

**The Fauna of Gopher Tortoise Burrows**—Beginning with the pioneering studies of Hubbard (1894, 1896), the importance of gopher tortoise (*Gopherus polyphemus*) burrows to the vertebrate and invertebrate faunas of xerophytic habitats in the southeastern United States has been thoroughly documented, and our knowledge continues to grow yearly as new techniques are employed to study this unique microenvironment. The tortoise burrow system, including its excavated sand mound, offers this diverse biota a shelter and retreat from stressful environmental conditions (cold, heat, light, fire, aridity, predation), a site for feeding or reproduction, and even a permanent microhabitat for one or all life stages. Tortoise fecal material, which may accumulate near the burrow terminus, supports a distinct community of microorganisms and insects.

Although numerous scientific papers treat one or more species of the tortoise's burrow associates, most such accounts have received limited circulation, and no comprehensive published list of the fauna currently known to use gopher tortoise burrows is available. The purpose of this note is to compile a single inclusive list of these animals so that they can be considered in gopher tortoise management and relocation efforts. In this respect, particular attention should be given to those species that are believed to maintain a commensal relationship with the tortoise. Like the tortoise, many of these species are included on state agency lists of rare and threatened species.

As the once vast expanses of southeastern xeric habitat are subjected to human alteration, remaining gopher tortoise populations are becoming increasingly isolated. As a result, even the most vagile of terrestrial and fossorial species, which once could migrate freely across continuous habitat to establish themselves in new tortoise colonies, may no longer be able to do so. Moreover, the wingless condition of many of the invertebrates associated with tortoise burrows already limits their dispersal capabilities. Whereas some of the vertebrates and larger winged invertebrates (e.g., dung beetles: *Onthophagus* and *Aphodius*; and scat fly: *Eutrichota gopheri*) may migrate successfully between isolated locations, many of the small, fragile, flying or flightless species may be unable to transfer. In a number of previous tortoise relocation efforts, subsequent studies showed that only a few large species of invertebrates had migrated, even after several years. Therefore, if gopher tortoises are to be relocated into areas that for some reason have no or very few tortoises, it may be necessary, depending upon the results of faunal surveys of recipient sites, to relocate the burrow-associated fauna (and in some cases the native upland flora) as well. Otherwise, even though relocation efforts might succeed in preserving some populations of an important and declining species of reptile, much of the true character of our native xeric ecosystems will have been lost.

While we remain uncertain about the actual number

of burrow-associated species, we know even less about their ecological roles in the burrow system. The Florida mouse may aid plant dispersal and propagation by carrying acorns and pine cones into the burrow, where the moist environment might facilitate germination. Significant contributions to soil mixing and nutrient recycling are probably made by invertebrates occupying the burrow. Many of the beetles bury tortoise dung, and most other insects in the burrow have one or more fossorial life stages. The burrow entrance accumulates large quantities of leaves and other debris that quickly decompose from the activities of commensals and other soil/humus dwellers in this humid microenvironment. Decomposition appears to occur at a higher rate within than outside the burrow (Milstrey, 1987).

The impacts of invertebrates on the parasite loads of burrow-inhabiting vertebrates is likewise unknown but may be significant. In burrows outside of Florida, and in areas where burrow commensals are not numerous, large quantities of scat often accumulate in and around the burrows. In contrast, in burrows hosting a diverse community of insects, tortoise scat is consumed almost as rapidly as it is generated (Milstrey, 1987). The role of insects, especially scarab beetles, in the prompt disposal of feces is reportedly important to controlling intestinal parasite loads in pastured cattle. A similar relationship may exist for the gopher tortoise. Knipling (1937) reported that 25% of tortoises collected in Georgia were parasitized, in some cases fatally, by the flesh fly, *Sarcophaga cistudinis*. This level of parasitism has not been observed in Florida study sites with robust insect communities. The difference may be due to higher numbers of insect predators in the burrows or to substantially lower quantities of decaying excrement, which is known to attract sarcophagid flies.

