

**Survey of Grasshoppers and Ants from the Big  
Hammock, Ochoopee Dunes, and Fall Line Sandhills  
Natural Areas**

A report submitted to the Georgia Department of Natural Resources

by

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## Introduction

Insects are often the most numerous organisms in terrestrial ecosystems, both in terms of abundance of individuals and species richness. As a result, their impact on the environment is also great. Many insects are often tied to specific habitats and are very sensitive to environmental change, making them increasingly popular among ecologists for use as bioindicators (See Andersen 1997 and McGeoch 1998). Land managers are also taking them into consideration more frequently when setting management goals and strategies. Under the Georgia Department of Natural Resources Georgia Sandhills Inventory project, two insect taxa, grasshoppers (Orthoptera: Acrididae) and ants (Hymenoptera: Formicidae), with high levels of environmental impact, were surveyed from three Natural Areas in Georgia to provide documentation of the relatively unknown insect fauna of these areas, and to provide baseline data for future studies and management strategies. The natural areas studied included: the Big Hammock N.A. (Tatnall Co.), the Oohoopee Dunes N.A. (Emmanuel Co.), and the Fall Line Sandhills N.A. (Taylor Co.). Though these three sites represent distinct sandhill habitats, they can be divided into two basic types, riverine and fall line. The sandhill habitats at the Big Hammock N.A. and Oohoopee Dunes N. A. are representative of the riverine sandhills of the Coastal Plain that were formed by wind removing sand from the exposed riverbottoms and depositing it on the northeastern banks of rivers during the Holocene (8,000 ypb) and Pleistocene eras (1.8 million to 8,000 years ago), whereas the Fall Line Sandhills were formed from the sands deposited on the ancient coastline of Atlantic Ocean approximately during the Miocene Epoch (25 million years ago) (Ivester et al. 2001 and Markewich and Markewich 1994).

### *Study taxa*

Grasshoppers are often the most dominant herbivores in temperate grasslands and savannahs and are in direct competition with other grazing animals for grasses and forbs and often with humans for grain crops (Otte 1981). In the southeastern United States, which is largely forested, grasshoppers also present other biological interests. Some species of grasshoppers inhabit the undergrowth and edges of forests. Due to the structural nature of these types of habitats, the ability of flight is often of little use. As a result most of the forest or “sylvan” species have short or reduced wings and are often incapable of flight, relying instead on their leaping ability as a means of locomotion. This lack of a strong dispersal mechanism often results in a clumped distribution of individuals and small geographic ranges for some species. The biology of many of these sylvan species is poorly known.

Among insects, ants are typically the most dominant and influential force in terrestrial ecosystems, and as such, may be among the most promising groups of animals for inclusion in community-based studies due to their contributions to ecosystem function (Hölldobler and Wilson 1990, Agosti et al. 2000.) They directly and indirectly affect faunal and floral groups by predation, scavenging, tending homopterans, protecting certain plants, dispersing seeds, and they also aid in nutrient and soil turnover (Agosti et al. 2000, Gorb and Gorb 2003, Hölldobler and Wilson 1990, Shultz and McGlynn 2000, Wheeler 1910). Ants also are of interest because of the putative deleterious effects caused by some species, especially the introduced Argentine ant, *Linepithema humile* Mayr, and the imported fire ants, *Solenopsis invicta* Buren, *S. richteri* Forel, and their hybrid *S.*

*invicta X richteri*, which have been shown to negatively affect wildlife, as well as humans, and may reduce biodiversity in the communities they invade. Given the ecological importance of ants, documenting the ant fauna of endangered ecosystems is an important starting place for guiding current management and future conservation/restoration projects in those systems.

### **Methods**

Three trips to each natural areas were spread out over of 2007 to allow for seasonal differences in species composition. The trips were made from 15-19 May, 16-19 July, and 5-10 October. Also included in the species lists for the Ochopee Dunes N.A. are data from previous visits made by the staff of the Mississippi Entomological Museum in 2002 and 2006. Species collected at the Nature Conservancy's Ochopee Dunes Preserve will also be listed as they could potentially occur at the Natural Area also and are likely indicative of this habitat.

Grasshopper specimens were acquired by capturing individuals with a net once a collector on foot flushed them. These specimens were placed into a killing jar containing Potassium Cyanide and then taken back to laboratory where they were pinned and labeled with collection data including state, county, natural area, latitude and longitude, date, collector, and any pertinent biological information, identified by JoVonn Hill, and then deposited in the MEM.

Ants were collected by various methods including visual searching for ant colonies in the ground, leaf litter, and plant parts. Leaf litter was collected by sifting fallen leaves and other decaying organic matter and placed in a Berlese funnel in the laboratory for extraction of ants. Foraging ants were collected by hand and with the use

of baits, namely peanut butter and cookies, at each locality. Hand collected specimens were preserved in 90% ethanol in separate vials for each ant colony or bait station. Representatives of each species were pinned and labeled in a manner similar to the grasshoppers. Specimens were identified by J. MacGown and J. Hill and then deposited in the Mississippi Entomological Museum (MEM).

## Big Hammock Natural Area

Big Hammock Natural Area is located along the northeast bank of the Altamaha River in Tattnall County, Georgia. The natural area is approximately 800 acres and adjoins the Big Hammock Wildlife Management Area (WMA), which encompasses 6,177 acres. Although the WMA is comprised primarily of bottomland hardwood forest with oxbow lakes and sloughs, the natural area is a sand ridge that includes a variety of habitats such as cypress/gum forest and an evergreen scrub forest comprised of turkey oak (*Quercus laevis*), sand live oak (*Q. geminata*), myrtle oak (*Q. myrtifolia*). This type of scrub forest is rare in Georgia and is host to several rare plants such as the Georgia plume (*Elliottia racemosa*) (Wharton 1978).



**Figure 1.** Sandhill habitat at Big Hammock Natural Area, Tattnall County, GA.

## Grasshoppers

A total of five species of grasshopper were collected from Big Hammock, which represented the lowest diversity among the three natural areas surveyed. Two species found at this site, *S. cristatum* (Scudder) and *S. marmorata picta* (Scudder) are indicative of open areas or open woodlands with sandy soils in the southeastern United States.

