheeler 1986, MacKay and MacKay 2002). Some species have shown mycophagous behavior and will consume fungus for food (Carroll et al. 1981). These ants are not considered a pest and are rarely found in domestic situations. Although they can be numerous in peridomestic areas they are harmless.

The species of *Aphaenogaster* have a distinctive slender appearance with long appendages and a narrow body and head. They also have a 12-segmented antenna that lacks a distinct apical club (the last four segments tend to gradually enlarge but do not form an obvious club). The species of *Aphaenogaster* are distinguished from *Myrmica* species by their straight antennal scape and their propodeum that is strongly differentiated from the rest of the mesosoma and always depressed below the level of the pronotum. These ants are found throughout the worldwide except Africa and South America.

Key to the genus *Aphaenogaster* (modified from Creighton 1950, MacGown 2005)

- 1 Antennal scape with conspicuous lobe, which extends rearward along basal fourth of scape, seen from side, thick with upper face forming obtusely projecting angle in middle *Aphaenogaster treatae*
- 1' Antennal scape without basal lobe or if small lobe present, it projects forward and does not involve basal fourth of scape 2
- 2(1') Outer face of frontal lobe bearing tooth-like flange which projects rearward *Aphaenogaster lamellidens*
- 2' Outer face of frontal lobe without tooth-like flange 3

- 3(2') Postpetiole broader than long and suboval in shape; propodeal spines longer than basal face of propodeum *Aphaenogaster tennesseensis*
- 3' Postpetiole as long as broad or longer than broad, globular or truncated cone-like in shape; propodeal spines absent or shorter than basal face of propodeum 4
- 4(3') Propodeum unarmed, rounded or angular but without distinct teeth or spines *Aphaenogaster floridana*
- 4' Propodeum armed with distinct teeth or spines (ants in following group are extremely difficult to identify and many of the characters given can be variable, possibly due to hybridization)(*fulva-rudis-texana* group) 5
- 5(4') Anterior edge of mesonotum rising abruptly above adjacent portion of pronotum, transverse welt thus formed distinctly concave in middle (this can be seen by looking at ant in full face view); propodeal spines at least as long as declivous face of propodeum and strongly directed upwards; lateral striations usually present on fore coxae; queens with transverse stria on mesopleura *Aphaenogaster fulva*
- 5' Mesonotum not abruptly elevated above pronotum or if higher, anterior edge does not form transverse welt; propodeal spines rarely as long as declivous face of propodeum and usually directed backward; lateral striations not present on fore coxae; queens with smooth mesopleura 6
- 6(5') Head (excluding mandibles) of largest workers not more than one-sixth longer than broad; head of smallest workers not more than one-fifth longer than broad 7

- 6' Head (excluding mandibles) of worker, regardless of size, approximately one-third long than broad 8
- 7(6) Largest workers are approximately 5.5 mm in length; queens are 7mm in length
..... *Aphaenogaster texana*
- 7' Largest workers are approximately 4.5 mm in length; queens are 5.5 mm in length
..... *Aphaenogaster carolinensis*
- 8(6') Eyes with 13-15 facets in greatest diameter; propodeal spines slightly incurved when seen dorsally; basal face of propodeum with coarse transverse rugules
..... *Aphaenogaster miamiana*
- 8' Eyes with 10-11 facets in greatest diameter; propodeal spines divergent when seen dorsally; transverse rugae on basal face of propodeum feeble and often replaced by punctures 9
- 9(8') Area between eye and frontal lobe with reticulate rugae which are not obscured by interrugal sculpture; pronotum often crossed with transverse rugules
..... *Aphaenogaster rudis*
- 9' Area between eyes and frontal lobe densely punctuate with punctures largely obscuring or replacing rugae; pronotum evenly punctuate-granulose, without transverse rugules..... *Aphaenogaster picea*

***Aphaenogaster floridana* M. R. Smith**

This species is found in northern Florida but was not collected during this project, although D.R. Smith recorded it here and in Georgia in 1979. It does not appear to be

common in Florida and is probably rare in Alabama. *A. floridana* lacks propodeal spines typical of other *Aphaenogaster* species.

Aphaenogaster fulva Roger

This ant belongs to the *fulva-rudis-texana* complex and is difficult to separate from other closely related species. Colonies can typically be found in rotten logs and stumps in mesic woodlands.

This species can be identified (to a degree) by the transverse welt, formed by the anterior edge of the mesonotum rising abruptly above the adjacent portion of the pronotum, is distinctly concave in the middle (this can be seen by looking at the ant in full face view). This is generally a good character for *A. fulva* although it is variable. The queens usually have transverse stria on the mesopleuron.

Aphaenogaster fulva is found in Louisiana (D.R. Smith 1979) and Florida (Deyrup 2003) north to Michigan (Wheeler et al. 1994) and Vermont (D.R. Smith 1979).

This species was collected in the following Alabama counties: **Bibb Co.** Pondville, **Clarke Co.** Grove Hill, **Clay Co.** Talladega NF: Chinnabee Trail, **Conecuh Co.** Evergreen, **Coosa Co.** Kellyton, **Greene Co.** Epes, **Hale Co.** Lake Payne, **Houston Co.** Dothan, **Lamar Co.** Vernon, **Lauderdale Co.** 2mi S of Rogersville, **Lawrence Co.**



Map 48. *Aphaenogaster fulva*

Bankhead NF, **Marengo Co.** Demopolis, **Perry Co.** Heiberger, **Shelby Co.**

Childersburg, **Walker Co.** Townley, **Wilcox Co.** Roland Cooper CG

Aphaenogaster lamellidens Mayr

This ant typically nests in logs or stumps but has been found in dead limbs of living oaks (Trager 1997). In this study *A. lamellidens* was only collected in the northern half of Alabama, indicating a possible aversion to the costal plain environment. The specific name is derived from Greek referring to the dens (tooth) on the lamelli (plate like extension, in this case of the frontal lobe). The outer face of the frontal lobe of this species bears a distinct tooth-like flange that projects rearward.

Aphaenogaster lamellidens is found in New York west to Illinois and Missouri, and south to Louisiana (D.R. Smith 1979) and Florida (Deyrup 2003).

This species was collected in the following counties in Alabama: **Blount Co.** Oneonta, **Chambers Co.** Lafayette, **Cherokee Co.** Little River Canyon, **Colbert Co.** Freedom Hills, **Fayette Co.** Wolf Creek WMA, **Lauderdale Co.** 2mi S of Rogersville, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn, **Macon Co.** Tuskegee, **Morgan Co.** Hartselle, **Tuscaloosa Co.** Tuscaloosa



Map 49. *Aphaenogaster lamellidens*

Aphaenogaster miamiana Wheeler

This species was once considered a subspecies of *A. texana* (Umphrey 1996) and is difficult to separate from others in the *fulva-rudis-texana* complex.

Geographically, *A. miamiana* seems more prevalent in the coastal plain, however the difficulties in identifying this species leaves that in question.

Aphaenogaster miamiana has eyes that are 13-15 facets in the greatest diameter and propodeal spines that curve inwards slightly when seen dorsally. The basal face of propodeum has coarse transverse rugules. These however, tend not to be reliable morphological features. This species is found in Florida (Deyrup 2003) and Mississippi (MacGown 2005).

This species was collected in Alabama in the following counties: **Baldwin Co.** Bay Minette, **Barbour Co.** Blue Springs SP, **Bibb Co.** Blue Girth Creek, **Butler Co.** 1mi N of Spring Hill, **Escambia Co.** 1mi E of Flomaton, **Geneva Co.** Hartford, **Houston Co.** Chattahoochee SP, **Macon Co.** Tuskegee NF, **Monroe Co.** Claiborne Lake Project



Map 50. *Aphaenogaster miamiana*

Aphaenogaster picea (Wheeler)

This is another member of the *fulva-rudis-texana* complex that is difficult to identify. Like others in this complex it is nearly impossible to be sure of the actual range of this ant.

This species can be tentatively identified by the area between the eyes and the frontal lobe appearing densely punctuate with the punctures largely obscuring or replacing the rugae; pronotum evenly punctuate-granulose, without transverse rugules

Aphaenogaster picea is found from Nova Scotia south to North Carolina and west to Wisconsin and Iowa (D.R. Smith 1979) and also in Mississippi (M.R. Smith 1928). This species was collected in Alabama in **Clay Co.** Talladega NF: Chinnabee Trail.



Map 51. *Aphaenogaster picea*

Aphaenogaster rudis Enzmann

This ant can be found in soil, rotten logs or stumps, under stones or under the bark of living trees. Like other species of *Aphaenogaster* it scavenges for dead insects but also consumes seed elaiosomes and is considered an important seed disperser (Ruhren and Dudash 1996).

The area between the eye and the frontal lobe of this species has reticulate rugae that are not obscured by the interrugal sculpture; pronotum often crossed with transverse rugules.

Aphaenogaster rudis is found from Massachusetts (D.R. Smith 1979) west to Wyoming (G.C. Wheeler and J. Wheeler 1988) to Kansas (Dubois 1994) south to Alabama and possible surrounding states. This species was reported in Alabama in **Cleburne Co.** by Umphrey (1996).



Map 52. *Aphaenogaster rudis*

Aphaenogaster tennesseensis (Mayr)

Aphaenogaster tennesseensis is thought to be a temporary social parasite of other *Aphaenogaster* species, namely *A. fulva*, *A. rudis* and *A. picea*. Generally this species nests above ground in rotting wood but queens can be found in the ground nests of other species. This species has a postpetiole that is broader than long and suboval in shape. It



Map 53. *Aphaenogaster tennesseensis*

also has distinctive propodeal spines that are longer than the basal face of the propodeum.

Aphaenogaster tennesseensis is found in Ontario (D.R. Smith 1979) south to Florida (Deyrup 2003) and west to Texas (G.C. Wheeler and J. Wheeler 1985). This species was collected in the following counties: **Bibb Co.** Blue Girth Creek, **Houston Co.** Dothan

Aphaenogaster treatae Forel

This ant has a fairly large range and can be found throughout the eastern U.S. It can commonly be found foraging in leaf litter and nests in the soil. Colony size can range from 65 to 1,600 with an average of about 680 adults (Talbot 1954)

Aphaenogaster treatae has a conspicuous lobe on the antennal scape, which extends rearward along the basal fourth of the scape, seen from side it is thick with the upper face forming a obtusely projecting angle in the middle.

This species is found in Florida (Deyrup 2003), Louisiana (Moser and Blum 1960) north to Michigan (Wheeler et al. 1994), into Ontario (D.R. Smith 1979).



Map 54. *Aphaenogaster treatae*

Aphaenogaster treatae was collected in the following counties: **Bibb Co.** Blue Girth Creek, **Clay Co.** Talladege NF: Chinnabee Trail, **DeKalb Co.** DeSoto SP, **Lamar Co.** Ferbank (Murphree 1947), **Lawrence Co.** Joe Wheeler SP, **Macon Co.** Tuskegee NF

***Aphaenogaster* sp. (*fulva-texana-rudis* complex)**

This species is probably *Aphaenogaster carolinensis* Wheeler or *Aphaenogaster* n. sp. N19 (Umphrey 1996). This is a difficult complex with no reliable character to positively separate species. *A. carolinensis* can be separated from *A. texana* based on size: the largest workers are approximately 4.5 mm in length while the queens are 5.5 mm in length, although this is not always reliable.

Aphaenogaster carolinensis is found in the eastern U.S., the true range is difficult to determine due to the problems of accurately identifying members of this complex.

This species (or complex) was collected in the following counties in Alabama: **Blount Co.** Oneonta, **Colbert Co.** Freedom Hills, **DeKalb Co.** DeSoto SP, **Etowah Co.** Gadsden, **Franklin Co.** Bear Creek, **Lauderdale Co.** Rogersville, **Lawrence Co.** Joe Wheeler SP, **Macon Co.** Tuskegee NF, **Sumter Co.** Livingstong, **Tuscaloosa Co.** Sipsey WMA, **Winston Co.** Smith Lake



Map 55. *Aphaenogaster* sp.

Genus *Crematogaster* Lund –Acrobat ants

These ants are called “acrobats” because of the distinctive behavior that many *Crematogaster* species have of elevating their gaster up and over their heads when disturbed. The etymology of the generic name refers to this behavior (“crema” Greek for hang or suspend and “gaster” referring to modified abdomen). These ants do not sting but instead exude noxious chemicals from their flattened modified sting (Forel 1928). This chemical defense is effective against ants but harmless to humans.

Acrobat ants nest in a variety of areas including: living trees, soil, rotting logs or stumps, insect galls, acorns, and occasionally in woodwork. They tend to be omnivorous scavengers but are commonly found associated with honeydew producing insects.

Acrobat ants are found throughout the world.

Crematogaster species are easily recognized by their heart-shaped gaster (seen from above) that is attached to the post-petiole on the dorsal surface of the first gastral segment, in profile the dorsum of the gaster is relatively flat while the ventral surface is strongly convex. Their antenna is 11-segmented.

Key to the genus *Crematogaster* (modified from Creighton 1950, Johnson 1988b, Buren 1968, MacGown 2005)

- | | | |
|----|--|---|
| 1 | Postpetiole suboval and entire, without median sulcus, very small ants (1-2mm in length) | 2 |
| 1' | Postpetiole divided by distinct median sulcus, medium sized ants (3+mm in length) | 3 |

- 2(1) Propodeal spines directed upward and about one-half as long as distance between their base; rugae on pronotum usually lateral in position; coloration dark yellow
..... *Crematogaster missouriensis*
- 2' Propodeal spines directed more backward than upward and less than one-half distance which separate their bases; two prominent rugae near middle of pronotum; color light yellow *Crematogaster minutissima*
- 3(1') Pronotal pleurae sculptured, roughened looking and opaque 4
- 3' Pronotal pleurae mostly unsculptured with large band having smooth, reflective or shiny surface 5
- 4(3) Pronotum with band of erect hairs occurring transversely and other erect hairs scattered randomly across mesonotum *Crematogaster lineolata*
- 4' Pronotum with erect hairs confined to humeral shoulders; occasionally erect hairs occur on anterior margin of propodeum *Crematogaster vermiculata*
- 5(3') Propodeal spines short and in dorsal view, inner margins parallel to longitudinal body axis; dark brown body *Crematogaster ashmeadi*
- 5' Propodeal spines long, in dorsal view spines diverge from longitudinal body axis
..... 6
- 6(5') Pubescence on head and thorax appressed, hairs on head fine and in orderly rows
..... *Crematogaster atkinsoni*
- 6' Pubescence on head and thorax suberect or erect (at least some) and hairs on head not lying in orderly rows *Crematogaster pilosa*

Crematogaster ashmeadi Mayr

This is one of the most common species of tree nesting *Crematogaster* in Alabama. It nests arboreally in twigs or branches (Buren 1968). Colonies may be large and are found in pine or hardwoods. In a study of a pine forest of northern Florida (Tschinkel and Hess 1999) *C. ashmeadi* was found on approximately 50% of the trees examined (out of 4,766). These ants defend their territory and exclude other ant species from nesting in or utilizing their tree.

This species has distinctly short propodeal spines that, in dorsal view, have inner margins that are parallel to the longitudinal body axis. *C. ashmeadi* is dark brown in color.

Crematogaster ashmeadi is found in North Carolina (Nuhn 1977) south to Florida (Deyrup 2003) and west to Texas (Wheeler and Wheeler 1985) and Kansas (Dubois 1994). It is also recorded in the Bahamas (Deyrup 1998).

This species was collected in the following counties in Alabama: **Bibb Co.** Blue Girth Creek, **Blount Co.** Oneonta, **Cherokee Co.** Little River Canyon, **Colbert Co.** Freedom Hills, **Covington Co.** Solon Dixon Center, **Cullman Co.** 2mi N of Cullman, **Dallas Co.** 1mi W of Selma, **Fayette Co.** Wolf Creek WMA, **Henry Co.** Abbeville (Murphree 1947), **Houston Co.** Dothan, **Lauderdale Co.** 2mi S of Rogersville,



Map 56. *Crematogaster ashmeadi*

Lawrence Co. Bankhead NF, **Lee Co.** Auburn, **Limestone Co.** Gipsey, **Lowndes Co.** Prairie Creek CG, **Madison Co.** Huntsville, **Mobile Co.** Mobile, Monroe, **Morgan Co.** Hartselle, **Pickens Co.** Cochrane, **Shelby Co.** Childersburg, **St. Clair Co.** Whitney Junction (Murphree 1947), **Tuscaloosa Co.** Uni. of Ala. – Tuscaloosa, **Walker Co.** Townley, **Wilcox Co.** Roland Cooper CG, **Winston Co.** Smith Lake

Crematogaster atkinsoni Wheeler

These ants produce large carton nests in sedges or brushes usually in coastal salt marshes. The pubescence on the head and thorax of this species is appressed while the hairs on the head are fine and in orderly rows.

Crematogaster atkinsoni can be found in North Carolina (Carter 1962) south to Florida (Deyrup 2003) and west to Mississippi (MacGown 2005). This species was not collected during this survey however Johnson reported it here in 1988.

Crematogaster lineolata (Say)

This is another fairly common ant from the genus *Crematogaster* with a wide range in the United States. *C. lineolata* can be found nesting in ground in wooded areas or in logs or stumps.

This species has a roughed pronotal pleurae and a band of erect hairs occurring



Map 57. *Crematogaster lineolata*

transversely on the pronotum and other erect hairs scattered randomly across the mesonotum.

Crematogaster lineolata is found in southeastern Canada and eastern US with a western limit of Utah (Rees and Grundmann 1940).

This species was collected in the following counties in Alabama: **Barbour Co.** Blue Springs SP, **Blount Co.** Oneonta, **Choctaw Co.** Choctaw NWR, **Clay Co.** Talladega NF: Chinnabee Trail, **Cleburne Co.** Talladega NF, **Colbert Co.** Freedom Hills, **Cullman Co.** 2mi N of Cullman, **Dale Co.** Daleville, **Dallas Co.** Carlowville, **DeKalb Co.** DeSoto SP, **Escambia Co.** 1miW of Flomaton, **Henry Co.** 1mi N of Abbeville, **Lawrence Co.** Joe Wheeler SP, **Limestone Co.** 2mi N of Decatur, **Lowndes Co.** Collirene, **Macon Co.** Tuskegee NF, **Marengo Co.** Chickasaw SP, **Wilcox Co.** Camden, **Winston Co.** Center (Murphree 1947)

Crematogaster minutissima Mayr

This small yellow species of *Crematogaster* nests in the soil usually at the base of trees or stumps or logs. *C. minutissima* has also been found in potted plants in a backyard setting.

These ants have propodeal spines that are directed more backward than upward and the length of the spines is less than one-half



Map 58. *Crematogaster minutissima*

the distance that separates their bases. Two prominent rugae are present near the middle of the pronotum. This species is light yellow in color and smaller than *C. missouriensis*.

Crematogaster minutissima is found in the southern US ranging from North Carolina and Arkansas south to northwestern Costa Rica (Longino 2005).

This species was collected in the following counties in Alabama: **Bibb Co.** Blue Girth Creek, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn, **Mobile Co.** Mobile, **Pike Co.** Troy (Murphree 1947), **Talladega Co.** Fayetteville (Murphree 1947)

***Crematogaster missouriensis* Emery**

This species is similar to *C. minutissima* in behavior and morphology.

Crematogaster missouriensis nests in either the soil or in deadwood. This ant has propodeal spines directed upward and about one-half as long as the distance between their bases. The rugae on pronotum is usually lateral in position. This species is dark yellow and slightly larger than *C. minutissima*.

Crematogaster missouriensis is found in the southern US ranging from North Carolina and Arkansas south to northwestern Costa Rica (Longino 2005)

This species was collected in the following counties in Alabama: **Baldwin Co.** Bay Minette, **Bibb Co.** Blue Girth Creek, **Clay Co.** Talladega NF: Chinnabee Trail,



Map 59. *Crematogaster missouriensis*

Lawrence Co. Joe Wheeler SP, **Madison Co.** Uni of Ala. - Huntsville, **Morgan Co.**

Hartselle

***Crematogaster pilosa* Emery**

This species commonly nest in logs or stumps in marshland or mesic habitats. *C. pilosa* obtains most of its food from honeydew but if found indoors it shows a preference for fatty or oily foods (Murphree 1947). The pubescence on the head and the thorax of this species is suberect or erect (at least some of them) and the hairs on the head do not lie in orderly rows

Crematogaster pilosa is found in North Carolina (Powell 1937) south to Florida (Deyrup 2003) and west to Louisiana (Moser and Blum 1960).

