

The chaetotaxy of the palpgenu in the adult stages of *Thinoscius* is interesting in that it deviates from the normal chaetotaxy of the segment in the *Typhlodromus-Lasioseius* group: a chaetotactic formula (2:5:5) for the trochanter, femur and genu as compared with 2:5:6. The five setae on the palpfemur of *Thinoscius* are probably homologous with the five setae on the same segment in *Typhlodromus* (Evans, 1953).

Finally, the males of *Thinoscius* possess a distinct anal shield as opposed to a compound ventri-anal shield in the *Typhlodromus-Lasioseius* group. The ventri-anal shield, in males of the latter group, is present even in those genera in which the females have an anal shield, e.g. *Jordensia* Oudem. and *Garmania* Nesbitt.

On the basis of the above characters the writer considers it necessary to erect a new subfamily for the genus *Thinoscius*.

#### Summary.

1. A new subfamily is erected for the genus *Thinoscius* Halbt., 1920, which is redefined. The genotype is *Thinoscius fucicola* (Halbt.), 1920, comb. nov.
2. Redescriptions and figures of the two known species of this genus are given.
3. *Lasioseius spinatus*, Sell., 1940, and *Lasioseius uncinatus* Sell., 1940, are respectively the female and male of the same species; the former having page priority. *L. spinatus* is considered a synonym of *Thinoscius spinosus* (Willm.), 1939.
4. The systematic position of *Thinoscius* is discussed.

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ANNAL 12<sup>th</sup> V. 7 1954

## LXXVI.—STUDIES ON MALLOPHAGA FROM THE COLLECTIONS OF THE BRITISH MUSEUM (NAT. HIST.), LONDON.

### I. A PRELIMINARY SURVEY OF THE GENUS *LUNACEPS* (Clay & Meinertzhagen), 1939.

By G. TIMMERMANN, D.Sc.

A SYSTEMATIC arrangement of the forms of the genus *Lunaceps* into species and species groups has proved rather difficult because of the fact that *Lunaceps*, as no other genus of Ischnoceran Mallophaga parasitic on Charadriiform hosts, shows very little plasticity of shape. Although there are considerable differences of size and proportions of body in the *Lunaceps* populations from different hosts (smaller and larger, narrower and stouter forms), the characteristic habitus of the genus is strictly preserved in all cases. As, furthermore, these differences within and between the single populations are bridged over to a large extent by intermediate forms and even the male genitalia (in most other genera very valuable taxonomic criteria) are of the same type throughout the whole genus, the difficulties which confront the systematist who tries to group the *Lunaceps*-forms are quite easily understood. Moreover, all characters, such as absolute size, relative width of head and abdomen, length of the paramers, etc., vary more or less independently and are not co-ordinated with one another, the result of which is a big number of different small forms; and the arrangement of these into related groups (species and species groups) is a very thankless task.

With regard to this situation, it is not strange that Waterston (1915) dealt with all *Lunaceps*-forms in the limits of one single species, whereas the other extreme to consider each or nearly each population as a different species would be as well acceptable. For the purpose of the following survey I have steered a middle course and, for the present, all hitherto known *Lunaceps*-forms are included in four different species groups, which from the size of the insects and their distribution on the hosts appear as natural units. Furthermore, I have tried to distinguish within each group different species on the strength of morphological characters, but in the case of the small wader *Lunaceps*, in order to avoid an overburdening of the nomenclature by the introduction of too many new names, I have not named each single population but only a few conspicuous ones, so to speak as landmarks, within the field of variation. The other small forms are mentioned in every case below the species to which they stand closest.

#### A.—The small wader group.

##### 1. *Lunaceps incoenis* (Kellogg & Chapman), 1899.

The description of the *Lunaceps* species of the small wader begins with a nomenclatorial accident, in so far as the narrowest of the *Lunaceps* species hereto described, parasitic on *Erolia temminckii* and *Erolia*

