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SOME NOTES ON SPECIATION AND GEOGRAPHICAL DISTRIBUTION OF THE GENUS *CONOMELUS* FIEBER, 1866 (HOMOPTERA CICADINA DELPHACIDAE)

By H. HOCH

The delphacid genus *Conomelus* FIEBER, 1866 was investigated thoroughly by REMANE & ASCHE in 1979. Their analysis concerning cladistic relationship showed the existence of three groups:

1. *Conomelus sagittifer* REMANE & ASCHE, 1979,
2. *Conomelus anceps* (GERMAR, 1821),
3. *Conomelus lorifer* RIBAUT, 1948 - group.

REMANE & ASCHE assumed the *C. lorifer* RIB. - group to consist of 6 valid species:

1. *C. dehneli* NAST, 1966 (Poland),
2. *C. filifer* REMANE & ASCHE, 1979 (Austria to central Italy),
3. *C. lorifer* RIBAUT, 1948 (Italy: Abruzzi),
4. *C. harpagifer* REMANE & ASCHE, 1979 (Italy: southern Calabria),
5. *C. clavifer* REMANE & ASCHE, 1979 Greece, Anatolia),
6. *C. odryssius* DLABOLA, 1965 (very insufficiently and unrecognizably described after one male from Bulgaria),

for all 6 taxa could be easily distinguished by morphological characters and showed, at that time, non-overlapping distribution. In addition two further species of *Conomelus* FIEB. have been described:
Conomelus calabricus DLABOLA, 1979 (Italy: northern Calabria), which obviously belongs to the *C. lorifer* RIB. - group and
Conomelus serrifer REMANE, 1980 (southern Spain), which now forms, together with *C. sagittifer* REMANE & ASCHE, 1979, the *C. sagittifer* REMANE & ASCHE group.

But the publication of REMANE & ASCHE (1979) left open quite a number of questions, reaching from the possible existence of further species in the uninvestigated mountain ranges in Italy to the reaction of the populations in a possible touching or even overlapping zone in Italy as well as on the Balkan Peninsula, as discussed already in REMANE & ASCHE 1979.

In order to achieve some progress in solving these questions left open by REMANE & ASCHE, 1979, extensive field investigations were carried out in summer and fall 1979 in the Balkan Peninsula as well as in the whole of Italy

by M. ASCHE and the author. Preliminary examination of the *Conomelus*-material collected during these field investigations gave the following results:

1. In Italy:
   The former distribution pattern of the members of the *C. lorifer* RIB. - group presented by REMANE & ASCHE, 1979 is seen in Fig. 1 and seems to give the very impression of the existence of three «good species». In 1979 the rather exact morphological intermediate forms between the above mentioned taxa were found (in the mountain ranges connecting the formerly investigated collecting sites), geographically staggered in homogenous populations. The situation in Italy thus can be described as a clinal morphological shift, geographically graded from southern to northern Italy, connecting continously *C. harpagifer* REMANE & ASCHE with *C. calabricus* DLAB., *C. calabricus* DLAB. with *C. lorifer* RIB., *C. lorifer* RIB. with *C. filifer* REMANE & ASCHE, which in addition showed to be identical with *C. dehneli* NAST.
2. On the Balkan Peninsula:
   On the Balkan Peninsula no additional species identical with the figures of *C. odryssius* DLAB. could be found, in spite of research at its type locality. (An examination of the type specimen of *C. odryssius* DLAB. carried out in April 1981 by the author showed the identity of *C. odryssius* DLAB. and *C. clavifer* REMANE & ASCHE, which meanwhile was published by DLABOLA, 1981).
   C. dehneli NAST was found much farther southeast than was known before, reaching southern Bulgaria via Jugoslavia.
   C. odryssius DLAB. occurs north of Greece, meeting in few places
   C. dehneli NAST populations in central Jugoslavia as well as in southern Bulgaria. Only in these places of syntopic occurrence of both species, locally few specimens with a mosaic-like combination of characters more or less intermediate between *C. dehneli* NAST and *C. odryssius* DLAB. were found. These specimens are therefore considered to be hybrids between *C. dehneli* NAST and *C. odryssius* DLAB.

Thus, in contrast to the Italian Peninsula, the situation in Jugoslavia and Bulgaria strongly differs from the italian graded shift-phenomenon.