This species was collected in the following counties in Alabama: **Baldwin Co.** Fort Morgan, Loxley, **Calhoun Co.** Wellington (Murphree 1947), **Cleburne Co.** Choccolocco WMA, **Coffee Co.** Clintonville, **Conecuh Co.** Repton (Murphree 1947), **Cullman Co.** 2mi N of Cullman, **Dale Co.** Newton (Murphree 1947), **Dallas Co.** Selma, **Escambia Co.** 1mi W of Flomaton, **Fayette Co.** Bankston (Murphree 1947), **Franklin Co.** Bear Creek, **Greene Co.** Boligee (Murphree 1947), **Jackson Co.** Paint Rock River, **Lauderdale Co.** 2mi S of Rogersville, **Lawrence Co.** Joe Wheeler SP, **Lee**



Map 60. *Crematogaster pilosa*

Co. Auburn, **Monroe Co.** Claiborne Lake CG, **Pickens Co.** Cochrane, **Shelby Co.** Childersburg, **Sumter Co.** Coatopa, **Tallapoosa Co.** Thornton, **Washington Co.** Chatom

***Crematogaster vermiculata* Emery**

This species is arboreal and are found in cypress swamps or in trees in the vicinity of wetlands (Johnson 1988b).

Crematogaster vermiculata has roughened pronotal pleurae and erect hairs are confined to the humeral shoulders (there may be occasionally erect hairs on the anterior margin of the propodeum). This species is also distinctly rugoreticulate on the thoracic dorsum.

This species is found in North Carolina (Carter 1962) south to Florida (Deyrup 2003) and west to Louisiana (Moser and Blum 1960). *Crematogaster vermiculata* was collected in the following counties in Alabama: **Barbour Co.** Blue Springs SP, **Lauderdale Co.** Joe Wheeler SP



Map 61. *Crematogaster vermiculata*

Genus *Cyphomyrmex* Mayr

This is a primitive fungus-growing ant genus that utilizes caterpillar feces as a substrate for yeast that it consumes for food. There is a close-knit relationship between fungus growing ants and their cultivars that originated over 50 million years ago (Mueller et al. 1998). *Cyphomyrmex rimosus* is the only species of this genus that has been found

in Alabama and is not considered to be a native of this state. Four species of *Cyphomyrmex* are found in the southern regions North America. In Central and South America this genus is much more diverse.

***Cyphomyrmex rimosus* (Spinola)**

Cyphomyrmex rimosus form small colonies of 200 adults or less and nest in the soil. They may be quite abundant in the coastal plain region of Alabama. I have observed this species carrying insect parts, caterpillar feces and occasionally dried plant matter. *C. rimosus* can be found in areas heavily infested other invasive ants but they seem to coexist with little problems (Storz and Tschinkel 2004). When disturbed these ants exhibit thanotosis (playing dead behavior). It is possible that this behavior and their thick armor-like integument protect them from the depredations of other ant species.

This species has blunt tubercles on the mesosoma, with characteristically thick and rough integument. The frontal lobes are expanded laterally and cover much of the side of the head (as seen in full face view) and project forward, anteriorly reaching or over lapping the anterior margins of the clypeus.



Map 62. *Cyphomyrmex rimosus*

Cyphomyrmex rimosus is found in the southern US, from Florida (Deyrup 2003) to California (MacKay and MacKay 2002); this range extends south through Latin America to Argentina (Longino 2005).

This species was collected in the following counties in Alabama: **Baldwin Co.** Bay Minette, **Covington Co.** Conecuh Trail, **Dale Co.** Daleville, **Escambia Co.** 1mi W of Flomaton, **Henry Co.** Abbeville, **Houston Co.** 1mi W of Dothan, **Lowndes Co.** Lowndesboro, **Mobile Co.** Saraland, **Monroe Co.** Claiborne Lake, **Montgomery Co.** Montgomery, **Wilcox Co.** Roland Cooper CG

Genus *Monomorium* Mayr

These ants are little and (usually) black. *Monomorium* ants are common “tramp” species and are considered invasive pests in many areas. Most species are adaptable and can nest inside human dwellings. These ants are typical generalist omnivores but show a preference for sweet food items. Members of this genus are found worldwide.

Monomorium species are small and have a 12-segmented antenna with a 3-segmented club. Their mandibles have 3-4 teeth and clypeus usually with 2 longitudinal carinae extending past the anterior border of the clypeus as teeth. Ants of this genus lack propodeal spines.

Key to the genus *Monomorium* (modified from Creighton 1950, Dubois 1986)

- 1 Head and thorax densely punctuate, opaque or feebly shining; color clear reddish yellow *Monomorium pharaonis*

- 1' Head and thorax mostly or entirely smooth, strongly shining with only scattered punctures; color not reddish yellow.....2
- 2(1') Teeth which terminate clypeal carinae indistinct or absent, clypeal edge between carina straight or feebly impressed, not sulcate behind; head and gaster brownish, thorax, petiolar node and appendages dirty yellow*Monomorium floricola*
- 2' Teeth which terminate clypeal carinae distinct, clypeal edge between them bearing marked concave impression, often carried back between carinae as triangular sulcus; color not as above3
- 3(2') Node of petiole, in profile, somewhat higher than base is long with anterior peduncle as long as base of node; mesopleuron and base of propodeum rugulose or delicately striate; color ferruginous to black, may have bluish or greenish reflections*Monomorium viridum*
- 3' Node of petiole, in profile, approximately as high as long with anterior peduncle notably shorter than base of node; mesopleuron and base of propodeum smooth and shining; color concolorous black*Monomorium minimum*

***Monomorium floricola* (Jerdon)-Bicolored trailing ant**

Monomorium floricola is an invasive from the Old World, most likely Asia, and can be found in warmer tropical regions of the world (Wilson and Taylor 1967). It was not collected during this survey but it is reasonable to assume that this ant could be found in the extreme south of Alabama or in domestic settings. This ant is a common household pest in Florida.

This species completely lacks or has indistinct clypeal teeth. The head and gaster is brownish, while the thorax, petiolar node and appendages are dirty yellow.

Monomorium floricola is found in Florida and tropics of the world (Smith 1979).

It was reported in Alabama by D.R Smith (1979).

***Monomorium minimum* (Buckley) - Little black ant**

As the common name implies *M.*

minimum is, literally, a little black ant. This ant is extremely abundant and successful in Alabama, it may be found through out the state in just about any environment and is found throughout the U.S., although it is most common in the southeast. This species typically nests in soil or close to the ground. *M. minimum* can invade buildings and is extremely difficult to eradicate.

In profile, the node of the petiole of this species is approximately as high as it is long. The mesopleuron and the base of the propodeum for the most part smooth and shining. This ant is concolorous black with no greenish reflections.



Map 63. *Monomorium minimum*

Monomorium minimum was collected in the following counties in Alabama:
Blount Co. Oneonta, **Clay Co.** Talladega NF: Chinnabee Trail, **Coosa Co.** Kellyton, **Covington Co.** Conecuh Trail, **DeKalb Co.** DeSoto SP, **Escambia Co.** 2mi E of

Flomaton, **Fayette Co.** Wolf Creek WMA, **Franklin Co.** Bear Creek, **Hale Co.** Payne Lake, **Jackson Co.** Paint Rock River, **Lamar Co.** Vernon, **Lauderdale Co.** Rogersville, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn, **Limestone Co.** 1mi N of Decatur, **Lowndes Co.** Collirene, **Madison Co.** Huntsville, **Marengo Co.** Foscue Creek CG, **Marion Co.** Bear Creek, **Mobile Co.** Saraland, **Monroe Co.** Hybart, **Montgomery Co.** Montgomery, **Morgan Co.** Hartselle, **Pickens Co.** Cochrane, **Tallapoosa Co.** Lake Martin, **Tuscaloosa Co.** Uni. of Ala. - Tuscaloosa

Monomorium pharaonis (Linnaeus) - Pharaoh ant

The Pharaoh Ant is an introduced ant, probably from Africa or Asia. This ant forms polygynous colonies that are difficult to eliminate once established inside a building due to the colonies “budding” (queens scatter and form new colonies) when disturbed. *M. pharaonis* can be problematic in hospital situations where it has been implicated in spreading diseases (Chadée and LeMaitre 1990).



Map 64. *Monomorium pharaonis*

Unlike other species of *Monomorium*, *M. pharaonis* has dense punctures on the head and thorax giving the ant an opaque or feebly shining appearance. Color is clear reddish-yellow.

This species is found worldwide, either in tropic regions or as a domestic pest.

Monomorium pharaonis was collected in the following counties in Alabama: **Lee Co.**

Auburn, Mobile Co. Mobile; Widespread, according to Murphree (1947).

***Monomorium viride* Brown**

This ant is native to Florida and can be found throughout that state. *M. viride* prefers to nest in sandy soil and is thought to be polygynous (DuBois 1986). The specific name refers to the greenish metallic reflections on some specimens (“viridis” is Latin for green).

In profile, the node of the petiole of this species is somewhat higher than its base is long. The mesopleuron and the base of the propodeum is rugulose or delicately striate. The color of this ant is ferruginous to black, may have bluish or greenish reflections. This ant was only collected by Glancey et al. in 1976



Map 65. *Monomorium viride*

Monomorium viride is found in Florida (Deyrup 2003) with other isolated populations in New Jersey (D.R.Smith 1979) and Texas (Wheeler and Wheeler 1985). This species was reported in Alabama in **Mobile Co.** by Glancey et al. (1976).

Genus *Myrmecina* Curtis

Ants of the genus *Myrmecina* are specialist predators of mites (Masuko 1995).

There is only one described species found in North America: *Myrmecina americana* Emery. There is possibly another rare species found in Florida but it has not been described yet (Deyrup 2003). The genus *Myrmecina* can be found world wide except for Africa and Antarctica

This genus is easily recognized by its propodeum that is armed with 2 pairs of spines. In profile, the petiole is short and subcylindrical lacking an anterior peduncle and with a rudimentary node. The humerus is moderately to sharply angulate.

Myrmecina americana Emery

This species forms small cryptic colonies in the soil of wooded areas and is commonly collected in leaf litter where it apparently forages. *M. americana* has a large range through out the U.S. and Canada ranging from Quebec south to Florida, west to Iowa, Colorado and California, northern Mexico, but it is more common in regions with moist wooded areas.

Myrmecina americana was collected in the following Alabama counties: **Baldwin Co.** Bay Minette, **Bibb Co.** Blue Girth Creek, **Chilton Co.** 3mi N of Mapleville, **Clay Co.** Talladega NF: Chinnabee Trail, **Dallas Co.** 2



Map 66. *Myrmecina americana*

mi W of Orville, **Henry Co.** Abbeville, **Houston Co.** Chattahoochee SP, **Jackson Co.** Paint Rock River, **Lauderdale Co.** Florence, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Chewacla SP, **Macon Co.** Tuskegee NF, **Marion Co.** Hamilton, **Shelby Co.** Childersburg

Genus *Myrmica* Latreille

Ants in the genus *Myrmica* generally prefer cooler climates and can be abundant in the northern U.S. and Canada. Most species are adapted to living in mesic woodlands of moderate to high elevation. This genus is most diverse in Europe and Asia. *Myrmica* ants are all generalist predators and scavengers although some will feed on honeydew or nectar.

Ants in the genus *Myrmica* have pectinate mid and hind tibia, which will separate them from all other genera except *Pogonomyrmex*. They are easily separated from *Pogonomyrmex* by the lack of a psammophore and the smaller size of *Myrmica* ants.

Key to the genus *Myrmica* (modified from Creighton 1950)

- 1 Antennal scape suddenly bent at base, upper surface forming right angle; lamina always present, of varying shapes but never absent from upper surface; scape of male as long following four or five segments *Myrmica americana*
- 1' Antennal scape gradually and evenly bent at base, upper surface never forming right angle at bend; lamina, if present, forming low and inconspicuous ridge at side of bend and never prolonged onto upper surface of scape 2

2(1') Antennal scapes surpassing occipital margin by amount equal to their greatest thickness; propodeal spines about 1.5x as long as distance between bases and slightly deflected downward; color piceous brown; length 4.0-4.7mm; antennal scape of male as long as the following six segments taken together

.....*Myrmica punctiventris*

2' Antennal scapes barely surpassing occipital margin; propodeal spines only slightly longer than distance separating bases and not deflected downwards; color brownish yellow; length 3.5-4.0mm; antennal scape of male as long as following two segments taken together*Myrmica pinetorum*

***Myrmica americana* Weber**

Myrmica americana typically nests in the soil or under stones or wood. Unlike most *Myrmica*, this species is often found in open areas. It is also aggressive and can inflict a painful sting. Alates can be found in nests between August and November with mating flights in August and September (MacKay and MacKay 2002).

In the workers of this species, the antennal scape is suddenly bent at the base, the upper surface forming a right angle. Lamina are always present and of varying shapes but never absent from the upper surface. Males



Map 67. *Myrmica americana*

are identified by their scape which is as long the following four or five segments when taken together.

Myrmica americana is found throughout the U.S and north to Quebec. In Alabama it was collected in **Jackson Co.** US Route 72 X Paint Rock River (the specimen was collected under the under over pass on the Paint Rock River).

***Myrmica pinetorum* Wheeler.**

These ants may be found nesting in the soil or under objects in open areas or pine forests (Carter 1962). *M. pinetorum* seems to have a fairly disjunct distribution in Alabama this could be due to the rather cryptic nature of this species though.

In workers, the antennal scapes barely surpass the occipital margin and propodeal spines are only slightly longer than the distance that separates their bases and not deflected downwards. *M. pinetorum* is brownish yellow and about 3.5-4.0mm in length. In males the antennal scape is as long as the following two segments taken together.

Myrmica pinetorum is found in southeastern Canada south to the southeastern U.S., Michigan (Wheeler and Wheeler 1994), North Carolina (Carter 1962).



Map 68. *Myrmica pinetorum*

This species was collected in the following counties in Alabama: **Barbour Co.** Blue Springs SP, **Clay Co.** Talladega NF: Chinnabee Trail, **DeKalb Co.** DeSoto SP, **Winston Co.** Smith Lake

***Myrmica punctiventris* Roger**

Nests of these ants may be found in the soil or rotten logs in wooded areas. This was the most commonly collected *Myrmica* species in Alabama and it can be quite abundant in higher elevation areas of the state.

In workers of this species, the antennal scapes surpass the occipital margin by an amount equal to their greatest thickness. Their propodeal spines are about 1.5x as long as the distance between the bases and slightly deflected downward. *M. punctiventris* has a piceous brown color and is approximately 4.0-4.7mm in length. In males the antennal scape is as long as the following six segments taken together

Myrmica punctiventris has been reported in Michigan (Wheeler and Wheeler 1994) south to Georgia (Ipser et al. 2004) and east to Kansas (Dubois 1994). Rare in Florida (Deyrup 2003).

This species was collected in the following counties in Alabama: **Clay Co.** Talladega NF: Chinnabee Trail, **Cleburne Co.** Choccolocco WMA, **Coosa Co.** Kellyton,



Map 69. *Myrmica punctiventris*

DeKalb Co. DeSoto SP, **Etowah Co.** Gadsden, **Lee Co.** Auburn, **Macon Co.** Tuskegee

NF

Genus *Pheidole* Westwood - Big headed ants

With approximately 900 recognized species, this genus is one of the most diverse in the world. These ants are found worldwide but are most diverse in the New World tropics. Typically *Pheidole* are granivorous and carnivorous, obtaining food from scavenging and collecting seeds. Most *Pheidole* are dimorphic but there are a few species that are polymorphic with a caste of medians as well as majors and minors. The majors usually have a greatly enlarged heads with powerful mandibles that are used for crushing seeds. Although these large majors are sometimes referred to as "soldiers" they rarely defend the nest and usually are the first to escape when disturbed.

All of the Alabama species of *Pheidole* have workers that are dimorphic, with slender normal size workers and more robust large headed majors. Both majors and minors have a 12-segmented antenna and a 3-segmented apical club. Minors can be distinguished by their propodeum, which is usually distinctly lower in elevation than the pronotum; the mesonotum is often as high as the pronotum and separated from the propodeum by a distinct step

Key to the genus *Pheidole* (modified from Wilson 2003)

- 1 Hypostomal border (ventral anterior rim of head capsule, beneath mandibular insertions) of major bearing 0-3 teeth (one on each side of ventral midline of head and one or none on midline or none at all) (pilifera group) 2

- 1' Hypostomal border of major bearing 4-5 (two on each side of ventral midline of head and one or none on midline) 4
- 2(1) Major: at least mesopleuron and usually entire side of pronotum free of carinulae *Pheidole bicarinata*
- 2' Major: entire side of mesosoma (pronotum, mesopleuron and propodeum) covered by parallel longitudinal carinulae 3
- 3(2') Major: pronotal dorsum covered by transverse carinulae and mesonotal dorsum by longitudinal carinulae on surface made opaque by foveolae; hypostoma with 3 teeth; Minor: pronotum foveolate and opaque *Pheidole davisi*
- 3' Major: promesonotal dorsum smooth and shiny; hypostoma lacking teeth completely; Minor: pronotum smooth and shiny *Pheidole adrianoi*
- 4(1) Major: Scape conspicuously flattened near base, width greater at basal segment than at distal segment; head strongly heart shaped with deep mid-occipital cleft and round sides in full face view; petiolar peduncle and node thick; Minor: broad occiput in frontal view, nuchal collar absent (crassicornis group) 5
- 4' Major: Scape narrower at basal segment than at distal segment; head quadrate or rectangular, with relatively shallow occiput cleft and straight to weakly convex sides in full face view; petiolar peduncle usually slender; Minor: narrowed occiput, nuchal collar present 7
- 5(4) Major: First gastral tergite in profile devoid of pilosity or nearly so, at most 1-2 hairs projecting above margin; Minor: head completely foveolate and opaque in full face view *Pheidole crassicornis*

- 5' Major: First gastral tergite in profile with abundant hairs; Minor: head foveolate and opaque only on sides, median strip down face devoid foveolae and not opaque6
- 6(5') In profile, hairs on first gastral tergite mostly as long or longer than maximum length of eye; erect hairs present on occiput; color dark brown*Pheidole tetra*
- 6' In profile, hairs on first gastral tergite mostly shorter than eye length; no erect hairs on occiput; color reddish brown*Pheidole* sp.
- 7(4') Major: medium to very small (head width of 1.2 mm or less); robust body form; mesonotal convexity in side view absent or at most vestigial, profile of promesonotum continuous and descends to metanotal groove either in slow curve or abruptly through obtuse angle; antennal club thick compared with other segments of funiculus; antennal scape short, extending at most slightly beyond midpoint between eye and occipital corner; Minor: scape at most extends only 2x its maximum width past occipital corner (flavens group)8
- 7' Major: mesonotal convexity usually strongly developed, rarely low and weak and never absent, with clearly defined anterior and posterior faces; antennal scape usually reaches well beyond midpoint between eye and occipital corner; minor: scape extends by 4x or more its maximum width beyond occipital corner (fallax group)12
- 8(7) Major: in full face view, rugoreticulum present on occiput9
- 8' Major: in full face view, no rugoreticulum present on or near occiput or anywhere on posterior fifth of dorsal surface of head10

- 9(8) Major: inner pair of hypostomal teeth reduced to denticles, much smaller than outer pair; Minor: posterior dorsal half of head lacks carinulae; body blackish brown with metallic blue reflections *Pheidole metallescens*
- 9' Major: inner pair of hypostomal teeth strongly developed, as long as outer pair; Minor: longitudinal carinulae cover posterior dorsal half of head; head and mesosoma light reddish to reddish brown, waist and gaster dark yellow with no metallic reflections anywhere *Pheidole dentigula*
- 10(8') Anterior half of pronotal dorsum covered with transverse carinulae
..... *Pheidole moerens*
- 10' Anterior half of pronotal dorsum entirely free of carinulae 11
- 11(10') Major: in side view, mesosoma variably carinate but completely devoid of foveolae or with small patch along upper metanotal groove, its surface uniformly smooth and shiny *Pheidole tysoni*
- 11' Major: in side view, mesosoma with extensive foveolae, surface opaque
..... *Pheidole floridana*
- 12(7') Major: seen in full face view, entire dorsal surface of head including occipital lobes covered by rugoreticulum *Pheidole obscurithorax*
- 12' Major: seen in full face view, most or all of dorsal surface of head free of sculpture 13
- 13(12') Major: no rugoreticulum on head, only parallel longitudinal carinulae
..... *Pheidole morrisi*
- 13' Major: rugoreticulum present between eye and antennal fossa and often elsewhere on head *Pheidole dentata*

***Pheidole adrianoi* Naves (*pilifera* group)**

Pheidole adrianoi is found in the coastal regions of Florida, Georgia and Alabama where it usually nests in sandy soil in clearings within forests (Wilson 2003).

This species is similar to *Pheidole davisi* but is distinguished by the following features: the major's promesonotal dorsum is smooth and shiny and lacks hypostoma lacking teeth completely, while the minor has a pronotum that smooth and shiny.

This ant is more common in Florida (Deyrup 2003) but has also been collected in coastal Georgia (Ipser et al. 2004). In Alabama this species was collected in **Baldwin Co.** Weeks Bay National Estuarine Research Reserve.



