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PARASITIC ARTHROPODS OF WHITE-FOOTED MICE AT McCLINTIC WILDLIFE STATION, WEST VIRGINIA

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ABSTRACT. Seven species of parasitic arthropods (one sucking louse, one bot, 2 fleas, one tick, and 2 mites) were recovered from 81 white-footed mice, *Peromyscus leucopus,* live-trapped on the grounds of the McClintic Wildlife Station, Mason County, WV, from March through November 1990. The most commonly collected arthropods were the fleas *Orchopeas leucopus* (89 specimens) and *Epitedia wenmanni* (23), and the tick *Dermacentor variabilis* (38). Sex ratios for both flea species were female biased; 1.8:1.0 for *O. leucopus* and 1.6:1.0 for *E. wenmanni.*

Peromyscus leucopus (Rafinesque) is a competent reservoir host for both the Lyme disease spirochete *Borrelia burgdorferi* Johnson, Schmid, Hyde, Steigerwalt, and Brenner, and the etiologic agent of human babesiosis, *Babesia microti* Franca (Spielman et al. 1985, Spielman 1988). Although the latter zoonosis is unknown from West Virginia, there is some concern that Lyme borreliosis may become more prevalent in the state, perhaps vectored by species of *Ixodes* other than *Ixodes scapularis* Say (Hall et al. 1991). Because of this concern, and because little is known about ectoparasites from *P. leucopus* in West Virginia, it seemed prudent to examine this potential reservoir species for hematophagous arthropods.

This investigation was carried out on an ≅ 28-ha plot within the 1,133-ha Clifton F. McClintic Wildlife Station in Mason County, WV (USGS Topographic Map; Cheshire, Ohio Quadrangle) from March through November of 1990. The study plot was characterized by deciduous woodlands surrounding patches of grassy meadows dotted with multiflora rose (*Rosa multiflora* Thunberg). White-footed mice were captured using Sherman live-traps (7.6 × 7.6 × 22.8 cm) baited with a mixture of rolled oats and peanut butter. Traps were placed in 5 lines each of 5 traps (25 traps total) spaced at 15-m intervals forming a grid with outer boundaries of 60 m. Traps were set in the late afternoon and checked early the next morning 2–5 times each month from March through November 1990. Traps were set in different areas of the study plot to spread the trapping pressure as evenly as possible.

Each captured animal was sacrificed on site by thoracic compression in a separate zip-lock plastic bag, placed on ice, then transported to the laboratory. Each host was brushed over a white enamel pan, then washed in a dilute soap solution. The wash solution was vacuum filtered through a Buchner funnel lined with #1 Whatmann filter paper. Contents of the enamel pan, filters, and the bag from which the host had been taken were thoroughly examined under a stereomicroscope. Ectoparasites were stored in 70% ethanol. All fleas were desclerotized for 4–24 h in a 4% aqueous solution of potassium hydroxide, dehydrated in an ethanol series, cleared in methyl salicylate, and mounted in Permount® for identification. Other ectoparasites were prepared and mounted as above, omitting the desclerotizing step in the procedure. The terms prevalence and mean intensity, as we use them, follow the definitions of Margolis et al. (1982).

Seven species of arthropods were recovered from 81 *Peromyscus leucopus* individuals captured during this study (Table 1). All of these arthropod species have previously been reported from this host species (Durden 1992). Twenty-eight of 37 (75.7%) male *P. leucopus* were infested by at least one species of ectoparasite, and 25 of 44 (56.8%) female *P. leucopus* were similarly infested. This difference in prevalence between male and female hosts is not significant ($\chi^2 = 2.38$, 1 df, $P > 0.05$).

Both *Orchopeas leucopus* (Baker) and *Epitedia wenmanni* (Rothschild) are commonly associated with *P. leucopus* (Durden 1992), so it was not surprising to find these fleas in West Virginia. Prevalence and mean intensity (43.2% and 2.5) reported here for *O. leucopus* on *P. leucopus* are similar to the 50% and 2.5 figures for the same flea–host association in Maryland (Durden 1992). Other studies, however, have reported lower prevalences and mean intensities for *O. leucopus* on *P. leucopus*: 6% and 1.7 in Illinois (Basolo and Funk 1974), 7% and 3.3 in Wisconsin (Amin 1976), 10% and 1.0 in Tennessee (Durden and Wilson 1991), 11% and 2.0 in Pennsylvania (Whitaker and Lukoschus 1982), 18% and 1.7 in Connecticut (Main 1983), 21% and 2.4 in Indiana (Whitaker 1982), 34% and 1.6 in Ontario (Lindsay et al. 1991), and 34% and 2.2 in New Mexico (Holdenried and Morlan 1956). Prevalence and intensity (13.6% and 2.1) for *E. wenmanni* on *P. leucopus* in West Virginia are considerably lower than the 31% and 5.7 values reported by Durden (1992). Other previously reported figures for *E. wenmanni* on *P. leucopus* are: 6% and 1.5 in Connecticut (Main 1983), 11%

Table 1. Parasitic arthropods collected from *Peromyscus leucopus* at McClintic Wildlife Station, Mason Co., WV 1990.

