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PRESENCE OF TICKS ON THE HEADS OF HONEYEATERS IN NEW ENGLAND NATIONAL PARK

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Ten species of honeyeater and three species of thornbill, present in New England National Park, were examined for ticks. Approximately 5% of the 1 229 birds inspected had ticks present on their heads. Most infected birds were caught in winter. I suggest that ticks wait on the flowers of *Banksia spinulosa* for prospective hosts, and that interspecific differences in infestations among the birds are due to differences in their habitat selection foraging behaviour and morphology. Mosts ticks were found around and in front of the eyes.

INTRODUCTION

Parasites, whether internal or external, can be a direct or indirect cause of disease and death among birds (Rand 1974). The ectoparasites commonly found on birds include lice, fleas, mites, argasid and ixodid ticks, calliphorid and hippoboscid flies and occasionally leeches (Welty 1962; Lane 1969). Many of these parasites are blood suckers. Ticks have been noted on a number of marine bird species (Murray 1969) but very little is known of tick infestations of terrestrial Australian species.

In this paper I report on tick infestations on the heads of honeyeaters (Meliphagidae) and thornbills (*Acanthiza* spp.) captured in the New England National Park. Data on the distribution of ticks on the birds' heads, the seasonal changes and interspecific variation in tick infestations are presented.

STUDY AREA AND METHODS

The birds examined were netted in an open-layered forest in the New England National Park (30°30'S., 150°30'E.) in northern N.S.W. The vegetation and avifauna of the study area has been described elsewhere (Ford and Pursey 1982; McFarland in press).

In most months between January, 1982 and September, 1983, mist nets were set up for the purpose of banding honeyeaters. Whenever time permitted, a few minutes were spent inspecting the entire head of each bird handled for the presence of ticks. For most bird species the rate of capture was so low that all birds caught were examined, but for the Eastern Spinebills and Yellow-faced Honeyeaters only a sub-sample was taken. (Scientific names of all birds examined are given in Table 1.) Records were kept of the numbers of ticks present and their positions on the birds' heads (see Fig. 1).

RESULTS

A number of the ticks found on the birds were subsequently identified as nymphal and larval *Exodes* spp. (Murray pers. comm.).

Ticks were found on five of the ten species of honeyeater and two of the three species of thornbill examined (Table 1). Of the 1 229 birds inspected approximately 5% had a tick or ticks attached to their heads. Based on the proportion of birds examined that had ticks the birds were ranked from the most to the least infected: White-cheeked = Lewin's ⩾ New Holland = thornbills ⩾ Yellow-faced > Eastern Spinebill (Contingency X^2 beween species with total sample sizes greater than 20; ⩾ — $p<0.01$, > — $p < 0.05$, = — not significantly different).

Apart from New Holland Honeyeaters in February all bird species tended to have ticks present from late autumn to early spring (Table 1). For some species, due to small sample sizes, the percentage of birds infected varied markedly from month to month. In two infected species with reasonable sample sizes, the New Holland and Lewin's Honeyeaters, the period of infestation was from May to August inclusive. This period was also the time of greatest infestations per bird. Generally only one to two ticks were found on an infected bird, although up to eight ticks were recorded on a single Lewin's Honeyeater.

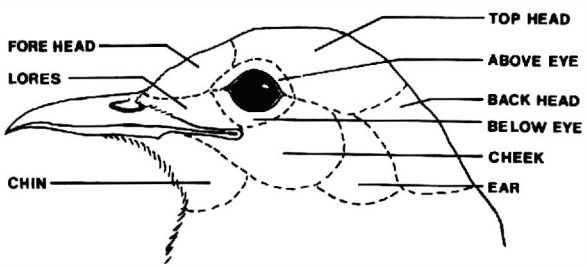

Figure 1. *Areas recognised on the head of a bird.*

Ticks appeared to be concentrated in certain areas on the heads of both the honeyeaters and the thornbills (Table 2). For all infected species

TABLE 1

Seasonal changes in tick infestation on honeyeaters and thornbills in New England National Park (percentages of birds examined (n) which had ticks present).

Bird Species		Month												
		J	F	M	A	M	J	J	A	S	O	N	D	Total
New Holland Honeyeater	%–	14.3	0	0	66.7	33.3	10.0	31.8	9.5	0	—	—	14.9
Phylidonyris novaehollandiae	(n)–	(21)	(35)	(20)	(6)	(27)	(40)	(22)	(21)	(3)	—	—	(195)
Eastern Spinebill	%–	0	0	0	0	0	0	0	0	0	0	—	0
Acanthorhynchus tenuirostris	(n)–	(10)	(56)	(102)	(34)	(140)	(58)	(91)	(133)	(62)	(3)	—	(689)
Lewin's Honeyeater	%–	—	0	20.0	50.0	75.0	33.3	50.0	0	—	—	—	42.4
Meliphaga lewinii	(n)–	—	(3)	(5)	(4)	(8)	(6)	(6)	(1)	—	—	—	(33)
Yellow-faced Honeyeater	%–	0	0	1.1	0	0	0	0	0	0	—	—	—
Lichenostomus chrysops	(n)–	(5)	(10)	(94)	(9)	(1)	(2)	(3)	(42)	(1)	—	—	(167)
White-cheeked Honeyeater	%–	—	0	0	80.0	50.0	—	100.0	100.0	0	—	—	50.0
P. nigra	(n)–	—	(3)	(5)	(5)	(2)	—	(4)	(2)	(1)	—	—	(22)
Thornbills*	%–	0	0	0	100.0	30.0	30.0	0	0	0	—	—	9.9
Acanthiza spp.	(n)–	(9)	(3)	(2)	(1)	(10)	(10)	(2)	(15)	(10)	(6)	—	(71)

* Includes Brown (*A. pusilla*) and Striated (*A. lineata*) Thornbills. Other birds examined: Red Wattlebird *Anthochaera carunculata* (7) — none; White-eared Honeyeater *L. leucotis* (1) — none; Brown-headed Honeyeater *Melithreptus brevirostris* (12) — none; White-naped Honeyeater *M. lunatus* (12) — 8.3%; Scarlet Honeyeater *Myzomela sanguinolenta* (14) — none; Buff-rumped Thornbill *A. reguloides* (6) — none.