Map 70. *Pheidole adrianoi*

***Pheidole bicarinata* Mayr (*pilifera* group)**

This species has a large range in the U.S. and may be found throughout Alabama. Like most *Pheidole* it will harvest seeds but it seems to be an able scavenger too. *Pheidole bicarinata* will nest in rotten logs, in soil, or under rocks or refuse. These ants seem to favor disturbed areas in Alabama.

There are a number of *Pheidole* species that look similar to *P. bicarinata* but none of these are found in Alabama. It is also possible that *P. bicarinata* represents a complex of species but this question has yet to be answered.

The *Pheidole bicarinata* major has two hypostomal teeth and the mesopleuron and usually most of the rest of the side of the pronotum is free of carinulae. Color is generally brownish yellow to dark brown but this varies over its range to a clear yellow in the west.

Pheidole bicarinata is found in New Jersey south to northern Florida and west through Nebraska, Colorado and Texas to Utah and Nevada (Wilson 2003).

This species was collected in the following counties in Alabama: **Blount Co.** Oneonta, **Dallas Co.** Selma, **DeKalb Co.** DeSoto SP, **Geneva Co.** 2mi W of Hacoda, **Lawrence Co.** Joe Wheeler SP, **Lowndes Co.** Prairie Creek CG, **Macon Co.** Loachapoka, **Marion Co.** Hamilton, **Morgan Co.** Hartselle, **Pickens Co.** Cochrane, **Shelby Co.** Childersburg, **Tuscaloosa Co.** Tuscaloosa, **Winston Co.** Smith Lake

Pheidole crassicornis Emery (*crassicornis* group)

Pheidole crassicornis nest in the soil and lack the characteristic crater-like mounds of excavated soil at the entrances to their tunnels. Naves (1985) reported that their nests were at least 60cm deep and that foragers were seen carrying live termites and



Map 71. *Pheidole bicarinata*

dead arthropods. In Alabama, these ants have been collected on the coastal plain and Cumberland Plateau regions indicating that they probably have a statewide distribution.

Pheidole crassicornis majors are distinguished by the scape that is thickened basally and curved towards the insertion. Majors also lack hairs on the first gastral tergite (at most 1-2 hairs projecting above the margin). Minors have foveolate heads that are opaque in full-face view.

This species is found in North Carolina south to northern Florida and west to western Texas (Wilson 2003).

Pheidole crassicornis was collected in the following counties in Alabama:
Barbour Co. Blue Springs SP, **Butler Co.** Chapmen (Murphree 1947), **DeKalb Co.** DeSoto SP, **Lee Co.** Auburn, **Lowlndes Co.** Prairie Creek CG, **Macon Co.** Tuskegee NF.

***Pheidole davisi* Wheeler (*pilifera* group)**

This species forms crater like nests in open sunny areas, usually in pine barrens. *P. davisi* has been observed harvesting seeds (Wilson 2003). This ant would most likely be found in valleys of northeastern Alabama but it was not collected during this survey.

Majors of this species are identified by the absence of the metanotal groove making the basal face of the propodeum contiguous with the metanotum (in profile). The



Map 72. *Pheidole crassicornis*

mesonotal dorsum, mesopleuron and side of propodeum are opaque and covered with longitudinal carinulae and foveolae. Minors have longitudinal carinulae on their mesopleuron and side of propodeum. Their mesosoma is foveolate and opaque.

Pheidole davisii has been reported in New York south to North Carolina, specimens have also been collected from northeastern Mexico: Monterrey, Nuevo Leon (Wilson 2003). This species was reported in north Alabama by D.R. Smith (1979).

***Pheidole dentigula* M.R Smith (*flavens* group)**

Pheidole dentigula may be found in mesic habitats nesting in the soil or in moist, rotting stumps or logs. In dry environments it will nest in moist microhabitats like rotting wood or in under dampened leaf litter (Wilson 2003). This ant most likely has a statewide distribution but seems more common in the moist lowlands of south Alabama.

The majors of *P. dentigula* closely resemble the majors of *P. metallescens*, however those of *P. dentigula* have inner hypostomal teeth that are as long and as developed as the outer pair. Minors can be distinguished by the longitudinal carinulae on the posterior dorsal half of the head. The minor's head and mesosoma is light reddish to reddish brown, while the waist and gaster is dark yellow with no metallic reflections anywhere.



Map73. *Pheidole dentigula*

Pheidole dentigula is found in Tennessee and North Carolina south to the Florida Keys and west to eastern Texas (Wilson 2003)

This species was collected in the following counties in Alabama: **Barbour Co.** Eufala, **Bibb Co.** Blue Girth Creek, **Calhoun Co.** Jacksonville, **Clay Co.** Talladega NF: Chinnabee Trail, **Henry Co.** Abbeville, **Houston Co.** Chattahoochee SP, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn, **Tuscaloosa Co.** Tuscaloosa

Pheidole dentata Mayr (*fallax* group)

Pheidole dentata is an abundant and successful ant that is common throughout its range. There appear to be at least two color morphs: a lighter form that nests in open ground and a darker form that nests in shaded forests. The darker form is more common in the southeastern U.S. and forms monogynous colonies of a few hundred workers while the lighter form is more common in the northern extant of its range and produces polygynous colonies of over 5,000 workers (Wilson 2003).



Map 74. *Pheidole dentata*

According to Wilson, these ants are excellent for laboratory use. They survive quite nicely on dead insects and sugar water and have been utilized in a number of his studies (Wilson 1975, Wilson 1976a, Johnston and Wilson 1985).

On the major of this species rugoreticulum is present next to the antennal fossa, the carinulae found on the frontal lobes is limited to the margins and extends posteriorly only slightly (less than 1 eye length) past the level of the eye (in full face view). Short propodeal teeth distinguish minors. Color varies between light yellowish to dark brown.

Pheidole dentata is found in Maryland south to the Florida Keys, west to Illinois, Kansas and Texas, south to northern Mexico (Monterrey, Nuevo Leon) (Wilson 2003).

This species was collected in the following counties in Alabama: **Baldwin Co.** Bay Minette, **Barbour Co.** Eufala, **Clay Co.** Talladega NF: Chinnabee Trail, **Cleburne Co.** Choctawhatchee WMA, **Colbert Co.** Freedom Hills, **Coosa Co.** Kellyton, **Covington Co.** Yellow River, **Cullman Co.** Cullman, **Escambia Co.** 2mi W of Flomaton, **Geneva Co.** Hacoda, **Hale Co.** Payne Lake, **Houston Co.** Dothan, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn, **Limestone Co.** 2mi N of Decatur, **Lowndes Co.** Prairie Creek CG, **Macon Co.** Tuskegee, **Marion Co.** Hamilton, **Mobile Co.** Saraland, **Perry Co.** Heiberger, **Shelby Co.** Childersburg, **Tuscaloosa Co.** Lake Lurleen SP, **Washington Co.** Chatom

Pheidole floridana Emery (*flavens* group)

These ants occur in wooded areas and typically nest in rotten logs or stumps or in the soil. Alates have been recorded in nest between September and October. *P. floridana* is an



Map 75. *Pheidole floridana*

omnivore like most *Pheidole*, but it does not appear to collect seeds for food.

Majors of this species have fine fovea on the dorsum of their head. In minors the antennal scape is relatively short, just reaching or barely surpassing the occipital corner. Majors and minors both have smooth and shiny first gastral tergites.

Pheidole floridana is found in North Carolina south to Florida Keys and west to central Texas, south into Mexico (Wilson 2003). In Alabama this species has been collected in: **Baldwin Co.** Bay Minette; **Mobile Co.** Mobile (Wilson 2003).

***Pheidole metallescens* Emery (*flavens* group)**

This species nests in shaded areas, in the soil or in rotting logs. Colonies are monogynous and will collect seeds and dead insects for food. The minor workers of this species can be quite striking when viewed under a microscope with a bluish metallic sheen.

Majors of this species are red-brown and are distinguished from *P. dentigula* by their poorly developed inner hypostomal teeth. Minors are distinctly blackish, most with blue metallic reflections. Their mesosoma is usually foveolate and opaque.

Pheidole metallescens is found in Florida west through the Gulf States to Oklahoma and southern Texas (Wilson 2003).



Map 76. *Pheidole metallescens*

This species has been collected in the following counties in Alabama: **Barbour Co.** Blue Springs SP, **Covington Co.** Solon Dixon Center, **Mobile Co.** Mobile, **Tuscaloosa Co.** Tuscaloosa, **Wilcox Co.** Roland Cooper CG

***Pheidole moerens* Wheeler (*flavens* group)**

This ant is an introduced species from the West Indies. *P. moerens* is widespread in the southeastern US and has been introduced to California and Hawaii, probably via nursery plants (Grunner et al 2003). Even though this species is invasive it does not seem to be of economic importance and has been largely ignored.

Majors of this species are reddish brown. Their occiput is smooth and shiny but the rest of the head is carinulate with a small patch of rugoreticulum behind the antennal fossa. Minors are medium to dark brown with their head and mesosoma covered in foveae. They have some rugoreticulum present around their each eye.

Pheidole moerens is found in the southeastern U.S., California (Martinez 1997), Hawaii (Grunner et al 2003), and possibly introduced to other tropical regions.



Map 77. *Pheidole moerens*

This species was collected in the following counties in Alabama: **Baldwin Co.** Bay Minette, **Coffee Co.** Elba, **Covington Co.** Solon Dixon Center, **Dale Co.** Daleville, **Geneva Co.** Hacoda, **Houston Co.** Dothan, **Lee Co.** Auburn, **Mobile Co.** Mobile

***Pheidole morrisi* Forel (*fallax* group)**

These ants form large colonies and obtain food by scavenging and occasionally harvesting seeds (Naves 1985). *P. morrisi* prefers to nest in sandy areas where it builds small crater mounds of excavated sand. This species tends to be polygynous and monodromous in the northern extent of its range and monogynous and polydromous in the southern extent of its range (Johnson 1988a, Wilson 2003).



Map 78. *Pheidole morrisi*

Majors of this species have long antennal scapes (approaching the occiput to within 2x the width of the antenna) and lack rugoreticulum on the head. They are also densely hairy, with many hairs longer than the eye length. Minors have an occiput that is narrowed slight and a thin nuchal crest. Both majors and minors are yellow with propodeal spines that are reduced to denticles or virtually absent.

Pheidole morrisi is found in New York south to Florida and west to Illinois, Missouri, Oklahoma and Texas (Wilson 2003).

This species was collected in the following counties in Alabama: **Baldwin Co.** Bay Minette, **Covington Co.** Conecuh Trail, **Escambia Co.** 2mi E of Flomaton, **Madison Co.** Huntsville

***Pheidole obscurithorax* Naves (*fallax* group)**

This exotic ant has the largest major caste of *Pheidole* in the southeast. The large robust majors typically do not forage, but linger around the nest entrance. These ants prefer sandy soil have u-shaped mounds of excavated soil at the entrances. *P. obscurithorax* was most likely introduced into Mobile, Alabama from northern Argentina during the 1950's (Wilson 2003). This ant shows a great deal of tolerance to other aggressive ants and has been found with nests close to those of *Solenopsis invicta*, the Red Imported Fire Ant.

Majors of this species are the largest of all the *Pheidole* in Alabama with a head width of 1.7-1.8mm. They have relatively short antenna scapes and a heavily rugoreticulate head. Minors have petiolar and postpetiolar nodes that foveolate and opaque dorsally. Both major and minor are reddish brown to dark brown, usually with appendages and heads being a lighter shade than the rest of the body.



Map 79. *Pheidole obscurithorax*

Pheidole obscurithorax is found in northern Argentina, Paraguay. In the U.S it can be found in Alabama and Florida panhandle (Wilson 2003). This species was collected in the following counties in Alabama: **Baldwin Co.** Bay Minette, **Escambia Co.** 2mi E of Flomaton, **Mobile Co.** Mobile

***Pheidole* sp. (*crassicornis* group)**

This *Pheidole* species was left out of Wilson's 2003 work and will probably be described by Stephan Cover or Joe MacGown (Joe MacGown, pers. comm.)

This species is similar to *P. tetra* except that it has shorter hairs on the first gastral tergite mostly much (shorter than eye length) and had no erect hairs on the occiput. Color reddish brown.

This ant was collected in the following counties in Alabama: **Clay Co.**

Talladega NF: Chinnabee Trail, **Dallas Co.** Orville, **Lamar Co.** Vernon, **Lawrence Co.** Joe Wheeler SP, **Marion Co.** Hamilton, **Tuscaloosa Co.** Lake Lurleen SP



Map 80. *Pheidole* species

***Pheidole tetra* Creighton (*crassicornis* group)**

This species nests in open soil or under logs or stones. *P. tetra* has been found at altitudes ranging from 100 to 1600 m above sea level (here in Alabama it was collected at about 160 m). This ant can be found in scrublands, grasslands and urban areas according to MacKay and MacKay (2002). During this survey foragers were collected in an oak-pine forest lakeside at the Lewis Smith Lake.



Map 81. *Pheidole tetra*

Majors of this species look similar to *P. crassicornis* but can be separated by their abundant pilosity. Both majors and minors are light to dark brown in color.

Pheidole tetra is known from Durango, Mexico (Rojas-Fernandez and Fragosa. 1994), isolated localities in Arizona and Texas (MacKay and MacKay 2002), and Missouri (Wilson 2003). This species was collected in Alabama in **Winston Co.** Smith Lake.

***Pheidole tysoni* Forel (*flavens* group)**

These ants are found in a variety of habitats ranging from urban settings to woodlands. They invariably nest in soil and excavated mounds of soil can present or absent at the entrances to their tunnels. *P. tysoni* is known to tend aphids and collect floral nectar and it has been found with seeds in its nest (Wilson 2003).

Majors and minors of this species are both yellow and lack sculpturing on their head, except for some longitudinal carinulae on the anterior portion of the head. They both have relatively unsculptured bodies as well.

Pheidole tysoni is found in New York south to north Georgia to Tennessee and Kentucky, with populations in west Texas, Arizona, New Mexico and Juarez, Mexico (Wilson 2003).

This species was collected in the following counties in Alabama: **Clay Co.** Talladega NF: Chinnabee Trail, **Lawrence Co.** Joe Wheeler SP, **Montgomery Co.** Montgomery, **Pickens Co.** Cochrane



Map 82. *Pheidole tysoni*

Genus *Pogonomyrmex* Mayr – Harvester ants

These ants are known as harvester ants due to the large number of seeds that most species collect and store for food. Members of this genus always nest in the soil and have colonies ranging from a few hundred to several thousand adults. The genus *Pogonomyrmex* is very diverse in xeric regions, especially the southwestern U.S. East of the Mississippi river however there is only one species, *Pogonomyrmex badius*. The generic name of this species is derived from the Greek word “pogono” for beard and “myrmex” for ant; this is referring to the psammophore, or sand beard, that all *Pogonomyrmex* species have. This genus is found exclusively in the New World.

Pogonomyrmex species have a petiolar node that is set off sharply from the long, distinctive anterior peduncle, the node in side view roughly triangular. The most distinctive feature is the cluster of beard-like hairs (psammophore) present on the gula. They also have pectinate middle and hind tibial spurs.

***Pogonomyrmex badius* (Latreille) – Florida harvester ant**

The nests of this ant can be found in drier areas in the southeastern U.S., usually in open sandy areas or in pine forests. Nests are marked by a circular disc of trimmed vegetation (if in a grassy area) and occasionally with small bits of charcoal that the ants deposit around their nest.

Unlike most *Pogonomyrmex* species, *P. badius* workers are dimorphic. Larger majors make up about 7% of the colony population, with the average colony containing at least 2500 adults. The majors generally do not forage but will aggressively defend the nest when disturbed. This ant can inflict an extremely painful sting. In Florida, reproductives are produced early in spring (Tschinkel 1999).



Map 83. *Pogonomyrmex badius*

Pogonomyrmex badius is dimorphic and larger than other *Pogonomyrmex* ants and it is the only species found east of the Mississippi River. This species is found in North Carolina south to Florida and east to the Mississippi River.

Pogonomyrmex badius was collected in the following counties in Alabama:

Baldwin Co. Fort Morgan, **Barbour Co.** Eufala (Murphree 1947), **Covington Co.** Solon Dixon Center, **Lee Co.** Beauregard, **Mobile Co.** Mobile

Genus *Protomognathus* Forel

Protomognathus ants are obligate slave makers that parasitize colonies of *Temnothorax* species of ants, particularly *T. longispinosus* and *T. curvispinosus*. There is only one species in this genus, *Protomognathus americanus*, and it is found in the northern U.S and Canada.

Protomognathus americanus (Emery)

These ants live in stems, rotting wood or large nuts (such as acorns) that have been hollowed out by insects. Studies have shown that *P. americanus* has little effect on colonies that are raided (Alloway 1979, Hare and Alloway 2001). This species look similar to *Temnothorax* but are easily separated by their much longer frontal carinae.



Map 84. *Protomognathus americanus*

These ants have been collected in Illinois, Indiana, Kansas, Michigan, Minnesota and Ontario, Canada. Northern Alabama is the farthest south that they have been collected but these ants are probably widespread but uncommonly collected due to their cryptic lifestyle.

Protomognathus americanus was collected in Alabama in **Madison Co.** Huntsville, this colony was collected in a backyard in the city of Huntsville in the dried stem of a dead plant. *T. curvispinosus* slaves were present.

Genus *Pyramica* Roger

Pyramica ants are widespread and fairly common but rarely collected. These small ants move slowly and are typically found in leaf litter. They are specialized predators of collembolans and other small arthropods. These ants hunt by snapping their jaws back and releasing them when sensory hairs along the clypeus are contacted by prey (much in the same way as the Ponerine ants in the genus *Odontomachus*). *Pyramica* species wait until prey items contact them rather than chasing down prey. There are usually spatulate or clavate hairs present on the clypeus and it is thought that this might act as a lure to prey. Some species smear their bodies with soil and detritus, possibly to disguise their odor from other arthropods (Masuko 1985). *Pyramica* may be found in the nests of other ants (particularly fungus growing ants) preying on fungivorous collembolans. In Alabama there are 16 species of *Pyramica* making this the most diverse genus in the state. This genus is found worldwide.

These ants have 6 antennal segments and could only possibly be confused with *Sturmigenys* species of ants. They are distinguished by their triangular or subtriangular

mandibles that have a dentate masticatory margin and lack an apical fork of inward directed spiniform teeth.

