

1995

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Recommended Citation

Dorris, Peggy Rae; Robison, Henry W.; and Carlton, Chris (1995) "Spiders (Arthropoda: Aranea) From Deciduous Forest Litter of the Ouachita Highlands," *Journal of the Arkansas Academy of Science*: Vol. 49 , Article 11.

Available at: <https://scholarworks.uark.edu/jaas/vol49/iss1/11>

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Spiders (Arthropoda: Aranea) From Deciduous Forest Litter of the Ouachita Highlands

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Abstract

One hundred two litter samples were collected from oak/hickory and maple/beech forests in the Ouachita Highlands of western Arkansas July 1991-June 1992. Berlese residues of these collections produced 17 families, 51 genera, and 56 species of spiders, and included 19 species previously unreported for the state of Arkansas.

Introduction

A series of Berlese samples was collected during the calendar year July 1991-June 1992 to assess the diversity and abundance of litter faunas of deciduous forest habitats in the Ouachita Highlands of western Arkansas. Moist deciduous valleys dominated by beech (*Fagus grandifolia*), maples (*Acer spp.*), and white oak (*Quercus alba*), and moist deciduous slopes dominated by white oak (*Quercus alba*), black oak (*Quercus velutina*), and various hickories (*Carya spp.*) were sampled. Our objectives were to assess species richness and abundance of a wide range of taxa that occur in forest litter habitats, identify new or previously unrecorded species, and determine seasonal patterns of some of the more abundant species.

Dorris and Burnside (1977) employed sifting methods and numerous other collecting techniques in the Ouachita Highlands, but detailed analysis of forest litter arthropods of this region are lacking. This research allows a more thorough understanding of spider diversity, seasonal utilization, and microhabitat distribution in upland regions of Arkansas.

Materials and Methods

The choice of deciduous forests in the Ouachita National Forest as a study area was based on recent documentation that suggest significant faunistic association with faunas in the southern Appalachian Mountains (Carlton and Cox, 1990, Gleason et. al., 1994, Mohlenbrock, 1993, Noble, 1993 and Babaei, 1992). Protected beech-maple valleys and north facing deciduous slopes were chosen because experience had suggested that they would yield the greatest diversity of any forest litter habitats in the Interior Highlands.

Site selection was based on dominant tree composi-

tion, ease of access, and past records of other interesting species. Primary sites were chosen during the first two weeks of the study (July 1991). Secondary sites were chosen throughout the project. Primary sites were sampled repeatedly throughout the study, secondary sites were sampled no more than twice.

Five study sites (Fig. 1) in the Ouachita National Forest where large areas of mature white oak or beech/maple forest occur were selected for regular sampling during this study. They are as follows:

1. Near the corners of Scott, Logan, and Yell Counties north of Blue Ball. White oak forest.
2. Polk County, on the east and northeast slope of Rich Mountain. White oak forest.
3. Montgomery County, Little Missouri Falls Recreation Area. Beech/maple forest.
4. Polk County, in the vicinity of Shady Lake and Bard Springs recreation areas. Beech/maple forest.
5. Montgomery County, southeast of Mt. Ida between Collier Springs and Crystal Recreation Area. Beech/maple forest.

These five areas circumscribe an area of approximately 1600 square miles in the Ouachita Mountain core region.

Litter samples were collected by sifting forest litter, including thoroughly rotted logs, leaf packs, root mats, and flood debris, through a 1/4 inch wire mesh sifter. The sifted sample was weighed and held in a cloth bag at room temperature until extraction. Organisms were extracted for 24 hours using Berlese funnels equipped with incandescent lights. Spiders and other organisms extracted from the samples were preserved in 70% ethanol. The spiders were later sorted and identified using a dissecting microscope. Sources used for identification of spiders included Kaston (1948, 1978), Comstock (1948), Heiss and Allen (1986), and Emerton (1902). Voucher specimens of identified taxa are deposited in the

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Henderson State University spider collection.