*Melanoplus cf. nigrescens* (Scudder) was unique to this site. It was collected in the areas with more of a closed canopy, mainly along the trail at the edge of the sandhill habitat.

This species belongs to the *Melanoplus nigrescens/querneus* group which is a bit of a taxonomic enigma in the Southeast with apparent intergradation among the species

(Dakin and Hays 1970). Names cannot be confidently placed on many of the specimens of this species until this group is studied more intensively. *Melanoplus scapularis* Rehn

and Hebard occurred at this site and the Fall Line Sandhills N. A. This little known

species, was most frequently found in large patches of gopher apple (*Licania michauxii*), where several individuals were observed eating the browned flowers of that plant. Big

Hammock shared three species with Ochoopee Dunes, *Spharagemon bolli* Scudder, *S.*

*cristatum*, and *S. marmorata picta*, and four species with the Fall Line Sandhills N. A.,

*Spharagemon bolli*, *S. cristatum*, *S. marmorata picta* and *M. scapularis*.

<b>Table 1.</b> Collection information of grasshoppers and ants from Big Hammock Natural Area.				
<b>Site</b>	<b>Lat/Long</b>	<b>Description</b>	<b># Grasshopper Sp.</b>	<b># Ant Sp.</b>
Big Hammock	32°51'55"N82°02'59"W	Pine-oak dune woodland	5	25

<b>Table 2.</b> Grasshoppers Found at Big Hammock Natural Area.
OEDIPODINAE <i>Spharagemon cristatum</i> (Scudder) <i>Spharagemon bolli</i> Scudder <i>Spharagemon marmorata picta</i> (Scudder)
MELANOPLINAE <i>Melanoplus</i> cf. <i>nigrescens</i> (Scudder) <i>Melanoplus scapularis</i> Rehn and Hebard

**Ants**

Overall, 25 species of ants were collected at the sandhill habitat at Big Hammock N. A. Although some of the species collected are widespread and found in a variety of habitats, ten species that we collected are typically restricted to sandy habitats. These species were *Dorymyrmex bossutus*, *Forelius pruinosus*, *Paratrechina phantasma*, *Camponotus socius*, *Monomorium viride*, *Solenopsis pergandei*, *Aphaenogaster floridana*, *Pheidole adrianoi*, *P. floridana*, and *P. morrisii*. The collection of *D. bossutus* and *P. phantasma*, which are not usually found in disturbed sites, indicated that this locality was relatively undisturbed. Only two exotic species, *C. rimosus* and *S. invicta*, were collected, with only a single queen of the *Cyphomyrmex* being found and only few colonies of *Solenopsis* being discovered. The 25 species collected at this site were slightly less than the 33 species found in sandhill habitat at the Fall Line Sandhill N.A. in Taylor County, and much less than the 76 species that were collected from Ochoopee Dunes in Emanuel County. This was not surprising, as the Ochoopee Dunes area is much more extensive and we made more collections there. However, the species composition from Big Hammock was much more interesting than that of the Fall Line Sandhills, which was dominated by species that thrive in disturbed sand habitats. Big Hammock had

some affinities with the Oohoopee fauna, but there were some obvious differences. This was the only site where *D. bossutus*, a species which is restricted to sandhill or scrub habitats, was collected. Interestingly, it was the only *Dorymyrmex* species seen here. Although workers of *M. viride* were collected at Oohoopee, no colonies were noted, and they appeared to be much more abundant at Big Hammock. No colonies of *Pogonomyrmex* were found at Big Hammock, and perhaps there was not enough open areas for them, or possibly the extreme slope of the site was too much for their colonies. Big Hammock and Oohoopee shared 12 species of ants that were not found at the Fall Line Sandhills sites including *P. parvula*, *P. phantasma*, *C. castaneus*, *C. socius*, *M. viride*, *A. treatae*, *P. floridana*, *P. morrisii*, *C. ashmeadi*, *C. lineolata*, *T. pergandei*, and *T. texanus*. All three sites (Big Hammock, Oohoopee, and Fall Line Sandhills) shared the following 12 species: *F. pruinosus*, *H. opacior*, *P. ornata*, *C. rimosus*, *T. septentrionalis*, *S. carolinensis*, *S. invicta*, *S. pergandei*, *A. floridana*, *P. adrianoi*, *P. dentata*, and *M. americana*. No species were shared with Fall Line Sandhills that were not also found at Oohoopee.

**Table 3.** Ant species found at Big Hammock Natural Area

DOLICHODERINAE

*Dorymyrmex bossutus* (Trager) (**rarely collected species**)

*Forelius pruinus* (Roger)

FORMICINAE

*Paratrechina parvula* (Mayr)

*Paratrechina phantasma* Trager (**new record for GA**)

*Camponotus castaneus* (Latreille)

*Camponotus socius* Roger

PONERINAE

*Hypoponera opacior* (Forel)

MYRMICINAE

*Pyramica ornata* (Mayr)

*Cyphomyrmex rimosus* (Spinola) Exotic

*Trachymyrmex septentrionalis* (McCook)

*Monomorium viride* Brown

*Solenopsis invicta* Buren **Exotic**

*Solenopsis carolinensis* Forel

*Solenopsis pergandei* Forel

*Aphaenogaster floridana* Smith

*Aphaenogaster treatae* Forel

*Pheidole adrianoi* Naves

*Pheidole dentata* Mayr

*Pheidole floridana* Emery

*Pheidole morrisii* Forel

*Crematogaster ashmeadi* Mayr

*Crematogaster lineolata* (Say)