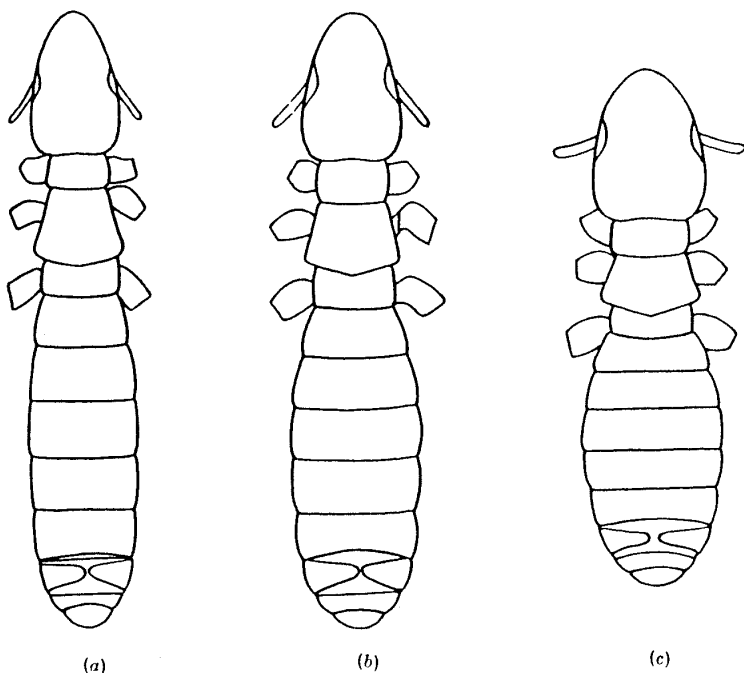
*minuta*, agrees so well with Kellogg & Chapman's *Nirmus incoenis* of 1899 that I make no scruple to place it with this species, though the head measurements stated by the authors lie at the lower limit of the specimens measured by me. However, *Lunaceps incoenis* (Kell. & Chap.) has been described from a single female from *Squatrola squatarola* and is almost certainly a straggler, its true host being doubtless a small wader species. As there are many of them which harbour *Lunaceps* species very close to one another, there is, in my opinion, no way of determining the type-host subsequently with any certainty by help of a single female *Lunaceps* specimen.

A very narrow, yellowish-brown species with narrow blackish-brown bordering decorations.

## Male (10 measured) :

Width of head	0.20-0.23
Length of head	0.36-0.38
Width of abdomen	0.23-0.27
Total length	1.40-1.53
Length of paramers	0.08 mm.

Fig. 1.



(a) *Lunaceps cabanisi*, sp. n. on *Ereunetes mauri* (a), *Lunaceps drosti*, sp. n. on *Calidris canutus* (b) and *Lunaceps nercis*, sp. n., on *Erolia maritima* (c). Outlines of body of males.

## Female (10 measured) :

Width of head	0.22-0.23
Length of head	0.37-0.38
Width of abdomen	0.29-0.31
Total length	1.60-1.67 mm.

Described from 32 males and females from *Erolia temminckii*. Thirteen males and females from *Erolia minuta* belong to the same species.

2. *Lunaceps cabanisi*, sp. n. (Fig. 1 a.)

Type-host : *Ereunetes mauri*.

In appearance, shape and coloration very similar to *L. incoenis* but somewhat more compactly built, head relatively wider ; perhaps also in the whole somewhat larger, paramers longer.

## Male :

Width of head	0.23
Length of head	0.36-0.38
Width of abdomen	0.26-0.27
Total length	1.45-1.48
Paramers	0.10 mm.

## Female :

Width of head	0.23-0.25
Length of head	0.38
Width of abdomen	0.31-0.32
Total length	1.67-1.73 mm.

Holotype male and allotype female from *Ereunetes mauri*, California, Feb. 1939, Meinertzhagen Coll., slide No. 12760-61a and 25 other males and females, dates as listed above, paratypes.

Here may perhaps be added the still somewhat stouter population from *Erolia testacea* (paramers 0.08-0.09 mm.), though it is not considered to be a distinct species.

3. *Lunaceps holophaeus* (Burmeister), 1838. (Figs. 2 and 3.)

Type-host : *Philomachus pugnax*.

Similar to the former (*cabanisi*), but still stouter, head and abdomen broader, besides on the whole longer and somewhat brighter and yellower, the dark bordering decoration pattern much weaker.

## Male (10 measured) :

Width of head	0.23-0.25
Length of head	0.36-0.38
Width of abdomen	0.28-0.31
Total length	1.49-1.67
Paramers	0.09-0.10 mm.