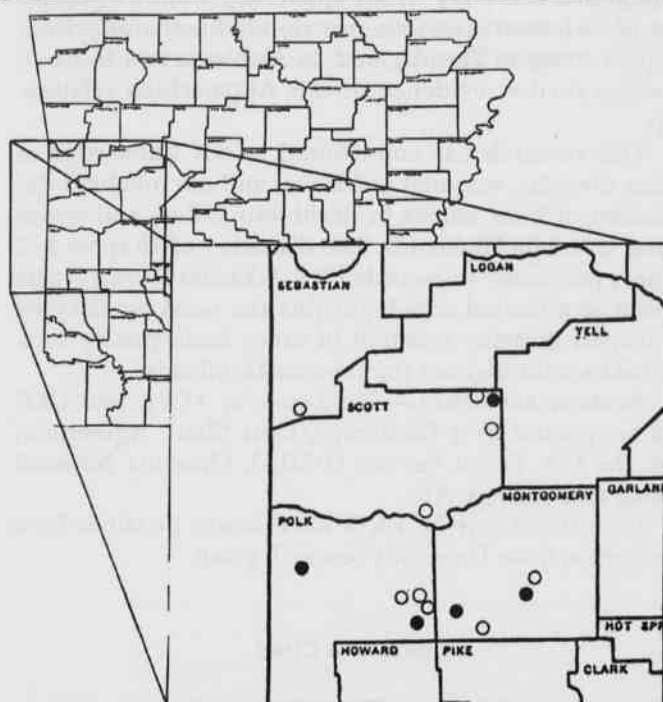


Fig. 1. Forest litter sample localities in the Ouachita Highlands during 1991 and 1992. Solid circles = primary sample sites. Open circles = secondary sample sites.

Results and Discussion

A total of 102 forest litter samples was collected from 14 localities, five primary and nine secondary as shown in Fig. 1. Seventeen families and 56 species among 51 genera of spiders were collected with 19 species having been previously unrecorded for the state (Dorris 1985, 1989). Below a list of spider taxa and abbreviated locality information is provided. Species that are new for the state are indicated by an asterisk. More detailed locality data are available from HWR or CEC.

Taxa	County	Location	Date
AGELENDIDAE			
* <i>Calymmaria cavicola</i> (Banks)	Yell	Blue Mt. Lake	3/24/92
	Mont.	E. Crystal Mt.	10/5/91
<i>Circurina arcuata</i> Keyserling	Polk	Caney Creek Wild.	6/19/92
	Polk	E. Slope Rich Mt.	9/28/91
	Scott	Mill Creek Rec.	2/11/92
* <i>Circurina brevis</i> (Emerton)	Scott	Dry Creek	5/15/92
<i>Cryphoea montana</i> Emerton	Polk	Caney Creek Wild	10/4/91
	Mont.	Albert Pike	8/24/91
	Polk	E. Slope Rich Mt.	12/18/91
* <i>Cybacus reticulatus</i> Simon	Polk	N. Slope Rich Mt.	12/18/91
* <i>Tegenaria domestica</i> (Clerck)	Polk	Rich Mt. Eagleton	1/9/92

