

SPIDERS (ARANEAE) IN THE DIET OF AMERICAN WOODCOCK IN MAINE

Birds are recognized predators of spiders (Gertsch 1979; Kaston 1981). Although numerous studies have reported spiders in avian diets, most concern passerine species (e.g., Orians and Horn 1969; Cowie and Hinsley 1988; Guinan and Sealy 1987) and few identify spiders to family or generic level. Information on the taxa of spiders consumed by avian species will expand our knowledge of bird-spider and predator-prey interactions.

The American woodcock (*Scolopax minor*) is a ground-dwelling bird that feeds on invertebrates on and beneath the forest floor. Woodcock use their long bill to extract prey from the soil and to capture prey on the surface (Sheldon 1967). Quantitative analyses of woodcock food habits include spiders (Pettingill 1936; Sperry 1940; Miller 1957; Krohn 1970), but the taxa consumed were not identified. These studies also indicate that spiders compose a small percentage of the biomass consumed by woodcock; however, a more recent analysis in Maine suggests that spiders may be more important when the woodcock's primary prey, earthworms (Lumbricidae), are less available (Vander Haegen unpublished data). This note documents the family, genus, and, in some cases, species of spiders consumed by American woodcock collected on the Moosehorn National Wildlife Refuge, Washington County, Maine.

Woodcock were collected from late March - late June, 1987-1989, either by shotgun ($N = 45$), or as incidental mortalities from a radio-telemetry study ($N = 15$). Immediately after shooting, 70% ethanol was forced down the esophagus to retard digestion. Contents of the esophagus, proventriculus, and ventriculus were removed and preserved in 70% ethanol. Contents were later submerged in a shallow dish and examined with a stereomicroscope (10-60X). Spiders and spider parts were removed and identified by the junior author. When genitalia were present, specimens were identified to species based on keys and species descriptions in Kaston (1981) and other consulted sources. In the absence of spider genitalia, most parts could be identified only to order, family, and sometimes genus. All spiders and spider parts were stored in 2-dram vials and will be deposited in the arachnid collections of the U.S. National Museum of Natural History, Washington, D.C.

Fifteen of 60 (25%) woodcock examined contained the remains of from 1 to 3 spiders. Spiders of 4 families, 5 genera, and at least 5 species were identified (Table 1). Hunting spiders outnumbered web-spinning spiders 19 to 2; remains of 3 spiders were undetermined. *Trochosa* was the dominant genus among spider prey found in woodcock digestive tracts. All of the identified genera except *Coras* were also captured during expellant sampling of the sub-litter layer of woodcock feeding habitats on the Refuge (Jennings et al. 1990).

The preponderance of hunting spiders eaten by woodcock was not reflected in the results from expellant sampling, where web-spinning spiders outnumbered hunters 2 to 1 (Jennings et al. 1990). This suggests that woodcock either were encountering a greater percentage of hunting vs. web-spinning spiders, or were better able to detect and capture hunting vs. web-spinning spiders. Many of the web-spinning species collected by expellant were small spiders of the families Theridiidae, Linyphiidae, and Erigonidae. We suspect that such small spiders are

Table 1.—Species and number of spiders found in American woodcock stomachs, Moosehorn National Wildlife Refuge, Washington County, Maine, 1987-89.

Family Species	Number		
	Male	Female	Juv.
Agelenidae			
<i>Cicurina brevis</i> (Emerton)		1	
<i>Coras</i> sp.			1
Lycosidae			
<i>Trochosa terricola</i> Thorell	2	2	
<i>Trochosa</i> sp.	1		11
Clubionidae			
<i>Clubiona canadensis</i> Emerton		1	
<i>Clubiona</i> sp.			1
Thomisidae			
<i>Xysticus</i> sp.			1
Undetermined			3

below the threshold of acceptable prey-size for woodcock. The stomach-content results (Table 1) support this hypothesis because most of the spider prey eaten by woodcock were Lycosidae, which generally are larger than species of theridiids, linyphiids, and erigonids.

All identified genera eaten by woodcock were also captured during pitfall trapping in spruce-fir forests of Maine (Hilburn and Jennings 1988; Jennings et al. 1988). Hunting spiders, predominantly Lycosidae, were abundant in pitfall-trap catches in Maine, a result attributable to the roving nature of this foraging guild (Uetz and Unzicker 1976). The mobility of hunting spiders may also make them more available to foraging woodcock. This study indicates that soil- and litter-inhabiting spiders are included in the diet of American woodcock in Maine.

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