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Uwagi o taksonomii kilku europejskich gatunków z rodzaju *Omphrale* MEIG. (*Diptera, Omphralidae*)

Таксономические заметки о нескольких европейских видах из рода *Omphrale* MEIG. (*Diptera, Omphralidae*)

Notes on the taxonomy of some European species of the genus *Omphrale* MEIG. (*Diptera, Omphralidae*)

[With 7 figures and 2 tables in the text]

As yet extent of species within the genus *Omphrale* MEIG. is an open question. This concerns not only rare but even common species. It is very difficult to determine the limits of certain species, and the way in which this problem is solved in taxonomic works is open to serious criticism.

The object of this paper is a critical review of the taxonomy of four European species of this genus: *O. fenestralis* (L.), *O. senilis* (FABR.), *O. glabrifrons* (MEIG.) and *O. vitripennis* (MEIG.).

O. senilis (FABR.) was for a long time synonymised with *O. fenestralis* (L.) (LOEW 1857, BEZZI 1903, ENGEL 1932, KRÖBER 1925). In 1926, SÈGUY separated these two species on the basis of differences in the coloration of the haltere capitula. Some time later, KRÖBER (1938) accepted his view with certain reservations.

O. vitripennis (MEIG.) was initially wrongly treated as

a synonym of *O. fenestralis* (L.); later, BEZZI (1903) and then KRÖBER (1938) took it as a synonym of *O. glabrifrons* (MEIG.) basing on the unsufficient description given by MEIGEN (1824). Discussing the synonymy of European species of the genus *Omphrale* MEIG., KRÖBER (1937) supposed that *O. vitripennis* (MEIG.) might be also regarded as a distinct species differing from *O. glabrifrons* (MEIG.) in the coloration of the halteres, analogically to the difference between *O. fenestralis* (L.) and *O. senilis* (FABR.); the situation was complicated by the fact that the only specimen of this species (♂), which served as basis for MEIGEN'S description, was taken in Austria 130 years ago and is probably lost. Thus a real solution of this problem was impossible.

Working on the collection of the Institute of Zoology of the Polish Academy of Science I have found material, sufficient, in my opinion, for solving the problems of the taxonomy of these four species.

I. VARIABILITY OF THE HALTERE COLORATION IN *O. fenestralis* (L.)

In search for additional morphological characters for the discrimination of *O. fenestralis* (L.) and *O. senilis* (FABR.), I have analysed the material with special reference to the structure and coloration of the frons and of the antennae, the profile of the head and the outline of its hind margin. The outline of the posterior margin of the head appeared to be promising; in *O. senilis* (FABR.) it bulges out at the base of the ocellar prominence, and in *O. fenestralis* (L.) it is straight. But, the study of a larger number of specimens of both species proved the existence of intermediate forms. Also, a critical analysis of the data shows that the shape of the curvature appears to change with minute differences in the position of the specimen. The coloration of the capitula of the halteres remains the only distinguishing character. The difficulties in using it have been pointed out, however, some time ago by KRÖBER.

While determining specimens of this group, the author of this paper met with a great number of specimens with an

intermediate coloration of the capitula of the halteres and decided to try to determine by statistical methods, how far the two species are distinguished by the coloration of the halteres. Thus the material of the species *O. fenestralis* (L.) and *O. senilis* (FABR.) has initially been treated as one group.

The whole group, termed Central European series, comprises 39 specimens from Poland, the Lithuanian SSR and Saxonia (Germany). Polish specimens are divided into the Central Poland and Pomeranian series comprising 15 and 18 specimens respectively.

The Central Poland series includes 10 specimens taken by the author in the Puszcza Kampinoska (Kampinos Forest) and five specimens from Warszawa and Skierniewice.

The Pomeranian series includes 12 specimens taken in Szczecin on a single day on the windows of one flat, and 6 specimens from Słupsk and the Island of Wolin.

Thus the series from Szczecin and Puszcza Kampinoska (Kampinos Forest), 12 and 10 specimens respectively, are the basic two series of the whole group.

After drawing the dorsal view of the halteres of all specimens the extension of their dark coloration was determined and the frequency of the various coloration variants in the examined series was plotted on graphs.

Analysing a fairly scanty material statistically, one may be seriously doubted whether it is permissible to draw certain conclusions as to the value of the analysed characters. To remove such doubts, the author assumes that conclusions may be drawn from results obtained if:

1. the course of variation within particular populations is of a regular character,

2. the deviations from mean values of coloration variants remain within limits permitting, according to statistical criteria, to draw conclusions.

The material from particular regional populations was then combined in some series; the resulting curves [fig. 1-5] and value of the error of arithmetical means [table I] permit to appraise the material and to determine whether the problem in question can be solved.