Key to the genus *Pyramica* (modified from Bolton 2000)

- 1 Mandibles narrow and elongate, sublinear to linear in full-face view, at full closure mandibles meet at apical third or less of their length (MI 25-67) 2
- 1' Mandibles triangular to elongate-triangular in full face view, at full closure mandibles meet through apical half or more of their length, at most with basal gap (MI 11-25) 3
- 2(1) Basal and two succeeding teeth on mandible triangular and acute, second tooth longer than basal; disc of postpetiole without posteriorly curved spatulate hairs; dorsum of mesonotum with pair of erect simple hairs; anterior and lateral margins of clypeus meet in angular corners in full face view; scape relatively short (SI 65-69) *Pyramica angulata*
- 2' Basal and third tooth on mandible triangular and acute, second tooth broad and bluntly rounded, basal tooth longer than second or third teeth; disc of postpetiole with posteriorly curved spatulate hairs; dorsum of mesonotum without erect simple hairs; anterior and lateral margins of clypeus meet through rounded curves in full face view; scape relatively long (SI 79-84) *Pyramica pergandei*
- 3(1') Petiole ventrally lacking spongiform tissue; pleurae, side of propodeum and disc of postpetiole reticulate-punctate; first gastral tergite finely and densely striolate-punctulate; first gastral sternite finely shagreenate or punctulate at least basally and laterally *Pyramica margaritae*

- 3' Petiole ventrally with conspicuous spongiform crest or curtain; pleurae, side of propodeum and disc of postpetiole smooth; first gastral tergite smooth behind basigastral costulae, usually entirely smooth, rarely with some sculpture near apex; first gastral sternite unsculptured or sculpture only near apex 4
- 4(3') Clypeus in anterior view with apicodorsal series of 4-6 stout standing long hairs, radiating from apex like ribs of fan; in profile clypeal dorsum with pair of long wire-like hairs arising at about midlength, each hair is inclined posteriorly from above its base, then curves smoothly upwards so that apical half of shaft directed vertically or nearly so 5
- 4' Clypeus in anterior view without apicodorsal series of stout standing hairs radiating like ribs of fan; in profile clypeal dorsum without long wire-like hairs arising at about midlength; without hairs that incline posteriorly from just above their base then curve vertically 6
- 5(4) Long hairs that radiate apicodorsally from clypeus strongly bulbous at apices, in profile bulbous-tipped hairs distinctly curved posteriorly *Pyramica ornata*
- 5' Long hairs that radiate apicodorsally from clypeus simple at apices, in profile hairs not obviously curved posteriorly *Pyramica dietrichi*
- 6(4') With head in full-face view and mandibles closed masticatory margin without distinct gap basally; if basal lamella concealed by clypeus, gap between basal tooth and anterior margin of clypeus is shorter than length of basal tooth; if basal lamella exposed at full closure then gap between basal tooth and basal lamella absent or distinctly shorter than length of basal tooth 7

- 6' With head in full-face view and mandibles closed masticatory margin with distinct gap basally; if basal lamella concealed by clypeus then gap between basal tooth and anterior margin of clypeus greater than length of basal tooth; if basal lamella exposed at full closure then gap between basal tooth and basal lamella distinctly longer than length of basal tooth 12
- 7(6) Dorsal surface of fully closed mandible basally with distinct sharp transverse edge or rim running across width of blade parallel to and in front of anterior clypeal margin; pronotum sharply marginate dorsolaterally, dorsum transversely flattened and unsculptured; first gastral tergite without standing hairs of any form
..... *Pyramica membranifera*
- 7' Dorsal surface of fully closed mandible basally without transverse edge or rim running across width of blade parallel to anterior clypeal margin; pronotum not marginate dorsolaterally, dorsum transversely convex and sculptured; first gastral tergite with standing hairs of some form present 8
- 8(7) With head in full-face view, hairs that project from lateral clypeal margin fine and conspicuously J-shaped, curved posteriorly *Pyramica ohioensis*
- 8' With head in full-face view, hairs that project from lateral clypeal margin variable in form, curved or inclined anteriorly but not J-shaped 9
- 9(8') Leading edge of scape with row of conspicuous projecting curved hairs, one or more distal to subbasal bend, distinctly curves toward base of scape
..... *Pyramica rostrata*
- 9' Leading edge of scape with all projecting hairs curved toward apex of scape, entirely lacking hairs that curve toward base of the scape 10

10(9') Dorsum of clypeus with dense short broadly oval-spatulate; in profile these hairs reclinate to appressed; in full-face view hairs that project from lateral clypeal outline broadly spatulate and strongly curved anteriorly

.....*Pyramica clypeata* (in part)

10' Dorsum of clypeus with elongate narrow hairs, simple, somewhat flattened or narrowly linear-spatulate; in profile, these hairs not appressed, either elevated and inclined anteriorly or curving anteriorly in their apical halves; in full-face view hairs that project from lateral clypeal outline either fine and simple or narrow and linear-spatulate, inclined anteriorly, only weakly curved or more or less straight

.....11

11(10') Clypeal pilosity everywhere fine and filiform, acute apically; in full-face view hairs projecting from lateral margin of clypeus same shape and about same length as those arising mid-dorsally; in profile hairs on clypeal mid-dorsum elevated and inclined anteriorly*Pyramica laevinasis*

11' Clypeal pilosity everywhere narrowly linear-spatulate or flattened and spatulate in apical half and truncated apically; in full-face view hairs projecting from lateral margin of clypeus of different shape and longer than those arising mid-dorsally; in profile hairs on clypeal mid-dorsum curved or arched anteriorly

.....*Pyramica pilinasis*

12(6') Principal basal dental row of mandible with 5 teeth followed distally by 2 smaller teeth; counting from base tooth, third tooth is longest

.....*Pyramica clypeata* (in part)

- 12' Principal basal dental row of mandible with 4 teeth followed distally by 2 smaller teeth; counting from base tooth third tooth is not longest 13
- 13(12') Leading edge of scape with all hairs curved or inclined towards apex of scape
..... *Pyramica talpa*
- 13' Leading edge of scape with two or more of principal hairs curved or inclined toward base of scape 14
- 14(13') In full-face view hairs on lateral clypeal margin curved anteriorly and hairs on anterior clypeal margin either curved toward midline or directed anteriorly; entirety of clypeal margin without any hairs curved away from midline, inclined or curved outwards or curved posterolaterally 15
- 14' In full-face view hairs on lateral clypeal margin curved anteriorly and hairs on anterior clypeal margin either curved toward midline or directed anteriorly; entirety of clypeal margin without any hairs curved away from midline, inclined or curved outwards or curved posterolaterally 16
- 15(14) Pronotal humeral hair absent; with head in full-face view upper scrobe margin without laterally projecting elongate filiform hair *Pyramica creightoni*
- 15' Pronotal humeral filiform or flagellate hair present; with head in full-face view upper scrobe margin usually with laterally projecting filiform or flagellate hair just behind level of eye or close to apex of scrobe *Pyramica metazytes*
- 16(14') With clypeus in full-face view laterally or posteriorly curved marginal hairs restricted to 1–2 pairs situated on anterior margin above mandibles; hairs on lateral margins not all curved posteriorly *Pyramica pulchella*

- 16' With clypeus in full-face view laterally or posteriorly curved marginal hairs present on anterior margin above mandibles; all hairs posteriorly curved on lateral margins *Pyramica reflexa*

***Pyramica angulata* (M. R. Smith)**

This species is found in rotten wood or leaf litter. *P. angulata* has been reported in the nests of *Strumigenys louisianae* Roger (Brown 1953)

The basal and two succeeding teeth on the mandible are triangular and acute, the second tooth is longer than the basal. The disc of postpetiole without posteriorly curved spatulate hairs. The dorsum of mesonotum has a pair of erect simple hairs. Anterior and lateral margins of the clypeus meet in angular corners in full face view. The scape of this ant is relatively short (SI 65-69).

Pyramica angulata is found from Maryland south to Florida and west Missouri and Texas (Bolton 2000).

This species was collected in Alabama in the following counties: **Hale Co.** Moundville (Bolton 2000), **Lauderdale Co.** Joe Wheeler SP, **Lawrence Co.** Joe Wheeler SP, **Marshall Co.** Union Groove (Bolton 2000), **Tuscaloosa Co.** Moody Swamp (Bolton 2000).



Map 85. *Pyramica angulata*

Pyramica clypeata (Roger)

This ant nests in soil, rotten wood, leaf litter or under stones (Brown 1953). In full-face view this species has an anterior broadly rounded and glossy clypeus, without bimargification. Dorsally the clypeus has small appressed spatulate hairs and laterally has larger spatulate hairs that project as an anteriorly curved fringe.

Pyramica clypeata is found from New York south to Florida and west to Texas (Bolton 2000).

This species was collected in the following counties in Alabama: **DeKalb Co.** DeSoto SP (Bolton 2000), **Marshall Co.** Union Grove (Bolton 2000) **Morgan Co.** Hartselle, **Tuscaloosa Co.** Buhl (Bolton 2000).



Map 86. *Pyramica clypeata*

Pyramica creightoni (M. R. Smith)

This species is found in leaf litter samples (Brown 1953). *P. creightoni* lacks standing pronotal humeral hair. The head, in full-face view, has an upper scrobe margin with no laterally projecting elongate filiform hair.

Pyramica creightoni is found in the District of Columbia south to Florida and west to Mississippi (Bolton 2000). This species was collected in Alabama in **Mobile Co.** Spring Hill.

Pyramica dietrichi (M. R. Smith)

This species will nest in soil, leaf litter or under stones. It has also been collected in the nests of other ants (Brown 1953). *Pyramica dietrichi* has long distinctive hairs that radiate apicodorsally from the clypeus. These hairs are simple at their apices and in profile these hairs not obviously curved posteriorly

This species is found in Maryland south to Florida and west to Louisiana (Bolton 2000). In Alabama this ant was collected in the following counties: **Lawrence Co.** Joe Wheeler SP; **Houston Co.** Chattahoochee SP (Bolton 2000), **Mobile Co.** Mobile, **Tuscaloosa Co.** Bryce Lake (Bolton 2000).



Map 87. *Pyramica creightoni*



Map 88. *Pyramica dietrichi*

Pyramica laevinasis (M. R. Smith)

This ant has been found in rotten logs and prey on collembolans (D.R. Smith 1979). *P. laevinasis* has fine filiform hairs covering its clypeus. The hairs that project from the lateral margin of the clypeus are the same shape and same length as those arising mid-dorsally. In profile, the hairs on the clypeal mid-dorsum elevated and inclined anteriorly.



Map 89. *Pyramica laevinasis*

This species is found in North Carolina south to Florida and west to Texas (Bolton 2000). In Alabama this species was collected in the following counties: **Lee Co** Auburn. **MarshallCo.** Guntersville (Bolton 2000), **Mobile Co.** Dauphin Island (Bolton 2000).

Pyramica margaritae (Forel)

This species was reported as being found in the soil in Alabama (D.R. Smith 1979). It is an invasive species probably from Central America. *P. margaritae* This species lacks spongiform tissue ventrally on the petiole and the pleurae, side of propodeum and disc of postpetiole are reticulate-punctate. The first gastral tergite is finely and densely striolate-punctulate everywhere while the first gastral sternite is finely shagreenate or punctulate at least basally and laterally

Pyramica margaritae is found in Georgia and Florida west to Texas and south through Central America and into Colombia, it also found on many Caribbean islands (Bolton 2000). This species was reported in Alabama by D.R. Smith (1979).

Pyramica membranifera (Emery)

Like most *Pyramica* species this ant will nest in a variety of moist habitats including soil, leaf litter, and rotting wood. This ant has a transverse edge running across the width of the dorsal mandible blade surface parallel to and in front of the anterior clypeal margin. The pronotum is sharply marginate dorsolaterally with the dorsum transversely flattened and unsculptured. The first gastral tergite lacks standing hairs of any from.

Pyramica membranifera is found in Florida, Mississippi, Louisiana and Texas (Bolton 2000); this species is invasive to the US and can be found in many localities around the world including Europe, Africa, Asia Indonesia and many island in the Pacific and Caribbean.

This species has been collected in the following counties in Alabama: **Baldwin Co.** Bay Minette, **Bibb Co.** Blue Girth Creek, **Macon Co.** Tuskegee NF



Map 90. *Pyramica membranifera*

Pyramica metazytes Bolton

This ant appears to relatively rare or cryptic and has only been collected from a few southern US states. This species has a pronotal humeral hair that is long and flagellate. With head in full-face view the upper scrobe margin usually with a laterally projecting filiform or flagellate hair just behind the level of eye or close to apex of scrobe.

Pyramica metazytes is only recorded from Kentucky and Tennessee (Bolton 2003). In Alabama this species was collected in **Monroe Co.** Haines Island Reserve.



Map 91. *Pyramica metazytes*

Pyramica ohioensis (Kennedy & Schramm)

This species is commonly found under objects such as stones or logs (Brown 1953). With head in full-face view, *P. ohioensis* has hairs that project from the lateral clypeal margin that are fine and conspicuously J-shaped and curved posteriorly.

Pyramica ohioensis is found in Ohio and



Map 92. *Pyramica ohioensis*

Maryland south to Georgia and west Texas (Bolton 2000).

This species was collected in the following counties in Alabama: **Clay Co.** Talladega NF: Chinnabee Trail, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn, **Monroe Co.** Haines Island Reserve, **Sumter Co.** Hwy 17xNoxubee River

Pyramica ornata (Mayr)

This species is relatively common through out its range and can be collected in leaf litter samples (Brown 1953). This ant has long distinct hairs that radiate apicodorsally from the clypeus. These hairs are strongly bulbous at their apices, in profile they are distinctly curved posteriorly

Pyramica ornata is found in Maryland south to Florida and west to Texas (Bolton 2000).

This species was collected in Alabama
ing the following counties: **Baldwin Co.** Bay
Minette , **Bibb Co.** Glades Preserve , **Chilton**
Co. Mapleville, **Conecuh Co.** no locality
given, **Henry Co.** Abbeville, **Lawrence Co.**
Joe Wheeler SP, **Lee Co.** Chewacla SP,
Marion Co no locality given., **Marshall Co.**
Union Grove (Bolton 2000). **Sumter Co.**
Livingston, **Tuscaloosa Co.** Tuscaloosa



Map 93. *Pyramica ornata*

Pyramica pergandei (Emery)

These ants have unusually large colonies (~300 adults) for *Pyramica* species.

P. pergandei is commonly found in the nests of other ants, preying on collembolans. This species seems to have a preference for colder climates and can be found north into Canada.

On the mandible of this species, the basal and third teeth are triangular and acute; the second tooth broad and bluntly rounded while the basal tooth is longer than the second or third tooth. The disc of the postpetiole has posteriorly curved spatulate hairs while the dorsum of the mesonotum without erect simple hairs. The anterior and lateral margins of the clypeus meet through rounded curves in the full-face view. The antennal scape relatively long (SI 79-84)

Pyramica pergandei is found in Ontario, Canada south into New England and Gulf Coast states, western border of range is Kansas (Bolton 2003). This species was collected in Alabama in **DeKalb Co.** DeSoto SP.



Map 94. *Pyramica pergandei*

Pyramica pilinasis (Forel)

These ants are typically found under stones, in soil or in leaf litter (Brown 1953). This species closely resembles *P. laevinasis* but it is distinguished by these traits: *P. pilinasis* has clypeal pilosity everywhere that is narrowly linear-spatulate or flattened and spatulate in the apical half and truncated apically. In full-face view, the hairs that project

from the lateral margin of the clypeus are of a different shape and longer than those arising mid-dorsally; in profile the hairs on the clypeal mid-dorsum curved or archer anteriorly.

Pyramica pilinasis is found in Illinois south into the Florida and west to Louisiana (Bolton 2000). In Alabama this species was collected in **Tuscaloosa Co.** Bryce Lake (Bolton 2000).



Map 95. *Pyramica pilinasis*

Pyramica pulchella (Emery)

This species nests in the ground or in rotting stumps or logs (Brown 1953). With clypeus in full-face view, laterally or posteriorly curved marginal hairs are restricted to 1–2 pairs situated on the anterior margin above the mandibles. The hairs on lateral margins of the clypeus are not all curved posteriorly.

Pyramica pulchella is found in Michigan south to Florida and west to Louisiana and Kansas (Bolton 2000).

This species was collected in Alabama in the following counties: **Baldwin Co.** Bay Minette, **Bibb Co.** Glades Preserve , **Conecuh Co.** no locality given; **Marshall Co.**



Map 96. *Pyramica pulchella*

Union Grove (Bolton 2000), **Mobile Co.** Mobile (Bolton 2000), **Morgan Co.** Decatur (Bolton 2000)

Pyramica reflexa (Wesson & Wesson)

These are typical *Pyramica* ants that dwell in the soil or under leaf litter and prey upon collembolans. With clypeus in full-face view laterally or posteriorly curved marginal hairs are present on the anterior margin above the mandibles. All the hairs on the lateral margin are posteriorly curved.

Pyramica reflexa is found in Illinois south to Florida and west to Texas (Bolton 2000). In Alabama this species was collected in the following counties: **Lawrence Co.** Joe Wheeler SP; **Franklin Co.** Dismal Canyon(Bolton 2000).



Map 97. *Pyramica reflexa*

Pyramica rostrata (Emery)

This is another species with large colonies (+200 adults) for a *Pyramica* species; it is also thought that this species is polygynous. It seems to specialize in collembolans from the families Entomobryidae and Isotomidae (Brown 1953)

On the leading edge of scape these ants have a row of conspicuous projecting curved hairs of which one or more, distal to the subbasal bend, distinctly curve toward the base of the scape.

Pyramica rostrata is found in Illinois to east to New York south to Florida and west to Texas (Bolton 2000).

This species was collected in the following counties in Alabama: **Baldwin Co.** Bay Minette (Bolton 2000), **Bibb Co.** Glades Preserve, **Franklin Co.** Dismal Canyon (Bolton 2000), **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn, **Sumter Co.** Livingston, **Tuscaloosa Co.** Elrod (Bolton 2000).

Pyramica talpa (Weber)

These ants live in leaf litter and soil. The leading edge of the scape of this species has all hairs curved or inclined towards the apex of the scape. The dorso-lateral margin of the head has a single freely projecting long flagellate hair.



Map 98. *Pyramica rostrata*



Map 99. *Pyramica talpa*

The anteriorly curved hairs on the fringe of the lateral clypeus margins are strong and linearly spatulate to weakly spoon shaped, while the hairs on the clypeal dorsum are strongly spatulate.

Pyramica talpa is found in Illinois and Ohio south to Florida and Louisiana (Bolton 2000). This species was collected in the following counties in Alabama: **Baldwin Co.** Bay Minette , **Bibb Co.** Glades Preserve ; **Houston Co.** Chattahoochee SP (Bolton 2000), **Mobile Co.** Spring Hill (Bolton 2000).

Genus *Solenopsis* Westwood - Fire ants and thief ants

This is diverse genus with ants ranging in size from medium to very small. Several infamous ants that readily invade tropical and sub tropical regions are in this genus including: *S. invicta*, *S. richteri* and *S. geminata*. These species have been introduced by human commerce and established themselves in foreign habitats. All of *Solenopsis* ants can sting although only the larger species can penetrate human skin. The effect is usually described as a match being pressed against the skin, hence the common name “fire ants”. The smaller members of this genus are known as thief ants because they are thought to engage in kleptobiotic behavior (stealing of food or brood from other ants). *Solenopsis* species are found worldwide.

Under close examination these ants are hard to confuse with any other genera. *Solenopsis* ants have a distinct 10-segmented antenna with a 2-segmented apical club, and the lack propodeal spines. Larger species tend to be polymorphic while smaller species are monomorphic and (usually) yellow in color.

Key to the genus *Solenopsis* (Modified from Creighton 1950, Thompson 1989, Trager 1991, MacKay and MacKey 2005, MacGown 2005)

- 1 Second and usually third segment of funiculus at least 1.5x as long as broad (geminata species complex) 2
- 1' Second and at least third segment of funiculus only slight longer than broad, often broader than long 5
- 2(1) Clypeus, in full-face view, lacking median tooth, or at most with small blunt protuberance 3
- 2' Clypeus, in full-face view, with conspicuous, median tooth 4
- 3(2) Sides of head distinctly divergent toward occiput; occipital furrow shallower, not rugose; propodeal carinae lacking or at most developed only at junction of dorsal and posterior propodeal faces (rarely lobe- or tooth-like flange at junction of dorsal and posterior faces of propodeum); petiolar ventral process developed as ventral flange or lobe on larger specimens *Solenopsis xyloni*
- 3' Sides of head subparallel; emargination of posterior border of head deep extending toward frons as median rugose furrow; distinct propodeal carinae originating near junction of propodeal dorsum and declivity and extending forward toward anterior edge of propodeum; petiolar ventral process small, rarely flange-like *Solenopsis geminata*
- 4(2') Head, scapes and thorax reddish brown distinctly lighter than gaster; conspicuous, elongate triangular dark brown to black mark on frons; spot on first tergite lacking, or if present, spot dusky reddish and grading indistinctly into dark posterior band; head ovate to weakly heart-shaped and relatively broad in frontal

- view, CI 95-100 in largest majors; humeral bosses lacking or indistinct, anterior portion of pronotum evenly rounded when viewed dorsally *Solenopsis invicta*
- 4' Head and scapes brownish black, as dark as gaster or only slightly lighter; elongate triangular mark on frons barely or not at all visible; yellowish spot on first tergite usually present and with definite posterior border; head subelliptical to weakly ovate and narrow in frontal view, CI 90-96 in largest majors; pronotal dorsum medially concave; pronotum with humeral bosses *Solenopsis richteri*
- 4'' Intermediate in some of the characters of 4 and 4'; most often with basic color pattern of "washed out" *S. richteri*, head and thorax more brownish or mottled than gaster; gaster spot dusky with posterior margin in distinct; elongate triangular streak on frons visible, and head ovate to weakly heart shaped (due to variable morphological characters, this hybrid can only be accurately identified by using cuticular hydrocarbons) *Solenopsis richteri x invicta*
- 5(1') Postpetiole greatly dilated and expanded, more than half as wide as gaster; propodeum finely and densely sculptured; eyes of workers with at least 12 ommatidia (globularia species complex) *Solenopsis globularia littoralis*
- 5' Postpetiole not dilated and barely more than one-third as wide as gaster; propodeum smooth and without sculpture; eyes of workers with fewer than 12 ommatidia, usually less than 6 ("thief ant" complexes) 6
- 6(5') Eye tiny and difficult to see, with little or no pigmentation; head elongate and usually coarsely punctate; in frontal view, head with median strip free of punctures and hairs and forming weakly impressed longitudinal furrow; in dorsal view, postpetiole circular in shape 7

- 6' Eyes small but easily seen, usually consisting of about 4 ommatidia with black pigmentation; head not overly elongate, punctures either coarse or not; in front view, head without median strip free of punctures and hairs; in dorsal view, postpetiole usually oval in shape (except in *S. pergandei*) 8
- 7(6) Erect hairs on pronotum of various lengths and not as dense as on head; erect hairs on gaster sparse and of various lengths; head narrow, elongate, and flat; small species (head and thorax length 0.61-0.69 mm) *Solenopsis tennesseensis*
- 7' Pronotum and gaster with erect hairs all of approximately same length; medium sized species (head and thorax length 0.76-0.83 mm); head thick in profile, densely covered with hairs *Solenopsis tonsa*
- 8(6') Length of antennal segments 3-8 (antennal segments excluding scape, pedicel and apical 2-segmented club) together longer than distance between frontal carinae (length greater than 0.1mm and usually greater than 0.12mm) 9
- 8' Length of antennal segments 3-8 together shorter or about equal to distance between frontal carinae (length less than 0.1mm, rarely longer) 10
- 9(8) Punctures on head small and not much greater in diameter than hairs which arise from them; postpetiole, as seen from above, somewhat oval shaped; color clear golden yellow to light brownish yellow; queens yellowish-orange, head and gaster slightly darker brownish orange, shiny in appearance; queens average sized (TL about 3.2-3.5 mm) *Solenopsis molesta*
- 9' Punctures on head coarse and larger than diameter of hairs which arise from them; postpetiole, as seen from above, circular in shape; color pale yellow to milky

- white; queens yellowish-orange, opaque in appearance; queens much larger (TL greater than 5 mm) *Solenopsis pergandei*
- 10(8') Node of petiole placed anterior to petiolar-postpetiolar juncture giving petiole distinct slender posterior peduncle; color dark brown with lighter reddish brown head and/or thorax to black; metanotal groove deeply impressed distinctly setting off the promesonotum from propodeum; arboreal species (nest in twigs)
- *Solenopsis picta*
- 10' Node of petiole placed near petiolar-postpetiolar juncture; color of body usually pale yellow; metanotal groove not usually impressed; not arboreal
- *Solenopsis carolinensis*

***Solenopsis carolinensis* Forel**

This small thief ant nests in the soil close to other ant species. Most likely *S. carolinensis* obtains most of its food by stealing stored food or brood from other ant species.