## Female (10 measured) :

Width of head	0.23-0.27
Length of head	0.36-0.40
Width of abdomen	0.29-0.35
Total length	1.71-1.91 mm.

Owing to the loss of the types destroyed in Berlin, Germany, during the last war, I am erecting neotypes, and choose as neotype a male and *A.M.N.H.* ser. 12, vol. vii.

as neallotype a female from *Philomachus pugnax*, Suffolk, Eng., Aug. 1926, Meinertzhagen Coll., slide No. 4921; 104 further specimens from the same host-species from Great Britain, Estonia and Palestine neoparatypes.

*Lunaceps bicolor* has been described in 1880 by Piaget from *Vanellus vanellus* and that almost certainly from straggling specimens because, as far as we know nowadays, there is no *Lunaceps* species parasitic on the

Fig. 2.

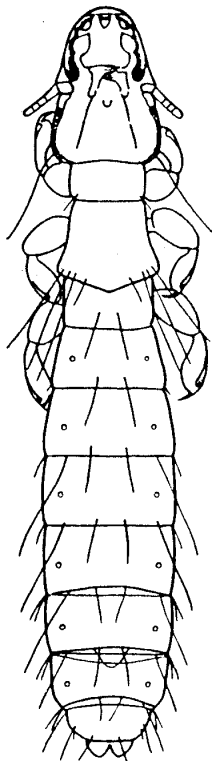
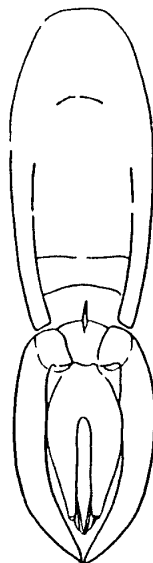


Fig. 2. *Lunaceps holophaeus* (Burm.) on *Philomachus pugnax*. Female.  
Fig. 3. *Lunaceps holophaeus* (Burm.) on *Philomachus pugnax*. Male genitalia.

Fig. 3.



lapwing. As Piaget's type-specimens (2 ♀♀ and 2 ♂♂), in shape as well as in size, agree very well with *holophaeus*, I think it useless to keep *L. bicolor* alive any longer, but consider it as a synonym of *L. holophaeus* (Burm.).

Measurements of the type-specimens of *Lunaceps bicolor* (Piaget):—

Male :

Width of head	0.23
Length of head	0.36
Width of abdomen	0.27
Total length	1.60-1.62
Paramers	0.09-0.10 mm.

Female :

Width of head	0.25
Length of head	0.38
Width of abdomen	0.28-0.31
Total length	1.80-1.82 mm.

4. *Lunaceps falcinellus*, sp. n.

Type-host : *Limicola falcinellus*.

Differs from *L. holophaeus* in the following points : head of nearly same width but longer, abdomen wider, outlines more curved ; body on the whole shorter, paramers shorter, too.

Male :

Width of head	0.23-0.25
Length of head	0.36-0.40
Width of abdomen	0.29-0.32
Total length	1.42-1.49
Length of paramers	0.09 mm.

Female :

Width of head	0.23-0.26
Length of head	0.38-0.41
Width of abdomen	0.32-0.34
Total length	1.48-1.57 mm.

Holotype male from *Limicola falcinellus*, India, Aisnee, Mekran Coast, 16. xii. 1872 and allotype female from same host, Karachi, Pakistan, 8. ii. 1872, and 25 other males and females paratypes.

The population on *Tryngites subruficollis* has a similar head and a similar width of the abdomen as *L. falcinellus*, sp. n., but seems to be somewhat larger (2 ♂♂, 1.60-1.66, paramers 0.10 mm.).

5. *Lunaceps drosti*, sp. n. (Fig. 1 b.)

Type-host : *Calidris canutus*.

As *L. holophaeus*, but stouter, head and abdomen wider, paramers longer.

Male (10 measured) :

Width of head	0.25-0.27
Length of head	0.37-0.39
Width of abdomen	0.32-0.36
Total length	1.44-1.60
Paramers	0.11 mm.

Female (10 measured) :

Width of head	0.26-0.28
Length of head	0.38-0.39
Width of abdomen	0.38-0.41
Total length	1.64-1.73 mm.