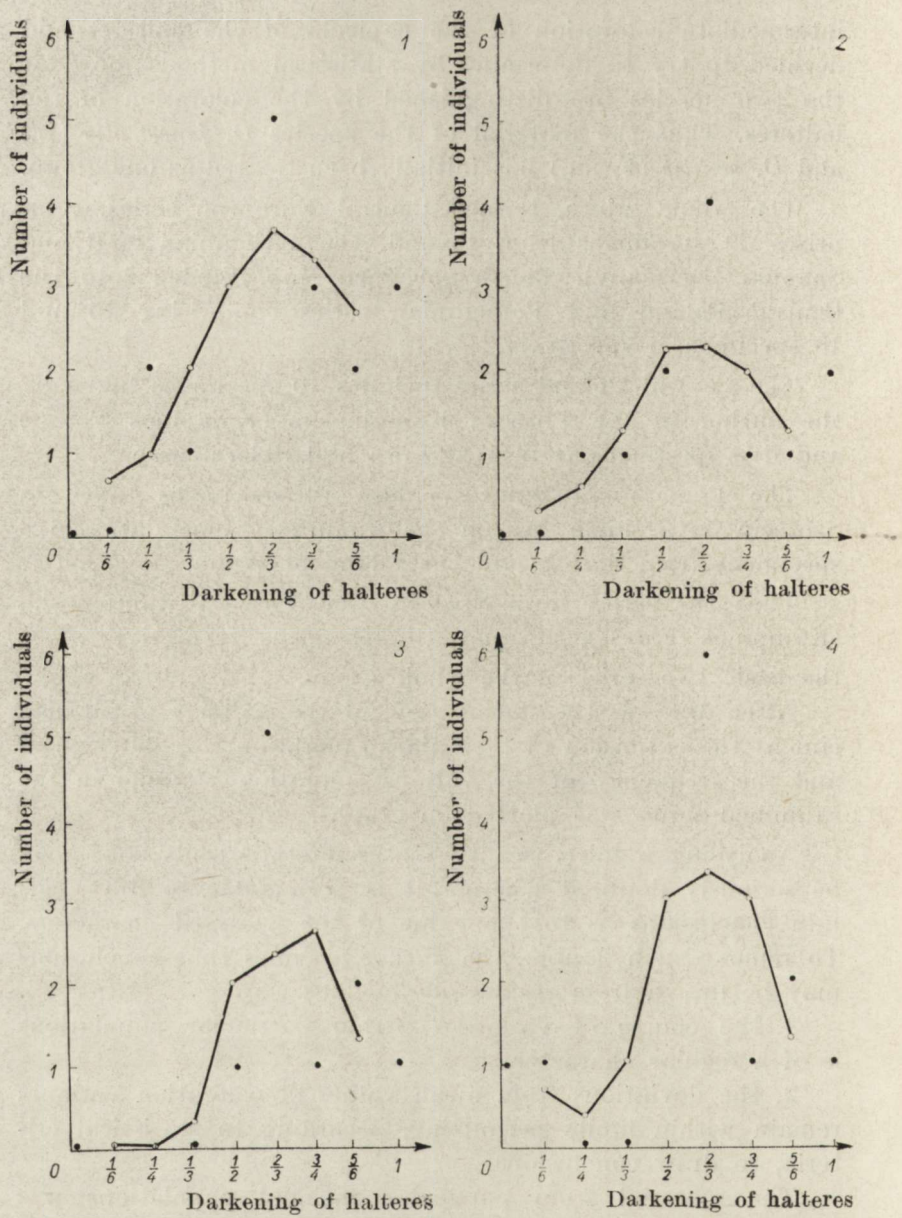

Fig. 1—4. *Omphrale fenestralis* (L.). Graphs showing the variability of haltere coloration in particular regional series. Fig. 1 — Pomeranian series; fig. 2 — Szczecin series; fig. 3 — Puszcza Kampinoska series; fig. 4 — Central Poland series.

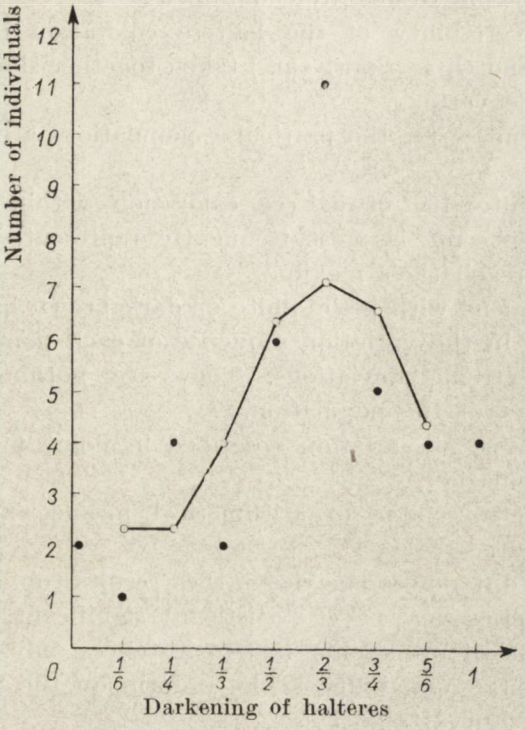

Fig. 5. *Omphrale fenestralis* (L.). Graph showing the variability of haltere coloration in the Central European series.

