Mallophaga on the Rock Pigeon (Columba livia) in New Zealand, with a Key to their Identification

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Summary
Five species of lice are reported. In the Menoponidae, Hohorstiella latu was occasionally found. Bonamiella columbae was present in three samples, and Callocephalum lunatum once only. In the Philopteridae, Colombicola columbae was very commonly found, and Campodeusites bidestatus compar was the next most frequent and abundant. An earlier report in the literature of the occurrence of Campodeusites gallinarum on New Zealand rock pigeons is shown to be due to a misidentification, and the history of the error is documented.

INTRODUCTION AND KEY TO SPECIES
Five species of Mallophaga (chewing lice) have been found on the rock pigeon (Columba livia domestica, 1789) in New Zealand. All are introduced in the fauna, as is of course the host. Adult and nymphal lice may be separated by the following key (adapted from Emmons, 1957):

1. Maxillary palp present (Menoponidae) (Fig. 3) — Maxillary palp absent (Philopteridae) (Figs. 1, 2)
2. A pair of prominent spine-like processes on the ventral surface of the head (Fig. 3) — Hohorstiella latu
3. No spine-like processes on the head — Hohorstiella latu
4. Third femur with three combs of fine setae on the ventral surface (Fig. 6); claw as in Fig. 7 — Callocephalum lunatum
5. Third femur without combs of setae (Fig. 4); claw as in Fig. 5 — Campodeusites bidestatus compar
6. Very slender form; head longer than wide (Fig. 1) — Colombicola columbae
7. Stout form; head slightly wider than long (Fig. 2) — Campodeusites bidestatus compar

NOTES ON THE FOREGOING GENERA AND SPECIES
Hohorstiella latu (Plat., 1880) — type host: Columba livia domestica. I have taken this species on a few occasions in New Zealand, from rock pigeons only. It appears to occur on this host throughout the country, but not in large numbers. Nelson and Murray (1971) reported this louse in Australia on the same host, particularly on the head where the eggs are laid predominantly. Hohorstiella is a small genus confined to Columbiformes. Callocephalum lunatum Denny, 1892 — type host: Columba livia domestica. I have found only one specimen (a female) among numerous collections from the rock pigeon in New Zealand, but the species is very common on the Australian Harrier. Cover approximates gouldi, which appears to be its chief and only other host in this country. The louse is widely distributed elsewhere, and is found on a number of Falconiformes and possibly sporadically within the Gruiformes and Strigiformes (Price, 1907). Nelson and Murray reported

Fig. 1. Colombicola columbae, J. Head, dorsal view. Fig. 2. Campodeusites bidestatus compar, J. Head, dorsal view. Fig. 3. Hohorstiella latu, J. Head, ventral view. Fig. 4. Bonamiella columbae. Left third femur, ventral view. Fig. 5. Bonamiella columbae. Left tarsus and claw. Fig. 6. Callocephalum lunatum. Left third femur, ventral view. Fig. 7. Callocephalum lunatum. Left tarsus and claw.
it is common on the domestic pigeons in Australia, particularly on the body, wings, and tail feathers. Columboidea is a very large genus with approximately a hundred species found on a number of orders of birds: Strigiformes, Caprimulgiformes, Piciformes, Charadriiformes, Galliformes, Columbiformes, Passeriformes (Corvidae) and Psittaciformes. A few species have been found from a skin of the Adelie Penguin, Pygoscelis adeliae (Sphenisciformes), but the record requires confirmation (Chay, 1946).

Bosomutia columbina Emerson, 1957 — type host: "domestic pigeon." I have found this species in small numbers (females only) on three occasions in New Zealand. (Additional specimens, especially of males, would be welcomed by the writer.) Identification was kindly verified by Professor R. C. Emerson, to whom specimens were sent. The species has not been taken very often; it occurs in New Zealand and in North America (where it was first found), and has been reported from Europe (Zlotowa and Luczaka, 1967; Ribbeck, 1972) and in Egypt (Selmo, El-Kashy and El-Rafaij, 1968), always on pigeons. Bosomutia is a very small genus confined to Columbidae.

Columbola columbola (Linnaeus, 1758) — type host: Columba livia domestica. This species is widespread and abundant on captive and feral rock pigeons in New Zealand. It appears to be common wherever the host occurs, and it is abundant in Australia (Nelson and Murray), being found especially on the body and wing feathers. Columbola contains over 30 species, restricted to Columbidae. Tendende (1967) recognized three subspecies of C. columbula, of which only C. columbula L. (1758) is reported from Columba livia; the New Zealand specimens agree with his descriptions and illustrations of this subspecies. Campaspatula bidensitata compar (Beverley, 1889) has a type host: Columba livia. This is widespread in New Zealand. It occurs on the ground and wing feathers only, though it occurs in much smaller numbers than does Columbola columbola. Nelson and Murray also found it to be less common in Australia. Campaspatula is a small genus restricted to Columbidae.