AMAUROBIDAE			
<i>Amaurobius ferox</i> (Walckenaer)	Polk	N. Slope Rich Mt.	12/18/91
<i>Titanoeca americana</i> Emerton	Mont.	Crystal Rec. Area	10/5/91
ARANEIDAE			
<i>Araneus cingulatus</i> (Walckenaer)	Polk	Rich Mt. Eagleton	1/9/92
	Polk	E. Slope Rich Mt.	9/28/91
* <i>Hyposinga pygmaea</i> (Sundevall)	Polk	N. Slope Rich Mt.	12/18/91
CLUBIONIDAE			
<i>Castianeira cingulata</i> (L. Koch)	Polk	Caney Creek Wild.	12/18/91
<i>Clubiona obesa</i> Hentz	Polk	Caney Creek Wild.	12/18/91
<i>Clubionoides excepta</i> (L. Koch)	Mont.	Crystal/Collier	7/7/91
<i>Trachelas deceptus</i> (Banks)	Polk	Caney Creek Wild.	10/4/91
<i>Trachelas similis</i> Cambridge	Polk	E. Slope Rich Mt.	9/28/91
DICTYNIIDAE			
* <i>Dictyna sublata</i> (Hentz)	Scott	Mill Creek Rec.	2/11/92
GNAPHOSIDAE			
<i>Drassodes neglectus</i> (Keyserling)	Mont.	Albert Pike	8/24/91
* <i>Drassyllus agilis</i> (Bryant)	Polk	Caney Creek Wild	12/18/91
<i>Drassyllus covensis</i> Exline	Polk	Caney Creek Wild.	12/18/91
<i>Gnaphosa sericata</i> (L. Koch)	Polk	Caney Creek Wild.	12/19/91
* <i>Haplodrassus signifer</i> (L. Koch)	Polk	Caney Creek Wild.	12/18/91
* <i>Orodassus assimilus</i> (Banks)	Polk	Caney Creek Wild.	12/18/91
* <i>Poecilochroa ocellata</i> (Walckenaer)	Yell	S. Blue Mt. Lake	3/24/92
<i>Zelotes hentzi</i> (Barrows)	Polk	N. Slope Rich Mt.	12/18/91
LINYPHIIDAE			
* <i>Bathyphantes pallida</i> (Banks)	Mont.	Crystal/Collier	7/7/91
	Polk	Caney Creek Wild.	10/4/91
* <i>Helophora insignis</i> (Blankwall)	Polk	Caney Creek Wild.	12/18/91
<i>Lepthyphantes nebulosa</i> (Sundevall)	Scott	Mill Creek Rec.	2/11/91
* <i>Microneta viaria</i> (Blackwall)	Polk	Caney Creek Wild.	10/4/91
<i>Tenessellum formicum</i> (Emerton)	Polk	Caney Creek Wild.	12/18/91
	Scott	Mill Creek Rec.	2/11/91
LYCOSIDAE			
<i>Allocosa funerea</i> (Hentz)	Polk	Caney Creek Wild.	12/18/91
<i>Arctosa rubicunda</i> (Keyserling)	Polk	N. Slope Rich Mt.	9/28/91
<i>Pardosa milvina</i> (Hentz)	Polk	Caney Creek Wild.	12/18/91
<i>Pirata minutus</i> Emerton	Polk	Rich Mt. Eagleton	1/9/92
<i>Pirata piratica</i> (Clerck)	Scott	Dry Creek	5/15/92
<i>Schizocosa bilineata</i> (Emerton)	Polk	Caney Creek Wild.	12/18/91
NESTICIDAE			
<i>Eidmanella pallida</i> (Emerton)	Mont.	Crystal Rec.	10/5/91
	Mont.	Little Mo. Falls	8/15/91
	Yell	S. Blue Mt. Lake	3/24/92
	Polk	Rich Mt. Eagleton	1/9/92
OXYOPIDAE			
<i>Oxyopes salticus</i> Hentz	Polk	Caney Creek Wild.	12/18/91
PHOLCIDAE			
<i>Spermophora meridionalis</i> Hentzq	Yell	Blue Mt. Lake	3/24/92
SALTICIDAE			
<i>Ballus youngi</i> G. & E. Peckham	Polk	Caney Creek Wild.	12/18/91
<i>Evarcha hoyi</i> (G. & E. Peckham)	Mont.	Albert Pike	8/24/91
<i>Habrocestum pulex</i> (Hentz)	Polk	Caney Creek Wild.	12/18/91
	Polk	Rich Mt. Eagleton	1/9/92
* <i>Habronattus agilis</i> (Banks)	Polk	Caney Creek Wild.	10/4/91
<i>Habronattus decorus</i> (Blackwall)	Polk	N. Slope Rich Mt.	12/18/91
<i>Sitticus palustris</i> G. & E. Peckham	Polk	Caney Creek Wild.	12/18/91
SEGESTRIDAE			
<i>Ariadna bicolor</i> (Hentz)	Polk	Caney Creek Wild.	12/18/91
THERIDIIDAE			
* <i>Achaearanea rupicola</i> Emerton	Polk	Caney Creek Wild.	12/18/91
<i>Ctenium riparium</i> (Keyserling)	Polk	Caney Creek Wild.	10/4/91
	Mont.	Little Mo. Falls	8/15/91