Although the purpose of this note is to encourage inclusion of burrow associates along with tortoises in relocation efforts, a word of caution is in order. The ecological or spatial requirements of a given species of burrow associate may extend beyond that which can be satisfied by the tortoise's upland habitat alone. Obviously, there is no value in relocating gopher frogs, *Rana areolata*, into pristine sandhills habitat if no appropriate ponds are available within a few km for breeding. Likewise, a viable population of the eastern indigo snake, *Drymarchon corais couperi*, may require a much larger area of habitat than has been set aside as a recipient site for relocated tortoises. Furthermore, much of the tortoise burrow community comprises an ecologically intimate food web, and it may be that relocation of selected members but not others from that web would be a futile exercise. For example, *Ceuthophilus* crickets and other burrow-dwelling invertebrates are known to be important foods of gopher frogs and Florida mice, respectively (Milstrey, 1986, unpublished data), so that the success of attempts to relocate these vertebrates may depend upon the ability to relocate certain prey species as well.

Microhabitat differences might also be crucial; in a comparison of invertebrate communities associated with tortoises inhabiting upland vs. pine flatwoods habitats, Milstrey (1986, 1987) found dramatic differences in both species composition and numbers. Unfortunately, we know very little of the biology of most burrow associates; studies such as those of Diemer and Speake (1983), Eisenberg (1983), Franz (1986a), and Milstrey (1986) are crucial to effective management of the burrow-associated fauna.

For all of the reasons cited above, we recommend, to the extent feasible, a holistic or community-level rather than a single-species approach in gopher tortoise relocation projects.

To date, 60 vertebrate (Table 1) and 302 invertebrate (Table 2) species have been recorded from gopher tortoise burrows, and certainly many more await discovery, especially among the invertebrates. To our knowledge, no systematic survey of invertebrates other than arthropods has even been attempted, and, in fact, studies of the latter group have been confined principally to one small geographic area (Alachua and Putnam Counties, Florida). It would not be surprising if the burrows of tortoises in southern Florida, where pressure to relocate is especially high, may house a number of previously undescribed species of invertebrates. Southern Florida, particularly the Lake Wales Ridge, may have served as a refugium for the gopher tortoise and its burrow community during the Pleistocene, when Florida and much of the tortoises' known range were inundated by high sea levels. Casual observations and collections by University of Florida researchers (including EGM) in Georgia, South Carolina, Mississippi and northern Florida have revealed fewer commensal invertebrates as burrows are sampled toward the extremes of the tortoise's range. Further investigations of invertebrate use of tortoise burrows outside of Florida are encouraged (Mr. Paul Lago currently is conducting one such study in Mississippi). Distributional surveys of all species of tortoise burrow associates are sorely needed so that any attempts to relocate such species will be geographically appropriate. Except under unusual circumstances, no burrow associate should be relocated beyond its known range.

In the accompanying tables, which are arranged phylogenetically, we have attempted to indicate the degree of association of each species with gopher tortoise burrows. Commensals are known or believed to depend intimately upon tortoise burrows, at least in some parts of their ranges; for some invertebrates the relationship may be obligatory (Young and Goff, 1939; Woodruff, 1982). At least for some vertebrates, such as the eastern indigo snake, the degree of association is known to vary geographically. Taxa for which we found at least 10 records of burrow use, or for which anecdotal reports are especially numerous, are categorized as frequent occupants. Insufficient data are available to categorize many species; it is likely that most use burrows only infre-

quently (includes accidental and casual categories of some authors) or occasionally, although additional studies may reveal frequent or even commensal use. For all taxa we have provided at least one source of documentation. References cited in the tables are not comprehensive but rather are intended to serve as useful starting points for readers who may wish to pursue additional information about the species or the various methods (e.g., digging, trapping, vacuuming) of determining their presence and effecting their safe removal. Higher taxa for vertebrates follow Banks et al. (1987).

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Table 1. Vertebrates reported from the burrow system (including excavated sand mound at entrance) of the gopher tortoise, *Gopherus polyphemus*. Category designations include known or suspected commensals (C) and frequent burrow occupants (F). Species that recently have expanded their ranges or been introduced into all or part of the tortoise's range are indicated by asterisks.

