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GAMMARUS KISCHINEFFENSIS SCHELLENBERG, 1937 IN SOUTH-EASTERN POLAND

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ABSTRACT

Gammarus kischineffensis Schellenberg, 1937, has been recorded for the first time in Poland. The differences in morphology between this and other Polish species are discussed.

The short list of Polish freshwater gammarids can be enriched with a new species, *Gammarus kischineffensis* Schellenberg, 1937, which has been found lately in many sites, mainly in the drainage area of the upper reaches of the river San - a right affluent of the river Vistula.

The first very superficial description of this species (locus typicus: Kischinev, Moldavia, USSR) without any drawings (Schellenberg, 1937) has been completed by Dobreanu & Manolache (1939), on the basis of Roumanian material. In their 1939 paper, the species in question appeared under the name *Gammarus chisinauensis*. Cărăuşu, Dobreanu & Manolache (1955), in their comprehensive monograph of the Roumanian Amphipoda, rightly resume the original name. They give many localities of *G. kischineffensis* in Moldavia, east of the Carpathian range, in the basins of the rivers Siret and Prut. Straškraba (1962, 1967, 1969) records this species from the easternmost part of Czechoslovakia. Finally, it is apparent from the monograph of Dedju (1967) and from the papers of Jalynskaja (1968, 1970) that *G. kischineffensis* is the most common gammarid species of the entire Dniester and Prut drainage basins, i.e. in the southern part of the Ukrainian and in the Moldavian Soviet Republics.

G. kischineffensis is a rather eurytopic species. The Roumanian authors report it in particular from small streamlets, from the drainage channels, and even from very small forest springs. Jalynskaja (1968) also found this species mainly in the streams of the basin of upper Dniester, where the temperature could reach even 25°C, while Dedju (1967) collected *G. kischineffensis* in various types of water bodies, such as subterranean waters, springs, streams and rivers, as well as ponds and man-made reservoirs. Dedju observed, however, that *G. kischineffensis* occurs in stagnant waters only when these are supplied by run-

ning waters. In larger riverbeds - in the middle and lower courses of Dniester, and in lower course of Prut - this species has not been found. Dedju supposes that it cannot live there through competition by the expansive ponto-caspian species of the genera *Dikerogammarus*, *Pontogammarus*, and *Chaetogammarus*. In the uppermost courses of the spring streams of these basins, *G. kischineffensis* is replaced by representatives of the *G. balcanicus*-group. According to Dedju (1967) in the basin of the Prut, *G. kischineffensis* and *G. balcanicus* each have separate ranges. Jalynskaja (1968, 1970) working in the same general area did not confirm such a disjunct distribution pattern; however, she also observed that *G. balcanicus* dominated in waters nearer to the springs, which are cooler, richer in Na^{+}ions and poorer in Ca^{++} and K^{+}ions - this in contradistinction to *G. kischineffensis*.

Fig. 1 shows the approximative distribution area of *G. kischineffensis*, based upon the hitherto known data, covering also new records from Poland. It seems very probable that the distribution area of this species reaches in reality farther to the east, possible to the river Boh basin; it is possible that it penetrates also to the north to the river Pripet basin, taken its euryoecious abilities into consideration. In the west, the Carpathian range appears to be a strong barrier preventing the spreading of *G. kischineffensis*. The Slovakian locality, in an affluent of the river Uh (Straškraba, 1962, 1969) (indicated by a crosslet in fig. 2) shows that it succeeded in crossing this mountain ridge to reach the river Tisa drainage system, perhaps through one of the nearest "weak places", viz. the Uzhocka pass (889 m above sea level). At the foot of Carpathians *G. kischineffensis* spreaded in north-western direction and reached the Vistula basin, so it has crossed the watershed between the Baltic and Black Sea drainage areas.

In fig. 2 the localities of *G. kischineffensis* in Poland are plotted. Fourteen of these are situated in systems draining into the Baltic (river San and its affluents) whereas five drain into the Black Sea (rivulets Strwiąż and Mszanka - affluents of Dniester). The northernmost site of *G. kischineffensis* known up to now is the river San near the village Nozdrzec; judging from the local nature of the river it is very probable that the species will have penetrated further downstream.

The following list enumerates the records of this gammarid new to Polish fauna. The samples have been deposited in the Zakład Zoologii Ogólnej, Uniwersytet Łódzki (ZZOUŁ) and the Zoölogisch Museum Amsterdam (ZMA).

