

The presence of blackhead disease has only been realized since high winds have uprooted a large number of banana plants without causing 'breakneck' of the pseudostems. Investigations have shown that the roots of such plants have been so extensively invaded by *Radopholus similis* that they have been killed by the entry of secondary organisms into the stele. Where infection is not very severe, plants may produce good grades of fruit, and the heaviest losses from toppling often occur in such circumstances. Present indications are that, where the disease is particularly severe, losses from toppling may not be so serious because the plants are backward in growth and bear light bunches. The roots of young suckers tend to be less heavily invaded than those of the parent plants and these healthier roots are able to assist in anchoring the parent. In the taller plants, bearing heavier fruit, this assistance is inadequate to prevent toppling.

Radopholus similis is a burrowing nematode which soon leaves tissue rotted by secondary organisms, with the result that examination of blackened roots and heads (corms) frequently yields remarkably few parasitic nematodes. To find *R. similis* readily in the banana plant it should be sought in two regions, namely, where purplish streak lesions (less than $\frac{1}{8}$ in. wide and often not more than $\frac{1}{4}$ in. long) occur on young roots and, also, at the junction of diseased and healthy tissue near the surface of the corm, which is seldom invaded to a depth of more than half an inch. Invaded tissue is isolated by the formation of wound cambium. Although able to confine the nematodes to the surface layers of the head in this way, the banana plant is unable to resist penetration into the comparatively loose-celled parenchyma of the root cortex, so that the nematodes readily enter as far as the endodermis, where secondary organisms gain access to the vascular system, resulting in death of the roots.

R. LEACH

Banana Board Research Dept.,
Kingston, Jamaica.

¹ Ashby, S. F., Bull. Dept. Agric. Jamaica, 2, 316 (1915).

² Cobb, N. A., J. Agric. Res., 4, 561 (1915).

³ Martyn, E. B., Bull. Dept. Sci. Agric. Jamaica, 32 (1942).

Leucocytozoon spp. in some Hertfordshire Birds

DURING the course of some work on the blood parasites of birds¹ (some of which has been or will shortly be published²) gametocytes of several species of *Leucocytozoon* were observed in the blood of seven species of birds. In the absence of reports of the incidence of this parasite in British birds since those of Seligman and Sambon³ (in grouse), Woodcock⁴ (in chaffinches and redpolls) and Coles⁵ (in thrush, blackbird, jay, pigeon, starling, moorhen and "many others") it is thought that results from the present investigation (which took place between 1953 and 1955) might be of interest.

All the birds were shot or trapped near St. Albans, Hertfordshire, and thin films of their peripheral blood (stained with Giemsa's stain) were examined under a magnification of about 100 diameters for at least 10 min. The term 'adult' in Table 1 refers to all birds which had left the nest and were able to fly.

Details of the birds which were found to be infected are recorded in Table 1. No parasites were found in nine adult and four nestling song thrushes (*Turdus e. ericetorum* Turton), eight adult and one nestling

Table 1. INCIDENCE OF *Leucocytozoon* spp. IN SOME HERTFORDSHIRE BIRDS

Species of bird	Age group	No. examined	No. infected	Percentage infected
Rook (<i>Corvus f. frugilegus</i> L.)	Adult	52	8	15
Jackdaw (<i>C. monedula spermologus</i> Vieill.)	Nestling	25	0	0
Blackbird (<i>Turdus m. merula</i> L.)	Adult	27	1	4
Wood pigeon (<i>Columba p. palumbus</i> L.)	Adult	33	9	27
Blue tit (<i>Parus caeruleus obscurus</i> Pražak)	Nestling	12	0	0
Carrion crow (<i>Corvus c. corone</i> L.)	Adult	12	2	17
Tawny owl (<i>Strix aluco sylvatica</i> Shaw)	Nestling	1	0	0
	Adult	5	1	20
	Adult	2	2	—
	Adult	1	1	—

starlings (*Sturnus v. vulgaris* L.), or seven adult house sparrows (*Passer d. domesticus* L.). (Species of which fewer than five individuals were examined are excluded from this list.)

The species of *Leucocytozoon* found were identified as follows: *L. sakharoffi* Sambon 1908 in rook, jackdaw and carrion crow; *L. dubreuilii* Mathis and Leger 1911 in blackbird; *L. marchouxi* Mathis and Leger 1910 in wood pigeon; *L. majoris* (Laveran 1902) in blue tit; and *L. danilewskyi* Ziemann 1898 in tawny owl. This last species was found inhabiting both round and elongated host cells in the blood, whereas all the other species were found in round cells only.

It is interesting to note that no nestling birds were found to be infected. Of the 52 adult rooks examined, 48 were known to be less than one year old (because they possessed a forwardly directed tuft of feathers at the base of the beak which is lost at the beginning of the second year⁶), and all the infected birds were among this group. This suggests that infection of British rooks (and probably other species) does not occur until either just before or after they leave the nest.

I wish to thank Prof. P. C. C. Garnham for his advice and interest throughout this work.

J. R. BAKER*

Department of Parasitology,
London School of Hygiene and Tropical Medicine,
Keppel Street, London, W.C.1.

* Present address: East African Trypanosomiasis Research Organization, Tororo, Uganda.

¹ Baker, J. R., Ph.D. thesis, University of London, 1955.

² Baker, J. R., *Parasitol.*, 46, 308, 321, 335 (1956); *J. Protozool.* (in the press).

³ Seligman, C. G., and Sambon, L. W., *Lancet*, 829 (1907).

⁴ Woodcock, H. M., *Quart. J. Micro. Sci.*, 55, 641 (1910).

⁵ Coles, A. C., *Parasitol.*, 7, 17 (1914).

⁶ Witherby, H. F., Jourdain, F. C. R., Ticehurst, N. F., and Tucker, B. W., "The Handbook of British Birds" (Witherby, London, 1938-41).

Influence of Parasitization on Form Determination in Aphids

PARASITIZATION of the immature stages of some insects and Crustacea is known to result in structural abnormalities in the adults. Examples from insects are the production of 'intersexes' in certain Homoptera and Hymenoptera when parasitized by Strepsiptera¹, and of 'intercastes' of ants parasitized by nematodes². Unparasitized aphids intermediate in structure between alate and apterous forms have been observed and described a number of times³, and