Solenopsis carolinensis has the node of its petiole placed near the petiolar-postpetiolar juncture. Body color is pale yellow and the metanotal groove is not usually deeply impressed. Most of the hairs on the hind tibia are erect or suberect. Queens are yellow and have large eyes



Map 100. *Solenopsis carolinensis*

that cover half of the head (0.25mm).

This species is found in Kentucky (Cockfield and Potter 1984), North Carolina (Powell 1937), and Florida (Deyrup 2003).

Solenopsis carolinensis was collected in the following counties of Alabama:

Cleburne Co. Talladega NF, **Colbert Co.** Bear Creek, **Covington Co.** Solon Dixon Center, **Henry Co.** Abbeville, **Lee co.** Chewacla SP, **Lowndes Co.** Prairie Creek CG, **Macon Co.** Tuskegee NF, **Madison Co.** Uni. of Ala. -Huntsville, **Tuscaloosa Co.** Tuscaloosa

***Solenopsis geminata* (Fabricius) – Tropical fire ant**

This fire ant was collected in the southern regions of Alabama during the survey by Murphree (1947) but it has not been reported since that time. *S. geminata* is still quite common in some areas of Florida and coastal Texas but has been displaced by invasions of *S. richteri* and *S. invicta* in most of its range. It is unknown if this species is native to the US or simply the result of an early introduction.

This ant is similar in habits to *S. xyloni* but *S. geminata* prefers coastal regions. This species is more granivorous than other North American *Solenopsis* ants but it still obtains much of its food from honeydew and predation (Holldobler and Wilson 1990)



Map 101. *Solenopsis geminata* (distribution in the 1930's)

The sides of this ant's head are subparallel and the emargination of posterior border is deep extending toward frons as median rugose furrow. Distinct propodeal carinae are present that originate near the junction of propodeal dorsum and declivity and extending forward toward anterior edge of propodeum. The petiolar ventral process is usually small, rarely flange-like

Solenopsis geminata is found in Central America, Gulf Coast of the United States, particularly Florida and Texas, introduced to various tropical regions of the world.

This species was collected by Murphree (1947) in Alabama: **Baldwin Co.** Bay Minette, **Barbour Co.** Batesville, Louisville, **Coffee Co.** Enterprise, **Covington Co.** Flora, **Crenshaw Co.** Patsburg, **Dale Co.** Asbury, Newton, **Dallas Co.** Brantley, **Escambia Co.** Flomaton, **Geneva Co.** Hartford, Samson, **Houston Co.** Columbia, **Pike Co.** Troy

Solenopsis globularia littoralis Creighton

This species is typically found on the coast but can be collected inland. Colonies are small to medium and can be found in rotting logs or stumps. It is likely that their main food comes from honeydew and scavenging (Murphree 1947).

The postpetiole of this species is greatly dilated and expanded, more than half as wide as the gaster; the propodeum is finely and densely



Map 102. *Solenopsis globularia littoralis*

sculptured; eyes of workers with at least 12 ommatidia.

This ant is found in North Carolina (Carter 1962) south to Florida (Deyrup 2003)

This species was collected in the following counties in Alabama: **Baldwin Co.**

(Creighton 1930); **Russell Co.** Cottonton (Murphree 1947), **Mobile Co.** Mobile

***Solenopsis invicta* Buren – Red imported fire ant (RIFA)**

This is one of the most common and most recognized ants in Alabama. *S. invicta* was first reported in Daphne, Alabama in 1945 and it is thought that this species was introduced to Mobile from Brazil sometime between 1940 and 1945 (Buren et al. 1974).

Solenopsis invicta forms large mound nests usually in open or disturbed areas. Colonies can be polygynous or monogynous. This ant is a generalist that will scavenge for dead animal material or prey on other insects. They will also consume seeds and will readily tend honeydew producers.

The red imported fire ant is considered a major economic pest due to its painful sting, aggressive manner and unsightly mounds. Without a doubt *S. invicta* has had a major impact on all the ecosystems that it invades. It has been shown to reduce ground nesting bird population (Vinson and Sorenson 1986, Allen et al. 1995) and can also have a negative impact on agriculture (Banks et al. 1990). However there is some indication that RIFA can exert a positive influence on crops by eliminating leaf chewing insect herbivores (Kaplan and Eubanks 2002) and that they can drastically reduce tick populations (Fleetwood et al. 1984), thereby indirectly decreasing the spread of tick borne diseases.

Efforts to control *S. invicta* have largely failed and this ant continues to be the number one ant pest in the southeastern United States. It should be noted that this species can hybridize with *S. richteri* and the hybrid is difficult to distinguish from pure *S. invicta* without the use of a cuticular hydrocarbon analysis.

The head, scapes and thorax of *S. invicta* are reddish brown and distinctly lighter than gaster. There is a conspicuous, elongate triangular dark brown to black mark on frons. Usually there is no spot on first tergite but if present it is dusky reddish and grading indistinctly into dark posterior band. The head is ovate to weakly heart-shaped and relatively broad in frontal view, CI 95-100 in largest majors and humeral bosses lacking or indistinct, with the anterior portion of pronotum evenly rounded when viewed dorsally.

The red imported fire ant is found in the southern US from North Carolina west to California. In Alabama this species was collected in the following counties:**Baldwin Co.** Fort Morgan, **DeKalb Co.** DeSoto SP, **Lee Co.** Auburn, **Mobile Co.** Dauphin Island. This species is widespread, especially in southern two thirds of the state, the dividing line being Pickens Co. to Shelby Co. to Randolph Co. (L.C. Graham pers. comm.)



Map 103. *Solenopsis invicta*

***Solenopsis invicta X richteri* –Imported fire ant hybrid**

This is a hybrid of *S. invicta* and *S. richteri*. It is almost identical to *S. invicta* in its habits and appearance but it tends to be slightly less aggressive. RIFA and BIFA do not hybridize in their native range of Brazil possibly due to environmental barriers but they readily interbreed in areas where they come into contact in the southeastern US.

Solenopsis invicta X richteri can share intermediate traits from both species of ants. This hybrid can only be accurately identified by surface hydrocarbon analysis.

This hybrid is found in northern Georgia to northeastern Mississippi. In Alabama it is found north of the Pickens-Shelby-Randolph Co. line described under *S. invicta* (L.C. Graham pers.comm.).



Map 104. *Solenopsis invicta x richteri*

***Solenopsis molesta* (Say)**

This species is common throughout its range. This ant is omnivorous and will consume dead insects, seeds or honeydew. Like other thief ants this species will steal food and brood from other ants. It will typically nest in the soil or under stones usually near other ant nests but it can also invade homes and become a minor household pest.

The punctures on the head of *S. molesta* are small and not much greater in diameter than the hairs that arise from them. The postpetiole, as seen from above, is somewhat oval shaped. The color of this ant is clear golden yellow to light brownish yellow. Queens are yellowish-orange with the head and gaster slightly darker brownish orange. They shiny in appearance and average sized (total length about 3.2-3.5 mm)

Solenopsis molesta is found in eastern and central US north into southern Canada (Creighton 1950).

This species was collected in the following counties in Alabama: **Barbour Co.** Blue Springs SP, Eufala, **Clay Co.** Talladega NF: Chinnabee Trail, **Franklin Co.** Bear Creek, **Hale Co.** Lake Payne, **Houston Co.** Chattahoochee SP, **Lamar Co.** Vernon, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn, **Macon Co.** Tuskegee, **Mobile Co.** Mobile, **Morgan Co.** Hartselle, **Pickens Co.** Cochrane, **Shelby Co.** Childersburg, **Tuscaloosa Co.** Lake Lureen SP



Map 105. *Solenopsis molesta*

Solenopsis pergandei Forel.

This species nests in the soil generally next to other ant species, little else is known of its habits. The punctures on the head of *S. pergandei* are coarse and larger than the diameter of hairs which arise from them. The postpetiole, as seen from above, is circular

in shape. The color of this species is pale yellow to milky white. Queens are yellowish-orange, opaque in appearance and relatively large (total length greater than 5 mm).

Solenopsis pergandei is found in Virginia south to Florida and west to Louisiana (Creighton 1950) possibly rare in Texas and New Mexico (MacKay and MacKay 2002).

This species was collected in Alabama in the following counties: **Coosa Co.** Equality (Murphree 1947), **Covington Co.** Conecuh Trail, **Mobile Co.** Mobile, **Tuscaloosa Co.** Tuscaloosa

Solenopsis picta Emery.

This ant is generally found in hollow twigs (Creighton 1950). The node of petiole of this ant is placed anterior to the petiolar-postpetiolar juncture giving the petiole a distinct slender posterior peduncle. This species is dark brown in color with a lighter reddish brown head and/or thorax to black.



Map 106. *Solenopsis pergandei*



Map 107. *Solenopsis picta*

The metanotal groove is deeply impressed distinctly setting off the promesonotum from the propodeum.

Solenopsis picta can be found in Florida to west to Texas (Creighton 1950). In Alabama this species was collected in: **Baldwin Co.** Bay Minette, **Barbour Co.** 5mi S of Eufala, **Montgomery Co.**(no locality).

***Solenopsis richteri* Forel –Black imported fire ant (BIFA)**

Solenopsis richteri is similar in habits and appearance to *S. invicta*, however this species is less aggressive and more suited to cooler climates. *S. richteri* was probably introduced to Mobile, Alabama in 1918 in soil being used as ballast on commercial ships from South America (Buren et al. 1974).

The head and scapes of this species are brownish black, as dark as the gaster or only slightly lighter. The elongate triangular mark on frons is barely or not at all visible while a yellowish spot on first tergite is usually present with a definite posterior border. The head is subelliptical to weakly ovate and narrow in frontal view (CI 90-96 in the largest majors). The pronotal dorsum is medially concave and the pronotum has humeral bosses.



Map 108. *Solenopsis richteri*

In the US *S. richteri* is found in southern Tennessee and northeastern Mississippi. This species was reported in Baldwin Co. and Mobile Co. by Murphree (1947). At this time BIFA is only found in the extreme northwestern portion of Alabama in the counties of Lauderdale, Limestone and Lawrence (Graham pers. comm.).

***Solenopsis tennesseensis* M. R. Smith**

This tiny ant is almost completely subterranean and only occasionally collected by soil sifting (MacKay and MacKay 2002). Little is known about this species, although it probably obtains food through predation and thievery from other ants.

This species has erect hairs on the pronotum of various lengths that are not as dense as those found on the head. The erect hairs on the gaster are somewhat sparse and of various lengths. The head is narrow, elongate, and flat. This species is very small species (the head and thorax length 0.61-0.69 mm).

Solenopsis tennesseensis is found from California east to Florida (MacKay and MacKay 2002, Deyrup 2003), northern limit is probably Kansas (Dubois 1994). In Alabama this species has been collected in **Baldwin Co.** Bay Minette.



Map 109. *Solenopsis tennesseensis*

***Solenopsis tonsa* Thompson.**

This ant is found in northern Florida but little is known of its habits. Most likely it engages in lestobiosis like other thief ants.

The pronotum and gaster of this species have erect hairs all of approximately the same length. This is a medium sized species (the head and thorax length 0.76-0.83 mm) with the head thick in profile and densely covered with hairs.

Solenopsis tonsa is only known from north Florida and southern Alabama. In Alabama it has been collected in **Baldwin Co.** (no locality given).



Map 110. *Solenopsis tonsa*

***Solenopsis xyloni* McCook –Southern fire ant**

The southern fire ant is similar to *S. invicta* and builds mound nests, particularly in disturbed areas. However this ant is less aggressive than the RIFA and has a less painful sting that does not result in pustule. During the 1940's this was considered a major economic pest and was common in Alabama. After the introduction of *S. invicta* this species has seemingly disappeared from this state and has not been collected since the 1960's.

The sides of the head of this species are distinctly divergent toward occiput with the occipital furrow shallow and not rugose. Propodeal carinae are lacking or at most

developed only at the junction of dorsal and posterior propodeal faces (rarely a lobe- or tooth-like flange at junction of dorsal and posterior faces of propodeum). The petiolar ventral process is developed as ventral flange or lobe on larger specimens

This species is found in California west to Florida, although this range is not uniform due to direct competition with *S. invicta*. It is also found in Mexico in Chihuahua, Sinaloa, Coahuila, and Nuevo Leon (MacKay and MacKay 2003).

In the past this species was widespread throughout the southern U.S. and was reported as occurring in 154 communities in Alabama (Murphree 1947) and Murphree considered it as being found throughout the state. This species was not found during the course of recent collecting and is thought to have been forced out of the area by the introduced fire ants, *S. invicta*, *S. richteri*, and their hybrid.

Genus *Stenamma* Westwood

Members of this genus of relatively primitive ants are more diverse in the Nearctic and Palearctic regions but can also be found in the Neotropical, Oriental and Indo-Australia regions. These ants can be found foraging in shady areas often during the cooler times of the year. Little is known about the habits of these ants but it is thought that they are generalist predators of small arthropods.

Nests may be located in wooded areas under stones, in leaf litter or in rotting wood, but are rarely found due to the cryptic nature of *Stenamma* species and the small size of their colonies, generally with a few dozen adults. These ants are slow moving and usually only collected in soil extractions or through leaf litter sifting.

These ants are difficult to distinguish from other genera. Members of this genus have antennae with 12 segments and with scapes not reaching the occipital border and with an apical antennal club of 4 segments. The clypeus usually has 2 longitudinal carinae that do not form teeth on the anterior margin. Workers are monomorphic and have small propodeal spines or teeth.

Key to the genus *Stenamma* (modified from M.R. Smith 1957, Dubois and Davis 1998, and MacGown 2005)

- 1 Rugulae or rugulose-reticulate sculpturing of promesonotum transverse in direction *Stenamma foveolocephalum*
- 1' Rugulae or rugulose-reticulate sculpturing of promesonotum usually longitudinal in direction *Stenamma meridionale*

***Stenamma foveolocephalum* M. R. Smith**

Little is known of *S. foveolocephalum* and only workers have been collected. This species nests in sandy soil and has been collected in January and February. This ant has transverse rugulae or the rugulose-reticulate sculpturing on the promesonotum.

Stenamma foveolocephalum is only known from Alabama, Mississippi, Florida



Map 111. *Stenamma foveolocephalum*

and North Carolina (Dubois and Davis 1998). In Alabama it was reported in **Bibb Co.** by Dubois and Davis (1998).

***Stenamma meridionale* M. R. Smith.**

These ants have small colonies with an average of 15 adults (Talbot 1957) and can generally be found in wooded areas nesting in the soil. This species usually has longitudinal rugulae or rugulose-reticulate sculpturing on the promesonotum usually. *Stenamma meridionale* is found in Illinois (Dubois and LeBerge 1988) south to North Carolina (Nuhn 1977) and the Gulf states (excluding Florida). It is also recorded in Idaho (Yensen et al. 1977) and might have a wider range but this is difficult to tell due to the cryptic nature of this species.

This species was collected in the following counties in Alabama: **Monroe Co.** Haines Island Reserve, **Sumter Co.** Hwy 17 x Noxubee River



Map 112. *Stenamma meridionale*

Genus *Strumigenys* F. Smith

Ants in the genus *Strumigenys* are similar in their habits to those in the genus *Pyramica*. These ants are also collembolan predators that have small colonies and nest

and forage in leaf litter. There is only one species of *Strumigenys* found in Alabama, 4 other species can be found in southern Florida but are not likely to be found in Alabama.

These ants have 6-segmented antenna like *Pyramica* but have elongate mandibles with a distinct apical fork of inwardly two directed spiniform teeth. This genus has a worldwide distribution but is most diverse in the Neotropics.

Strumigenys louisianae Roger

Small colonies of these ants can be found under stones, rotting wood or in leaf litter. *S. louisianae* are found in Florida north to North Carolina and west to Texas.

This species was collected in Alabama in the following counties: **Baldwin Co.** Bay Minette, **Barbour Co.** Eufaula, **Bibb Co.** Red Eagle, **Butler Co.** Pine Apple, **Clay Co.** Talladega NF: Chinnabee Trail, **Henry Co.** Abbeville, **Houston Co.** Chattahoochee SP, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn, **Tuscaloosa Co.** Tuscaloosa, **Morgan Co.** Decatur (M.R. Smith 1932)



Map 113. *Strumigenys louisianae*

Genus *Temnothorax* Mayr – Creeper ants

Members of this genus are found in a variety of environments worldwide. Many *Temnothorax* species nest in plant cavities such as hollowed out dried grass stems or

twigs, some nest under tree bark or in the shells of empty nuts, and only a few nest in the soil. It is thought that *Temnothorax* species are generalist omnivores that will consume honeydew and nectar and also forage for dead insects and seeds. These ants are called “creeper ants” due to their habit of walking with their body close to the substrate instead of high on their legs like many other ants (Deyrup pers. comm.). Until recently all of these ants were considered to be in the genus *Leptothorax* Mayr (Bolton 2003).

These ants have 11-12 segmented antennae with poorly defined 3 segmented apical clubs. With the exception of *T. pergandi* all of these species lack a metanotal suture impression and have propodeal spines. These ants are typically small (1.5-3.5mm in length) with larger members generally dark brownish and smaller members yellowish in color. Hairs are usually blunt and stout.

Key to the genus *Temnothorax* (modified from Deyrup and Cover 2004)

- 1 Mesosoma in lateral profile with conspicuous impression between mesonotum and propodeum (this keys out on generic key as well) *Temnothorax pergandi*
- 1' Mesosoma in lateral profile not conspicuously impressed between mesonotum and propodeum 2
- 2(1') Propodeal spines in lateral view short and triangular, no longer than width of eye 3
- 2' Propodeal spines in lateral view slender, usually longer than width of eye 4
- 3(2) Head in frontal and lateral view with conspicuous, irregular, longitudinal carinae *Temnothorax bradleyi*

- 3' Head in frontal and lateral view largely shining and lacking sculpture, with only few delicate carinae around eye and frontal ridges, or, in larger specimens, head mostly granulate, not shining, with delicate carinae almost hidden in granulate background *Temnothorax schaumii*
- 4(2') Dorsum of mesosoma mostly smooth and shining; color usually dark brown, legs and antennae pale yellow *Temnothorax tuscaloosae*
- 4' Dorsum of mesosoma either with obvious fine carinae, or not shining, or both ... 5
- 5(4') Head and body dark reddish brown; sides of head with conspicuous, irregular, closely spaced carinae *Temnothorax smithi*
- 5' Head and body not dark reddish brown; sides of head without closely spaced carinae 6
- 6(5') Propodeal spines in lateral view shorter than basal face of petiole; sides of mesosoma with fine, irregular carinae that are not parallel; color blackish occasionally with dark red on mesosoma *Temnothorax texanus*
- 6' Propodeal spines in lateral view about as long as basal face of petiole; sides of mesosoma with strong subparallel carinae; color varies from blackish to yellow 7
- 7(6') Blackish; head in frontal view with delicate, longitudinal ridges, but otherwise shining *Temnothorax longispinosus*
- 7' Yellow to yellowish brown; head in frontal view not shining *Temnothorax curvispinosus*

***Temnothorax bradleyi* (Wheeler)**

Colonies of this species are typically found in the galleries under the bark of living pine trees, usually *Pinus palustris* (long leaf pine) and *P. elliottii* (slash pine) (MacKay 2000, Deyrup and Cover 2004). This species was not collected during this survey. The head of this species in frontal and lateral view has conspicuous, irregular, longitudinal carinae.