*Temnothorax pergandei* Emery

*Temnothorax texanus* Wheeler

*Myrmecina americana* Emery

## Ohooppee Dunes Natural Area

The Ohooppee Dunes Natural Area is comprised of three separate tracts of land comprising 1800+ acres in Emanuel County, Georgia. The site is significant in that it is characterized by a series of inland sand dunes found on the east side of the Ohooppee River. These dunes are thought to have originated by high winds during drought periods in the Pleistocene. The habitat is similar to the back dunes found along the Gulf and Atlantic coastlines. The plant community consists of a dwarf oak-pine woodland with open patches of xeric dune scrub. Stunted turkey oaks (*Q. laevis*), longleaf pines (*Pinus palustris*), bluejack oak (*Quercus incana*), and dwarf post oak (*Quercus margaretta*) are dominant trees. Some of the woody shrubs present include Rosemary (*Ceratiola ericoides*), seaside, or woody goldenrod (*Chrysoma pauciflosculosa*), red flowering woody mint (*Calamintha coccinea*), blueberry (*Vaccinium* sp.), *Clethra alnifolia*, and *Cyrilla racemiflora*. Common herbaceous plants in the natural area include such species as gopher apple (*Licania michauxii*), sand chickweed (*Arenaria* sp.), nailwort (*Paronychia* sp.), wire plant (*Stipulicida setacea*), goat's rue (*Tephrosia virginiana*), sand spikemoss (*Selaginella arenicola*), *Amsonia ciliata*, *Baptisia perfoliatum*, *Lupinus diffusus*, and many others. Various mosses and lichens are abundant, and in some areas form a rough carpet upon the sandy floor. Gopher tortoise burrows are in abundance at the site as well.

The Mississippi Entomological Museum staff has made previous trips to these dunes in 2002 and 2006. The records of the species collected on these trips will be

included here and annotated. Likewise specimens from the Nature Conservancy's Ohooppee Dunes Preserve will be listed below, but annotated separately.



**Figure 2.** Typical habitat seen at Ohooppee Dunes Natural area

### **Grasshoppers**

A total of 19 species were collected from all of the tracks of land and collecting trips to the Ohooppee Dunes habitat, giving it the second highest level of diversity of the three habitats surveyed. This habitat shared 12 species with the Fall Line Sandhills N. A. including *Orphulella pelidna* (Burmeister), *Syrbula admirabilis* (Uhler), *Arphia sulphurea* (Fabricius), *Pardalophora phoenicoptera* (Burmeister), *Psinidia fenestralis* (Serville), *Spharagemon bolli*, *S. cristatum*, and *S. marmorata picta*, *Trimerotropis maritima* (Harris), *Schistocerca damnifica* (Saussure), *Melanoplus impiger* Scudder, and *M. impudicus* Scudder. Three species were shared between Ohooppee and the Big

Hammock N. A. including *Spharagemon bolli* Scudder, *S. cristatum*, and *S. marmorata picta*. Seven species were found only in the Oohoopee Dunes during this survey: *Eritettix simplex* (Scudder), *Schistocerca americana* (Drury), *Schistocerca alutacea* (Harris), *Eotettix pusillus* Morse, *Melanoplus acidocercus* Hebard, *M. carnegiei* Morse, and *M. stegocercus* Rehn and Hebard

Two species of special note, *Melanoplus acidocercus* and *Melanoplus stegocercus*, were collected in this habitat. *Melanoplus acidocercus* was described in 1919 from specimens collected at Bainbridge, Decatur Co., Georgia. Since their description, no new information has been reported for this species in the scientific literature. The type series was “found common in oak shoots in areas of sandy soil overgrown with oaks, and occasional among the scant grasses and plants growing on the sandy soil, in the higher areas of long leaf pine woods” (Hebard 1919). The collections at the Oohoopee Dunes area represent a significant eastern range extension for this species. Currently, it is not known whether these two localities represent a discontinuous range or whether it is simply an artifact of undercollecting in the region. This species belongs to the *scudderi* species group and like the other member of the group it is a late summer to fall occurring species. MEM records from 2006 indicate that this species begins to mature in late July. Several pairs of this species were observed mating during the October visit to the site. Individuals roost on low-growing vegetation, such as the lower limbs of small oak trees during the night.

*Melanoplus stegocercus* was originally described in 1916 from a single individual collected along the Cannochee River near Groveland, Bryan Co., Georgia on 28 July 1913. No description of the habitat was given. It was thought that no novel information

had been presented in the scientific literature since the description. However, while identifying the Oohoopee specimens it was discovered that a very similar species was described as *Melanoplus tumidicercus* in 1932 by Theodore Hubbell from a series of four individuals collected 2.2 miles north of Uvalda, Montgomery County, GA. Examination of the type specimens of both species, and a large series of specimens collected from the Oohoopee Dunes and a new series of specimens from the original type locality of *M. stegocercus* indicated that *M. tumidicercus* is synonymus with *M. stegocercus*. Since *M. stegocercus* was described first that name would have priority. Nymphs of this species were observed during the May visit, while adults were first collected in mid-June. Several pairs of this species were observed mating during the October visit to the site. Taken together, these observations suggest that this species overwinters in the egg stage and emerges in spring, and then matures in early summer. Individuals were also observed roosting on low-growing vegetation, such as the lower limbs of small oak trees during the night. Although this species is fairly common at all three sections of the Oohoopee N. A. and the Nature Conservancy Preserve, *M. stegocercus* seems to be restricted in distribution to the Vidalia Uplands physiographic region of mid southwestern Georgia. It also may be tied to dune-like forested habitats, as the type locality near Groveland was also a sandy pine-oak dune woodland. A visit was made to the type locality of *M. tumidicercus* on 23 July 2006. Most of the area had been converted to pine plantation. However, an examination of the flora along the edge of the woods and the road seemed to indicate that at one time this site supported an environment similar to that of the Oohoopee and Groveland sites. However, *M. stegocercus* was not observed at this location. Given its restricted distribution, likely dependence on a dune habitats, and poor dispersal ability

it is recommended that this *M. stegocercus* be added to Georgia's Species of Special Concern list, with at least a global ranking of G4 and a state ranking of S3. A population also occurs in the dune like habitat along the nature trail at George L. Smith State Park.

**Table 4.** Collection information of grasshoppers and ants from the Ohoopsee Dunes Natural Area. SNA=South Natural Area, CNA= Central Natural Area, and NNA= North Natural Area

<b>Site</b>	<b>Lat/Long</b>	<b>Description</b>	<b># Grasshopper Sp.</b>	<b># Ant Sp.</b>
SNA 1	32°31'51"N82°27'23"W	Pine-oak dune woodland	15	58
SNA 2	32°32'15"N82°27'40"W	Xeric dune scrub	8	
CNA	32°34'31"N82°26'30"W	Pine-oak dune woodland	7	16
NNA	32°36'16"N82°25'30"W	Pine-oak dune woodland	4	21

**Table 5.** Grasshoppers collected in the Oohoopee Dunes habitat.

N. C. Pres. = Nature Conservancy Preserve, CNA= Central Natural Area, NNA= North Natural Area, SNA= South Natural Area.

**Gomphocerinae**

*Orphulella pelidna* (Burmeister): N.C. Pres.