Scientific Name	Common Name	Category	Source
<b>AMPHIBIA</b>			
CAUDATA: SALAMANDRIDAE			N
<i>Notophthalmus viridescens</i>	eastern newt		
ANURA: PELOBATIDAE			N,R
<i>Scaphiopus holbrookii</i>	eastern spadefoot		
ANURA: LEPTODACTYLIDAE			I
<i>Eleutherodactylus planirostris*</i>	greenhouse frog		
ANURA: BUFONIDAE			N
<i>Bufo americanus</i>	American toad		G,J,N,R
<i>Bufo terrestris</i>	southern toad		N,T,
<i>Bufo woodhousii</i>	Woodhouse's toad		
ANURA: HYLIDAE			G
<i>Acris gryllus</i>	southern cricket frog		
ANURA: MICROHYLIDAE			G,N,R
<i>Gastrophryne carolinensis</i>	eastern narrow-mouthed toad		
ANURA: RANIDAE		C	E,F,G,J,N,R,T
<i>Rana areolata</i>	gopher frog		
<b>REPTILIA</b>			
CROCODILIA: ALLIGATORIDAE			S
<i>Alligator mississippiensis</i>	American alligator		
TESTUDINES: EMYDIDAE			N,P,T
<i>Terrapene carolina</i>	eastern box turtle		
SQUAMATA: IGUANIDAE			G,P,R
<i>Anolis carolinensis</i>	green anole	F	G,Q,R
<i>Sceloporus undulatus</i>	eastern fence lizard		O
<i>Sceloporus woodi</i>	Florida scrub lizard		
SQUAMATA: TEIIDAE		F	G,J,N,R
<i>Cnemidophorus sexlineatus</i>	six-lined racerunner		
SQUAMATA: SCINCIDAE			S
<i>Eumeces egregius</i>	mole skink		G
<i>Eumeces inexpectatus</i>	southeastern five-lined skink		N
<i>Eumeces laticeps</i>	broad-headed skink		S
<i>Neoseps reynoldsi</i>	sand skink		G,R
<i>Scincella lateralis</i>	ground skink		
SQUAMATA: COLUBRIDAE			G
<i>Cemophora coccinea</i>	scarlet snake		J,N
<i>Coluber constrictor</i>	black racer	F/C	D,G,N,T
<i>Drymarchon corais couperi</i>	eastern indigo snake		G,P
<i>Elaphe guttata</i>	red rat snake		G,N,P
<i>Heterodon platyrhinos</i>	eastern hog-nosed snake	F	G,N,P,T
<i>Masticophis flagellum</i>	eastern coachwhip	F	F,G,N,T
<i>Pituophis melanoleucus</i>	pine snake		S
<i>Tantilla relicta</i>	Florida crowned snake		G
<i>Thamnophis sirtalis</i>	eastern garter snake		
SQUAMATA: ELAPIDAE			G
<i>Micrurus fulvius</i>	eastern coral snake		

Table 1 (continued)

Scientific Name	Common Name	Category	Source
<b>SQUAMATA: VIPERIDAE</b>			
<i>Agkistrodon piscivorus</i>	cottonmouth	F	P
<i>Crotalus adamanteus</i>	eastern diamondback rattlesnake	F	G,N,P,R,T N
<i>Sistrurus miliarius</i>	pigmy rattlesnake		
<b>AVES</b>			
<b>GALLIFORMES: PHASIANIDAE</b>			
<i>Colinus virginianus</i>	northern bobwhite	F	N,P,T R
<i>Meleagris gallopavo</i>	wild turkey		
<b>STRIGIFORMES: STRIGIDAE</b>			
<i>Athene cunicularia floridana</i>	Florida burrowing owl	F	Q,T
<b>PASSERIFORMES: TROGLODYTIDAE</b>			
<i>Thryothorus ludovicianus</i>	Carolina wren		N,T
<b>PASSERIFORMES: MUSCICAPIDAE</b>			
<i>Turdus migratorius</i>	American robin		P
<b>PASSERIFORMES: EMBERIZIDAE</b>			
<i>Aimophila aestivalis</i>	Bachman's sparrow		P,R R
<i>Pipilo erythrophthalmus</i>	rufous-sided towhee		
<b>MAMMALIA</b>			
<b>MARSUPIALIA: DIDELPHIDAE</b>			
<i>Didelphis virginiana</i>	Virginia opossum		N,P,R,T
<b>EDENTATA: DASYPODIDAE</b>			
<i>Dasypus novemcinctus*</i>	nine-banded armadillo	F	P,Q
<b>CARNIVORA: CANIDAE</b>			
<i>Canis familiaris*</i>	domestic dog		C T
<i>Canis latrans*</i>	coyote		N,T
<i>Urocyon cinereoargenteus</i>	gray fox		H,N,T,U
<i>Vulpes vulpes*</i>	red fox		
<b>CARNIVORA: PROCYONIDAE</b>			
<i>Procyon lotor</i>	raccoon		N,R,T
<b>CARNIVORA: MUSTELIDAE</b>			
<i>Mephitis mephitis</i>	striped skunk		J,N,P,T Y
<i>Mustela frenata</i>	long-tailed weasel		Y,Z
<i>Spilogale putorius</i>	spotted skunk		
<b>CARNIVORA: FELIDAE</b>			
<i>Lynx rufus</i>	bobcat		U
<b>RODENTIA: SCIURIDAE</b>			
<i>Sciurus niger</i>	fox squirrel		R
<b>RODENTIA: MURIDAE</b>			
<i>Mus musculus*</i>	house mouse		N,T H
<i>Neotoma floridana</i>	eastern woodrat		X
<i>Ochrotomys nuttalli</i>	golden mouse		
<i>Peromyscus gossypinus</i>	cotton mouse	F	N,P,T N,T
<i>Peromyscus polionotus</i>	oldfield mouse		
<i>Podomys (=Peromyscus) floridanus</i>	Florida mouse	C	E
<i>Sigmodon hispidus</i>	hispid cotton rat	F	N,P,T
<b>LAGOMORPHA: LEPORIDAE</b>			
<i>Sylvilagus floridanus</i>	eastern cottontail		N,T