Map 114. *Temnothorax bradleyi*

Temnothorax bradleyi is found in northern Florida (Deyrup 2003), Georgia (Wheeler 1913) and it was reported in **Jefferson Co.** Birmingham Alabama by Murphree (1947).

***Temnothorax curvispinosus* (Mayr)**

This species nests in twigs or grass stems usually close to the ground, but can also be found under the bark of living trees or in nutshells or galls. Colonies are generally small with 80-100 workers and are usually polygynous and polydomous (MacKay and MacKay 2002). *T. curvispinosus* consumes honeydew off of leaves but is not known to tend honeydew producers directly, these ants also collect seeds and dead insects. Reproductives can be found in nests from June to August with flights starting in early

July. *T. curvispinosus* can be a host for the slave making ant, *Protomognathus americanus*.

This small yellow ant has 11-antennal segments with long inwardly curving propodeal spines. In frontal view the head of this species is non-shining.

Temnothorax curvispinosus is found in the eastern US, with a western border of Texas (Wheeler and Wheeler 1985) and the Dakotas (Wheeler and Wheeler 1987); Collections have also been made in Arizona (Hunt and Snelling 1975)



Map 115. *Temnothorax curvispinosus*

This species was collected in the following counties in Alabama: **Clay Co.** Talladega NF: Chinnabee Trail, **Cleburne Co.** Choccolocco WMA, **DeKalb Co.** DeSoto SP, **Etowah Co.** Gadsden, **Lauderdale Co.** Joe Wheeler SP, **Lawrence Co.** Bankhead NF, **Lee Co.** Auburn, **Lowndes Co.** Prairie Creek CG, **Madison Co.** Huntsville, **Marengo Co.** Chickasaw SP, **Winston Co.** Smith Lake

***Temnothorax longispinosus* (Roger)**

This species is more common in northern regions of the US but is found in the south Appalachian Mountains. *T. longispinosus* nest in hollow twigs or the shells of nuts and occasionally under tree bark. Colonies on the average are composed of 47 adults with

150 being a large colony (Holldobler and Wilson 1990). This ant can be a host of *Protomognathus americanus*.

This species is small and blackish. The head in frontal view has delicate, longitudinal ridges, and is shiny.

Temnothorax longispinosus is found in the New England States (Creighton 1950) west to Iowa (Buren 1944) and Missouri and south into the northern portions of Alabama and Mississippi

This species was collected in the following counties in Alabama: **Clay Co.** Talladega NF: Chinnabee Trail, **DeKalb Co.** DeSoto SP

Temnothorax pergandi (Emery).

This species generally nests in the twigs or nuts usually buried in leaf litter. Occasionally it will nest in the soil. Colonies contain 36 or more adults and are monogynous with reproductives appearing April through December (MacKay and



Map 116. *Temnothorax longispinosus*



Map 117. *Temnothorax pergandi*

MacKay 2002).

This species has a pronounced impression between the mesonotum and the propodeum that can easily separate it from other *Temnothorax* species.

Temnothorax pergandei is found in New Jersey south to Florida and west to Nebraska and Arizona (Deyrup and Cover 2004). This species was collected in the following states in Alabama: **Cullman Co.** 2mi N of Cullman, **DeKalb Co.** DeSoto SP, **Lawrence Co.** Joe Wheeler SP, **Lowndes Co.** Prairie Creek CG

***Temnothorax schaumii* (Roger)**

This species will nest in the branches or under the bark of live hardwoods. One nest dissected contained 143 workers, 35 larvae and one queen (MacKay and MacKay 2003).

Temnothorax schaumii is usually dark brown but it can occasionally be partially or wholly yellowish. The head in frontal and lateral view is largely shining and lacking sculpture, with only a few delicate carinae around the eyes and frontal ridges. In larger specimens, the head is mostly granulate, not shining, with delicate carinae almost hidden in granulate background.



Map 118. *Temnothorax schaumii*

This species is found in southern Maine south to central Florida and west to Texas (Deyrup and Cover 2004). In Alabama this species was collected in **Lawrence Co.** Joe Wheeler SP

***Temnothorax smithi* (Baroni Urbani)**

Nests of this species are typically found in standing dead trees in open areas. The head and body of this ant are dark reddish brown, with conspicuous, irregular, closely spaced carinae on the sides of the head.

Temnothorax smithi is found in North Carolina (Carter 1962) south to Florida (Deyrup 2003) and west to Mississippi (MacGown 2005). It was reported in Alabama by D.R. Smith (1979).

***Temnothorax texanus* (Wheeler)**

These ants are found in shallow nests in sandy or clay soil under trees. They generally forage under a thin layer of litter, invisible to the passive observer (Deyrup and Cover 2004).

Reproductives appear in the nest from late May to late June (MacKay and MacKay 2003).

This species has propodeal spines that, in lateral view, are shorter than basal face of petiole. The side of mesosoma has fine,



Map 119. *Temnothorax texanus*

irregular carinae that are not parallel. Workers are blackish occasionally with dark red on mesosoma while queens are blackish to brick red.

Temnothorax texanus is found in New Jersey south to Florida and west to New Mexico (Deyrup and Cover 2004). In Alabama it has been collected in **Clay Co.** Talladega NF: Chinnabee Trail.

***Temnothorax tuscaloosae* (Wilson)**

This species nests at the bases of hardwood trees in moist habitats (Wilson 1950). This ant is usually dark brown with the legs and antennae pale yellow. The dorsum of the mesosoma is mostly smooth and shiny.

Temnothorax tuscaloosae is only known from Alabama and North Carolina (Carter 1962). In Alabama it has been collected in the following counties: **Monroe Co.**

Haines Island Reserve, **Tuscaloosa Co.**

Tuscaloosa (Wilson 1950)



Map 120. *Temnothorax tuscaloosae*

Genus *Tetramorium* Mayr

Ants of this genus nest in the soil of under objects such as stones or logs.

Tetramorium species are found throughout the world but are most common and diverse in

Asia and Australia. It is thought that most of these ants are generalist scavengers or predators.

Members of this genus have a ridge formed by their clypeus in front of the antennal insertions, giving the appearance of the antennal sockets being deep pits. These ants can have 11 or 12-segmented antennae. Many of the species present in the US are thought to have been introduced by human activity (Brown 1957).

Key to the genus *Tetramorium* (modified from Creighton 1950)

- 1 Antenna with 12 segments, erect body hairs simple *Tetramorium caespitum*
- 1' Antenna with 11 segments; erect body hairs simple, branched or trifid 2
- 2(1') Most erect body hairs branched or trifid *Tetramorium lanuginosum*
- 2' Erect body hairs simple..... *Tetramorium bicarinatum*

***Tetramorium bicarinatum* (Nylander)**

This is probably an introduced species. *T. bicarinatum* was considered widespread by Murphree (1947) and Glancey et al. collected a few specimens in 1976 in Mobile, Alabama. However, this species was not collected during this survey and if this species is still in Alabama it is probably exceedingly rare. It should be noted that past literature refers to *T. bicarinatum* as *T. guineense* (Fabricius). This species has an 11-segmented antenna and simple body hairs. It is reddish yellow in color with a blackish or brownish gaster. An antennal sulcus is present

Tetramorium bicarinatum is found in Florida west to Texas and also found in greenhouses or urban areas throughout the country (Creighton 1950). It has been introduced to many tropical and subtropical regions of the world.

This species has been collected in Alabama in **Mobile Co.** (Glancey et al. 1976), and was widespread, according to Murphree (1947).

***Tetramorium caespitum* (Linnaeus) – Pavement ant**

This is an invasive ant, most likely from Europe or Asia (Brown 1957) that is extremely common pest on the Atlantic coast. *T. caespitum* is called the pavement ant because it is commonly found nesting under pavement, sidewalks or foundations . Colonies are also be found under stones or wood and occasionally in open soil. In colder regions these ants will invade structures and typically nest near heat sources, such as radiators or heat ducts



Map 121. *Tetramorium caespitum*

(Hedges 1997). These ants will tend aphids, collect seeds and scavenge for dead animal and plant material. *T. caespitum* can also be destructive to crops by gnawing on roots and stalks.

This species has a 12-segmented antenna and simple body hairs. The basal half of the first gastric segment is smooth and shiny and the head and thorax is longitudinally

striated. The antennal scapes do not reach the occipital border of the head and there is no antennal sulcus.

Tetramorium caespitum is widespread invasive found throughout the US, and most common in New England states. Also found in Europe, Asia and Africa. This species was collected in Alabama in **Limestone Co.** 2mi N of Decatur: Calhoun College.

***Tetramorium lanuginosum* Mayr**

This species is listed as *Tetramorium (Triglypthothrix) striatidens* Emery in Murphree 1947. This is another tramp species that is found in the southeastern US and other tropical regions of the world and is probably a native of India. This species distinctive trifid hairs on its body.

Tetramorium lanuginosum is found in Florida (Deyrup 2003) north to North Carolina (Creighton 1950) and west to Louisiana (Moser and Blum 1960), also found in tropics and sub-tropics worldwide.

This species was collected in Alabama by Murphree (1947) in the following counties: **Dale Co.** Pinckard., **Houston Co.** Ashford



Map 122. *Tetramorium lanuginosum*

Genus *Trachymyrmex* Forel

These ants are fungus growers that use plant material and insect feces as a substrate for their fungus. Nests are constructed in packed soil or sand and composed of

interconnected oval chambers that are a few centimeters in diameter. Nest entrances are usually marked by crescent shaped mounds of excavated soil. The entrances are closed during times of extreme heat, probably to conserve moisture in the fungal chambers. The name of this genus is derived from the Greek word for rough: "trachy", referring to the rough, tuberculate nature of the bodies of these ants.

Members of this genus are found in the Nearctic and Neotropical regions, 9 species are found in the US but this genus is diverse in the tropics of Central and South America. There is only one ant of this genus found in Alabama, *Trachymyrmex septentrionalis*.

***Trachymyrmex septentrionalis* (McCook)**

This is a fairly common ant in the United States but it is often over looked because of its benign behavior. These ants are found in wooded areas ranging from dense forests yards, parks, and camp grounds throughout Alabama. Colony sizes range from 200 to 1400 adults (Holldobler and Wilson 1990).

This species has spines and teeth on the mesosoma and head and tubercles on the gaster. The frontal lobes are expanded



Map 123. *Trachymyrmex septentrionalis*

laterally but do not project forward to the anterior margin of the clypeus. This species has an 11-segmented antenna.

Trachymyrmex septentrionalis is found in New York south to Florida and west to Texas and Kansas (Creighton 1950).

This species was collected in the following counties in Alabama: **Butler Co.** Pine Apple, **Covington Co.** Conecuh Trail, **Hale Co.** Payne Lake, **Houston Co.** 2mi W of Dothan, Chattahoochee SP, **Lawrence Co.** Joe Wheeler SP, **Lowndes Co.** Prairie Creek CG, **Macon Co.** Tuskegee, Mobile, **Monroe Co.** Hybart, Claiborne Lake CG, **Morgan Co.** Hartselle, **Pickens Co.** Cochrane, **Tuscaloosa Co.** Lake Lurleen SP, **Wilcox Co.** Roland Cooper CG

SUBFAMILY PONERINAE - Hunter ants

North American ants of the subfamily Ponerinae are typically ground dwelling and generally form small colonies that are found in leaf litter or under the bark of fallen trees. With the exception of the genus *Odontomachus* these are usually small (~4mm), rather cryptic ants that are not commonly collected. Queens closely resemble the workers in size and morphology.

In tropical regions these ants are more diverse and can reach much larger body sizes. The infamous “bullet ant” (*Paraponera clavata* (Fab.)) of Central and South America is a good example as it is 18-25mm long and can deliver the most painful and debilitating insect sting (Schmidt 1990).

All ants in this subfamily are thought to be solitary predators (Creighton 1950, Hölldobler and Wilson 1990) although some have been known to consume nectar (Deyrup et al. 2003).

Ponerines are considered to be primitive ants due to their behavior and morphology. They are lone foragers that do not recruit other workers to food items. At nest founding the queen forages until the first workers emerge even though her wing muscles degenerate to provide some nutrients (Haskins and Enzmann 1938). Ponerine species are all monomorphic and queens and workers tend to be similar in size.

This subfamily derives its name from the genus *Ponera* which comes from the Greek word “Poneros” for bad, worthless, or useless. It is unknown what exactly this refers to. A suggested common name for this subfamily is “the hunter ants” due to their predatory habits. All of the suggested common names listed for this subfamily and the etymology of the generic and specific names are reported in Deyrup et al. 2003.

Several recent surveys of Ponerines have been conducted in countries around the world including Poland (Czechowski 1999), Spain (Tinaut and Martinez-Ibanez. 1998) and Korea (Kim et al. 1998)

Ponerines have a single petiolar segment and a well-developed sting. Their integument is thick and generally sculptured in some fashion. This subfamily has a worldwide distribution. Ponerine ants are more diverse in the tropical regions of the world. Of the approximately 30 species found in the United States, most can be found in the southern states. Seven species have been recorded in Alabama.

Key to the Alabama genera of Ponerinae (modified from Deyrup et al. 2003)

- 1 Mandibles elongate with tips turned inward.....*Odontomachus*
1' Mandibles not as above, triangular.....2
2(1') Mandible (in side view) with large pit at base (fig. 6); middle tibia with obvious spines in addition to hairs, spines and spurs*Cryptopone gilva*

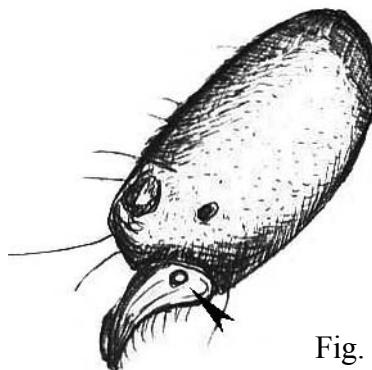


Fig. 6. Lateral view of *Cryptopone gilva* head

- 2' Mandible not as above; middle tibia lacking standing hairs.....3
3(2') Ventral process of petiole angulate posteriorly with small round translucent "port-hole" anteriorly (fig. 7)*Ponera*
3' Ventral process of petiole rounded posteriorly; lacking "port-hole" (fig. 8)
.....*Hypoponera*

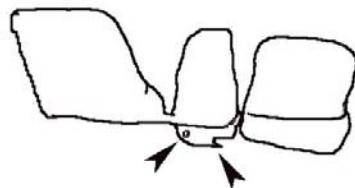


Fig. 7. Lateral view of *Ponera* sp.
petiole

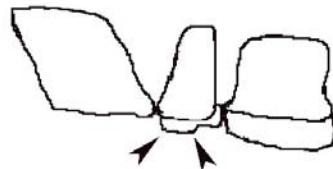


Fig. 8. Lateral view of *Hypoponera* sp.
petiole

Genus *Cryptopone* Emery – Pit-jawed ants

There is only one species in this genus reported in the United States, *Cryptopone gilva* (Roger). This genus derives its name from the Greek word “kryptos” meaning hidden or secret and from “poneros”, as used at the subfamily and generic level. This possibly refers to the cryptic nature of this genus.

Cryptopone ants are distinguished from other Ponerines by the oval pit on the mandible, close to where it is attached to the head capsule. The middle tibia is also covered in spines and hairs. Their coloration is orange-brown.

There are a total of 18 species of *Cryptopone* found worldwide with 15 occurring in the Pacific Asian region, ranging from Japan to Australia to Melanesia. One species is found in Central America, another in South Africa and one in southern North America (Bolton 1995).

Cryptopone gilva (Roger)

This species is found in rotten logs in moist wooded areas and are predatory on arthropods (Haskins 1931, M.R. Smith 1934). Haskins' work contains much of the known life history information of this ant. The specific name uses “gilva”, the Latin term for pale yellow, probably referring to the color of type specimens. However, the typical color is orange-brown.



Map 324. *Cryptopone gilva*

The range of *Cryptopone gilva* extends from North Carolina (Carter 1962) to Florida (Deyrup 2003) to Texas (D.R. Smith 1979). This species was collected in the following locality in Alabama: **Butler Co.** 4mi. N of Greenville

Genus *Hypoponera* Santschi - Mini ponerine ants

Little is known about these ants. *Hypoponera* species superficially resemble species from the genus *Ponera*, however they lack the “port-hole” on their petiole and they are generally smaller in size. In mounting and preserving *Hypoponera* and *Ponera* species, care should be taken to make the lower surface of the petiole visible. This can be done by shifting the hind legs forward or by elevating the gaster. Workers have small eyes (only a few ommatidia) while reproductives have much larger eyes. Queens closely resemble workers morphologically but can be separated by the larger eye size and presence of wings or wing scars.

This genus derives its name from “hypo” the Greek term for under or below and “ponera” referring to the subfamily. This probably refers to size, since these ants tend to be smaller than *Ponera* species.

Hypoponera species are structurally similar to *Ponera* species except they lack the distinctive “port-hole” on the ventral side of the petiole.

Key to the genus *Hypoponera* (modified from Deyrup et al. 2003)

- 1 Petiole of worker in lateral view narrowing strongly and rounded dorsally (fig. 9); head and body punctate but shining in fluorescent light*Hypoponera opacior*

1' Petiole of worker in lateral view not rounded (fig. 10), only weakly narrowed dorsally; head and body punctate-granulate not shining ...*Hypoponera opaciceps*

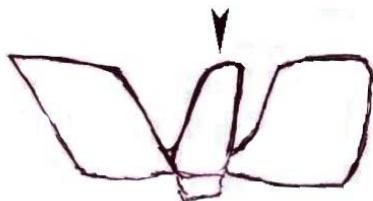


Fig. 9. Lateral view of
Hypoponera opacior petiole

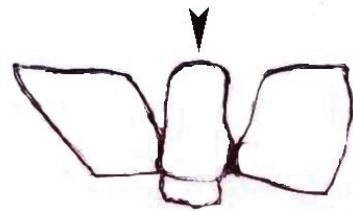


Fig. 10. Lateral view of
Hypoponera opaciceps petiole

Hypoponera opaciceps (Mayr)

This ant forms small colonies that are found in damp forested areas under the bark of fallen trees, rocks or occasionally in urban or disturbed areas. In Puerto Rico colonies are typically found under cow dung (Smith 1937). Alate flights have been reported in northern Florida from September to November (Van Pelt 1958) and year round in southern Florida (Deyrup et al. 2003). This ant is considered invasive in many parts of the world and was probably introduced to Polynesia and other areas from South America via commerce (Wilson and Taylor 1967).



Map 145. *Hypoponera opaciceps*

The specific name of this ant is from “opus”, the Latin term for shady or dark and “-ceps” referring to head. This is in reference to the punctate-granulate head that is opaque. *H. opaciceps* has a petiole that is not rounded or narrowed dorsally. This species is found throughout Central America, South America, West Indies, Southeast Asia, Polynesia. In the USA its range extends from South Carolina south to Florida, west to Colorado (Smith 1979).

This species was collected in the following localities in Alabama: **Baldwin Co.** Loxley (Murphree 1947), **Barbour Co.** Blue Springs State Park, **Conecuh Co.** Castleberry (Murphree 1947), **Covington Co.** Conecuh Trail, **Crenshaw Co.** Brantley (Murphree 1947), **Houston Co.** Chattahoochee State Park, **Marengo Co.** Chickasaw SP, **Mobile Co.** Fowl River (Murphree 1947), **Montgomery Co.** Montgomery (Murphree 1947), **Russell Co.** Seale (Murphree 1947), **Shelby Co.** Inverness (Murphree 1947)

Hypoponera opacior (Forel)

As the common name implies

Hypoponera opacior is more commonly collected than other ponerines and Murphree described it as such in 1947. It is typically found under the bark of fallen trees, under stones or in leaf litter where it forms small colonies. This ant inhabits a variety of environments and elevations ranging from the flatlands of Mobile



Map 126. *Hypoponera opacior*

to the highlands of the Appalachian mountain range.

“Opacus” (Latin for shady or dark) is used for the specific name of this ant and it is thought that this is probably referring to the color of the specimens when compared to other *Hypoponera* species.

Hypoponera opacior is identified by its petiole that is rounded and strongly narrowed dorsally, distinctly different than the more uniform petiole (side profile) of *H. opaciceps*. This ant is found in Central America, South America, and the West Indies, in the USA it is found in Oregon east to Virginia and south to Florida (Deyrup et al. 2003).

