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Recent finds of Haemodipsus spp. (Anoplura, Hoplopleuridae) on hares and rabbits in the Netherlands

by

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INTRODUCTION

Since the description of *Haemodipsus lyriocephalus* (Burmeister, 1938) as "the louse of the hare", and of *H. ventricosus* (Denny, 1842) as "the louse of the rabbit", it has generally been assumed that these were the only sucking lice specific for hares (*Lepus* spp.) and rabbits (*Oryctolagus*) respectively in Europe (see for instance NEUMANN, 1909; EWING, 1929; FREUND, 1935; NEVEU LEMAIRE, 1938; JANCKE, 1938; SÉGUY, 1944; HOPKINS, 1949; SMIT, 1951; WETZEL & RIEK, 1962; VON KÉLER, 1963). The data known by now about the geographical distribution of the two species can be summarized as follows:

H. lyriocephalus: Europe. Hosts: *Lepus timidus* (type host), *Lepus europaeus*. Rather rare (FREUND, 1935; BOUVIER, 1956 and others). Not transmissible to rabbits (BOUVIER, 1956).

H. ventricosus : Europe, Australia, Africa (FERRIS, 1954: on *Lepus saxatilis zuluensis*, Transvaal), North America (EWING, 1924 and others). Hosts: *Oryctolagus cuniculus* (type host), also found on domestic rabbits.

It was not until 1924 that a third species of the genus was described: *H. setoni* Ewing, 1924, type host *Lepus californicus melanotis* (Kansas, U.S.A.); it was subsequently found on several species of *Lepus*, once on *Sylvilagus* spec. indet. (FERRIS, 1951) and once on *Sylvilagus audubonii* (IGNOFFO, 1957) in various parts of the U.S.A. Later, a fourth species has been found: *H. africanus* Bedford, 1934, from *Lepus saxatilis*, Transvaal.

In the Netherlands, meanwhile, only a few records of these parasites have been published. MAITLAND (1858) mentioned finds of *H. lyriocephalus* on a hare in the vicinity of The Hague, and of *H. ventricosus* on tame rabbits in The Hague and Utrecht. In the PIAGET collection, which consists partly of material obtained in this country, there are various specimens of *H. ventricosus* found on "rabbits" with no further information. OUDEMANS has mounted 3 specimens (1 ♂, 1 ♀, 1 larva) of *H. lyiocephalus,* labelled by him as. "*Haematopinus lyriocephalus,* 3 ♀, from *Lepus timidus,* Utrecht, 1879" (Catal. nr. 28, collection State Museum of Natural History, Leiden). No specimens could be found in the collection of the Zoological Museum, Entomological Department, Amsterdam.

The present author found both species recently on their usual hosts. *H. lyriocephalus* (1 ♀, 1 larva) was collected from a *Lepus europaeus,* weakened by a parasitic enteritis and subsequently killed at Nunspeet, 18th February 1965.

H. ventricosus has been found more than once on wild rabbits (VAN DEN BROEK and JANSEN, 1964). The first sample obtained from an animal suffering from

myxomatosis on 14th November 1963, included 3 ♂, 7 ♀, 1 larva. The second sample was collected in February, 1965, from the skins of 19 hosts out of a population in East Flevoland, and consisted of 1 ♂, 14 ♀, 3 larvae. A superficial examination of these skins revealed that 10 of them harboured one or more parasites, i.e. 50 per cent at least.

A third species, however, has also been found. The first sample (1 ♂, 3 ♀) came from a *Lepus europaeus* from unknown locality, a blind animal suffering from keratitis (22th June 1957). The parasites have been erroneously recorded as *H. lyriocephalus* by SWIERSTRA c.s. (1958). Specimens of the same species (3 ♂, 5 larvae) also occurred on the diseased hare found at Nunspeet, 18th February 1965, which thus had harboured a mixed infection.