*Eritettix simplex* (Scudder): SNA sites 1 and 2.

*Syrbula admirabilis* (Uhler): SNA site 1

**Oedipodinae**

*Arphia sulphurea* (Fabricius): SNA site 1.

*Pardalophora phoenicoptera* (Burmeister): SNA sites 1 and 2, N.C. Pres.

*Psinidia fenestralis* (Serville): CNA.

*Spharagemon cristatum* (Scudder) CNA and SNA site 1.

*Spharagemon bolli* Scudder: CNA, SNA sites 1 and 2..

*Spharagemon marmorata picta* (Scudder): CNA, NNA, SNA sites 1 and 2., and N.C. Pres.

*Trimerotropis maritima* (Harris): SNA site 1.

**Cyrtacanthacrdinae**

*Schistocerca damnifica* (Saussure): NNA

*Schistocerca americana* (Drury): SNA site 1.

*Schistocerca alutacea* (Harris): SNA site 1.

**Melanoplinae**

*Eotettix pusillus* Morse: SNA Site 1.

*Melanoplus acidocercus* Hebard: CNA, NNA, and SNA sites 1 and 2.

*Melanoplus carnegiei* Morse: CNA, and SNA sites 1 and 2.

*Melanoplus impiger* Scudder: N. C. Pres.

*Melanoplus impudicus* Scudder: SNA sites 1 and 2.

*Melanoplus propinquus* Scudder: CNA.

*Melanoplus stegocercus* Rehn and Hebard: SNA sites 1 and 2, CNA. NNA, N.C. Pres.

**Ants**

A total of 76 species of ants were collected at the Oohoopee sites (including those species collected at the adjoining nature preserve). Additional collecting would probably add more species as several common species that likely occur there were not collected.

Twenty-one species apparently restricted to sandy habitats were collected including

*Dolichoderus mariae*, *Dorymyrmex bureni*, *D. grandulus*, *D. smithi*, *Forelius pruinosus*,

*F. n. species*, *Paratrechina phantasma*, *Camponotus floridanus* (nature preserve), *C. socius*, *Monomorium viride*, *Solenopsis abdita*, *S. pergandei*, *S. tennesseensis*, *Pogonomyrmex badius*, *Aphaenogaster floridana*, *A. umphreyi*, *Pheidole adrianoi*, *P. davisii*, *P. floridana*, *P. metallescens*, and *P. morrisii*. The undescribed species of *Forelius*, *Paratrechina phantasma*, and *Pheidole adrianoi* represent new state records for Georgia. Several other somewhat rare species were collected including *Discothryea testacea*, *Pyramica wrayi*, *Pheidole davisii*, and *Temnothorax smithi*. Other species collected are generally widespread and may be found in a variety of wooded habitats. Compared to the number of native species collected, very few exotics were found, including only *Brachymyrmex patagonicus*, *Paratrechina vividula* (possibly native), *Solenopsis invicta*, and *Tetramorium bicarinatum*. Fortunately, none of these species were common with *P. vividula* only being along the edge of the sandhill habitat in the north natural area and not obviously abundant; *S. invicta* only being found along the edge of the sandhill habitat on the roadside and not seen within the habitat itself; and only alates of *B. patagonicus* and *T. bicarinatum* collected at lights. Compared to the other two sandhill habitats in Georgia that we surveyed for ants, the Fall Line Sandhills N.A. in Taylor County where we found 33 species, and Big Hammock N.A. in Tattnall County where we found 25 species, the 76 species collected at Oohoopee was by far the highest. However, this difference was not surprising as the Oohoopee site is a much more extensive sandhill habitat and we made more collections there. There were some obvious affinities between Oohoopee and the other two natural areas. Oohoopee had 15 species in common with the Fall Line Sandhills N. A. that were not collected at Big Hammock including *D. bureni*, *D. smithi*, *B. depilis*, *B. patagonicus*, *F. dolosa*, *F. pallidefulva*, *P. pennsylvanica*,

*Py. rostrata*, *S. louisianae*, *P. badius*, *A. carolinensis*, *A. fulva*, *P. dentigula*, *C. pinicola*, and *T. curvispinosus*. Ochoopee and Big Hammock shared 12 species of ants that were not collected at the Fall Line Sandhills N. A. including *P. parvula*, *P. phantasma*, *C. castaneus*, *C. socius*, *M. viride*, *A. treatae*, *P. floridana*, *P. morrisii*, *C. ashmeadi*, *C. lineolata*, *T. pergandei*, and *T. texanus*. All three sites (Ochoopee, Fall Line Sandhills, and Big Hammock) shared the following species: *F. pruinosus*, *H. opacior*, *P. ornata*, *C. rimosus*, *T. septentrionalis*, *S. carolinensis*, *S. invicta*, *S. pergandei*, *A. floridana*, *P. adrianoi*, *P. dentata*, and *M. americana*.