Table 2. Invertebrates reported from the burrow system (including excavated sand mound at entrance) of the gopher tortoise, *Gopherus polyphemus*. Category designations include known or suspected commensals (C) and frequent burrow occupants (F).

Scientific Name	Common Name	Category	Source
<b>GASTROPODA</b>			
POLYGRIDAE	land snails		R
<i>Praticolella bakeri</i>			
ZONITOIDAE	land snails		R
<i>Glyphyalinia dalliana</i>			R
<i>Glyphyalinia indentata</i>			R
<i>Zonitoides arboreus</i>			R
<i>Hawaiiia minuscula</i>			
<b>MALACOSTRACA</b>			
DECAPODA: CAMBARIDAE			
<i>Procambarus</i> cf. <i>P. alleni</i>	freshwater crayfish		a
<b>ARACHNIDA</b>			
PEDIPALPIDA: THELYPHONIDAE			
<i>Mastigoproctus giganteus</i>	giant whip scorpions		V
PSEUDOSCORPIONIDA: CHERNETIDAE			
<i>Chelanops affinis</i>	pseudoscorpions	C	R,V
PHALANGIDA: PHALANGODIDAE			
<i>Crosbyella</i> sp.	harvestmen	C	R,V
ARANEAE: CTENIZIDAE			
<i>Ummidia</i> sp.	trapdoor spiders		R
ARANEAE: DICTYNIDAE			
<i>Dictyna</i> sp.	dictynid spiders		R
ARANEAE: GNAPHOSIDAE			
<i>Callilepis</i> sp.	gnaphosid spiders		R
<i>Zelotes limnophilus</i>			R
<i>Gnaphosa sericata</i>			R
ARANEAE: CLUBIONIDAE			
<i>Trachelas</i> sp.	sac spiders		R
<i>Scotinella</i> sp.			R
<i>Castianeira trilineata</i>	ant mimic spider		R
<i>Castianeira gertschi</i>	ant mimic spider		R
<i>Phrurotimpus</i> sp.			
ARANEAE: ANYPHAENIDAE			
<i>Aysha</i> sp.	anyphaenid spiders		R
ARANEAE: PHILODROMIDAE			
<i>Philodromus</i> sp.	crab spiders		R
ARANEAE: THOMISCIDAE			
<i>Ozyptila</i> sp.	crab spiders		R
<i>Xysticus</i> sp.			R
ARANEAE: SALTICIDAE			
<i>Thioclina</i> sp.	jumping spiders		R
<i>Corythalia canose</i>			R
<i>Habrocestum bufoides</i>			R
<i>Habrocestum xerophilum</i>			R
<i>Habrocestum</i> sp.			R
<i>Habronattus</i> n. sp.			R
<i>Habronattus</i> sp.			R
ARANEAE: LYCOSIDAE			
	wolf spiders		

Table 2 (continued)

