

served. Except for observations of binucleate cysts by us, morphological characteristics were similar to those described by Craig in 1912.

V. lobospinosa grew well on nutrient agar and could be maintained at 37 C or room temperature until the agar dried out. Viable amebae were present on refrigerated agar slants after 8 months and presumably could be kept longer if necessary. Cysts were abundant in fecal samples and on older agar cultures. Removal of cysts to either saline or distilled water resulted in a few excystments. Subculturing of amebae on fresh agar for 24 hr at room temperature resulted in populations of which 55.7% were trophozoites. Subculturing amebae on

fresh agar for a similar period at 37 C resulted in 59.9% trophozoites. Four-day-old subcultures reincubated at 37 C for 24 hr resulted in 4.7% trophozoites. Cysts apparently were not reproductive since only one motile ameba emerged from a cyst.

This investigation extends the range of *V. lobospinosa* to include Shelby County, Tennessee; also pigs and horses are added to the list of natural hosts.

Walter E. Wilhelm and James H. Anderson,* Department of Biology, Memphis State University, Memphis, Tennessee 38111. *Present address: Delta Chemical Corporation, 3915 Air Park Street, Memphis, Tennessee 38118

A Survey of the Arthropod Parasites of Pigeons (*Columba livia*) in Boston

The purpose of this study is to report the species of ectoparasites collected from pigeons in Boston and give their incidence of infection with observations on age and sex of the host.

One hundred and 22 pigeons caught in approximately equal numbers per month over a 15-month period were examined. The majority of pigeons were live-trapped in a Havahart pigeon trap. Birds classified as nestlings had been removed from nests. Juveniles were those, other than nestlings, which had bursas. Approximately equal numbers of males and females were collected. All pigeons were killed with chloroform within a few days of capture and examined for ectoparasites using the following techniques.

Longitudinal cuts were made on the left and right sides of the operculum and the exposed areas as well as the outer ears were flushed with water. Skin scrapings were taken from the ventral apterium. Each bird was then returned to the killing jar with 1 liter of water and 4 g of detergent and shaken for 5 min, after which the water was poured out and kept. The bottle was refilled twice with water alone and shaken for 30 sec each time. Finally, the bird was removed from the bottle, suspended, and rinsed with 300 ml of water to remove any remaining

parasites. The washing and rinsing fluids were filtered through closely woven nylon and the residue examined with the aid of a dissecting microscope. Permanent mounts of the ectoparasites were studied later using a compound microscope.

Thirteen species of ectoparasites were recovered: four species of Mallophaga, eight of Acarina, and one hippoboscid (Table I). To the author's knowledge, *Columba livia* is a new host record for the louse, *Menacanthus stramineus*, and the mite, *Picobia* sp. *Neocheyletiella heteropalpa* has not been reported previously from pigeons in North America.

Nestlings showed the lowest per cent infestation with all species of ectoparasites except *Dermanyssus gallinae*, a mite known to inhabit bird nests. Juveniles generally showed higher per cent infestation and mean number of ectoparasites per infested bird than either nestlings or adults. The generally lower mean number of ectoparasites of adult birds, as compared to juveniles, appears to indicate a decreased susceptibility with age.

Use of 2×2 contingency tests showed that there was no statistically significant difference ($P > 0.05$) between ectoparasite numbers on males and females.

TABLE I. Incidence and numbers of parasites from 122 pigeons in Boston—14 nestlings (N), 36 juveniles (J), and 72 adults (A).

Species	Pigeons infested			Number of parasites	
	Age	No.	%	Range	Avg
Biting lice					
<i>Columbicola columbae</i> (Linnaeus, 1758)	N	8	57.1	1-57	27.3
	J	35	97.2	6-811	179.3
	A	71	98.6	1-492	110.2
<i>Hohrstiella lata</i> (Piaget, 1880)	N	2	14.3	1-2	1.5
	J	22	61.1	1-70	10.0
	A	30	41.7	1-30	6.2
<i>Campanulotes bidentatus</i> <i>compar</i> (Burmeister, 1838)	N	3	35.7	1-52	53.3
	J	32	83.3	1-760	95.6
<i>Menacanthus stramineus</i> (Nitzsch, 1818)	A	66	91.7	1-782	153.6
	A	3	4.2	1-3	1.7
Mites					
<i>Dermanyssus gallinae</i> (DeGeer, 1778)	N	2	14.3	-	1.0
	J	6	16.7	1-3	1.3
	A	6	8.3	1-41	10.3
<i>Neonyssus melloi</i> (Castro, 1948)	N	2	14.3	2-5	3.5
	J	16	44.4	1-43	11.7
	A	27	37.5	1-45	8.1
<i>Neonyssus columbae</i> (Crossley, 1950)	J	10	27.8	1-21	4.2
	A	15	20.8	1-24	4.2
<i>Neochyletiella heteropalpa</i> (Mégnin, 1878)	J	8	22.2	1-183	28.9
	A	3	4.2	1-2	1.3
<i>Syringophilus columbae</i> (Hirst, 1920)	A	1	1.4	-	1.0
	A	1	1.4	-	1.0
<i>Picobia</i> sp. (Haller, 1878)	A	1	1.4	-	1.0
	A	1	1.4	-	1.0
<i>Harpirhynchus</i> sp. (Mégnin, 1877)	J	3	8.3	1-12	5.3
	A	14	19.4	1-20	5.1
Hypodectidae (Fain and Bafort, 1966)	A	2	2.8	-	1.0
	A	2	2.8	-	1.0
Louse fly					
<i>Pseudolynchia canariensis</i> (Macquart, 1839)	J	13	36.1	1-8	1.8
	A	8	11.1	1-3	1.4

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N. Sandra Brown, Department of Biology, Boston University, Boston. (Present address: Department of Biology, Simmons College, Boston, Mass. 02115.) Supported, in part, by summer grants from the NSF and Boston University Graduate School