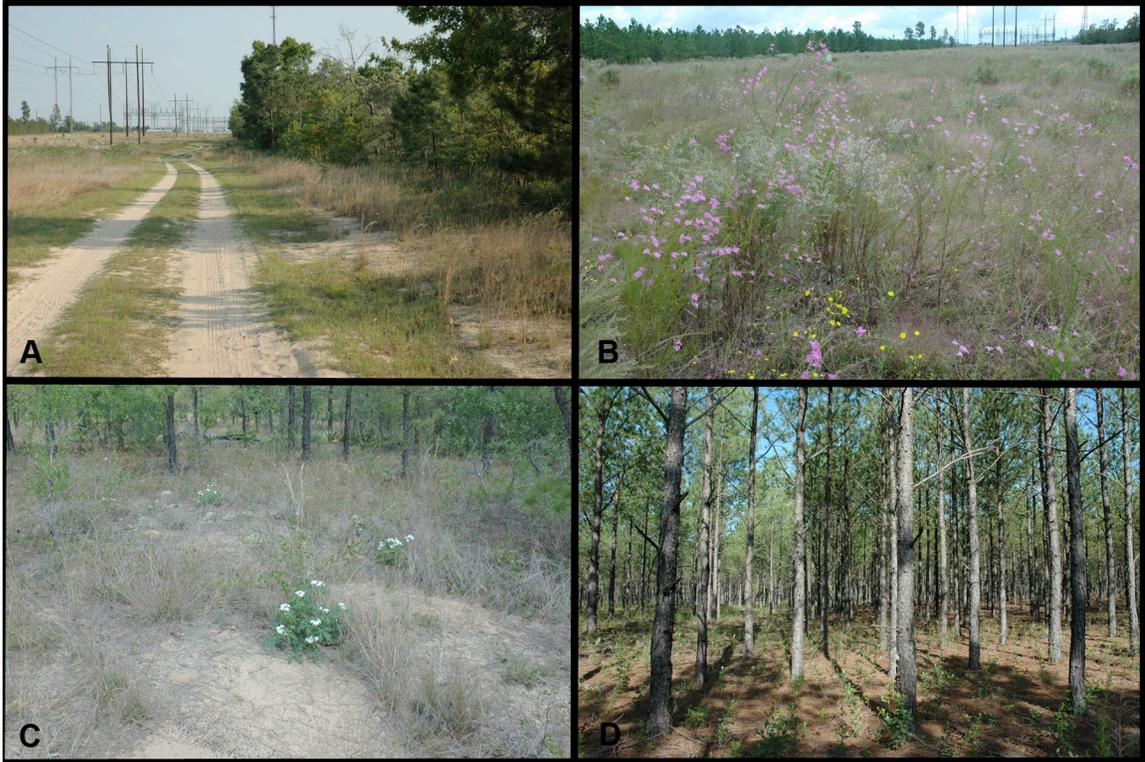
**Table 6.** Ants collected in the Ohoopsee Dunes habitat. N. C. Pres. = Nature Conservancy Preserve, SNA= South Natural Area, CNA= Central Natural Area, NNA= North Natural Area.

<p><b>DOLICHODERINAE</b>  <i>Dolichoderus mariae</i> Forel: SNA  <i>Dorymyrmex bureni</i> (Trager): CNA, NNA, SNA, and N. C. Pres.  <i>Dorymyrmex grandulus</i> (Forel): CNA and SNA.  <i>Dorymyrmex smithi</i> Cole: NNA.  <i>Forelius pruinus</i> (Roger): CNA, NNA, SNA, N. C. Pres.  <i>Forelius n. sp.</i>: SNA. (<b>New state record</b>)</p> <p><b>FORMICINAE</b>  <i>Lasius alienus</i> (Foerster) (SNA)  <i>Brachymyrmex depilis</i> Emery (NNA, SNA)  <i>Brachymyrmex patagonicus</i> Mayr: NNA, N. C. Pres. (<b>exotic</b>)  <i>Paratrechina faisonensis</i> (Forel): SNA.  <i>Paratrechina parvula</i> (Mayr): CNA, NNA, and SNA.  <i>Paratrechina phantasma</i> Trager: CNA, NNA, SNA, and N. C. Pres. (<b>New state record</b>)  <i>Paratrechina vividula</i> (Nylander): NNA. (<b>possibly exotic</b>)  <i>Camponotus castaneus</i> (Latreille): SNA.  <i>Camponotus floridanus</i> (Buckley): N. C. Pres.  <i>Camponotus impressus</i> (Roger): SNA.  <i>Camponotus socius</i> Roger: CNA, NNA, and SNA.  <i>Formica biophilica</i> Trager: SNA.  <i>Formica dolosa</i> Buren: SNA.  <i>Formica pallidefulva</i> Latreille: NNA.</p> <p><b>ECITONINAE</b>  <i>Neivamyrmex opacithorax</i> (Emery): SNA.</p> <p><b>AMBLYOPONINAE</b>  <i>Amblyopone pallipes</i> (Haldeman): SNA.</p> <p><b>PONERINAE</b>  <i>Cryptopone gilva</i> (Roger): N. C. Pres.  <i>Hypoponera opacior</i> (Forel): CNA, NNA, SNA, and N. C. Pres.  <i>Ponera exotica</i> Smith: N. C. Pres.  <i>Ponera pennsylvanica</i> Buckley: N. C. Pres.</p>	<p><b>PROCERATIINAE</b>  <i>Discothyrea testacea</i> Roger: SNA.  <i>Proceratium crassicorne</i> Emery: N. C. Pres.  <i>Proceratium pergandei</i> (Emery): SNA.  <i>Proceratium silaceum</i> (Roger): CNA, SNA.</p> <p><b>MYRMICINAE</b>  <i>Pyramica angulata</i> (Smith): SNA.  <i>Pyramica bunki</i> (Brown): SNA.  <i>Pyramica clypeata</i> (Roger): SNA.  <i>Pyramica dietrichi</i> (Smith): N. C. Pres.  <i>Pyramica missouriensis</i> (Smith): SNA.  <i>Pyramica ornata</i> (Mayr): N. C. Pres.  <i>Pyramica pergandei</i> Emery: N. C. Pres.  <i>Pyramica rostrata</i> (Emery): SNA.  <i>Pyramica talpa</i> (Weber): SNA.  <i>Pyramica wrayi</i> (Brown): N. C. Pres.  <i>Strumigenys louisianae</i> Roger: NNA, SNA.  <i>Cyphomyrmex rimosus</i> (Spinola): NNA and SNA.  <i>Trachymyrmex septentrionalis</i> (McCook): CNA, NNA, SNA, and N. C. Pres.  <i>Monomorium viride</i> Brown: SNA.  <i>Solenopsis abdita</i> Thompson: SNA.  <i>Solenopsis carolinensis</i> Forel: CNA, NNA, and SNA.  <i>Solenopsis invicta</i> Buren: NNA and SNA-only along roads bisecting sites, or at entrances. (<b>exotic</b>)  <i>Solenopsis pergandei</i> Forel: SNA.  <i>Solenopsis tennesseensis</i> Smith: SNA  <i>Myrmica punctiventris</i> Roger: SNA  <i>Pogonomyrmex badius</i> (Latreille): NNA, and SNA.  <i>Tetramorium bicarinatum</i> (Nylander): N. C. Pres. (<b>exotic</b>)  <i>Aphaenogaster ashmeadi</i> Emery: NNA and SNA.  <i>Aphaenogaster carolinensis</i> Wheeler: NNA and SNA.  <i>Aphaenogaster floridana</i> Smith: NNA SNA, and N. C. Pres.  <i>Aphaenogaster fulva</i> Roger: CAN.  <i>Aphaenogaster treatae</i> Forel: NNA and SNA.  <i>Aphaenogaster umphreyi</i> Deyrup &amp; Davis: SNA.</p>	<p><b>MYRMICINAE Continued</b>  <i>Pheidole adrianoi</i> Naves: SNA.  <i>Pheidole davisii</i> Wheeler: CNA, NNA, and SNA.  <i>Pheidole dentata</i> Mayr: CNA, NNA, SNA, and N. C. Pres.  <i>Pheidole dentigula</i> Smith: SNA.  <i>Pheidole floridana</i> Emery: NNA.  <i>Pheidole metallescens</i> Emery: CNA and SNA.  <i>Pheidole morrisii</i> Forel: CNA, NNA, SNA, and N. C. Pres.  <i>Crematogaster ashmeadi</i> Mayr: NNA and, SNA.  <i>Crematogaster cerasi</i> (Fitch): NNA and SNA.  <i>Crematogaster lineolata</i> (Say): NNA, and SNA.  <i>Crematogaster minutissima</i> (Mayr): N. C. Pres.  <i>Crematogaster pinicola</i> Deyrup and Cover: NNA and SNA.  <i>Temnothorax curvispinosus</i> Mayr : SNA  <i>Temnothorax pergandei</i> (Emery): CNA, NNA and SNA.  <i>Temnothorax schaumii</i> Roger: SNA.  <i>Temnothorax smithi</i> (Baroni Urbani): NNA  <i>Temnothorax texanus</i> (Wheeler): NNA and SNA.  <i>Myrmecina americana</i> Emery: SNA.</p>
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## Fall Line Sandhills