<i>Dipoena nigra</i> (Emerton)	Polk	N. Slope Rich Mt.	12/18/91
* <i>Pholocomma hirsutum</i> Emerton	Polk	Caney Creek Wild.	10/4/91
	Polk	Rich Mt. Eagleton	1/9/92
	Mont.	Crystal Rec.	10/5/91
* <i>Theridion alabamense</i> Gert. & Archer	Polk	Caney Creek Wild.	10/5/91
THERIDIOSOMATIDAE			
<i>Theridiosoma radiosa</i> (McCook)	Polk	E. Slope Rich Mt.	9/28/91
THOMISIDAE			
<i>Misumenops oblongus</i> (Keyserling)	Polk	N. Slope Rich Mt.	12/18/91
* <i>Oxyptila distans</i> Dondale & Redner	Polk	N. Slope Rich Mt.	12/18/91
	Polk	Caney Creek Wild.	12/18/91
<i>Xysticus elegans</i> Keyserling	Polk	N. Slope Rich Mt.	12/18/91
* <i>Xysticus locuples</i> Keyserling	Scott	Dry Creek	5/15/92
	Polk	N. Slope Rich Mt.	12/18/91
	Polk	Caney Creek Wild.	12/18/91
ULOBORIDAE			
<i>Uloborus diversus</i> Marx	Polk	Caney Creek Wild.	12/18/91

These identifications are based on examinations of 109 adult spiders. Generally, more spiders were collected during the colder months. This would be expected because protection in leaf litter, debris, and other objects is sought during the frigid months.

Eidmanella pallida was the most abundant species with specimens collected in nearly all counties sampled. Nesticidae is a small family of widely distributed spiders which build their webs under stones, leaves, and other dark places.

Previously unrecorded species were collected in small numbers usually one to four specimens; however, nearly every county in the study area produced at least one new species. Significant range extensions from oak/hickory slope habitats were seen in an extreme eastward move for *Cybaeus reticulatus* and *Xysticus locuples* and a westward move for *Oxyptila distans*.

Only six of the unrecorded species were collected from oak/hickory slope habitats. They are: *Hyposinga pygmaea*, *Cybaeus reticulatus*, *Tegenaria domestica*, *Oxyptila distans*, *Xysticus locuples*, and *Pholocomma hirsutum*. The remainder were collected in beech/maple valley forests.

Conclusions

The Ouachita National Forest litter collections representing Polk, Yell, Montgomery, and Scott Counties yielded 17 families, 51 genera, and 56 species of spiders. This number included 19 species not included in the Arkansas checklists reported by Dorris (1985, 1989).

Endemic faunas of the Magazine Mountain and the Ouachitas are classic examples of relict faunas, and are most closely related to the faunas of the Appalachians. Some aspects of this hypothesis are controversial, but the accumulating data supporting it are compelling according to Carlton and Cox (1990), Babaei and Stanton (1992),

Mohlenbrock (1993), Noble (1993), and Gleason et. al. (1994). The discovery of an apparently disjunct population of *Calymmaria cavicola* (previously known only from Virginia south to Florida, west to Alabama, and Indiana) provides further evidence of this Appalachian relationship.

This research has contributed to our knowledge of spider diversity, seasonal utilization and microhabitat distribution of litter faunas in deciduous valleys and slopes of the Ouachita Highlands. The discovery of 19 species of spiders previously unrecorded for Arkansas from a single habitat in a limited area highlights the need for detailed arthropod diversity research in other inadequately studied habitats throughout the Interior Highlands.

ACKNOWLEDGMENTS.—Fieldwork by HWR and CEC was supported by a Challenge/Cost Share Agreement with the U.S. Forest Service (USDA), Ouachita National Forest, Hot Springs, AR.

Identifications by PRD were made possible by a Henderson State University research grant.

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