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Successful Rearing of *Colpocephalum turbinatum* (Phthiraptera)

SEVERAL attempts have been made to rear avian lice *in vitro* but in most cases they have been maintained for only one generation[1,2]. Stenram[3], however, seems to have reared a species of the suborder Ischnocera, *Columbicola columbae* (Linn.) in culture for several generations without difficulty and I report here that a species of the suborder Amblycera has been colonized successfully *in vitro*. I also report the first definitive evidence of predation by lice, for this species feeds on its own eggs and nymphs.

Colpocephalum turbinatum Denny, which is found on the domestic pigeon, *Columba livia* Gmelin, has been reared continuously *in vitro* as a breeding population for over 16 months. Lice were kept in small, capped glass jars at 32°–37° C and 75% relative humidity. This species feeds on the fluffy area of a feather (as defined by Voitkevich[4]). Breast feathers of pigeons were used as a source of food and were replaced at approximately 2 week intervals. A section of primary or secondary feather 4 cm long was used for oviposition sites because the louse normally oviposits in the furrows between barbs on the large flight feathers of the wings: the primaries, their greater overcoverts, secondaries and alulae. When more than 300 eggs had been laid, the section of feather was replaced. A portion of the shaft (calamus) was placed in the culture jar as *in vivo* lice are found inside the shafts of the larger flight feathers of the wings and tail. Lice enter and leave a shaft through a small opening (upper umbilicus) or split in the feather extending distally from the upper umbilicus. Colonies were usually examined two or three times a week to count the number of each stage of the louse and to remove faecal droppings. Generation times at temperatures from 32°–37° C ranged from 20–30 days, and between sixteen and twenty-four generations were reared from the parent stock. Although these colonies could have been maintained indefinitely, they were terminated at the end of my stay in Australia.

Colonization was successful because the lice were reared in the conditions of temperature and relative humidity and with the food and oviposition and resting sites shown to be required by this species[5]. Previous failure may have been due to the absence of these conditions. Furthermore, colonies that were examined daily rather than two or three times weekly, showed a marked increase in mortality of both adults and nymphs and a reduction or cessation in the rate of oviposition. In the previous studies colonies were examined from one to six times a day to determine the exact duration of each stage

in the life cycle of a louse. It is thought that the frequent examination of colonies in part may be responsible for their limited success in rearing lice *in vitro*.

Adults of *Colpocephalum turbinatum* were also observed to eat their own eggs and nymphs. Entire eggs were eaten except for that portion of chorion that was cemented to the substrate. Eggs that were eaten *in vitro* and *in vivo* were those laid in shallower furrows of the smaller flight feathers or outside of the furrows. Chorions of hatched eggs were never observed to be eaten *in vitro* but parts of nymphs were found in the crop contents of adults. Adults were also observed consuming nymphs and partly consumed carcasses of nymphs were found in culture jars and *in vivo* within the shafts of the large flight feathers. Identification of carcasses as partly eaten nymphs was facilitated by the fact that adults characteristically consume all but the head, prothorax and intact crop with its contents. Marked dead nymphs and cast skins were never eaten by adults. Up to 80% of the nymphs in one generation may be eaten *in vitro*, but the corresponding percentage *in vivo* is unknown. Egg cases, cast skins and parts of lice and mites have been found in crops of lice[6–9], suggesting that avian lice may be predators. It is unlikely that this behaviour is unique to *C. turbinatum*, and further work will probably show that many species of lice are predators.

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