Table I

Omphrale fenestralis (L.). Arithmetical means of haltere coloration and their errors in particular regional series.

Locality	arithmetical mean of haltere coloration	error of mean	error per cent.
Szczecin	65,16%	6,75	10%
Pomerania	66,2 %	5,31	10%
Puszcza Kampinoska	72,5 %	4,46	6%
Central Poland	60,5 %	6,55	11%
Central Europe	59,6 %	4,22	7%

The following results were obtained:

1. The variability of the haltere coloration in *O. fenestralis* (L.) and *O. senilis* (FABR.) taken together shows a curve with a single vertex.

2. The curves for the particular populations are of a similar character.

3. The intensity of haltere coloration within the limits of 60-72 per cent. is most frequently represented. Here all the curves reach their maxima.

4. Specimens with plain white or dark brown haltere capitula appear in the variation sequence of each population and represent extreme deviations. They are nothing different from the rest of the population.

5. The type of variation described in point 4 is repeated in each population.

6. The error value of arithmetical means varies within 6-10 per cent.

7. The differences between the results obtained from particular series were never statistically significant, and approached statistical probability in two instances only. This bears evidence of the variability being uniform on the whole investigated territory [table II].

Table II

Omphrale fenestralis (L.). Results of comparison of particular regional series according to the formula: $\frac{M_1 - M_2}{\sqrt{m_1^2 + m_2^2}}$

	Central Europe	Central Poland	Puszcza Kampinoska	Pomerania
Szczecin	<1	<1	<1	<1
Pomerania	<1	<1	<1	
Puszcza Kampinoska	$\geqslant 2 < 3$	<2		
Central Poland	<1			

Conclusions. The character of the variability of haltere coloration in *O. fenestralis* (L.) and *O. senilis* (FABR.) proves that it is impossible to treat forms showing extreme coloration as separate species since the extreme colorations lie within the limits of variation in each population of these species. A distinction of species would be possible on the basis of the character under discussion only in the instance of a double-peaked curve on the graph. As the curves have in each instance only one vertex, the two species must be treated as one. Thus the name *O. senilis* (FABR.) must be regarded as a synonym of *O. fenestralis* (L.); such opinion is supported also by the fact that efforts to separate these species, based on morphological characters, phenological data or geographical distribution, have failed.

II. THE REDISCOVERY OF *Omphrale vitripennis* (MEIG.)

As I have mentioned at the beginning, the absence of specimens answering MEIGEN'S description of *O. vitripennis* (MEIG.) constituted the chief obstacle in deciding the question whether the name *O. vitripennis* (MEIG.) denotes a separate species or is merely a synonym for *O. glabrifrons* (MEIG.).

The collection of the Institute of Zoology of the Polish Academy of Science possesses three specimens of the genus *Omphrale* MEIG. which fit MEIGEN'S description and differ from *O. glabrifrons* (MEIG.) in the coloration of the haltere capitula.

After an analysis of the variability of the haltere coloration in *O. fenestralis* (L.) the application of this character in the taxonomy of the species belonging to the genus *Omphrale* MEIG. may appear objectionable. I take such view to be wrong, however. The variability of the haltere coloration of the *O. fenestralis* (L.) type is fairly exceptional among *Diptera* and in the majority of cases this character constitutes a good criterion for distinguishing various species. Yet, in each instance it has to be ascertained whether this character is markedly variable or not.

In the case of *O. fenestralis* (L.), specimens exhibiting extreme coloration (plain white or dark brown) make up 15 per cent.

of the whole material. The remainder show intermediate coloration. In the case of *O. glabrifrons* (MEIG.) and *O. vitripennis* (MEIG.), the halteres of all seven specimens representing in the collection either of these species are snow white or chocolate brown. In the instance of an *O. fenestralis* (L.) variability type, even in such a small series, specimens with intermediate coloration would most likely be represented. Thus it seems that the *O. fenestralis* (L.) variability type is not in question here, and that the coloration of the halteres may well serve for distinguishing the two species. Furthermore, the two species exhibit considerable differences in the venation of the wings and in the coloration of antennae. The various differences can be summarized in the form of a key as follows:

1. Capitula of halteres snow white. Median vein (m_1) strongly curved. A straight line drawn from the base of r_4 to the posterior margin of the wing and representing a continuation of the former runs along the transverse vein m_3 [fig. 6]. Distal joint of the antennae reddish-yellow at the base and dark brown at the tip . . . . . *O. glabrifrons* (MEIG.).