The Fall Line Sandhills Natural Area in Taylor County, Georgia is an 876 acre tract of sandhill habitat that was only recently acquired by the state of Georgia.

Historically, this area was most likely a mix of oak/pine dune scrub and longleaf pine (*Pinus palustris*) forests, which were dominated by wiregrass (*Aristida stricta*) and a myriad of other understory species. However, periodic burns are required for longleaf pine forests to flourish, with the result that only few of these pines are still present today. More recently, much of the property was planted with loblolly pines (*Pinus taeda*), which have not fared well due to the deep sand. Along the western edge of the property is an open swath that was created by a powerline cut. Vegetation on the powerline cut included *Rubus* sp., *Opuntia humifusa*, risky tread softly (*Cnidoscolus stimulosus*), wiregrass, and a variety of other grasses and forbs. Small pockets of oak scrub are still present and are dominated by turkey oak (*Q. laevis*), bluejack oak (*Q. incana*), dwarf post oak (*Q. margaretta*), loblolly pine, *Rubus* sp., wiregrass (*Aristida beyrichiana*), and an abundance of other plants present as well such as persimmon (*Diospyros virginiana*), *Vaccinium* sp., *O. humifusa*, little bluestem (*Schizachyrium scoparium*), risky tread softly, and other species. In addition to the typical sandhill flora and fauna, 11 species of concern are known to occur at the site including 8 animals and 3 plants, making this a unique area and an ideal study site for insects as well.



**Figure 3.** Various collecting sites at the Fall Line Sandhills Natural Area. A. Site 1 (May). B. Site 1 (October). C. Site 4. D. Site 6.

**Table 7.** Collection information of grasshoppers and ants from the Fall Line Sandhills Natural Area.

Site	Lat/Long	Description	# Grasshopper Sp.	# Ant Sp.
1	32°34'37"N84°17'25"W	Open powerline cut	13	16
2	32°35'03"N84°17'28"W	Open powerline cut and planted <i>Pinus taeda</i>	8	12
3	32°34'51"N84°16'49"W	Planted <i>P. taeda</i> w/ scattered <i>P. palustris</i>	0	7
4	32°34'37"N84°16'24"W	Open grassy area bordered by planted <i>P. taeda</i> . Also <i>P. palustris</i> , <i>Q. margaretta</i> , and <i>Crataegus sp.</i>	7	15
5	32°34'37"N84°16'24"W	Young <i>P. taeda</i> plantation	8	6
6	32°34'21"N84°16'27"W	Older <i>P. taeda</i> plantation	1	16
7	32°34'41"N84°16'59"W	Open pine and large <i>Q. falcata</i> . Lots of herbaceous sp.	1	7



**Figure 4.** Fall Line Sandhills Site 7.

### **Grasshoppers**

A total of 20 species were collected from this natural area, giving it the highest level of diversity of the three habitats surveyed. This natural area shared 12 species with the Ochopee Dunes N. A. and four species with the Big Hammock N.A.. Overall seven species were unique to this natural area including *Dichromorpha viridis* (Scudder),

*Achurum carinatum* (Walker), *Mermiria picta* (Walker) *Chortophaga viridifasciata* (Degeer), *Hesperotettix viridis* (Thomas), *Melanoplus keeleri* (Thomas), *Melanoplus sanquinipes* Gurney and Brooks. The overall grasshopper diversity of this site is in part due to the large powerline right (Sites 1 and 2) of way running through the natural area (as evidenced by 15 of the 20 species occurring at sites 1 and 2). The removal of woody species along this corridor provided more suitable conditions for the herbaceous cover favored by most grasshoppers, and the relative canopy free conditions also provided habitat for several species such as *Chortophaga viridifasciata* and *Trimerotropis maritima*. Several of the species occurring at the Fall Line Sandhills N. A. are characteristic of species that, in the southeastern U. S., are confined to long leaf pine savannahs and/or naturally occurring open areas. These include *Mermiria picta*, *Hesperotettix viridis*, *Melanoplus scapularis*. The remainder of the species are typical of open habitats, such as roadsides, pastures, and old fields, in the Southeast, although *Spharagemon cristatum*, *S. marmorata picta*, *Psinidia fenestralis* (Serville) (Scudder), *Melanoplus impiger* Scudder, and *Melanoplus impudicus* Scudder are generally restricted to areas with sandy soil.