Scientific Name	Common Name	Category	Source
<i>Lycosa carolinensis</i>		C/F	R,V
<i>Lycosa rabida</i>		F	V
<i>Lycosa timuqua</i>		F	R
ARANEAE: LYCOSIDAE (continued)			
<i>Lycosa</i> sp.		F	R
<i>Pirata spiniger</i>			R,V
<i>Pirata</i> sp.		F	R
<i>Sosippus janus</i> Brady			R
<i>Sosippus</i> sp.			R
ARANEAE: AGELENIDAE	funnel weavers		R
<i>Agelenopsis</i> sp.			R
ARANEAE: HAHNIIDAE	funnel weavers		R
<i>Neoantistea alachua</i>			R
<i>Neoantistea magna</i>			R
<i>Neoantistea</i> sp.			R
ARANEAE: THERIDIIDAE	cobweb weavers		
<i>Latrodectus mactans</i>	black widow spider	F	C,P,R
<i>Steatoda</i> sp.			R
<i>Argyrodes</i> cf. <i>A. trigonum</i> ?			R
<i>Achaearenea porteri</i>			R
ARANEAE: ARANEIDAE	orb-weavers		R
<i>Hypsosinga rubens</i>			R
ARANEAE: LINYPHYIIDAE	sheet-web spiders		R
<i>Florinda coccinea</i>			R
<i>Ceratinops crenata</i>			R
<i>Ceratielus</i> cf. <i>C. paludigera</i>			R
<i>Lepthyphantes</i> sp.			R
<i>Eperingone</i> sp.			R
ACARI: MESOSTIGMATA: MACROCHELIDAE	mites (predaceous)		
<i>Macrocheles dimidiatus</i> s. lat.		C	R
<i>Macrocheles</i> : three new species		C	R
ACARI: MESOSTIGMATA: EVIPHIDIDAE	mites (predaceous)		
<i>Alliphis</i> sp.		C?	R
ACARI: MESOSTIGMATA: DIPLOGYNIIDAE	mites (hister phoretic)		
<i>Brachysternum</i> sp.		C	R
ACARI: MESOSTIGMATA: LAELAPIDAE	mites (parasitic)		
<i>Haemolaelaps glascowi</i>		C	R
<i>Androlaelaps fahrenheitzi</i>		C	R
<i>Hypoaspis (Gaeolaelaps)</i> sp.		C	R
ACARI: MESOSTIGMATA: MACRONYSSIDAE	mites (parasitic)		
<i>Ornithonyssus bacoti</i>		C	R
ACARI: IXODIDA: ARGASIDAE			
<i>Ornithodoros turicata americanus</i>	relapsing fever tick	C	Q,R
ACARI: IXODIDA: IXODIDAE			
<i>Ixodes scapularis</i>	black-legged tick		R
<i>Amblyomma tuberculatum</i>	gopher tortoise tick	C	Q,R
<i>Amblyomma maculatum</i>	Gulf Coast tick		R
ACARI: ACTINEDIDA: CHEYLETIDAE	mites (predaceous)		
<i>Eucheyletia bishoppi</i> Baker		C	R
ACARI: ACTINEDIDA: CAECULIDAE	rake-legged mites		
<i>Microcaeculus</i> n. sp.		F	R

Table 2 (continued)

Scientific Name	Common Name	Category	Source
ACARI: ACTINEDIDA: TROMBIDIIDAE two species	mites (insect parasites)		R
ACARI: ACTINEDIDA: TROMBICULIDAE <i>Eutrombicula cinnabaris</i>	chiggers		R
<i>Parasecia gurneyi</i>			R
<i>Walchia americana</i>			R
ACARI: ACARIDIDA: LISTROPHORIDAE <i>Prolistophorus sparsilineatus</i>	fur mites	C	R
ACARI: ORIBATIDA: EUPHTHRIACARIDAE <i>Rhysotritia ardua</i>	soil mites		R
ACARI: ORIBATIDA: NOTHRIDAE <i>Nothrus carolinae</i>	soil mites		R
ACARI: ORIBATIDA: LIODIDAE <i>Liodes floridensis</i>	soil mites		R
ACARI: ORIBATIDA: GYMNODAMAEIDAE <i>Allodamaeus</i> sp.	soil mite		R
ACARI: ORIBATIDA: DAMAEIDAE <i>Lanibelba pini</i>	soil mites		R
ACARI: ORIBATIDA: TECHOCEPHAIDAE <i>Tectocepheus</i> sp.	soil mites		R
ACARI: ORIBATIDA: OPPIIDAE <i>Aeroppia floridana</i>	soil mites		R
ACARI: ORIBATIDA: TEGROBATIDAE <i>Eremgeozetes</i> sp.	soil mites		R
ACARI: ORIBATIDA: GALUMNIDAE <i>Pilogalumna</i> aff. <i>P. tenuiclava</i>	soil mites		R
ACARI: ORIBATIDA: ORIBATULIDAE <i>Scheloribates</i> sp.	soil mites		R
ACARI: ORIBATIDA: CHAUNOPROCTIDAE <i>Xylobates</i> sp.	soil mites		R
<b>CHILOPODA</b>			
SCOLOPENDROMORPHA one species	centipedes	F	R
LITHOBIOMORPHA one species	stone centipedes	F	R
<b>DIPLOPODA</b>			
SPIROBOLIDAE <i>Chicobolus spingerus</i>	millipedes	F	R
<i>Narceus</i> sp.		F	R
CASIOPETALIDAE <i>Abacion</i> sp.	millipedes	F	R
<b>INSECTA</b>			
ORTHOPTERA: GRYLLACRIDIDAE <i>Ceuthophilus latibuli</i>	wingless (cave) crickets	F	V
<i>Ceuthophilus walkeri</i>		C/F	R,V
ORTHOPTERA: TETRIGIDAE one species	pygmy grasshoppers		R