TABLE 2

Distribution of ticks on the heads of infected birds (n = total number of infected birds caught)

Bird pecies	n	Forehead	Top head	Back head	Ear	Cheek	Chin	Lores	Above eye	Below eye	Total
New Holland Honeyeater	29	5	3	0	1	3	0	8	21	7	48
Lewin's Honeyeater	14	1	3	1	8	0	0	1	11	4	29
Yellow-faced Honeyeater	1	0	0	0	0	0	0	0	1	0	1
White-cheeked Honeyeater	11	1	0	0	0	2	0	2	2	4	11
Thornbills	7	0	0	0	0	0	1	0	5	1	7
TOTALS	62	7	6	1	9	5	1	11	40	16	96

the majority of ticks were in the area around the eye (particularly above the eye), and on the lores. The distribution of ticks on the New Holland and Lewin's Honeyeaters were significantly different (Contingency $X^2 = 17.7$, $df = 7$; $p<0.05$). The main differences between the species were that the Lewin's had a higher proportion of ticks around the ear cavity while New Hollands had more on the lores and forehead (Table 2). Few ticks were ever found on the back of the heads or on the chins of any birds.

DISCUSSION

Ticks are usually located in those areas of the head which the birds cannot effectively preen, i.e. around the eye, the angle of the mandibles and the ear cavity (Rothschild and Clay 1961; Balmford 1980). These areas are probably the best and easiest sites for attachment being soft, highly vascularised patches of skin with few feathers.

Ticks have limited powers of movement compared to their hosts, and so usually wait at sites regularly visited by their hosts, e.g. roosting, breeding and feeding sites (Murray 1969). The birds most likely to be infected with ticks are those that dwell on the ground or in bushes or those that prey on tick infested rodents (Welty 1962). In the United States, Wharton (1931, cited in Welty 1962) noted that 8.7% of 944 birds banded had ticks present, with the highest percentages being on two brush dwelling species (White-throated Sparrow *Zonotrichia albicollis* = 11.7% and Rufous-sided Towhee *Pipilo erythrophthalmus* = 47.1%). Among the birds examined in New England the two species most often seen in the understorey, the White-cheeked and Lewin's Honeyeaters, had the greatest percentages of birds infected (50.0% and 42.4% respectively). All other bird species were observed in both the canopy and the understorey, and appeared to be in the drier areas, i.e. outside the gullies and away from the nearby cool temperate rainforest.

Another possible site where ticks may wait is on the flowers visited by the birds. Most infestation occurred in late autumn and winter. This coincides with the flowering of *Banksia spinulosa*, a low shrub whose inflorescences are probed by all species listed in Table 1, including the thornbills (pers. obs.). During winter this plant is the only major source of water and energy for the honeyeaters (Ford and Pursey 1982; unpubl. data). The chances of a tick successfully transferring onto a bird probably depend on both the duration of probing and the amount of contact between the flowers and the bird's head. The percentage time spent probing by honeyeaters is roughly proportional to the honeyeater's body size, i.e. Lewin's spend more time compared to New Hollands which is greater than the Spinebills. Also, birds with relatively short beaks such as the Lewin's, have to brush against the flowers more than long-billed species, such as the Spinebill, in order to reach the nectar. Yellow-faced Honeyeaters, a short-billed species, was poorly infected because this species is migratory with the passage of birds being in April and September (McFarland in press) which are outside the infestation period (Table 1). Thirty banksia inflorescences were examined and

no ticks were found. The sample of inflorescences as a site of tick infestation is purely circumstantial and only a suggestion. Differences in the birds' roosting and bathing sites could also account for the interspecific variation in tick infestation. Further studies, involving the systematic sampling of both birds and microhabitats for ticks, are required.

Ticks can transmit disease, cause death through toxic salvia, blindness if attached too close to the eyes, anaemia and a general weakening of the bird's condition (Rothschild and Clay 1961; Wallace 1963). The degree of harm depends on how many ticks are present and where they are attached. Very few of the birds examined in New England had high infestations. I suspect that the presence of ticks on most birds had little deleterious effect on the bird's survival.

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NESTING BEHAVIOUR OF SOOTY TERNS *Sterna fuscata* ON PELSART ISLAND, WESTERN AUSTRALIA

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From 19 to 27 November 1982 I visited Pelsart Island, Abrolhos Group, WA, with Dr G. K. Lane and my wife. We accompanied Mr P. J. Fuller from the WA Wildlife Research Centre during his survey of the breeding seabirds on the island.

Observations were made, among others, on the Sooty Tern *Sterna fuscata*. Although I had seen these birds breeding previously, the situation on Pelsart Island was almost unbelievable. Previous visitors had made comments on the numbers present. Gibson (1908) stated that