Holotype male and allotype female from *Calidris canutus*, N. Uist, Sept. 1941, Meinertzhagen Coll., slide No. 14599; 117 other males and females from the same host-species paratypes. Named in honour of Professor Dr. R. Drost, Director of the Vogelwarte Helgoland, Institut für Vogelforschung, in Wilhelmshaven.

Here is included the, on the whole, somewhat stouter population from *Calidris tenuirostris* (paramers 0.11–0.12 mm.). Nine specimens from *Aphyria virgata* are, in their measurements, also so close to *drosti*, sp. n., that I should not like to separate them, though there are some differences in size (paramers 0.13 mm.).

6. *Luniceps actophilus* (Kellogg & Chapman), 1899.

Type-host: *Crocethia alba*.

As *drosti*, sp. n., but relatively more wide-headed and on the whole somewhat smaller; paramers longer.

Male (10 measured):

Width of head	0.23–0.25
Length of head	0.34–0.35
Width of abdomen	0.33–0.38
Total length	1.37–1.44
Paramers	0.12 mm.

Female (10 measured):

Width of head	0.24–0.26
Length of head	0.34–0.36
Width of abdomen	0.38–0.40
Total length	1.51–1.57 mm.

The population living on *Erolia alpina* is similar to *L. actophilus*, its position being in a way an intermediate one between *actophilus* and *drosti*, sp. n.

7. *Luniceps nereis*, sp. n. (Fig. 1 c.)

Type-host: *Erolia maritima*.

An unusually well-marked new species, distinguished from all species (hitherto dealt with) by small size and extreme width of head.

Male:

Width of head	0.26–0.29
Length of head	0.34–0.38
Width of abdomen	0.32–0.38
Total length	1.17–1.39
Paramers	0.10–0.11 mm.

Female:

Width of head	0.28–0.30
Length of head	0.36–0.37
Width of abdomen	0.38–0.41
Total length	1.48–1.51 mm.

Holotype male and allotype female from *Erolia maritima*, Lapland, March 1938, Meinertzhagen Coll., slide No. 11071–72 a; 21 other males and females from Lapland and the British Isles paratypes.

B.—*The Limosa group.*

1. *Luniceps limosella*, sp. n. (Fig. 4 b.)

Type-host: *Limosa lapponica*.

This new species approaches in its measurements to a considerable extent *L. drosti*, sp. n., from which it is distinguishable, however, by its measurements, being larger on the average. A definite judgment of the validity and limitation of this species can hardly be obtained before a greater number of specimens from *L. lapponica* and all nearer related populations have been subjected to a mathematical test of their variability.

Male (10 measured):

Width of head	0.27–0.29
Length of head	0.39–0.41
Width of abdomen	0.36–0.40
Total length	1.44–1.60
Paramers	0.12 mm.

Female (10 measured):

Width of head	0.26–0.32
Length of head	0.39–0.41
Width of abdomen	0.40–0.49
Total length	1.55–1.82 mm.

Holotype male and allotype female from *Limosa lapponica*, N. Uist, Sept. 1941, Meinertzhagen Coll., slide No. 14660; 132 other males and females of the same host from Great Britain paratypes.

Specimens from *L. limosa* and *L. haemastica* (only one compared) agree with those from the type-host.

2. *Luniceps clayae*, sp. n. (Fig. 4 a.)

Type-host: *Limosa fedoa*.

Very similar to the former, but considerably larger, more slender, paramers longer.

Male (10 measured):

Width of head	0.31–0.32
Length of head	0.45–0.47
Width of abdomen	0.38–0.41
Total length	1.69–1.82
Paramers	0.14–0.15 mm.

Female (10 measured):

Width of head	0.32–0.33
Length of head	0.44–0.48
Width of abdomen	0.42–0.46
Total length	1.88–1.99 mm.

Holotype male and allotype female from *Limosa fedoa*, California, March 1939, Meinertzhagen Coll., slide No. 12997; 58 other males and females from California and Texas paratypes.

Named in honour of Miss Theresa Clay, British Museum (Nat. Hist.), London.

3. *Lunaceps paschalis*, sp. n. (Fig. 4 c.)Type-host : *Limosa haemastica*.Somewhat smaller than *limosella*, sp. n., also head much shorter, more rounded. Clypeus without dorsal preantennal suture.