When comparing my specimens from *Lepus* with material from the British Museum, Natural History, London, I found a few samples of similar specimens which had been tentatively identified by Dr. THERESA CLAY as *H. setoni* Ewing, 1924. Most of them had recently been collected on *Lepus timidus scoticus* in Scotland. A sample taken from *Lepus europaeus* at Durham, England, showed a mixed infestation of *H. setoni* (4 ♂, 7 ♀) and *H. lyriocephalus* (1 ♂, 1 ♀). 1 ♀).

Comparison of these specimens from Great Britain and the Netherlands with species of *H. setoni* from *Lepus californicus,* California, U.S.A., coll. G. F. FERRIS, 1920 (nr. 358) showed that Dr. CLAY's identification had been correct and that *H. setoni* occurs on the British Isles and on the European continent.

There is one indication that *H. setoni* may have been found in Europe before: NEUMANN (1909) mentioned the presence of slightly larger specimens ("taille un peu plus grande") of *H. ventricosus* (2 ♂, 1 ♀), taken from *Lepus timidus,* in the collection of Prof. R. BLANCHARD.

DESCRIPTION OF *Haemodipsus setoni.*

Female.

Head lyre-shaped, forehead conical and broadly rounded in front (see fig. 2). Temples projecting, with nearly parallel margins, each bearing 4—5 short spine-like setae at regular distances. Antennae alike in both sexes. Segment 1 rather stout, almost square, segment 2 the longest, segment 5 rather broadly rounded and bearing a tuft of several stout setae. Head joined to thorax by means of a narrow backward projection.

Thorax broader than long, sides slightly divergent posteriorly. Thoracic sternal plate not clearly delineated, weakly sclerotised, about hexagonal, situated between the coxae of the legs. First pair of legs reaching to about the middle of tibiae II, third pair somewhat longer and stouter than the second pair.

Abdomen pyriform to oval, covered with small scales. One row of slender setae dorsally and ventrally on each segment, interrupted twice on each side. Setae overlapping with at least a quarter of their length. Spiracles on segments 3—8, diameter ± 20 μ. Paratergal plates (definition: see FERRIS, 1951, p. 29) on segments 4—6, those on segment 3 the smallest. Each plate bears a long lateral seta at its base. Average length of plates on segments 4 or 5: ± 38μ. Gonapophyses small, not protruding, each bearing 6—10 small setae in an irregular row.