Table 2 (continued)

Scientific Name	Common Name	Category	Source
ORTHOPTERA: PHASMATIDAE	walkingsticks		
<i>Anisomorpha buprestoides</i>			R
ORTHOPTERA: BLATTELLIDAE	cockroaches		
<i>Parcoblatta</i> sp.	wood coackroach	F	R
HETEROPTERA: REDUVIIDAE	assassin bugs		
<i>Ploiaria carolina</i>			R
HETEROPTERA: CYDNIDAE	burrower bugs		
<i>Tominotus communis</i>		F	R
NEUROPTERA: MYRMELEONTIDAE	antlions		
<i>Myrmeleon carolinus</i>			R
<i>Myrmeleon mobilus</i>			R
<i>Glenurus gratis</i>		C/F	R
COLEOPTERA: CARABIDAE	ground beetles		
two species			R
COLEOPTERA: STAPHYLINIDAE	rove beetles		
<i>Bledius wudus</i>		F	R
<i>Pinophilus confusus</i>			R
<i>Megalopinus rufipes</i>			R
<i>Astenus linearis</i>			R
<i>Neohypnus melanops</i>			R
<i>Acrostilicus hospes</i>		C	V
<i>Lathrobium dimidiata</i>			V
<i>Paederus littoreus</i>			V
<i>Gabronthus mgogoricus</i>			R
<i>Philonthus</i> aff. <i>P. gopheri</i>		C	R
<i>Philonthus gopheri</i>		C	V
<i>Philonthus cautus</i>			V
<i>Sepedophilus basalis</i>		F	R
<i>Sepedophilus kiteleyi</i>		F	R
<i>Acrotona picescens</i>			R
<i>Acrotona</i> sp.			R
<i>Atheta macrops</i>			R
<i>Atheta</i> sp.			R
<i>Phanerota carinata</i> or <i>P. fasciata</i>			R
<i>Thinobius</i> sp.			R
COLEOPTERA: PSELAPHIDAE	short-winged mold beetles		
one species		F	R
COLEOPTERA: PTILIIDAE	feather-winged beetles		
<i>Nossidium</i> sp.			V
<i>Trichopteryx</i>		C?	V
one other species			R
COLEOPTERA: LEIODIDAE	round fungus beetles		
<i>Ptomaphagus consobrinus</i>			V
<i>Ptomaphagus texana</i>		C	R,V
<i>Ptomaphagus ulkei?</i>			V
COLEOPTERA: HISTERIDAE	hister beetles		
<i>Chelyoxenus xerobatis</i>		C	R,V
<i>Saprinus ferrugineus</i>		C/F	R,V
four other species		F	R
COLEOPTERA: ANTHICIDAE	antlike flower beetles		
<i>Anthicus ictericus</i>			V

Table 2 (continued)