How to explain this situation, especially these two quite different phenomena?

Supposingly during a pleistocene glacial period the area of the ancestor species of the *C. lorifer* RIB. - group was divided into at least three separated areas (the exact place and area borders of this ancestor species are not known):

1. a south-italian area
2. a ponto-mediterranean area

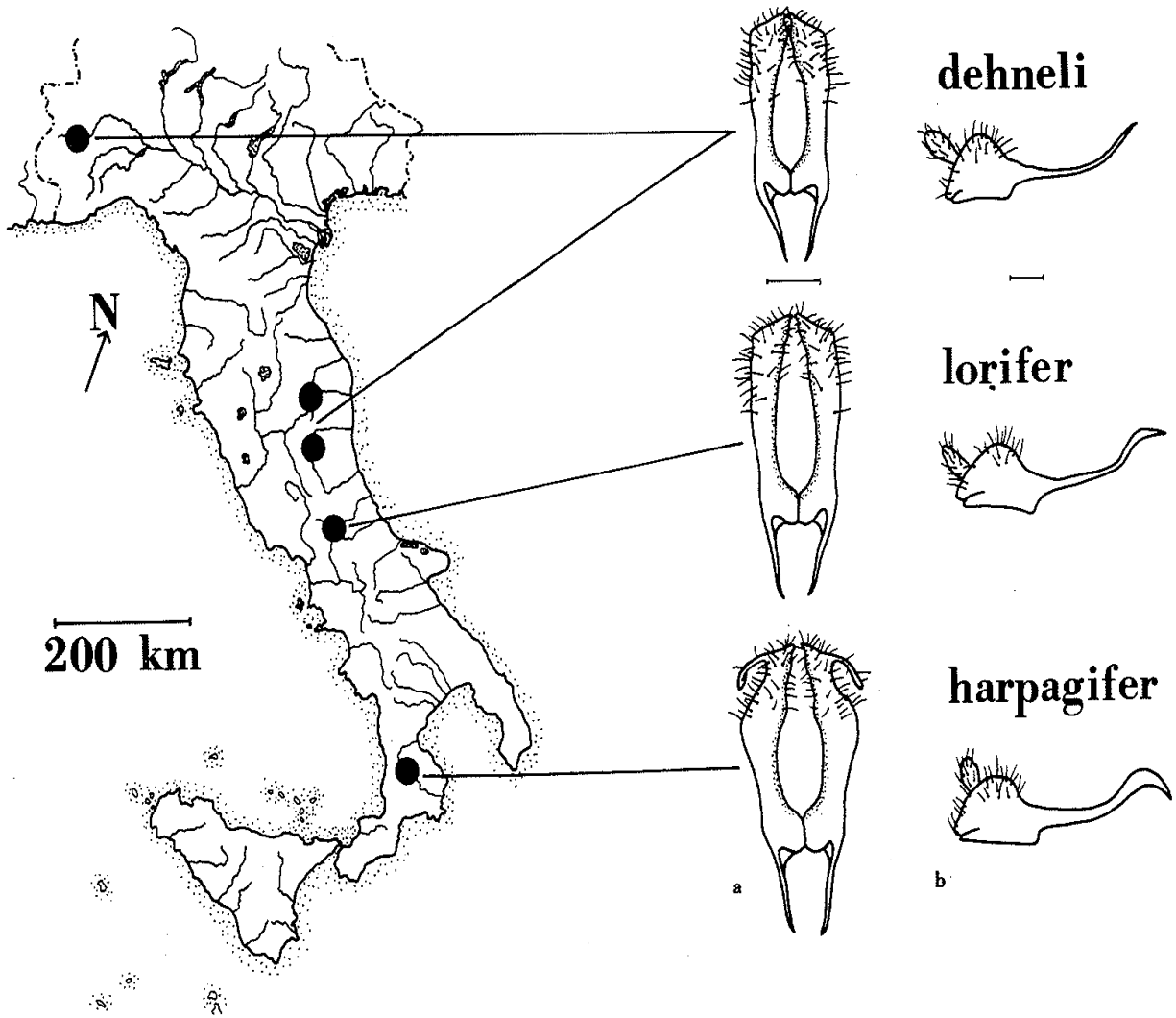

Fig. 1. Zoogeographical distribution of *C. lorifer* RIB. - group members in Italy up to summer 1978 (after REMANE & ASCHE, 1979).
Male genitalia: a. genital styles (caudal view)
b. anal tube (lateral view).