**Table 8.** Grasshoppers collected at Fall Line Sandhills Natural Area.

**Gomphocerinae**

*Orphulella pelidna* (Burmeister): Sites 1, and 5.

*Dichromorpha viridis* (Scudder): Site 4.

*Achurum carinatum* (Walker): Site 2.

*Mermiria picta* (Walker): Site 1.

*Syrbula admirabilis* (Uhler): Site 1.

**Oedipodinae**

*Arphia sulphurea* (Fabricius): Site 1.

*Chortophaga viridifasciata* (Degeer): Sites 1 and 2.

*Pardalophora phoenicoptera* (Burmeister): Sites 1, 2, 4, and 6.

*Spharagemon cristatum* (Scudder): Site 1, 2, and 4.

*Spharagemon bolli* Scudder: Sites 5 and 6.

*Spharagemon marmorata picta* (Scudder): Sites 1, 4, and 5.

*Trimerotropis maritima* (Harris): Site 1.

*Psinidia fenestralis* (Serville): Sites 2, 4, and 5.

**Cyrtacanthacrdinae**

*Schistocerca damnifica* (Saussure): Site 2.

**Melanoplineae**

*Hesperotettix viridis* (Thomas): Site 5.

*Melanoplus impiger* Scudder: Site 1, and 5.

*Melanoplus impudicus* Scudder: Sites 1, 4, and 5.

*Melanoplus keeleri* (Thomas): Site 4.

*Melanoplus sanguinipes* Gurney and Brooks: Site 2.

*Melanoplus scapularis* Rehn and Hebard: Site 5.

**Ants**

The collection of 33 species from the Fall Line Sandhills N. A. was comparable to the 25 species we collected at Big Hammock N. A. in Tattnall Co., but fell far short of the 76 species collected at Ochoopee Dunes in Emanuel County. This was not surprising, as the Ochoopee Dunes area is much more extensive, has been much less disturbed by heavy equipment, and we made more collections there. However, no rare, undescribed, or endemic species were found at the Fall Line Sandhills, and overall the array of species

found there was indicative of many sandy habitats in the Southeast. The Fall Line Sandhills N. A. had 15 species in common with the Ochoopee sites that were not collected at Big Hammock including *D. bureni*, *D. smithi*, *B. depilis*, *B. patagonicus*, *F. dolosa*, *F. pallidefulva*, *P. pennsylvanica*, *Py. rostrata*, *S. louisianae*, *P. badius*, *A. carolinensis*, *A. fulva*, *P. dentigula*, *C. pinicola*, and *T. curvispinosus*. All three sites (Fall Line Sandhills, Ochoopee, and Big Hammock) shared the following 12 species: *F. pruinosus*, *H. opacior*, *P. ornata*, *C. rimosus*, *T. septentrionalis*, *S. carolinensis*, *S. invicta*, *S. pergandei*, *A. floridana*, *P. adrianoi*, *P. dentata*, and *M. americana*. No species were shared with Big Hammock that were not also found at Ochoopee. The 33 species collected at the Fall Line Sandhills N. A. on only three occasions by general collecting compared favorably to the results of a four year study done of the ants of the Fall Line Sandhills at Fort Benning, Georgia by Graham et al. (2004), which documented 48 species. However, their study was more comprehensive in scope and included a variety of habitats, some of which were much less disturbed. Overall, their findings were remarkably similar to ours with the same species being abundant in the sandhills habitats, especially *D. smith* in disturbed areas.

**Table 9.** Ants collected at Fall Line Sandhills Natural Area.

**DOLICHODERINAE**

*Dorymyrmex bureni* (Trager): Sites 1, 2, 4, 5, 6, and 7

*Dorymyrmex smithi* Cole: Sites 1, 2, 4, and 5

*Forelius pruinosus* (Roger): Site 1.

**FORMICIAE**

*Brachymyrmex depilis* Emery: Site 6.

*Brachymyrmex patagonicus* Mayr: Sites 1, 3, 4, 5, and 6. **Exotic**

*Paratrechina arenivaga* (Wheeler): Sites 1 and 2.

*Paratrechina vividula* (Nylander): Sites 1, 2, 4, and 7. **Exotic??**

*Camponotus decipiens* Emery: Sites 1 and 7.

*Camponotus nearcticus* Emery: Site 6.

*Formica dolosa* Buren: Site 2, 5, and 6.

*Formica pallidefulva* Latreille: Site 3.

**PSEUDOMYRMICINAE**

*Pseudomyrmex pallidus* (Smith): Site 7.

**PONERINAE**

*Hypoponera opacior* (Forel): Sites 1, 3, 6, and 7.

*Ponera pennsylvanica* Buckley: Site 4.

**MYRMICINAE**

*Pyramica membranifera* (Emery): Site 2. **Exotic**

*Pyramica ornata* (Mayr): Sites 3, 4, and 6.

*Pyramica rostrata* (Emery): Site 6.

*Strumigenys louisianae* Roger: Sites 1 and 6.

*Cyphomyrmex rimosus* (Spinola): Site 3, 6, and 7. **Exotic**

*Trachymyrmex septentrionalis* (McCook): Sites 1, 2, 4, 5, and 7.

*Solenopsis invicta* Buren: Sites 1, 2, 3, 4, and 6. **Exotic**

*Solenopsis carolinensis* Forel: Sites, 2, 4, and 6.

*Solenopsis pergandei* Forel: Site 2.

*Pogonomyrmex badius* (Latreille): Sites 1, 2, 4, and 5.

*Aphaenogaster carolinensis* Wheeler: Sites 1, 2, and 4.

*Aphaenogaster floridana* Smith: Site 1.

*Aphaenogaster fulva* Roger: Site 1, 4, and 6.