Scientific Name	Common Name	Category	Source
COLEOPTERA: SCOLYTIDAE	bark and ambrosia beetles		V
<i>Ips avulsus</i>			V
COLEOPTERA: SCARABAEIDAE	scarab beetles		V
<i>Aphodius troglodytes</i>		C	V
<i>Ataenius exiguus</i>			V
<i>Ataenius platensis</i>			V
<i>Ataenius cylindrus</i>		F	R
<i>Ataenius miamii</i>		F	R
<i>Ataenius ovatulus</i>		F	R
<i>Ataenius saramari</i>		F	R
<i>Ataenius simulator</i>		F	R
<i>Ateuchus lecontei</i>			V
<i>Copris gopheri</i>		C?	R,V
<i>Diplotaxis bidentata</i>			V
<i>Onthophagus polyphemi</i> subsp.		C	R,V
<i>Onthophagus tuberculifrons</i>			V
<i>Phanaeus igneus floridanus</i>			
COLEOPTERA: THROSCIDAE	throscid beetles		
two species			R
COLEOPTERA: RHIZOPHAGIDAE	root-eating beetles		
one species			R
COLEOPTERA: CUCUJIDAE	flat bark beetles		
two species			R
COLEOPTERA: CIIDAE	minute tree fungus beetles		
one species			R
COLEOPTERA: ELATERIDAE	click beetles		
Elaterini: one species			R
<i>Conoderus</i> sp.			R
Cardiophorinae: one species			R
COLEOPTERA: LATHRIDIIDAE	minute brown scavenger beetles		
one species			R
COLEOPTERA: ALLECULIDAE	comb-footed beetles		
cf. <i>Mycetoclara</i> sp.		F	R
COLEOPTERA: TENEBRIONIDAE	darkling beetles		
Blaptini: two species			R
four other species			R
COLEOPTERA: PHALACRIDAE	shining flower beetles		
one species			R
COLEOPTERA: CHRYSOMELIDAE	leaf beetles		
<i>Cryptocephalus</i> : two species	case-bearing leaf beetles	F	R
COLEOPTERA: ALTICIDAE	flea beetles		
one species			R
COLEOPTERA: CURCULIONIDAE	weevils		
two species			R
LEPIDOPTERA: LIMACODIDAE	slug caterpillars		
<i>Euclea delphinii</i> (pupa)			R
LEPIDOPTERA: NOCTUIDAE	noctuid moths		
<i>Idia gopheri</i>		C	R,V
LEPIDOPTERA: TINEIDAE	clothes moths		
<i>Acrolophus pholeter</i> n. sp.		C	Q,R

Table 2 (continued)

Scientific Name	Common Name	Category	Source
LEPIDOPTERA: TINEIDAE (continued)			
<i>Acrolophus</i> sp.		F	R
DIPTERA: TIPULIDAE	crane flies		
<i>Nephrotoma</i> sp. (larvae)		F	R
DIPTERA: MYCETOPHILIDAE	fungus gnats		
<i>Phronia</i> sp.			R
<i>Rymosia</i> sp.			R
DIPTERA: SCIARIDAE	dark-winged fungus gnats		
<i>Epidapus</i> sp.			R
<i>Brachyneura</i> sp.			R
<i>Corynoptera</i> sp.			R
<i>Bradysia</i> sp. aff. <i>B. coprophila</i>			R
<i>Bradysia</i> sp.			R
DIPTERA: SCATOPSIDAE	minute black scavenger flies		
<i>Rhegmoclemia</i> ( <i>Neorhegmoclemina</i> ) <i>bisaccatum</i>		C	R
DIPTERA: CECIDOMYIIDAE	gall gnats		
Lesterminae			
new genus n. sp.			R
<i>Arareta</i> sp.			R
Porricondylinae			
new genus n. sp.			R
<i>Porricondyla</i> sp.			R
<i>Claspettomysia</i> sp.			R
Cecidomyiinae			
Cecidomyiidi: eight spp. (female)			R
<i>Schizomyia</i> sp.			R
<i>Lobodiplosis</i> sp.			R
<i>Resseliella</i> : two species			R
<i>Clinodiplosis</i> : two species			R
<i>Contarinia</i> sp.			R
<i>Cecidomyia</i> sp.			R
<i>Ledomysia</i> sp.			R
DIPTERA: BIBIONIDAE	march flies		
<i>Dilophus sayi</i>			V
DIPTERA: THEREVIDAE	stiletto flies		
<i>Arenagena</i> n. sp.		C	Q,R
<i>Litolinga tergisa</i> Say			R
<i>Ozodiceromyia notata</i>		F	R
<i>Ozodiceromyia</i> sp.			R
<i>Cycloptelus pictipennis</i>			R
DIPTERA: ASILIDAE	robber flies		
<i>Asilus</i> n. sp.		C	Q,R
DIPTERA: EMPIDIDAE	dance flies		
<i>Drapetis</i> ( <i>Drapetis</i> ) sp.		C	Q,R
<i>Drapetis</i> ( <i>Crossopalpus</i> ) sp.		C	Q,R
DIPTERA: DOLICOPODIDAE	long-legged flies		
<i>Condylostylus</i> sp.			R
<i>Chrysotus</i> sp.			R
DIPTERA: PHORIDAE	humpbacked flies		
<i>Dohrniphora</i> aff. <i>D. perplexa</i>			R
<i>Dohrniphora perplexa</i>			R