3. a central-european area, which seems to have been north of the others, perhaps at the southern slopes of the Alps.

During this separation the three populations developed morphologically in different ways: the south-italian population to *C. harpagifer* REMANE & ASCHE, the ponto-mediterranean population to *C. odryssius* DLAB. and the central-european population to *C. dehneli* NAST. Postglacially the area of at least one of the taxa (supposingly *C. dehneli* NAST?) enlarged and separation was cancelled.

In Italy there seems to have evolved an ample interbreeding zone between *C. dehneli* NAST and *C. harpagifer* REMANE & ASCHE, while in Jugoslavia and Bulgaria the process of speciation seems to be more advanced. In places of syntopic occurrence hybrids can locally be found, but no interogression area seems to have developed. The fertility grade of these hybrids has not yet been analyzed. These problems have to be solved by breeding experiments, including the analysis of the bioaccustical communication signals.

Nomenclatorical consequences

The process of speciation is closely related to the formation of reproductive isolation. This situation of reproductive isolation seems to exist in general between *C. dehneli* NAST and *C. odryssius* DLAB, in Jugoslavia and Bulgaria while in Italy between *C. dehneli* NAST and *C. harpagifer* REMANE & ASCHE such a reproductive isolation did not occur. Here is found a large introgression zone with clinal arrangement of character-shifting.

Named forms out of this introgression zone are *C. lorifer* RIB. and *C. calabricus* DLAB. (which is not identical with *C. harpagifer* REMANE & ASCHE, as erroneously thought in DLABOLA, 1981).

In the *C. lorifer* RIB.-group there seem to exist two species only:

1. the ponto-mediterranean *C. odryssius* DLAB., 1965 and
2. the species comprising the taxa

C. dehneli NAST (=*filifer* REMANE & ASCHE)
C. lorifer RIB.
C. calabricus DLAB.
C. harpagifer REMANE & ASCHE.

For nomenclatorical reasons this species has to take the oldest name: *C. lorifer* RIBAUT, 1948, the others being reduced to subspecific rank: *C. lorifer* ssp. *dehneli* NAST, 1966 stat. nov. (= *filifer* REMANE & ASCHE, 1979 syn. nov.)

The examination of paratype material has shown that *filifer* REMANE & ASCHE falls in the range of variation found in polish *C. dehneli* NAST.