This species was collected in the following localities in Alabama: **Baldwin Co.** Bay Minette, **Barbour Co.** Blue Springs SP and Eufala, **Bibb Co.** Blue Girth Creek, **Blount Co.** Oneonta, **Butler Co.** 4mi N of Greenville and Pineapple, **Chambers Co.** Lafayette, **Chilton Co.** 1mi N of Mapleville, **Clay Co.** Talladega NF: Chinnabee Trail, **Cleburne Co.** Heflin, **Conecuh Co.** Evergreen, **Coosa Co.** Kellyton, **Cullman Co.** Cullman, **Dallas Co.** Selma, **Elmore Co.** Elmore (Murphree 1947), **Escambia Co.** 2mi W of Brewton, **Franklin Co.** Bear Creek, **Henry Co.** 1mi N of Abbeville, **Houston Co.** Chattahoochee SP, 1mi W of Dothan, **Lauderdale Co.** Florence, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Chewacla Creek, **Macon Co.** Tuskegee NF, **Madison Co.** Uni. of Ala. Huntsville, **Marengo Co.** Foscue Creek, **Mobile Co.** Saraland, **Monroe Co.** Claiborne Lake CG, **Montgomery Co.** Montgomery, **Morgan Co.** Hartselle, **Shelby Co.** Childersburg, **Sumter Co.** Coatopa, **Tallapoosa Co.** Lake Martin, **Tuscaloosa Co.** Tuscaloosa, **Walker Co.** Townley, **Winston Co.** Natural Bridge

Genus *Odontomachus* Latrielle - Snapping ants

Odontomachus ants have an interesting prey capture method: they lock their elongate mandibles in an open position until they contact potential prey items with sensory hairs that trigger the jaws to snap shut on prey (Just and Gronenberg 1999, Paul 2001). This “snapping trap jaw” is known as the fastest animal movement (Gronenberg et al. 1993). These ants can also inflict a painful sting but are rarely problematic for humans as they are rather timid ants. If their colony is disturbed or if the workers are handled they are more likely to attempt to snap there jaws against the source of the disturbance causing a surprising amount of damage to exposed skin.

The name of this genus is based on the Greek term “Odonto” for tooth and “machetes” for warrior. This refers to the mandibles and aggressive behavior of disturbed workers. *Odontomachus* ants have elongate mandibles with the tips turned inward. They are also the largest ponerine ants present in Alabama with a body length approaching 1cm. These ants can be found worldwide, but are most common in tropical regions.

Key to the genus *Odontomachus* (modified from Deyrup et al. 2003)

- 1 Hairs on first gastral tergite fine, space between hairs less than one-third as wide as length of hair; posterior face of petiole smooth *Odontomachus brunneus*
- 1' Hairs on first gastral tergite sparse with spaces between hairs equal to or greater than one-half of length of hair; posterior face of petiole with obvious transverse striae *Odontomachus ruginodis*

Odontomachus brunneus (Patton) - Southeastern snapping ant

This is the most commonly collected *Odontomachus* species in Alabama. It is found in southern Alabama in the coastal counties and along the border with Florida where it inhabits wooded areas and swamps. Colonies are usually located at the base of trees or in rotten stumps.

This species name is derived from “brun” (Anglo-saxon), which means brown, referring to the coloration of this species. The first gastral tergite of *O. brunneus* is densely covered in fine hairs and the posterior face of the petiole is smooth. This species is found in Florida, southern Georgia and Alabama and probably found along the Gulf coast into Texas. Reported distributions in Central and South America (Brown 1976) are uncertain at this point (Deyrup et al. 2003).

This species was collected in the following localities in Alabama: **Baldwin Co.** S of Bay Minnette, **Houston Co.** Chattahoochee SP, **Mobile Co.** Mobile



Map 127. *Odontomachus brunneus*

Odontomachus ruginodis M. R. Smith. -Rough petiole snapping ant

Odontomachus ruginodis is an invasive ant that was introduced from the West Indies. It is generally found in disturbed areas and unlike *O. brunneus* it seems to prefer open sunny habitats. This ant is most likely a native of the West Indies that has been introduced to certain areas of the Gulf coast by human activity.

These ants, like other *Odontomachus* species, use their mandibles for defense and can use the force of their striking mandibles to bounce aggressors away from their nest. This has been termed the “bouncer defense” (Carlin and Gladstein 1989).

“Ruga” (Latin) means wrinkle and “nodus” means knot or swelling, this is referring to the striated or wrinkled appearance of the posterior face of the petiole. The first gastral tergite of this species has sparse hair coverage and the posterior face of the petiole has a wrinkled appearance due to transverse striae. *O. ruginodis* is found throughout the West Indies, in the USA it is found in southern Florida and southern Alabama, possibly localized introductions to other areas (Deyrup et al. 2003). This species was collected in the following locality in Alabama: **Baldwin Co.** Bon SeCour NWR



Map 128. *Odontomachus ruginodis*

Genus *Ponera* Latrielle - Little port-hole ants

Ants in the genus *Ponera* are distinguished by the translucent “port-hole” on the ventral portion of their petiole. Colonies are composed of around 30 individuals (Taylor 1967) and form nests in rotten wood or leaf litter. As other ponerines, these ants are thought to be predators of other insects. The distinctive “port hole” on the ventral surface of the petiole is used to distinguish this genus from other ponerines.

There are 31 species of *Ponera* worldwide, most of which occur in Australia and Southeast Asia. Two species are found in North America, both have been collected in Alabama.

Key to the genus *Ponera* (Deyrup et al. 2003)

- 1 Length ~2 mm, adult workers reddish brown *Ponera exotica*
- 1' Length ~3 mm, adult workers blackish brown *Ponera pennsylvanica*

***Ponera exotica* M. R. Smith**

This small ant was first reported in North Carolina (Smith 1962) and was thought to be an introduced species due to similarities with Indo-Australian *Ponera* species. It is currently considered a native of North America due to its widespread distribution and the lack of any specimens found outside of the southeastern United States. *Ponera exotica* can be distinguished from *P. pennsylvanica* by its smaller size and lighter (reddish brown) color.

This species is found from North Carolina south to Florida, and west to Oklahoma and southwestern Texas (Mackay and Anderson 1991).

This species was collected in following localities in Alabama: **Bibb Co.** Glades Preserve; **Lawrence Co.** Prairie Grove Glades; **Sumter Co.**, Hwy 17 X Noxubee River



Map 129. *Ponera exotica*

***Ponera pennsylvanica* Buckley**

Ponera pennsylvanica can be found in rotting wood, leaf litter or under stones. Wheeler found that under artificial conditions these ants are fairly gregarious and colonies can be combined with little conflict (Wheeler 1900). This species is dark brown and larger than the other species of *Ponera* found in Alabama, *P. exotica*.

Ponera pennsylvanica is found in southern Nova Scotia south to northern Florida, and west to eastern Minnesota and northeastern Texas, with isolated collection data from North and South Dakota, Colorado and New Mexico (Taylor 1967). Specimens have also been collected from west central Mexico (Mackay and Anderson 1991)

This species was collected in the following localities in Alabama: **Bibb Co.** Blue Girth Creek, **Blount Co.** Oneonta, **Clay Co.** Talladega NF: Chinabee Trail, **DeKalb Co.** De Soto SP, **Jackson Co.** Paint Rock River, **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn, **Macon Co.** Tuskegee NF, **Monroe Co.** Hybart, **Sumter Co.** Livingston, **Tuscaloosa Co.** Tuscaloosa



Map 130. *Ponera pennsylvanicus*

SUBFAMILY PROCERATIINAE

This is a small subfamily composed of ants that are specialist predators of arthropod eggs, especially those of spiders. Both genera present in Alabama (*Proceratium* and *Discothyrea*) have unusually modified gasters in which the terminal segment is tucked under the gaster and directed forward, the function of this modification is unknown. This subfamily is found worldwide.

Members of this subfamily look similar to Ponerines except they have horizontal frontal lobes that are reduced or absent (as seen in full face view) and reveal the antennal sockets. The promesonotal suture is always absent.

Key to the Alabama genera of Proceratiinae (modified from Bolton 1994)

- 1 Mandible lacking teeth, overhung by projecting clypeus; apical funicular segment strongly bulbous *Discothyrea testacea*
- 1' Mandible with 3 or more teeth, not overhung by the clypeus; apical funicular segment moderately enlarged but not strongly bulbous *Proceratium*

Genus *Discothyrea* Roger – Pygmy egg eating ants

There is only one species of this genus found north of Mexico, *Discothyrea testacea* Roger. Colonies are usually very small and found in rotting wood, leaf litter or under objects (Deyrup et al. 2003). This genus can be found worldwide.

Members of this genus lack mandibular teeth, and their mandibles are overhung by the projecting clypeus. Also the apical funicular segment of the antenna is strongly bulbous.

Discothyrea testacea Roger

This species is found in leaf litter usually through soil extractions. It is assumed that this species feeds on spider eggs but this has yet to be confirmed.

Discothyrea testacea is found in North Carolina south to Florida and west to Oklahoma (Deyrup et al. 2003).

This species was collected in the following counties in Alabama: **Baldwin Co.** Bay Minette, **Chilton Co.** 3mi N of Mapleville, **Lauderdale Co.** Joe Wheeler SP., **Lawrence Co.** Joe Wheeler SP, **Lee Co.** Auburn



Map 131. *Discothyrea testacea*

Genus *Proceratium* Roger – Egg eating ants

Members of this genus form small colonies (10-15 workers) that nest in rotting wood or in leaf litter. These ants most likely prey on the eggs of spiders (Brown 1958). *Proceratium* species are found throughout the world.

Ants in this genus have mandibles with 3 or more teeth, which are not overhung by the clypeus. The apical funicular segment is moderately enlarged but not strongly bulbous.

Key to the genus *Proceratium* (Brown 1979, Baroni Urbani and de Andrade 2003, MacGown 2005)

- 1 Petiole rectangular; anterior border of clypeus straight; palpi formula 2,2
- 2
- 1' Petiole convex; anterior border of clypeus subconvex, rectangular, or triangular; palpi formula 3,2 or 4,3 3
- 2(1) Larger size; TL >3.7mm and HW >0.75mm; frontal area broader than 1/3 of the maximum HW *Proceratium croceum*
- 2' Smaller size; TL <3.5mm and HW <0.75mm; frontal area at most slightly more than ¼ of the maximum HW *Proceratium silaceum*
- 3(1') Gaster short and opaque, with short dense hairs *Proceratium pergandei*
- 3' Gaster longer and shiny, with longer sparser hairs *Proceratium chickasaw*

***Proceratium chickasaw* De Andrade**

This ant is similar to *P. pergandei* and it nests in rotting wood or under stones. In this species the petiole is convex and the anterior border of clypeus is subconvex, rectangular, or triangular. The palpi formula is 3,2 or 4,3 and the gaster is long and shiny, with long sparser hairs (when compared to *P. pergandei*).



Map 132. *Proceratium chickasaw*

Proceratium chickasaw is found in the southeastern US, from Georgia west to Texas. In Alabama this species was collected in the following counties: **Bibb Co.** Glades Preserve, **Mobile Co.** (Baroni Urbani and De Andrade 2003), **Lauderdale Co.** Joe Wheeler SP, **Lawrence Co.** Joe Wheeler SP, **Tuscaloosa Co.** Tuscaloosa

***Proceratium croceum* (Roger)**

This ant is found in rotten logs and stumps and colonies have up to 30 workers. The petiole of this species is rectangular and the anterior border of clypeus is straight. The palpi formula is 2,2. These ants are larger size with TL >3.7mm and HW >0.75mm, while the frontal area is broader than 1/3 of the maximum HW.

Proceratium croceum is found in Virginia south to Florida and west to Texas and Illinois (Deyrup et al. 2003)



Map 133. *Proceratium croceum*

This species was collected in the following counties in Alabama: **Baldwin Co.** Bay Minette; **DeKalb Co.** DeSoto SP, **Mobile Co.** (Baroni Urbani and De Andrade 2003), **Montgomery Co.** (Baroni Urbani and De Andrade 2003), **Tuscaloosa Co.** (Baroni Urbani and De Andrade 2003)

Proceratium pergandei (Emery)

This ant nests under stones or in rotten logs. In this species the petiole is convex and the anterior border of clypeus is subconvex, rectangular, or triangular. The palpi formula is 3,2 or 4,3 and the gaster short and opaque, with short dense hairs (when compared to *P. chickasaw*).

Proceratium pergandei is found in Massachusetts south to Florida and west to Iowa, Arkansas and Louisiana (D.R. Smith 1979).

This species was collected in Alabama in the following counties: **Lawrence Co.** Joe Wheeler SP; **Mobile Co.** (Baroni Urbani and De Andrade 2003)



Map 134. *Proceratium pergandei*

Proceratium silaceum Roger

Nests of this ant are found in rotten wood or under stones. *P. silaceum* has been observed storing and eating spider eggs (Brown 1958). This is a smaller species with a TL <3.5mm and HW <0.75mm. The frontal area is at most slightly more than ¼ of the maximum HW.

Proceratium silaceum is found in southern Ontario, south to Florida, west to Illinois and Oklahoma (D.R. Smith 1979).

This species was collected in the following counties in Alabama: **Baldwin Co.** (Baroni Urbani and De Andrade 2003), **Bibb Co.** Glades Preserve, **Tuscaloosa Co.** Tuscaloosa, **Mobile Co.** (Baroni Urbani and De Andrade 2003)



Map 135. *Proceratium silaceum*

SUBFAMILY PSEUDOMYRMECINAE

Pseudomyrmecines are distinctively elongate ants with large well-developed eyes. They are closely associated with plants, and typically nest in the stems and twigs of dead plants. These ants can be found worldwide and are particularly diverse in tropical and subtropical areas.

Tropical members of this subfamily in South America and Africa have close mutualistic relationships with many plants. In these cases the host plant offers a hollow area (domatia) for the ants to nest in. In some instances the ants will tend honeydew-producing insects for food or the plant itself will provide food bodies or extra-floral nectar. The ants in return defend their host plant from herbivores and in some cases will attack other plants that compete with their host.

These ants are elongate with large eyes that are suboval or reniform and consisting of several hundred fine ommatidia. Ocelli are present even in workers.

Genus *Pseudomyrmex* Lund

This is the only genus of the subfamily Pseudomyrmecinae found in Alabama.

These ants are common especially in dried twigs and stems.

Key to the genus *Pseudomyrmex* (modified from Ward 1985)

- 1 Head and gaster usually dark brown; small species (HW < 0.82), with deep, wide metanotal groove; dorsal face of propodeum generally shorter than declivitous face *Pseudomyrmex ejectus*
- 1' Head and gaster golden yellow to orange-brown (fourth abdominal tergite may have darker fuscous patches); generally larger in size (HW 0.68-0.96), metanotal groove usually relatively shallow; if metanotal groove deep, then dorsal face of propodeum notably longer than declivitous face 2
- 2(1') Larger species (HW 0.87-0.96); frontal carinae relatively well-separated; eyes relatively short (REL 0.43-0.48); median portion of anterior clypeal margin weakly angulate, appearing tridentate *Pseudomyrmex seminole*
- 2 Smaller species (HW 0.68-0.89); frontal carinae more closely contiguous; eyes averaging a little longer (REL 0.45-0.54); median portion of anterior clypeal margin usually straight *Pseudomyrmex pallidus*

Pseudomyrmex ejectus (F. Smith)

This small species of *Pseudomyrmex* is only found on the coastal plain in Alabama. This ant is usually dark brown and small (HW < 0.82), with a deep, wide metanotal groove. Also the dorsal face of propodeum is generally shorter than declivitous face.

Pseudomyrmex ejectus is found in the southeastern United States, south to Costa Rica (Ward 1985).

This species was collected in the following counties in Alabama: **Baldwin Co.** Bay Minette, **Geneva Co.** (Murphree 1947) **Houston Co.** Chattahoochee SP, **Lee Co.** Auburn, **Macon Co.** Tuskegee NF, **Mobile Co.** (Ward 1985), **Monroe Co.** (Ward 1985)



Map 136. *Pseudomyrmex ejectus*

Pseudomyrmex pallidus (F. Smith)

This is the most common *Pseudomyrmex* species in Alabama, it is generally found in mesic areas or near bodies of water. This ant looks similar to *P. seminole* but is smaller (HW 0.68-



Map 137. *Pseudomyrmex pallidus*

0.89) and the frontal carinae are more closely contiguous and the eyes are a little longer (REL 0.45-0.54). Also the median portion of anterior clypeal margin is usually straight.

Pseudomyrmex pallidus is found throughout the southern United States, south to Costa Rica (Ward 1985).

This species was collected in the following counties in Alabama: **Baldwin Co.** Fort Morgan, **Blount Co.** Oneonta, **Clarke Co.** Grove Hill, **Coosa Co.** Kellyton, **Dale Co.** Daleville, **Dallas Co.** 2mi W of Selma, **Lee Co.** Auburn, **Marengo Co.** Demopolis, **Mobile Co.** (Ward 1985), **Montgomery Co.** 1mi E of Montgomery, **Shelby Co.** Childersburg, **Tallapoosa Co.** Lake Martin Dam, **Washington Co.** Chatom, **Wilcox Co.** Dry Fork

Pseudomyrmex seminole Ward

This ant is uncommon in Alabama and seems to prefer a much more tropical environment. This species is larger (HW 0.87-0.96) than *P. pallidus* and has frontal carinae that are relatively well separated. The eyes are relatively short (REL 0.43-0.48) and the median portion of anterior clypeal margin is weakly angulate, appearing tridentate.

Pseudomyrmex seminole is found sporadically in the Gulf States and is most



Map 138. *Pseudomyrmex seminole*

common in southern Florida (Deyrup 2003), south to Mexico (Ward 1985). In Alabama this species was only collected in **Baldwin Co.** Bay Minette.

RESULTS

Prior to this study only 95 species of ants were recorded in Alabama. This work has added 59 new state records, bringing the total number of known ant species in Alabama to 154. These records have also been consolidated with identification keys as well as notes on natural history and distribution. Three species previously reported in Alabama are left out of this list *Forelius analis* Andre, *Camponotus pylartes fraxinicola* M.R. Smith and *Dorymyrmex pyramicus* Roger due to questions of the validity of these species (refer the descriptions of the above genera for more information). Also not included in the species total is the hybrid *Solenopsis invicta x richteri*.

DISCUSSION

This survey fills in many of the gaps in the knowledge of the ant fauna of Alabama. The current total of 154 species is more in line with the numbers found in surrounding states including Georgia with 144 (Ipser et al. 2004), Mississippi with 163 (MacGown 2005), and Florida with 218 (Deyrup 2003).

Species that were reported in previous studies but were not collected in this study or in the last 15 years include: *Solenopsis geminata*, *Solenopsis xyloni*, *Paratrechina longicornis* (exotic), *Neivamyrmex opacithorax*, *Neivamyrmex carolinensis*, *Pyramica margaritae* (exotic), *Tetramorium lanuginosum* (exotic), *Temnothorax bradleyi*, *Temnothorax smithi*, *Formica archboldi*, and *Camponotus obliquus*. Several of these species may be present but have been overlooked or are rare. Some, such as *Solenopsis xyloni*, *S. geminata* and *P. longicornis* are undoubtedly less common than they were in L.C. Murphree's day and may even have been even extirpated, presumably due to the introduction of the red and black imported fire ants.

New exotic species include *Odontomachus ruginodis*, *Tetramorium caespitum*, *Pheidole obscurithorax* and *P. moerens*. *Odontomachus ruginodis* is probably at the northern extant of its range, however the two *Pheidole* species appear to be well established and slowly spreading northward. There is no evidence that they will

displace other invasives or natives, and in fact *P. obscurithorax* appears to coexist with *S. invicta*. *Tetramorium caespitum* is most likely an introduced species that has been present in the US since the period of British colonization. The one record from north Alabama is probably the extent of its range and it is likely to be rare in the state.

Other more established invasive species include *Cyphomyrmex rimosus* and *Brachymyrmex musculus*. Since both of these species are rather cryptic and benign their introductions have largely been undocumented.

Undoubtedly the most common ant in Alabama remains *Solenopsis invicta*. This ant or the hybrid *S. invicta x richteri* was found in every county and every environment. The only places that *S. invicta* did not seem to dominate were the Appalachian mountains and isolated areas that were infested with the Argentine ant, *Linepithema humile*.

REFERENCES

- Allen, C.R. R.S. Lutz, and S. Demarais. 1995. Red imported fire ant impacts on northern bobwhite populations. *Eco. Applications* 5(3): 632-638.
- Alloway, T.M. 1979. Raiding behavior of two species of slave-making ants, *Harpagoxenus americanus* (Emery) and *Leptothorax duloticus* Wesson (Hymenoptera: Formicidae). *Anim. Behav* 27: 202-210.
- Allred, D.M. 1982. Ants of Utah. *Great Basin Nat.* 42: 415-511.
- Baroni-Urbani, C. and M.L. de Andrade. 2003. The ant genus *Proceratium* in the extant and fossil record (Hymenoptera: Formicidae). *Museo Regionale di Scienze Naturali, Monografie* 36: 1-480.
- Banks, W.A., C.T. Adams, C.S. Lofgren and D.P. Wojcik. 1990. Imported fire ant infestation of soybean fields in the southern United States. *Florida Entomol.* 73: 503-504.
- Bolton, B. 1994. Identification guide to the ant genera of the world. Harvard University Press, Cambridge, MA. 222pp.
- Bolton, B. 1995. A new general catalog of ants of the world. Harvard University Press, Cambridge, MA. 504pp.
- Bolton, B. 2000. The Ant Tribe Dacetini. *Mem. Amer. Entomol. Inst.* 65: 1-1028.
- Bolton, B. 2003. Synopsis and classification of Formicidae. *Mem. Amer. Entomol. Inst.* 71: 1-370.