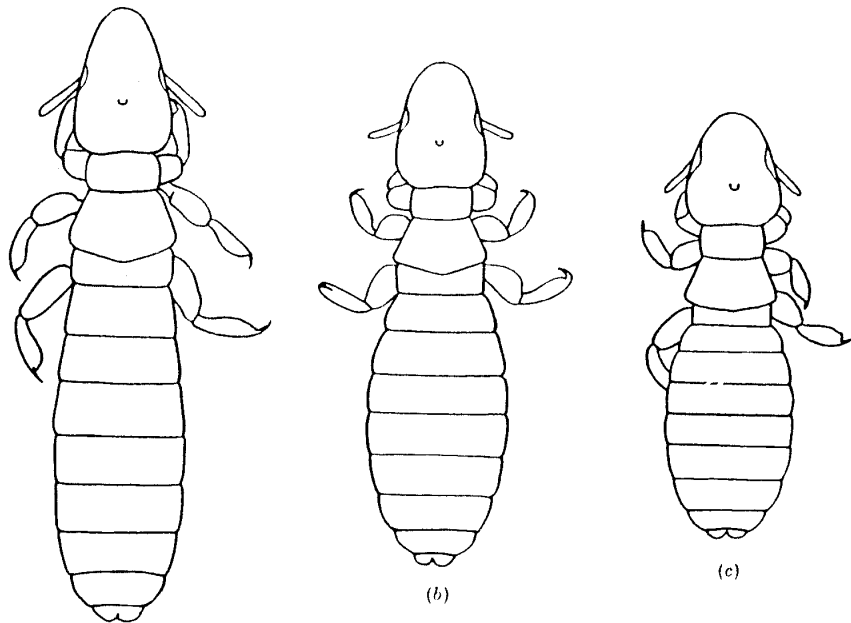
Male :

Width of head	0.29-0.32
Length of head	0.39-0.40
Width of abdomen	0.36-0.47
Total length	1.55-1.56
Paramers	0.13 mm.

Female :

Width of head	0.29-0.32
Length of head	0.36-0.40
Width of abdomen	0.41-0.47
Total length	1.39-1.60 mm.

Fig. 4.



(a) *Lunaceps clayae*, sp. n. on *Limosa fedoa* (a). *Lunaceps limosella*, sp. n. on *Limosa lapponica* (b) and *Lunaceps paschalis*, sp. n., on *Limosa haemastica* (c). Outlines of body of females.

Holotype female and allotype male from *Limosa haemastica*, Brownsville, Texas, in the Waterston Coll. of the British Museum (Nat. Hist.); three other females with same data paratypes.

C.—The *Numenius* group.(a) The *numenii*-*phaeopi* subgroup.

Paramers rather equally curved (sabre-shaped).

1. *Lunaceps numenii* (Denny), 1842. (Fig. 5 a-c.)Type-host : *Numenius arquata*.

Male (10 measured) :

Width of head	0.35-0.39
Length of head	0.52-0.56
Width of abdomen	0.47-0.52
Total length	2.05-2.25
Paramers	0.20-0.21 mm.

Female (10 measured) :

Width of head	0.37-0.42
Length of head	0.54-0.56
Width of abdomen	0.49-0.56
Total length	2.03-2.30 mm.

Here I place also the population parasitic on *N. americanus* and *N. madagascariensis*, which are so close to *numenii* that I think it would not be very useful to give them separate names.

2. *Lunaceps phaeopi* (Denny), 1842. (Fig. 5 d.)Type-host : *Numenius phaeopus*.As *numenii*, but considerably smaller.

Male (10 measured) :

Width of head	0.31-0.32
Length of head	0.45-0.49
Width of abdomen	0.41-0.45
Total length	1.80-1.93
Paramers	0.18 mm.

Female (10 measured) :

Width of head	0.31-0.35
Length of head	0.44-0.49
Width of abdomen	0.42-0.52
Total length	1.89-2.12 mm.

*Lunaceps* specimens from *N. ph. hudsonicus* which I have compared are not separable from *N. ph. phaeopus*.