C. lorifer ssp. *calabricus* DLABOLA, 1979 stat. nov.
C. lorifer ssp. *harpagifer* REMANE & ASCHE, 1979 stat. nov.

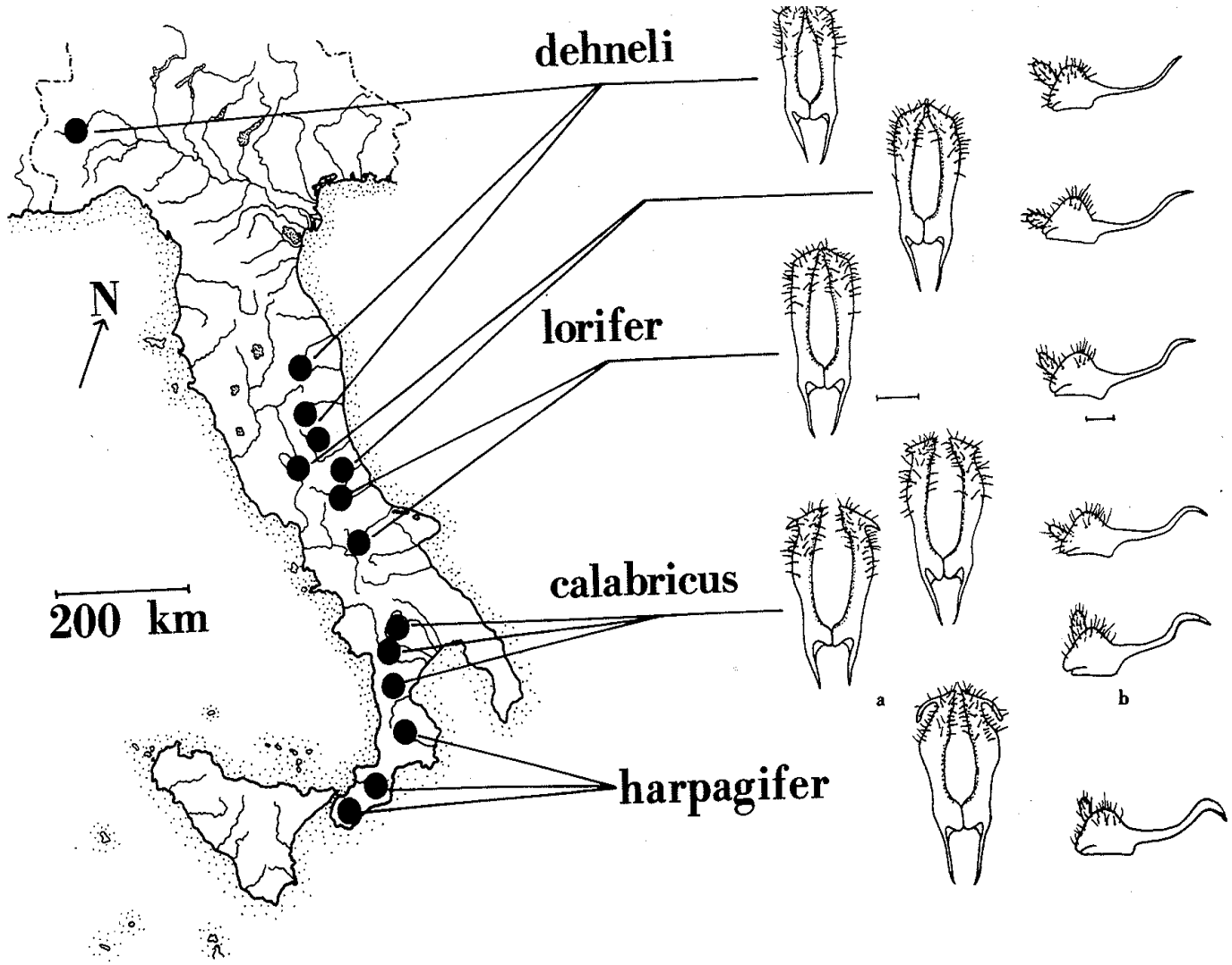

Fig. 2. Zoogeographical distribution of *C. lorifer* RIB. - group members in Italy (fall 1979).
Male genitalia: a. genital styles (caudal view)
b. anal tube (lateral view)

As mentioned above the synonymisation of *C. harpagifer* REMANE & ASCHE with *C. calabricus* DLAB. does not meet the facts. *C. harpagifer* REMANE & ASCHE is considered to be a valid subspecies because of the highly constant morphological characters in the shape of the male genitalia (e.g. distal part of genital styles) all over quite a large area in southern Italy. According to the description and figures given by DLABOLA for *C. calabricus,* it is different in the shape of the style. This is backed by the fact that we have found specimens agreeing with DLABOLA's figures not far from the type locality of *C. calabricus* DLAB. All these specimens of course had a row of small teeth at the distal right part of the aedeagus (taken by DLABOLA as «Seitenleiste»?).

Acknowledgement:
My thanks are given to Dr. J. DLABOLA, Praha, for his permission to examine the type specimen of *C. odryssius* DLAB. and to Prof. Dr. J. NAST, Warzszawa, for submitting paratypes of *C. dehneli* NAST.

Résumé

Le présent travail concerne la corrélation entre la zoogéographie et la spéciation dans le groupe *C. lorifer* RIB. établi 1979 par REMANE & ASCHE dans le genre *Conomelus* FIEBER, 1866 (Delphacidae). Considérant les circonstances biologiques ce groupe se constitue de deux espèces: *C. odryssius* DLABOLA, 1965 (=*clavifer* REMANE & ASCHE 1979) et *C. lorifer* RIBAUT, 1948 avec les ssp. suivantes:

