

TRANSPORT OF MALLOPHAGA BY FLEAS

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(With 1 Figure in the Text)

Among a large collection of alcohol material of Danish fleas, belonging to the Universitetets Zoologiske Museum at Copenhagen and kindly sent to me for identification by Dr S. L. Tuxen, was a tube which not only contained the fleas *Chaetopsylla trichosa* Kohaut (6 ♂, 22 ♀) and *Paraceras melis melis* (Walker) (3 ♂, 30 ♀), but also a large number of the chewing louse *Trichodectes melis* (Fabricius).* These

female of *Trichodectes melis*, is firmly attached on the outside of the left mid-tibia by having its mandibles entirely surrounding the tibia (Fig. 1). The two insects have been mounted on one slide (which is incorporated in the British Museum collection of fleas at Tring) and the attachment of the louse to the flea is so firm that the act of preparation did not separate the two insects.



Fig. 1. Head of *Trichodectes melis* attached to the left mid-tibia of *Chaetopsylla trichosa* by means of the mandibles.

specific badger-parasites were collected on the 27 October 1939 from a specimen of *Meles meles* received by the Department of Vertebrates of the Copenhagen Museum; the badger was caught at Skovshoved (Sealand, Denmark). Whilst separating the fleas from the lice I found it difficult to remove lice from several of the fleas. I then realized that these were cases of phoresy, and was fortunate enough to find in the batch a flea from which I had not yet removed the louse. The flea in question is a female of *Chaetopsylla trichosa* and the louse, a

* A list of records of Danish fleas, based upon this material, will be published in the *Entomologiske Meddelelser*.

Only one other recorded instance of this relationship between Mallophaga and Siphonaptera which is known to me is that recorded by Thompson (1934) who received from the late Prof. Julius Wagner a male of *Paraceras m. melis*, collected by him from a badger in the Crimean Peninsula; 'firmly attached to the hind tibiae of the flea by their mandibles were the head and thorax of a louse and one perfect female. The lice proved to be *Trichodectes melis* Fabricius, . . .' (The sex of the 'head and thorax' could have been determined, since the antennae of this louse show a remarkable sexual dimorphism.)

It may well have been that specimens of *Paraceras m. melis* were also among the batch of fleas from

which I removed lice. In any case, both of the specific badger-fleas (*P. m. melis* and *C. trichosa*) are now known to act, under certain conditions, as a means of transport for the badger-lice. It is of considerable interest that in both instances the lice attached themselves to the tibiae; that particular part of the flea's leg seems to be the most suitable for the louse to cling to, and its thickness may therefore be assumed to be subequal to the thickness of those hairs of the host to which the louse often attaches itself by means of the mandibles.

Most mammal-fleas do not come into contact with Mallophaga, since, for example, insectivores and bats have no Mallophaga and relatively few rodents are hosts to chewing lice. It is remarkable that so far no bird-fleas have been observed to carry Mallophaga, but this may be partly due to the fact that most bird-fleas do not remain for a sufficiently long time on the host after its death, and also, relatively little collecting of fleas from the bodies of birds has been done. Clay & Meinertzhagen (1943) record a number of cases in which Mallophaga were found to be attached to Hippoboscid flies. They carried out several simple experiments which proved that the Mallophaga attached themselves to the flies after the death of the host, thus 'using the flies as a lifeboat'. Since the badger is not a rare animal in

the British Isles, it would be of interest to carry out the following experiments, which are similar to those of Clay & Meinertzhagen:

(a) In order to establish whether lice are also carried by fleas on living hosts under natural conditions, fleas should be collected from living badgers (after having ascertained that the badgers are also infested with lice) and inspected for attached lice; alternatively, fleas could be collected from a badger immediately after its death, before the animal has had time to cool down.

(b) In order to obtain additional proof of lice using fleas 'as a lifeboat', collect all fleas alive from a freshly killed badger and inspect the living fleas for lice; then make sure the host is louse-infested, and put the fleas back on the dead animal, wrapping it up in cloth. After a few hours expose the wrapped-up animal to the fumes of chloroform and after a few minutes collect the fleas and examine them for lice.

(c) This is an alternative for (b), though much less exact: wrap a freshly killed badger up and chloroform it after a few hours; then collect and examine the fleas.

Note that in the British Isles the only flea occurring specifically on the badger is *Paraceras melis melis*, representatives of the genus *Chaetopsylla* never having been found in these Isles.

REFERENCES

- CLAY, T. & MEINERTZHAGEN, R. (1943). *Parasitology*, 35, 11-16.
 THOMPSON, G. B. (1934). *Ent. mon. Mag.* 70, 136.

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