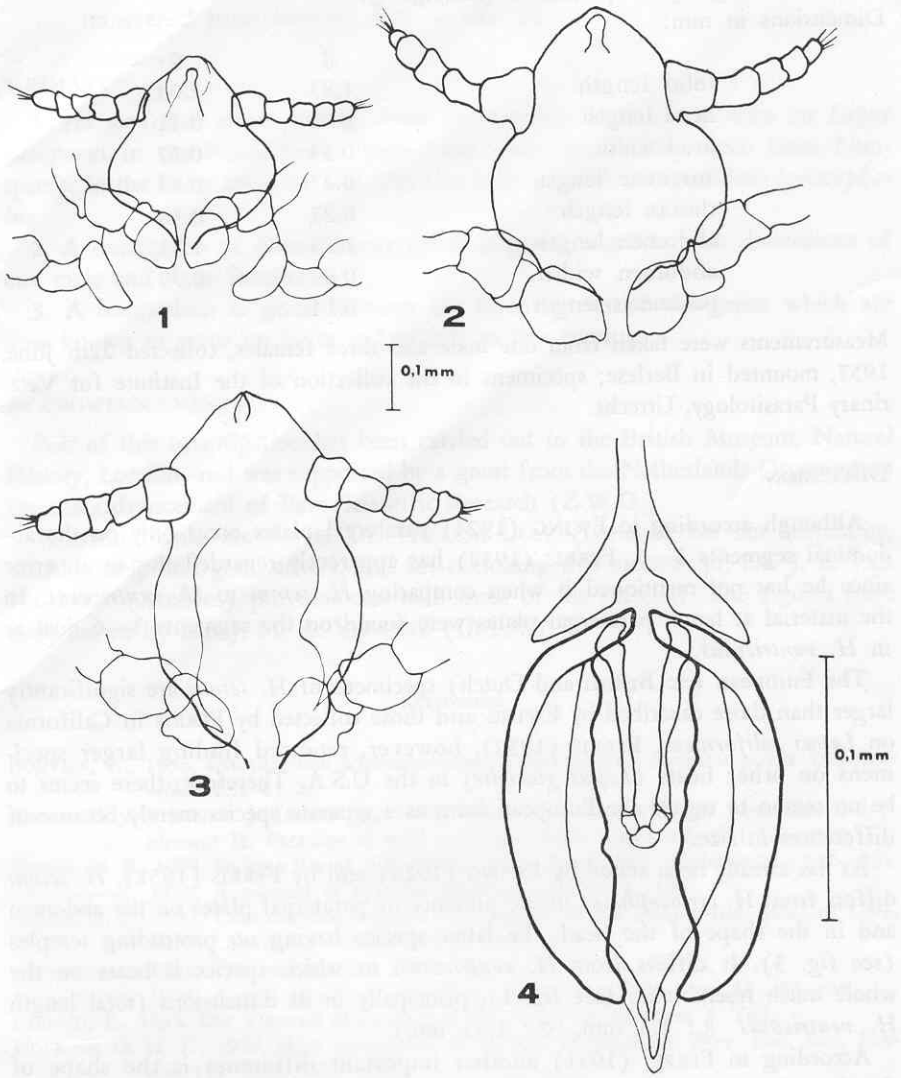

Fig. 1: *Haemodipsus ventricosus*, female, head. Fig. 2: *Haemodipsus setoni*, female, head. Fig. 3: *Haemodipsus lyriocephalus*, female, head. Fig. 4: *Haemodipsus setoni*, male, genital apparatus. Figures 1, 2 and 3 have been drawn to the same scale.

Egg oval, 0.88 mm long, 0.5 mm wide. Structure of operculum not visible in examined specimens.

Male.

Somewhat smaller than the female. Genital apparatus: parameres more than twice as long as broad, rather stout, forceps-shaped with slightly incurved tips.

Penis extending beyond parameres (see fig. 4).
Dimensions in mm:

	♂	♀
total length	1.83	2.04
head length	0.43	0.41
head width	0.34	0.37
antennae length	0.27	0.27
thorax length	0.27	0.30
abdomen length	1.13	1.33
abdomen width	0.89	0.99
parameres length	0.14	

Measurements were taken from one male and three females, collected 22th June, 1957, mounted in Berlese; specimens in the collection of the Institute for Veterinary Parasitology, Utrecht.

DISCUSSION.

Although according to EWING (1924) paratergal plates occur only on the abdominal segments 3—5, FERRIS (1932) has apparently regarded this as an error since he has not mentioned it when comparing *H. setoni* to *H. ventricosus*. In the material at hand, paratergal plates were found on the segments 3—6, just as in *H. ventricosus*.

The European (= British and Dutch) specimens of *H. setoni* are significantly larger than those described by EWING and those collected by FERRIS in California on *Lepus californicus*. FERRIS (1932), however, reported finding larger specimens on other hosts (*Lepus glacialis*) in the U.S.A. Therefore, there seems to be no reason to regard the European form as a separate species merely because of differences in size.

As has already been stated by EWING (1924) and by FERRIS (1951), *H. setoni* differs from *H. lyriocephalus* in the presence of paratergal plates on the abdomen and in the shape of the head, the latter species having no protruding temples (see fig. 3). It differs from *H. ventricosus*, to which species it bears on the whole much resemblance (see fig. 1), principally in its dimensions (total length *H. ventricosus* ♂ : 1.3 mm, ♀ : 1.65 mm).