Table 2 (continued)

Scientific Name	Common Name	Category	Source
DIPTERA: PHORIDAE (continued)			
<i>Megaselia miniata</i>			R
<i>Megaselia</i> : three other species		F	R
<i>Apocephalus tenuipes</i>			R
<i>Apocephalus</i> n. sp.			R
DIPTERA: SPHAEROCERIDAE			
	small dung flies		
<i>Spelobia</i> sp.		C	V
<i>Bitheca agarica</i>			R
<i>Bromeloecia winnemardi</i>			R
<i>Pterogramma</i> : two species			R
<i>Coproica</i> n. sp. aff. <i>C. ferruginata</i>		C	R
DIPTERA: MILICHIIDAE			
	milichiid flies		
<i>Milichiella</i> n. sp. aff. <i>M. arcuata</i>		C	R
DIPTERA: DROSOPHILIDAE			
	pomace flies		
<i>Drosophila guttifera</i>			R
DIPTERA: CHLOROPIDAE			
	frit flies		
<i>Conioscinella triorbiculata</i>			R
<i>Laohippelates pusio</i>			R
<i>Tricimba melanchiolica</i>			R
DIPTERA: ANTHOMYIIDAE			
	scat flies		
<i>Eutrichota gopheri</i>		C	Q,R,V
DIPTERA: SARCOPHAGIDAE			
	flesh flies		
<i>Sarcophaga cistudinis</i>			M
SIPHONOPTERA: RHOPALOPSYLLIDAE			
	flea		
<i>Polygenus floridanus</i>		C	R
HYMENOPTERA: BRACONIDAE			
	braconid wasp		
Alysiinae: two species		C	R
Microgastrinae: one species			R
Braconinae: two species			R
HYMENOPTERA: PTEROMALIDAE			
	parasitic wasps		
four species			R
HYMENOPTERA: EUPELMIDAE			
	parasitic wasps		
two species			R
HYMENOPTERA: ENCYRTIDAE			
	parasitic wasps		
four species			R
HYMENOPTERA: EULOPHIDAE			
	parasitic wasps		
five species			R
HYMENOPTERA: EUCOILIDAE			
	parasitic wasps		
two species		C?	R
HYMENOPTERA: DIAPRIIDAE			
	parasitic wasps		
one species		C?	R
HYMENOPTERA: SCELIONIDAE			
	parasitic wasps		
two species		C?	R
HYMENOPTERA: PLATYGASTRIDAE			
	parasitic wasps		
five species			R
HYMENOPTERA: BETHYLIDAE			
	parasitic wasps		
one species		C	R
HYMENOPTERA: DRYINIDAE			
	parasitic wasps		
one species			R
HYMENOPTERA: SPHECIDAE			
	sand wasps		
one species			R

Table 2 (continued)

Scientific Name	Common Name	Category	Source
HYMENOPTERA: FORMICIDAE	ants		
<i>Aphaenogaster fulva</i>		F	R
<i>Aphaenogaster carolinensis</i>			R
<i>Aphaenogaster ashmeadi</i>			R
<i>Conomyrma</i> : two species		F	R
<i>Pheidole diversipilosa</i>			R
<i>Pheidole metallescens</i>			R
<i>Pheidole morrisi</i>			R
<i>Pheidole anastasii</i>			R
<i>Pheidole adrianoi</i>			R
<i>Hypoponera opacior</i>		F	R
<i>Hypoponera punctatissima</i>			R
<i>Prenolepis imparis</i>			R
<i>Proceratium pergandei</i>			R
<i>Strumigenys louisianae</i>			R
<i>Pogonomyrmex badius</i>			R
<i>Solonopsis pergandei</i>		F	R
<i>Solonopsis nickersoni</i>			R
<i>Paratrechina parvula</i>			R
<i>Paratrechina faisonensis</i>			R
<i>Paratrechina arenivaga</i>		F	R
<i>Camponotus castaneus</i>			R
<i>Cyphomyrmex rimosus</i>			R
<i>Odontomachus brunneus</i>			R
<i>Crematogaster ashmeadi</i>		F	R
<i>Forelius pruinosus</i>			R
<i>Formica pallidefulva</i>			R