Brown, W.L. 1953. Revisionary studies in the ant tribe Dacetini. Amer. Midl. Nat. 50: 1-137

Brown, W.L., Jr. 1957. Is the ant genus *Tetramorium* native in North America? Breviora 72:1-8

Brown, W.L., Jr. 1958. Predation of arthropod eggs by the genera *Proceratium* and *Discothyrea*. Psyche 64:115.

Brown, W.L., Jr. 1976. Contributions toward a reclassification of the Formicidae. Part VI. Ponerinae, tribe Ponerini, subtribe Odontomachiti. Section A. Introduction, subtribal characters. Genus *Odontomachus*. Stud. Entomol. 19:67-171.

Brown, W.L., Jr. 1979. A remarkable new species of *Proceratium*, with dietary and other notes on the genus (Hymenoptera: Formicidae). Psyche 86 : 337-346.

Buren, W.F. 1944. A list of Iowa ants. Iowa State Coll. J. Sci. 18: 277-312.

Buren, W. F. 1968. A review of the species of *Crematogaster*, *sensu stricto*, in North America (Hymenoptera: Formicidae). Part II. Descriptions of new species. J of Georgia Entomol. Soc. 3: 91-121.

Buren, W. F., G. E. Allen, W. H. Whitcomb, F. E. Lennartz, and R. N. Williams. 1974. Zoogeography of the imported fire ants. J. N. Y. Entomol. Soc. 82: 113-124.

Carlin, N.F., and D.S. Gladstein. 1989. The "bouncer" defense of *Odontomachus ruginodis* and other Odontomachine ants (Hymenoptera: Formicidae). Psyche 96: 1-19.

Carroll, J.F, J.W. Kimbrough, and W.H whitcomb. 1981. Mycophagy by *Aphaenogaster* spp. (Hymenoptera: Formicidae). Proc. Entomol. Soc. Washington 83: 326-331.

- Carter, W.G. 1962. Ant distribution in North Carolina. J. Elisha Mitchell Sci. Soc. 78:150-204.
- Chadée, D.D. and A. LeMaitre. 1990. Ants: potential vectors of hospital infections in Trinidad. Trans. R. Soc. Trop. Med. Hyg.: 84, pp 297
- Cockfield, S.D. and D.A. Potter. 1984. Predatory insects and spiders from suburban lawns in Lexington, Kentucky. Great Lakes Entomol. 17: 179-184
- Creighton, W. S. 1930. The New World species of the genus *Solenopsis* (Hymenop. Formicidae). Proc. Amer. Acad. of Arts and Sciences 66: 39-151.
- Creighton, W.S. 1950. The ants of North America. Bulletin of the Museum of Comparative Zoology. Harvard 104: 1-585.
- Czechowski, W. 1999. New data on the occurrence of ants of the subfamily Ponerinae (Hymenoptera: Formicidae) in Poland. Frag. Faun. Warsaw 42:7-10.
- Deyrup, M. 1998. Composition of the ant fauna of three Bahamian islands found in San Salvador, Bahamas, pp23-31 found in Wilson T.K. (ed.), Bahamian Field Station Proceedings of the 7th symposium on the natural history of the Bahamas.
- Deyrup, M. 2003. An updated list of Florida ants (Hymenoptera: Formicidae). Florida Entomol. 86: 43-48.
- Deyrup, M. and S.Cover. 2004. A new species of *Odontomachus* ant (Hymenoptera: Formicidae). Proc. Amer. Acad. Arts and Sciences 66:39-151
- Deyrup, M., L. Davis, and S. Cover. 2003. The Ponerine ants (Formicidae: Ponerinae) of the United States. Pamphlet from Ant Course 2003, South West Research Station, AZ
- Deyrup, M., S.Trager and N.Carlin. 1985. The genus *Odontomachus* in the southeastern United States (Hymenoptera: Formicidae). Entomol. News 96: 188-195

- Dubois, M. B. 1986. A revision of the native New World species of the ant genus *Monomorium* (*minimum* group) (Hymenoptera: Formicidae). Univ. Kansas Sci. Bull. 53: 65-119.
- Dubois, M.B. 1994. Checklist of Kansas ants. Kansas School Nat. 40 (2): 3-16
- Dubois, M.B. and L.R. Davis. 1998. *Stenamma foveolocephalum* (= *S. carolinense*) rediscovered (Hymenoptera: Formicidae: Myrmicinae). Sociobiology 32: 125-138.
- Dubois, M.B. and W.E. LaBerge. 1988. Annotated list of ants in Illinois. pp. 133-157 found in Trager, J.C. (ed.), Advances in myrmecology. Brill Pub. Company. New York, NY
- Fleetwood, S.C., P.D. Teel, and G. Thompson. 1984. The impact of imported fire ants on lone star tick mortality in open and canopied pasture habitats of east central Texas. Southwest Entomol. 9:158-163
- Forbes, S.A. 1908. Habits and behavior of the cornfield ant, *Lasius niger americanus*. Univ. Ill. Agro. Exp. Stat. Bull. 131: 29-45
- Forel, A. 1928. The social world of ants in relation with that of man, 2 volumes. Translated by C.K. Ogden. Putnam's Sons, UK, London.
- Foster, E. 1908. The introduction of *Iridomyrmex humilis* (Mayr) into New Orleans. J. Econ. Entomol. 1: 289-293
- Glancey, B. M., D. P. Wojcik, C. H. Craig, and J. A. Mitchell. 1976. Ants of Mobile county, Al., as monitored by bait transects. J. Georgia Ent. Soc 11(3): 191-197
- Gronenberg, W., J. Tautz, and B. Holddolber. 1993. Fast trap jaws and giant neurons in the ant *Odontomachus*. Science 262:561-563

- Gruner, D.S., R.A. Heu, and M.E. Chun. 2003. Two ant species (Hymenoptera: Formicidae) new to the Hawaiian Islands. Bishop Museum Occasional Papers 74: 1-6
- Hare, J.F. and T.M. Alloway. 2001. Prudent *Protomognathus* and despotic *Lepto thorax duloticus*, differential costs of ant slavery. Proc. Nat. Acad. Sci. 98: 12093-12096
- Haskins, C.P. 1931 Notes on the biology and social life of *Euponera gilva* Roger var. *harnedi* MR Smith. J. N.Y. Entomol. Soc. 38:121-126.
- Haskins, C.P. and E.V. Enzmann. 1938. Studies of certain sociological and physiological features in the Formicidae. Ann. N.Y. Acad. Sci. 37: 97-162
- Hedges, S.A. 1997. Ants. pp.502-589 found in Moreland, D.(ed.), Handbook of pest control: the behavior, life history, and control of household pests. 8th Edition. Mallis Handbook & Tech. Training Company, Cleveland, OH
- Holldobler, B. and E.O. Wilson. 1990. The ants. Harvard University Press, Cambridge, MA. 732pp.
- Hunt, J.H. and R.R. Snelling. 1975. A checklist of the ants of Arizona. J. Arizona Acad. Sci. 10: 20-23
- Ipser, R.M., M.A. Brinkman, W.A. Gardner, and H.B. Peeler. 2004. A survey of ground-dwelling ants (Hymenoptera: Formicidae) in Georgia. Florida Entomol. 87:253-260
- Johnson, C. 1988a. Colony structure and behavioral observations in *Pheidole morrisi* (Hymenoptera: Formicidae), pp. 271-383 found in Trager, J.C. Advances in myrmecology. Brill Pub. Company. New York, NY
- Johnson, C. 1988b. Species identification in the eastern *Crematogaster*. J. Entomol. Sci. 23: 314-322.

- Johnston, A.B. and E.O. Wilson. 1985. Correlates of variation in the major/minor ratio of the ant, *Pheidole dentata* (Hymenoptera: Formicidae). Ann. Entomol. Soc. Amer. 78: 8-11
- Just, S. and W. Gronenberg. 1999. The control of mandible movements in the ant *Odontomachus*. J. Insect Physiol. 45: 231-240
- Kaplan, I., and M.D. Eubanks. 2002. Disruption of cotton aphid (Homoptera: Aphididae)-natural enemy dynamics by red imported fire ants (Hymenoptera: Formicidae). Envir. Entomol. 31:1175-1183
- Kim, B.J., J.H. Kim, and K.G. Kim, 1998. Systematic study of Ponerinae (Hymenoptera: Formicidae) from Korea. Korean J. Entomol. 28: 145-154
- Klotz, J.H. 1984. Diel differences in foraging in two ant species (Hymenoptera: Formicidae). J. Kansas Entomol. Soc. 57: 111-118
- Longino, J.T. 2005. The Ants of Costa Rica (website accessed: April 2005)
evergreen.edu/ants/AntsofCostaRica.html
- MacGown, J. 2005. Mississippi Entomological Museum (website accessed: April 2005)
msstate.edu/org/mississippientmuseum/Researchtaxapages/Formicidaehome.html
- MacKay, W. P. 1993. A review of the New World ants of the genus *Dolichoderus* (Hymenoptera: Formicidae). Sociobiology 22: 1-148.
- MacKay, W.P. 2000. A review of the New World ants of the subgenus *Myrafant*, (Genus *Leptothorax*)(Hymenoptera: Formicidae). Sociobiology 36: 165-444
- MacKay, W.P. and R.S. Anderson. 1991. New Distribution records for the ant genus *Ponera* (Hymenoptera: Formicidae) in North America. J. N.Y. Entomol. Soc 99: 696-699

- MacKay, W.P. and E. MacKay. 2002. The ants of New Mexico (Hymenoptera: Formicidae). Edwin Mellen Press. Lewiston, NY, USA. 398 pp.
- MacKay, W.P. and E. MacKay. 2005. The ants of North America.(website accessed: April 2005) www.utep.edu/leb/antgenera.htm
- Martinez, M.J. 1997. The first record of the ant *Pheidole moerens* Wheeler from western United States (Hymenoptera: Formicidae). Pan. Pac. Entomol. 73: 1-46
- Masuko, K. 1985. Studies on the predatory biology of oriental dacetine ants (Hymenoptera: Formicidae). Insect. Soc 31: 429-451
- Masuko, K. 1995. Specialized predation on oribatid mites by two species of the ant genus *Myrmecina* (Hymenoptera: Formicidae). Psyche 101: 159-173
- Moser, J.C. and M.S. Blum. 1960. The Formicidae of Louisiana. Insect Conditions La. 3: 48-50
- Mueller, U.G., S.A. Rehner, and T.R. Schultz. 1998. The evolution of agriculture in ants. Science 281: 2034-2038
- Murphree, L. C. 1947. Alabama ants, description, distribution, and biology, with notes on the control of the most important household species. M. S. Thesis, Mississippi State College, State College. 144 pp.
- Naves, M.A. 1985. A Monograph of the genus *Pheidole* in Florida, USA (Hymenoptera: Formicidae). Insecta Mundi 1:53-90
- Nuhn, T.P. 1977. A survey of the ants (Hymenoptera: Formicidae) on the campus of North Carolina State University at Raleigh. M.S. thesis, North Caroline State University. 47pp.

- Pass, B.C. 1960. Bionomics of the imported fire ant, *Solenopsis saevissima richteri* Forel. M.S. Thesis. Auburn University, Auburn, AL, 65pp.
- Paul, J. 2001. Mandible movements in ants. Comp. Biochem. Physio. Part A 131: 7-20.
- Powell, C.E. 1937. The ants of North Carolina and their guests. M.S. Thesis, Duke University. 54pp.
- Rees D.M. and A.W. Grundmann. 1940. A preliminary list of the ants of Utah. Bull.Univ. Utah Biol. Serv. 31: 3-12
- Rojas-Fernandez, P. and C. Fragosa. 1994. The ant fauna (Hymenoptera: Formicidae) of the Mapimi Biosphere Reserve, Durango, Mexico. Sociobiology 24: 47-75
- Ruhren, S. and M.R. Dudash. 1996. Consequences of the timing of seed release of *Erythronium americanum* (Liliaceae), a deciduous forest myrmecochore. Amer. J. Bot. 83: 633-640
- Schmidt, J.O. 1990. Hymenopteran Venoms: Striving Toward the Ultimate Defense Against Vertebrates, pp. 387-419 found in Evans, D.L., and J.O. Schmidt (eds.), Insect Defenses, Adaptive Mechanisms and Strategies of Prey and Predators . State Univ. of New York Press, Albany, NY.
- Smith, D.R. 1979. Formicoidea, pp.1323-1467 found in Krombein, K.V., P.D. Hurd, D.R. Smith, and D.R. Burks (eds.), Catalog of Hymenoptera north of Mexico. 2. Apocrita (Aculeata). Smithsonian Press, Washington D.C.
- Smith, M.R. 1928. An additional annotated list of the ants of Mississippi. with a description of a new species of *Aphaenogaster* (Hymenoptera.: Formicidae). Entomol. News 39: 246-279

- Smith, M. R. 1932. An additional annotated list of the ants of Mississippi (Hym.: Formicidae). Entomol. News 42: 157-160.
- Smith, M.R. 1934. Ponerine ants of the genus *Euponera* in the United States. Ann. Entomol. Soc. Amer. 27: 557-564.
- Smith, M.R. 1936. Distribution of the Argentine ant in the United States and suggestions for its control or eradication. U. S. Dep. Agric. Circular #387, 39 pp.
- Smith, M.R. 1937. The ants of Puerto Rico. J. Agr. Univ. Puerto Rico 20: 819-875.
- Smith, M. R. 1942. The Legionary ants of the United States belonging to *Eciton* subgenus *Neivamyrmex* Borgmeier. Amer. Midl.Nat. 27: 537-590.
- Smith, M. R. 1957. Revision of the genus *Stenamma* Westwood in America north of Mexico (Hymenoptera: Formicidae). Amer. Midl. Nat. 57: 133-174.
- Smith, M.R. 1962. A new species of exotic *Ponera* from North Carolina. Acta Hymenopterologica 1:377-382
- Snelling, R.R. 1988. Taxonomic notes on Nearctic species of *Camponotus*, subgenus *Myrmentoma* (Hymenoptera: Formicidae), pp. 55-78 found in Trager, J. (ed.), Advances in myrmecology. Brill Pub. Company. New York, NY
- Snelling, R.R. 1995. Systematics of Nearctic ants of the genus *Dorymyrmex* (Hymenoptera: Formicidae). Contributions in Sci. 454: 1-14
- Storz S.R. and W.R. Tschinkel. 2004. Distribution, spread, and ecological associations of the introduced ant *Pheidole obscurithorax* in the southeastern United States. J. Insect Sci. 4:12-23.
- Talbot, M 1943. Response of the ant *Prenolepis imparis* to temperature and humidity changes. Ecology 24:345-352

- Talbot, M. 1954. Populations of the ant *Aphaenogaster (Attomyrma) treatae* Forel on abandoned fields on the Edwin S. George Reserve. Contrib. from the Laboratory of Vert. Biology of the Uni. of Michigan 69: 1-9
- Talbot, M. 1957. Populations of ants in a Missouri woodland. Insect. Soc. 4:375-384.
- Taylor, R.W. 1967. A monographic revision of the ant genus *Ponera* Latrielle (Hymenoptera: Formicidae). Pac. Insects Monographs 13: 1-112
- Thompson, C.R. 1989. The thief ants, *Solenopsis molesta* group, of Florida (Hymenoptera: Formicidae). Florida Entomol. 72(2): 268-283.
- Tinaut, A. and D. Martinez-Ibanez. 1998. Nuevos datos para la fauna Iberica de hormigas. I Ponerinae y Formicinae (Hym. Formicidae). Bol. Asoc. Esp. Entomol 22: 233-236
- Trager, J. C. 1984. A revision of the genus *Paratrechina* (Hymenoptera: Formicidae) of the continental United States. Sociobiology 9: 49-162.
- Trager, J. C. 1988. A revision of the *Conomyrma* (Hymenoptera: Formicidae) from the southeastern United States, especially Florida, with keys to the species. Florida Entomol. 71: 11-29.
- Trager, J. C. 1991. A revision of the fire ants, *Solenopsis geminata* group (Hymenoptera: Formicidae: Myrmicinae). J. N.Y. Entomol. Soc. 99: 142-198
- Trager, J.C. 1997. A preliminary list of ants of the St. Louis region. American Museum of Natural History (website accessed May 2004)
research.amnh.org/entomology/social_insects/invtragerlab.html

- Trager, J.C., J.A. MacGown, and M.D. Trager. 2005. Revision of the Nearctic endemic *Formica pallidefulva* group (Hymenoptera: Formicidae: Formicinae). Mem. Amer. Entomol. Inst. In Press.
- Tschinkel, W.R. 1987. Seasonal life history and nest architecture of a winter-active ant, *Prenolepis imparis*. Insect. Soc. 34: 143-164.
- Tschinkel, W.R. 1999. Sociometry and sociogenesis of colony-level attributes of the Florida harvester ant (Hymenopter: Formicidae). Ann. Entomol. Soc. Amer 92: 80-89
- Tschinkel, W.R. and C.A. Hess. 1999. Arboreal ant community of a pine forest in northern Florida. Ann. Entomol. Soc. Amer. 92: 63-70
- Umphrey, G.J. 1996. Morphometric discrimination among sibling species in the fulvrudis-texana complex in the ant genus *Aphaenogaster* (Hymenoptera: Formicidae). Canadian J. Zool. 74: 528-559
- Van Pelt, A.F. Jr. 1958. The ecology of the ants of Welaka Reserve, Florida (Hymenoptera: Formicidae). Part II. Annotated list. Amer. Midl. Nat. 59: 1-57.
- Van Pelt, A.F. Jr. and J.B. Gentry. 1985. The ants (Hymenoptera: Formicidae) of the Savannah River Plant, South Carolina. Report SRO-NERP-14, Dept. Energy, Savannah River Eco. Lab. Aiken, SC. 56pp.
- Vinson S.B. and A.A. Sorenson. 1986. Imported Fire Ants: Life History and Impact. The Texas Department of Agriculture, Austin, TX. 28pp.
- Ward, P.S. 1985. The Nearctic species of the genus *Pseudomyrmex* (Hymenoptera: Formicidae). Quaestiones Entomologicae 21:209-246.

Ward, P.S. 1987. Distribution of the introduced Argentine ant (*Iridomyrmex humilis*) in natural habitats of the lower Sacramento Valley and its effects on the indigenous ant fauna. *Hilgardia* 55(2): 1-16.

Watkins, J.F. 1985. The identification and distribution of the army ants of the United States of American (Hymenoptera, Formicidae, Ecitoninae). *J. Kansas Entomol. Soc.* 58(3): 479-502.

Wheeler, G.C., and J.N. Wheeler. 1978. *Brachymyrmex musculus*, a new ant in the United States. *Entomol. News* 7: 189-190.

Wheeler, G.C. and J.N. Wheeler. 1985. A checklist of Texas ants. *Prairie Nat.* 17: 49-64.

Wheeler, G.C. and J.N. Wheeler. 1986. The ants of Nevada. Natural History Museum of Los Angeles County, Los Angeles, CA. 138pp.

Wheeler, G.C. and J.N. Wheeler. 1987. A checklist of the ants of South Dakota. *Prairie Nat.* 19: 199-208

Wheeler, G.C. and J.N. Wheeler. 1988. A checklist of the ants of Wyoming (Hymenoptera: Formicidae). *Insecta Mundi* 2: 231-239

Wheeler, G.C., J.N. Wheeler, and P.B. Kannowski. 1994. Checklist of the ants of Michigan (Hymenoptera: Formicidae). *Great Lakes Entomol.* 26: 297-310

Wheeler, W.M. 1900. The habits of *Ponera* and *Stigmatomma*. *Biol. Bull.* 2:43-69

Wheeler, W.M. 1918. Ants collected in Georgia by Dr. J.C. Bradley and Mr. W.T. Davis. *Psyche*: 112-117

Wilson, E. O. 1950. A new *Leptothorax* from Alabama (Hymenoptera: Formicidae). *Psyche* 57: 128-130.

Wilson, E.O. 1975. Enemy specification the alarm recruitment system of an ant. *Science* 190: 798-800

Wilson, E.O. 1976a. Organization of colony defense in the ant *Pheidole dentata* Mayr (Hymenoptera: Formicidae). *Behav. Ecol. Sociobiol.* 1:63-81

Wilson, E.O. 1976b. Which are the most prevalent ant genera? *Stud. Entomol.* 19: 187-200

Wilson, E.O. 2003. *Pheidole* in the New World. Harvard University Press. Cambridge, MA. 794pp.

Wilson, E.O., and R.W. Taylor. 1967. The ants of Polynesia. *Pac. Insects Monog.* 14: 1-109

Yensen, N.P., W.H. Clark, and A. Francoeur. 1977. A checklist of Idaho ants (Hymenoptera: Formicidae). *Pan Pac. Entomol.* 53: 181-187