According to FERRIS (1951) another important difference is the shape of the thoracic sternal plate, which should be transverse in *H. ventricosus*. FREUND (1935) and JANCKE (1938), on the other hand, give figures of a hexagonal plate. When studied with phase contrast illumination the whole plate appears more or less hexagonal, with a darkly sclerotized transverse band of irregular shape, which in most cases is already visible in uncleared specimens. The rest of the plate is hyaline and therefore only visible in rather bright illumination.

The impression of the shape of the thoracic sternal plate will thus largely depend on fixation and methods of investigation of individual workers. The difference between *H. setoni* and *H. ventricosus* regarding the sternal plate may therefore be formulated as follows:

H. setoni : shape about hexagonal, evenly but not heavily sclerotized.

H. ventricosus : shape about hexagonal, hyaline, with conspicuous dark sclerotized transversal band between legs II and III.

SUMMARY

1. *Haemodipsus setoni* Ewing, 1924 has recently been found twice on *Lepus europaeus* in the Netherlands (once from unknown locality, once from Nunspeet). In the latter case, the host was also infected with *Haemodipsus lyriocephalus.*

2. A description of *Haemodipsus setoni* is given, together with dimensions of one male and three females.

3. A comparison is given between the three species of the genus which are now known to occur on hares and rabbits in this country.

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References

BOUVIER, G., 1956, Ektoparasiten schweizerischer Wildsäugetiere. *Parasitologische Schriftenreihe* Heft 4 : 2.

BROEK, E. VAN DEN & J. JANSEN Jr., 1964, Parasites of animals in the Netherlands. Supplement II: Parasites of wild mammals. *Bijdr. Dierkunde* 34 : 103—105.

EWING, H. E., 1924, Sucking lice of jack rabbits. *Amer. Journ. trop. Medicine* 24 : 547—551.

————, 1929, A manual of external parasites. London. p. 140.

FERRIS, G. F., 1932, Contributions towards a monograph of the sucking lice. *Stanford Univ. Public. Biological Science* 2 (5): 273—413.

————, 1951, The sucking lice. *Mem. Pac. Coast Entom. Soc.* 1.

————, 1954, A new species of Anoplura. *Annals Natal Museum* 13 : 91—94.

FREUND, L., 1935, Die Tierwelt Mitteleuropas IV — 3—20. Insekten, 1. Teil.

HOPKINS, G. H. E., 1949, Host associations of the lice of mammals. *Proc. zool. Soc., London* 119 : 453, 543.

IGNOFFO, C. M., 1957, New records of mammal-lice associations. *Ent. News* 68 : 162.

JANCKE, O., 1938, Die Tierwelt Deutschlands. 35, Läuse oder Anoplura : 62—66. Jena.

KÉLER, S. VON, 1963, Die Tierwelt Mitteleuropas. Bd. IV Lief. 2 Heft VIII : Läuse, Anoplura, p. 11.

MAITLAND, R. T., 1858, in: J. A. HERKLOTS, Bouwstoffen voor eene fauna van Nederland, part 2. Parasitica in Nederland waargenomen.

NEUMANN, L. G., 1909, Notes sur les Pédiculidés. *Arch. Parasitologie* 13 : 497—537.

NEVEU-LEMAIRE, M., 1938, Traité d'entomologie médicinale et vétérinaire p. 658. Paris.

SÉGUY, E., 1944, Insectes ectoparasites p. 442. *Faune de France* 43. Paris.

SMIT, F. G. A. M., 1951, Wat leeft en groeit. Part 27. Vlooien en luizen. Utrecht.

SWIERSTRA, D., J. JANSEN Jr. & E. VAN DEN BROEK, 1958, Parasites of animals in the Netherlands. *Tijdschr. Diergeneeskunde* 84 : 892—900.

WETZEL, R. & W. RIECK, 1962, Krankheiten des Wildes, p. 140. Hamburg und Berlin.