*Pheidole adrianoi* Naves: Site 4.

*Pheidole dentigula* Smith: Site 6.

*Pheidole dentata* Mayr: Site 4.

*Crematogaster pinicola* Deyrup and Cover Sites 3 and 6.

*Temnothorax curvispinosus* Mayr: Site 4.

*Myrmecina americana* Emery: Sites 1, 3, 4, and 6.

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## Appendix

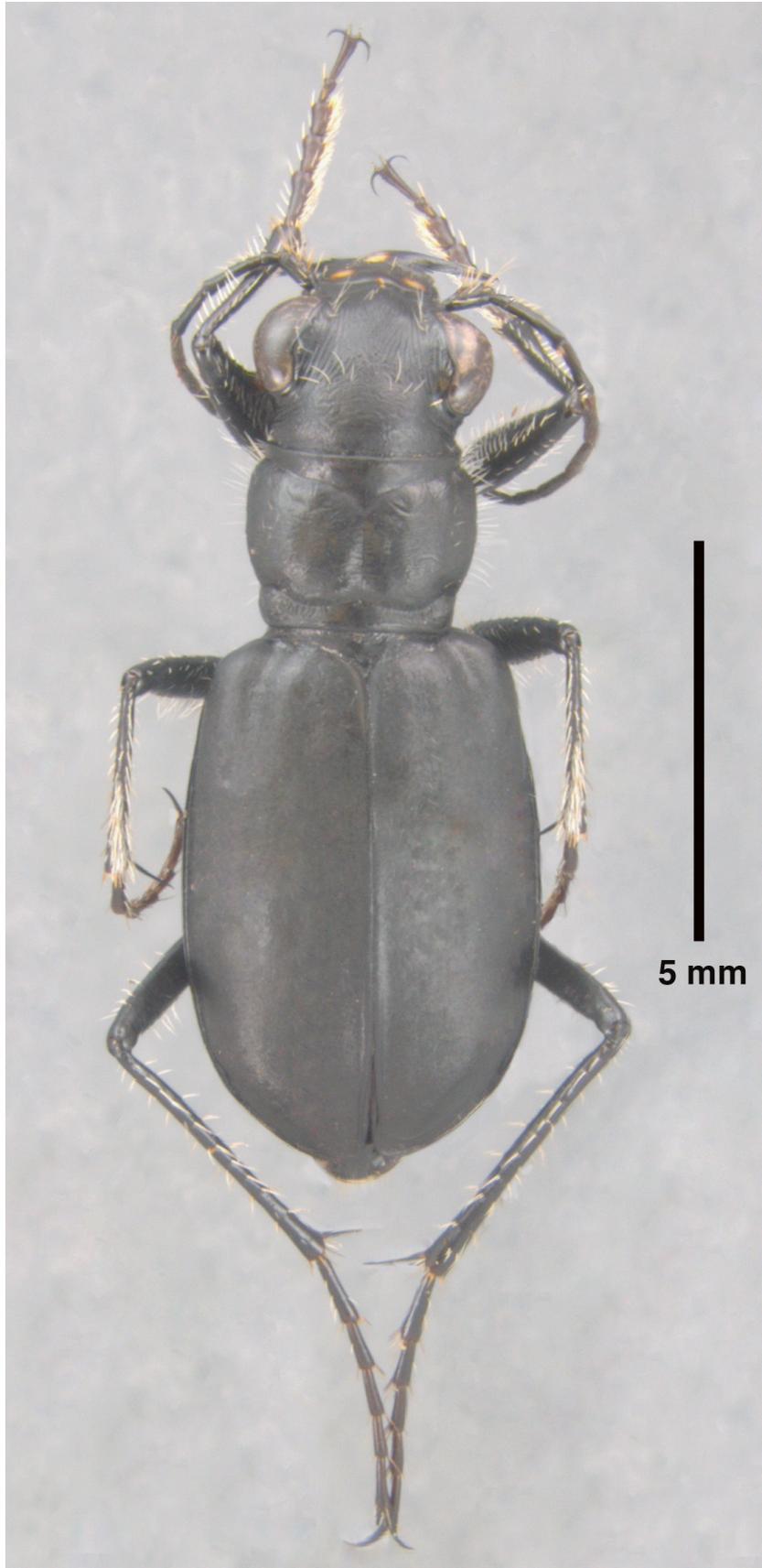
### Collection of *Cicindela nigrrior* Schaupp (Coleoptera: Cicindelidae) at Fall Line Sandhills Natural Area.

*Cicindela nigrrior* Schaupp, the Autumn Tiger Beetle, considered rare among North American tiger beetles, is found in grassy open areas on tightly packed sand (Pearson et al. 2006). The range of *C. nigrrior* is restricted to a narrow band along the eastern base of the southern Appalachian Mountains, and along the Gulf Coast of Mississippi, Alabama, and the Florida pan-handle. The adults of *C. nigrrior* are known to be active only in September and October, hence the common name. There are two color forms, an all black form, being more common in the southern part of its range and a blue-green form that is more common in the northern portion of the range.

During the October 5th visit to the Fall Line Sandhills N. A., at least 50 individuals of the all black form of *C. nigrrior* were observed along the powerline right of way (Site 1, 32°34'37"N84°17'25"W). This area perfectly matches the description of the preferred habitat mention above. No individuals were observed elsewhere at the natural area that day.

Tiger beetles are group of insects that are prized by many amateur collectors. *Cicindela nigrrior*, being a rare species, is highly sought after with the all black form being more favored by collectors than the blue-green (Giff Beaton pers. comm.). This species may have been extirpated from several sites due to over-collecting. Given this, knowledge of the presence of *C. nigrrior* at the Fall Line Sandhills N. A. should be protected. It is recommended that *C. nigrrior* be added to the Georgia's Animals of Special Concern List with at least a global ranking of G4 and a state ranking of S3.

Pearson, D. L., C. B. Knisley, and C. J. Kazilek. 2006. A Field Guide to the Tiger Beetles of the United States and Canada: Identification, Natural History, and Distribution of the Cicindelidae. Oxford University Press. New York, NY. 227pp.



**Appendix Figure 1.** *Cicindela nigrrior* Schaupp.