Many records of pigeon lice elsewhere refer to Campaspatula bidensatata (Scopoli, 1763) — type host: Columba palumbus, which is distinguished from compar by its greater size (Clay and Hopkins, 1931). Specimens from the New Zealand Columba livia fall within the range of measurements given by Kelso (1939, p. 161) and Tendende (1969) for compar. Specimens collected from rock pigeons in Christchurch were sent to Professor Tendende, who kindly verified the identification as C. b. compar.

In a report (Health, Millthorpe and Eve, 1971) on some ectoparasitic arthropods of (rock) pigeons in Christchurch, a passing reference was made to the presence of two species of lice. These were stated to be Columbola and Gonostomatidae. Whereas C. columbola is abundant on the introduced rock pigeons in this country, G. gallinula is normally a parasite of galliform birds. In an attempt to verify the records, specimens from the same collection of Heath et al. were obtained and slide preparations made of the adult lice. Columbola columbola, both males and females, was present, but not Gonostomatidae. Instead, there were specimens of both sexes of Campaspatula bidensitata compar which had evidently been misidentified as G. gallinula. The overall appearance of G. gallinula is, indeed, similar to that of C. bidensitata compar. and Gonostomatidae and Campaspatula are clearly very closely related.

To a large degree, the misidentification of C. bidensitata compar as G. gallinula by Heath et al. is due to Lapage (1956) to whom the authors turned for identification (Health, pers. commun.). Lapage (pp. 539-539, Figs. 351-351) referred to Gonostomatidae (de Geer, 1778) (= Gostomatidae [Nitzacher, and Gonzalities bidensitata compar (Nitzacher) (Hedrick, 1808)) for the illustration and stating "This species . . . is often called the fluff-louse of the fowl, pheasant and pigeon." It appears that Lapage followed Kelso in regard to host records also for Kelso (p. 136) mentioned numerous occurrences of G. holostegata on Phasianus colchicus, Calcutta gallus, Anas intera and other species. Kelso also reported earlier records from the domestic hen, and included a report of one female specimen from "Haustraria" (= Ceylonia sine domestica). The latter record was, in turn, derived from Zinkier. It is clear, however, from Zinkier's account (1930, p. 322) that he was simply reporting the existence, in the collections of the Zoologische Museum, in Berlin, of a female specimen of Gonostoma holostegata which had been taken from Columba livia var. variegata in the Berlin zoological gardens. Zinkier stated that this specimen should be regarded as a straggler (irritated), and reported a comparable instance of another typical Galliforme louse, the foot shaft louse, Mesoptera gallinula, L., 1758, on a pigeon. These must be regarded as examples of the dangers of establishing host-parasite records from a few parasitize specimens obtained from museum specimens or caged hosts. In the case in question, the "record" given by Zinkier, and adopted by Kelso and Lapage, has led to much confusion and is partly responsible for misleading Health et al. It should be disregarded as a normal host occurrence.

Further collections

Columba livia has been recorded elsewhere as bearing further species of lice; e.g. Emerson (1927) reported, for this host in North America, Calveria dianae Hufnagel Eichler, 1950 (type host: Columba livia domestica) and Phlyctenula anserina McGregor, 1917 (type host: Zenaida macroura, Mourning Dove). It would perhaps not be surprising if the first of these species were to be found in this country. The majority of the writer's records are derived from hosts collected in and near Christchurch, and the possibility of other populations of pigeons elsewhere in the country bearing such further species of lice should be explored. The writer will be glad to receive additional Mallophaga from this and other hosts for identification.

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REFERENCES


Ovarian Development in Black Beetle, Heteronychus arator (Coleoptera: Scarabaeidae)

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Summary
Observations made during a series of dissections of adult female Heteronychus arator (Fabricius) in 1973 and 1974 are recorded. Changes in the ovarioles and differences between mated and unmated individuals are described and an ovarian development ranking scheme is proposed for use in the description of seasonal ovarian development.

INTRODUCTION

As part of a study of Black Beetle adult ecology, an investigation was begun in 1973 on sexual development of the female between emergence as a terrestrial adult in the summer and copulation the following spring. Todd (1939) found that female beetles were in an unfertilised state from April until July, but dissections made at the beginning of October disclosed that all specimens were fertilised. Todd’s conclusion that mating took place in the spring (October) suggests that the mated condition was a precursor to ovarian development.

To further examine the relationship between the mated state and degree of development of the ovaries, adults were dissected from field and light trap collections.

Figure 1. Diagram of the female internal sexual structures of a black beetle. a, accessory glands; b, bursa copulatrix; m, spermatheca; l, lateral vesicle; v, vagina; o, oviduct.