*Lunaceps trimaculatus* (Piaget), 1880, erroneously described from "*Ciconia leucocephala*", fits in shape and size so well with *L. phaeopi* that it should be considered as a synonym of *phaeopi* (Denny). The only existing specimen of *trimaculatus* (holotype) is a male and has the following measurements :—

Width of head	0.32
Length of head	0.47
Width of abdomen	0.45
Total length	1.82
Paramers	0.18 mm.

Fig. 5.

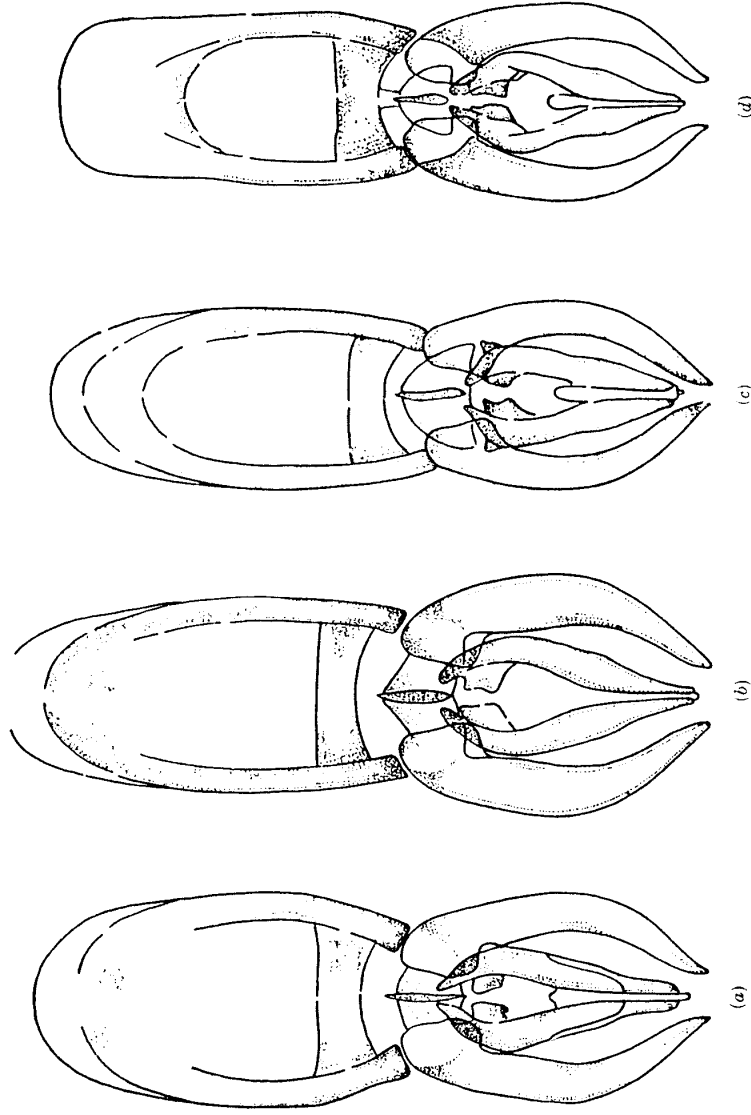
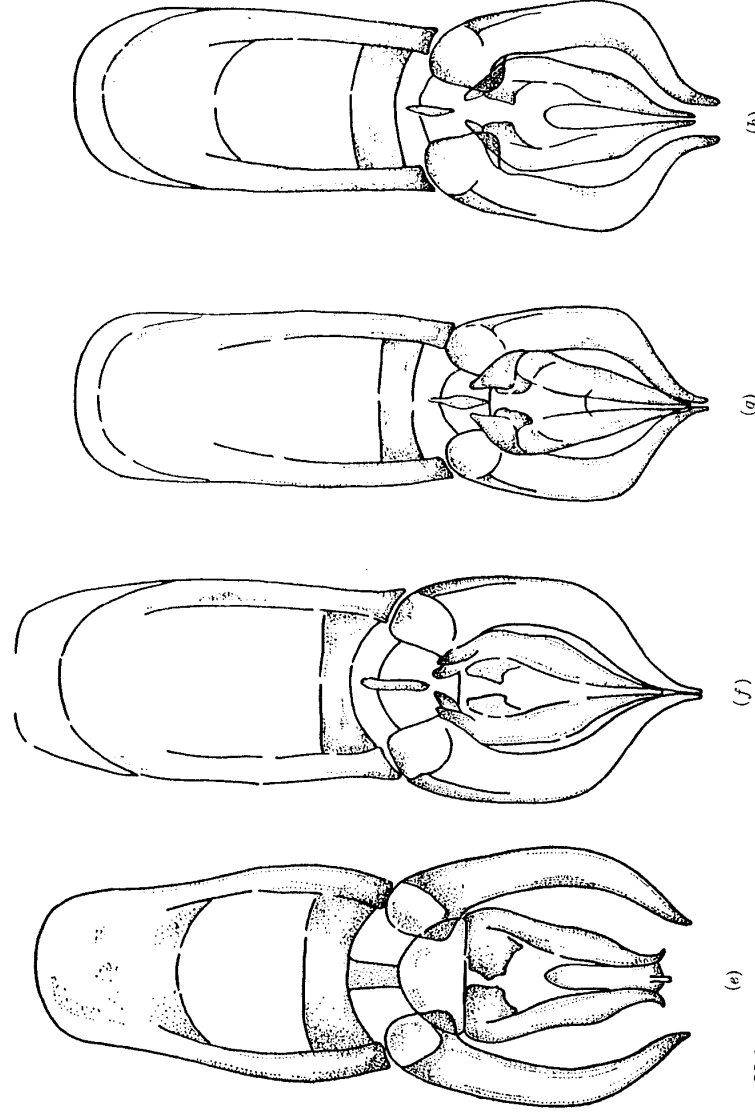
Male genitalia of *Lunaceps* species parasitic on *Numenius* s.l. (a) *arguata*, (b) *americanus*, (c) *madagascariensis*, (d) *phaeopus*.