C. lorifer ssp. *dehneli* NAST, 1966 stat nov. (=*filifer* REMANE & ASCHE, 1979 syn. nov.)

C. lorifer ssp. *calabricus* DLABOLA, 1979 stat. nov.

C. lorifer ssp. *harpagifer* REMANE & ASCHE, 1979 stat. nov.

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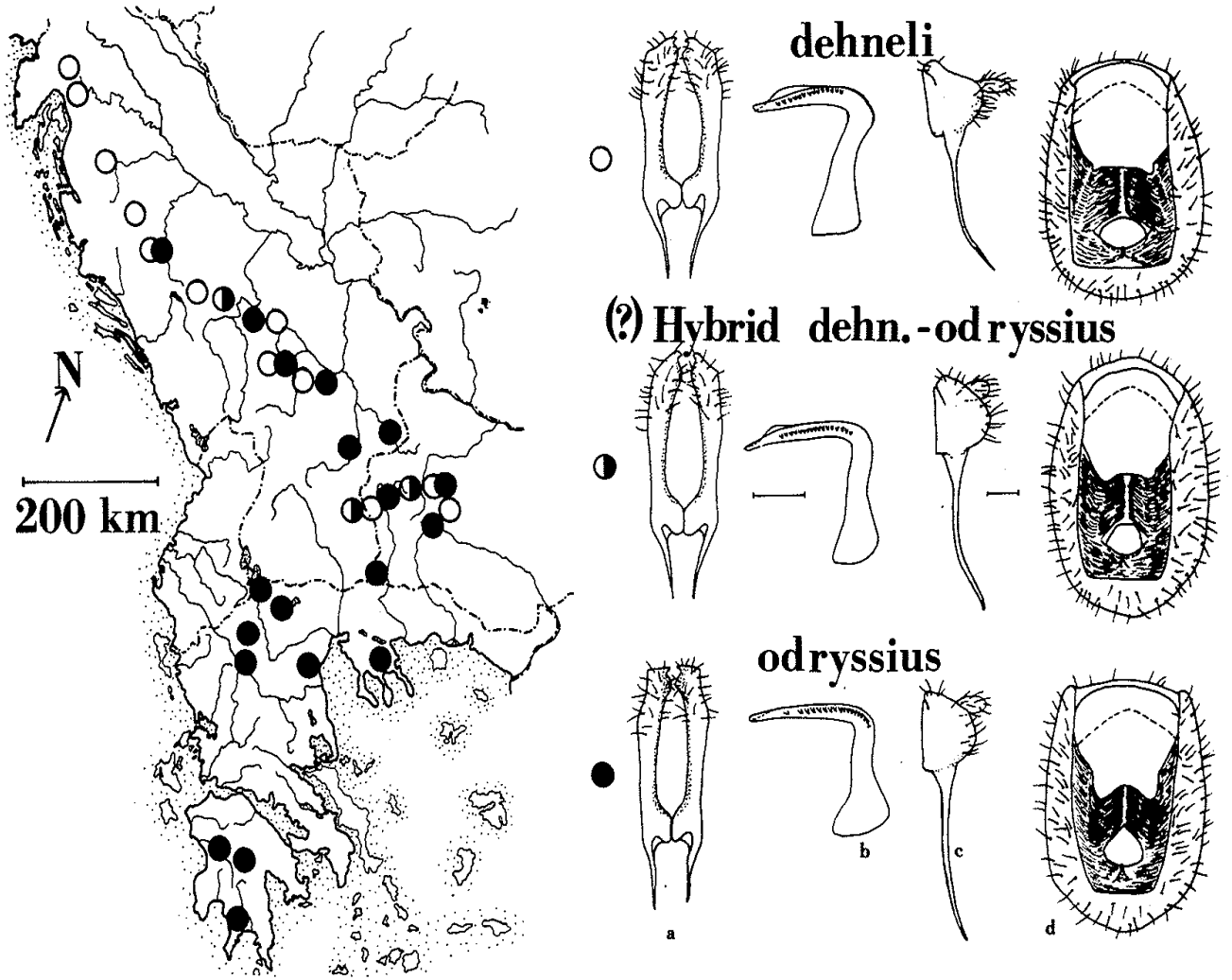

Fig. 3. Zoogeographical distribution of *C. lorifer* RIB. - group members on the Balkan Peninsula.
Male genitalia: a. genital styles, b. aedeagus, c. anal tube, d. genital phragma.
a.,d. caudal view, b.,c. lateral view

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Fachbereich Biologie / Zoologie
der Philipps-Universität Marburg
Lahnberge, Postfach 1929
D- 3550 Marburg / Lahn
Fed. Rep. of Germany

Fig. 1-3. Bors represent 0,1mm. Precise data concerning collecting sites will be published in another paper.