	P. leucopus females (n = 44)[1]				*P. leucopus* males (n = 37)[2]			
	Prevalence %	Mean intensity[3]	Range	No. collected[4]	Prevalence %	Mean intensity[3]	Range	No. collected[4]
Anoplura								
Hoplopleura hesperomydis	9.1	1.0	1	1♂, 3♀♀	5.4	1.0	1	2♀♀
Diptera								
Cuterebra fontinella	2.3	1.0	1	1L	2.7	1.0	1	1L
Siphonaptera								
Epitedia wenmanni	18.2	2.5 ± 2.8	1–9	8♂♂, 12♀♀	8.1	1.0	1	1♂, 2♀♀
Orchopeas leucopus	31.8	1.7 ± 1.3	1–5	7♂♂, 17♀♀	56.8	3.1 ± 2.6	1–9	25♂♂, 40♀♀
Acari								
Androlaelaps fahrenholzi	4.5	16.5 ± 19.0	3–30	U	5.4	9.5 ± 12.0	1–18	U
Dermacentor variabilis	13.6	1.8 ± 1.6	1–5	10L, 1N	29.7	2.5 ± 2.1	1–7	23L, 4N
Ornithonyssus bacoti	9.1	3.8 ± 4.9	1–11	12♀♀, 3N	8.1	1.3 ± 0.5	1–2	4♀♀

[1] Ten females trapped in the spring (March–May), 15 in the summer (June–August), and 19 in the fall (September–November).
[2] Twenty-six males trapped in the spring, 10 in the summer, and 1 in the fall.
[3] Mean ± SD.
[4] N, nymph(s); L, larva(e); U, undetermined.

and 1.2 in Quebec (Lindsay et al. 1991), 12% and 1.3 in Illinois (Basolo and Funk 1974), 13% and 1.0 in Tennessee (Durden and Wilson 1991), and 38% and 1.1 in Indiana (Whitaker 1982).

Sex ratios of fleas recovered from small mammals tend to be female-biased (Marshall 1981, Schwan 1993). In the present study, flea populations on *P. leucopus* were female-biased, with female to male sex ratios of 1.8:1.0 and 1.6:1.0 for *O. leucopus* and *E. wenmanni,* respectively. Durden (1992) recorded a female-biased ratio of 2.4:1.0 for *O. leucopus* on *P. leucopus.* The higher female-biased ratio of 4.0:1.0 for this same flea–host association recorded by Amin (1976) was based upon only 10 *O. leucopus* individuals. Joyce and Eddy (1944) and Durden (1992) cited female-biased ratios for *E. wenmanni* on *P. leucopus* at 2.1:1.0 and 1.5:1.0, respectively.

Prevalence and mean intensity (21% and 2.2) reported for *Dermacentor variabilis* (Say) on *P. leucopus* in the present study are similar to the 19% and 1.2 values cited by Durden (1992) from Maryland. Other studies, however, cite higher prevalences and mean intensities for this tick on *P. leucopus*: 27% and 3.2 in Ontario (Lindsay et al. 1991), 37% and 3.8 in Tennessee (Zimmerman et al. 1987), 58% and 5.2 in Maryland (Carroll et al. 1989). and 57% and 12.8 in Tennessee (Durden and Wilson 1991). Only Whitaker (1982) reported a lower prevalence, at 10%.

Prevalence and mean intensity (9.1% and 1.0) reported here for *Hoplopleura hesperomydis* (Osborn) are similar to the 11% and 1.8 recorded by Whitaker and Lukoschus (1982) in Pennsylvania. Higher prevalences and mean intensities for this same louse–host association have been reported by Durden (1992) (44% and 4.7), Basolo and Funk (1974) (30% and 4.2), and Durden and Wilson (1991) (23% and 2.6). Florschutz and Darsie (1960) failed to recover *H. hesperomydis* from *P. leucopus* in Delaware.

The bot *Cuterebra fontinella* Clark, and the 2 mesostigmatid mites, *Androlaelaps fahrenholzi* (Berlese) and *Orthinyssus bacoti* (Hirst) were recovered from relatively few white-footed mice in the present study. As a result, comparisons of prevalence and mean intensities with other reports have not been made.

Noticeably missing from the list of ectoparasites on *P. leucopus* at McClintic is the principal vector of Lyme borreliosis, *Ixodes scapularis* Say (Oliver et al. 1993). This is noteworthy because of the concern that Lyme disease may become more prevalent in West Virginia (Hall et al. 1991). The potential for Rocky Mountain spotted fever transmission still resides at McClintic, however, because the principal vector of this zoonosis in eastern North America, *D. variabilis,* is endemic to the wildlife station.

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