Fig. 5 (cont.).

Male genitalia of *Lunaceps* species parasitic on *Numenius* s.l. (e) *tahitiensis*, (f) *tenuirostris*, (g) *minus*, (h) *borealis*.

3. *Lunaceps hopkinsi*, sp. n. (Fig. 5 c.)Type-host: *Numenius tahitiensis*.

Somewhat larger and stouter, but hardly longer than *phaeopi*. The apices of the endomers not straight, but hook shaped. This distinguishing mark, however, is not in all specimens so clearly to be seen as in fig. 5 c, because the curvature of the endomer tip in mounted specimens varies according to the position in which it is seen.

Male:

Width of head	0.32-0.33
Length of head	0.47-0.50
Width of abdomen	0.45-0.49
Total length	1.75-1.87
Paramers	0.18-0.19 mm.

Female:

Width of head	0.35
Length of head	0.50
Width of abdomen	0.49
Total length	2.05 mm.

Holotype male from *Numenius tahitiensis*, Palau, Malakal, 25. vii. 1920\* and allotype female from same host, Canton Island, Phoenix group, 3. vii. 1889 and six other males with same data paratypes.

Named in honour of Mr. G. H. E. Hopkins, M.A., Zoological Museum, Tring, Herts., England.

(b) *The proximus subgroup.*

Paramers for last third of their length more or less abruptly bent.

4. *Lunaceps lissmanni*, sp. n. (Fig. 5 g.)Type-host: *Numenius minutus*.

Male:

Width of head	0.26-0.29
Length of head	0.41-0.45
Width of abdomen	0.38-0.43
Total length	1.53-1.80
Paramers	1.17-0.19 mm.

Female:

Width of head	0.28-0.31
Length of head	0.42-0.47
Width of abdomen	0.43-0.45
Total length	0.71-2.02 mm.

Holotype male and allotype female from *Numenius minutus*, Siberia, Meinertzhagen Coll., slide No. 11015; 19 other males and females, data as listed above, paratypes.

Named in honour of my old friend Dr. H. W. Lissmann, University of Cambridge, Department of Zoology.

\* Genitalia mounted separately on a second slide.

5. *Lunaceps rileyi*, sp. n. (Fig. 5 h.)Type-host: *Numenius borealis*.

Similar to the former species, but with broader head and more compact on the whole.

Male:

Width of head	0.29-0.31
Length of head	0.41-0.46
Width of abdomen	0.45-0.50
Total length	1.60-1.68
Paramers	0.19 mm.