—. Capitula of halteres chocolate brown. m_1 slightly curved. A continuation of r_4 in the direction of the posterior wing margin misses m_3 [fig. 7]. Wnole terminal joint of the antennae dark brown. . . . . *O. vitripennis* (MEIG.).

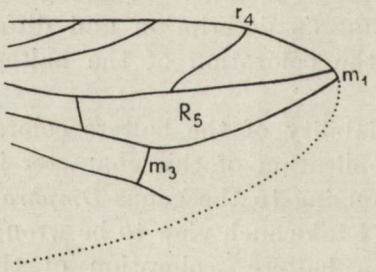

Fig. 6. *Omphrale glabrifrons* (MEIG.), tip of the wing.

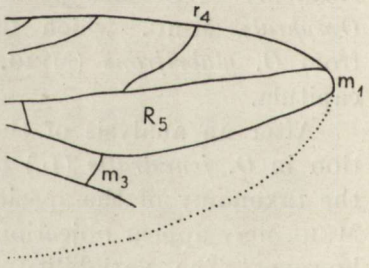

Fig. 7. *Omphrale vitripennis* (MEIG.), tip of the wing.

The above mentioned characters allow to treat *O. vitripennis* (MEIG.) as a separate species and not as a synonym of *O. glabrifrons* (MEIG.).

The collection of the Institute of Zoology of the Polish Academy of Science includes the following specimens of these two species, used as material for the above analysis:

O. vitripennis (MEIG.). Ukrainian SSR, Filonovskaja, 11 VI 1910 and 14 VI 1910, 2 ♀♀, leg. A. ILINSKIJ; Poland, Warszawa, 14 VII 1953, 1 ♀, leg. P. TROJAN.

O. glabrifrons (MEIG.) Italia, Genova, 1 VII 1910, 1 ♂, 1 ♀ (in copula), leg. G. MANTERO; Poland, Silesia, 2 ♀♀ without date and name of collector.

REFERENCES

BEZZI M. *Scenopinidae*. In BECKER Th., BEZZI M., BISCHOFF J., KERTÉSZ K. und STEIN P. „Katalog der paläarktischen Dipteren", 2, Budapest, 1903, pp 215–217.

ENGEL O. *Omphralidae (Scenopinidae)*. In DAHL M. und BISCHOFF H. „Die Tierwelt Deutschlands", 26, Jena, 1932, pp. 123–126.

KRÖBER O. *Omphralidae*. In LINDNER E. „Die Fliegen der paläarktischen Region", 26, Stuttgart, 1925, pp. 1–8.

KRÖBER O. Ein Beitrag zur Kenntnis der Omphraliden *(Scenopinidae) (Diptera)*. Stett. Ent. Zeit., Stettin, **98**, 1937, pp. 211–231.

LOEW H. Die bis jetzt bekannt gewordenen Arten der Gattung *Scenopinus*. Verh. Zool.- Bot. Ges., Wien, **7**, 1857. pp. 87–90.

MEIGEN J. W. Systematische Beschreibung der bekannten europäischen zweiflügeligen Insecten, 4, Hamm, 1824. pp. 113–118.

SÉGUY E. Diptères Brachycères *(Omphralidae)*. In „Faune de France", 13, Paris, 1926, pp. 274–279.

STRESZCZENIE

W niniejszej pracy autor dokonał analizy zmienności zabarwienia główki przezmianek u *Omphrale fenestralis* (L.) i *O. senilis* (FABR.). Charakter zmienności tej cechy u obu gatunków wyklucza możliwość traktowania ich jako gatunków samodzielnych. Z tego też względu *O. senilis* (FABR.) został zsynonimizowany z *O. fenestralis* (L.).

W drugiej części pracy autor donosi o znalezieniu *O. vitripennis* (Meig.) i daje klucz do odróżniania tego gatunku od *O. glabrifrons* (Meig.), z którym dotychczas był synonimizowany.

РЕЗЮМЕ

В настоящей работе автор провёл анализ изменчивости окраски головки жужжалец у *Omphrale fenestralis* (L.) и *O. senilis* (Fabr.). Характер изменчивости этого признака у обоих видов исключает возможность считать эти виды самостоятельными. В связи с этим *O. senilis* (Fabr.) признан синонимом *O. fenestralis* (L.).

Во второй части работы автор сообщает о находке *O. vitripennis* (Meig.) и указывает отличья этого вида от *O. glabrifrons* (Meig.), которого синонимом он до сих пор считался.

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