Female:

Width of head	0.33-0.35
Length of head	0.46-0.50
Width of abdomen	0.50-0.59
Total length	1.80-1.98 mm.

Holotype male and allotype female from *Numenius borealis*, U.S.A., Meinertzhagen Coll., slide No. 12546; 7 other males and females, data as listed above, paratypes.

Named in honour of Mr. N. D. Riley, Keeper of the Department of Entomology of the British Museum (Nat. Hist.), London.

6. *Lunaceps proximus* (Blagoveshtchensky), 1948. (Fig. 5 f.)Type-host: *Numenius tenuirostris*.

Larger than the two former species (nearly of same size as *L. phaeopi*, from which it is, however, easily distinguished by the shape of the paramers).

Male:

Width of head	0.32-0.34
Length of head	0.47-0.51
Width of abdomen	0.47-0.50
Total length	1.80-2.07
Paramers	0.20-0.21 mm.

Female:

Width of head	0.34
Length of head	0.50-0.51
Width of abdomen	0.52-0.54
Total length	2.06-2.12 mm.

Described from six males and two females from *Numenius tenuirostris* from Italy and Russia.

D.—*The Haematopus-Dromas group.*1. *Lunaceps haematopi*, sp. n.Type-host: *Haematopus ostralegus*.

This species is close to *L. numenii*, but in all measurements somewhat larger on the average. The paramers are longer (*numenii* 50, 50, 50, 50, 51, 52, *haematopi* 50, 53, 53, 53, 54, 54 micrometer units of 0.004 mm. each).

## Male :

Width of head	0.36-0.38
Length of head	0.52-0.56
Width of abdomen	0.50-0.54
Total length	2.16-2.23
Paramers	0.20-0.22 mm.

## Female :

Width of head	0.39-0.40
Length of head	0.55-0.56
Width of abdomen	0.54-0.58
Total length	2.29-2.39 mm.

Holotype male and allotype female from *Haematopus ostralegus*, Ireland, Sept. 1927. Meinertzhagen Coll., slide No. 10568; 53 other males and females from same host paratypes.

With *L. haematopi*, sp. n., I also place the population from *Dromas ardeola*, perhaps still a little stouter, of which however I have seen only nine specimens. The status of this new species needs further confirmation, because hitherto it is known from a single record only, all 55 specimens mentioned above belonging to one batch. This fact is somewhat striking in so far as the oyster catcher has been examined for Mallophaga relatively often.

## SUMMARY.

The whole *Lunaceps* material of the collections of the British Museum (Natural History) has been examined and has been placed provisionally in four different species-groups, which from the size of the species and their distribution on the hosts I have distinguished as the small wader group, *Limosa* group, *Numenius* group and *Haematopus-Dromas* group. The status of the latter requires further confirmation. Altogether 17 species are considered, 11 of which are new to science. For *L. holophaeus* (Burmeister), 1838, neotypes have been erected. Species described from wrong hosts (*incoenis*, *bicolor*, *lucidus*, *trimaculatus*), after examination of the types (with the exception of the first and third), have been moved to the right places in the system or sunk as synonyms.

A result not without interest for ornithological systematics was obtained from the study of the curlew-*Lunaceps*, of which I could compare material from all eight *Numenius* species. The *Lunaceps* species of the curlews and whimbrels may be divided into two different groups, distinguished by the form of the paramers of the male genitalia, confirming the opinion of a number of early ornithological systematists on the relationship of the bird group under consideration in a far-reaching and impressive manner. *N. tenuirostris* has to be classified with the two other small billed species (*minutus* and *borealis*). With respect to the result of comparative parasitology we then would come to a systematic arrangement of the genus *Numenius* s.l. as follows :

<i>Numenius (Numenius) arquata.</i>	<i>Numenius (Phaeopus) tahitiensis.</i>
<i>Numenius (Numenius) madagascariensis.</i>	<i>Mesoscolopax (Zarapita) tenuirostris.</i>
<i>Numenius (Numenius) americanus.</i>	<i>Mesoscolopax (Mesoscolopax) borealis.</i>
<i>Numenius (Phaeopus) phaeopus.</i>	<i>Mesoscolopax (Mesoscolopax) minutus.</i>

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