1) River San near village Nozdrzec, distr. Brzozów, 13-III-1968, leg. A. Piechocki, alt. about 250 m; ZZOUŁ, cat. no. 172.
2) Streamlet crossing the way Bukowsko - Tokarnia, distr. Sanok, 9-VIII-1967, leg. S. Niesiolowski, alt. about 450 m; ZZOUŁ, cat. no. 162.
3) Streamlet near Bukowsko, distr. Sanok, 9-VIII-1967, leg. S. Niesiołowski, alt. about 400 m; ZZOUŁ, cat. no. 163.
4) Streamlet flowing from Mount Chryszczata to Rabe, distr. Lesko, 19-VIII-1967, leg. S. Niesiołowski, alt. about 750 m; ZZOUŁ, cat. no. 169.
5) Stream Prowcza, affluent of the stream Dwernik, Berehy Górne, distr. Ustrzyki Dolne, 10-IX-1971, leg. A. Witkowski, alt. about 750 m; ZZOUŁ, cat. no. 206.
6) Stream Caryński near the bridge below the mouth of the streamlet Caryńczyk, distr. Ustrzyki Dolne, 17-VII-1967, leg. J. Kruszewski, alt. about 650 m; ZZOUŁ, cat. no. 217.
7) Stream Głuchy or its affluent near Rosochate, along the path from Haniów to Ostre, distr. Ustrzyki Dolne, 16-VII-1967, leg. J. Kruszewski, alt. about 500 m; ZZOUŁ, cat. no. 215.
8) Stream Czarny, W. of Polana, distr. Ustrzyki Dolne, VII-1971, leg. F. and J.D. van Mansvelt, alt. about 450 m; ZMA, cat. no. Amph. 103.385.
9) River Solinka near Bukowiec, distr. Lesko, VII-1971, leg. F. and J.D. van Mansvelt, alt. about 450 m; ZMA, cat. no. Amph. 103.386.
10) Streamlet directly S.E. of the great dam in the Solina, distr. Lesko, VIII-1971, leg. F. and J.D. van Mansvelt, alt. about 350 m; ZMA, cat. no. Amph. 103.388.
11) River Olszanica near Uherce, distr. Lesko, VIII-1971, leg. F. and J.D. van Mansvelt, alt. about 350 m; ZMA, cat. no. Amph. 103.401.
12) River Strwiąż (affluent of the Dniester), at the western border of the district of Ustrzyki Dolne, VIII-1971, leg. F. and J.D. van Mansvelt, alt. about 500 m; ZMA, no. Amph. 103.405.

13) Affluent of the stream Wankowa, W. of Olszanica near the bridge, distr. Ustrzyki Dolne, VIII-1971, leg. F. & J.D. van Mansvelt, ZMA, cat. no. Amph. 103.381.
14) Affluent of the Stary Potok, W. of Ustjanowa, distr. Ustrzyki Dolne, VIII-1971, leg. F. & J.D.van Mansvelt, ZMA, cat. no. Amph. 103.382.
15) Affluent of the streamlet Mszanka (an affluent of the Dniester), in Michniowiec, where the road crosses the water (without a bridge), distr. Ustrzyki Dolne, VIII-1971, leg. F. & J.D.van Mansvelt, ZMA, cat. no. Amph. 103.406.
16) Affluent of the streamlet Mszanka, E. of Bystre, distr. Ustrzyki Dolne, VIII-1971, leg. F. & J.D. van Mansvelt, ZMA, cat. no. Amph. 103. 407.
17) Spring-like affluent of the Mszanka, about 800 m W. of Michniowiec, distr. Ustrzyki Dolne VIII-1971, leg. F. & J.D. van Mansvelt, ZMA, cat. no. Amph. 103.408.
18) Stream Głuchy, S.E. of Polana, distr. Ustrzyki Dolne, VIII-1971, leg. F. & J.D. van Mansvelt, ZMA, cat. no. Amph. 103.409.
19) Stream Rabiański Potok, between Czarne and Bystre, S.W. of Baligród, distr. Ustrzyki Dolne, VIII-1971, leg. F. & J.D. van Mansvelt, ZMA, cat. no. Amph. 103.387.

In many localities, viz. the numbers 3,4,5,6,7, 13,14, and 19, the species was accompanied by *G. balcanicus*.

In Polish waters also, *G. kischineffensis* occurs mainly in small and medium-sized streams and rivers, occupying there microhabitats typical for freshwater gammarids, such as crevices under the stones, in waterweeds, between dead leaves and twigs, etc. Judging from the data recorded by Dedju (1967) it can safely be assumed that this species will be able to populate the littoral zone of the Solina dam reservoir.

To facilitate the recognition of *G. kischineffensis* we are giving below some characteristic features of this species:

1) The lack of calceoli in adult males. In the majority of the *Gammarus* species, at any rate in all Polish freshwater gammarids, calceoli are present.

2) The posterodistal corner of basis of the 7th peraeopod is produced into a distinct projection; the width of this posteriorly protruding part of basis is about the half of the width of ischium (in large males somewhat less) and its angle is slightly acute (or rectangular). In this character *G. kischineffensis* resembles the *balcanicus*-group. In the *pulex*-group this projection is almost absent, while in *G. lacustris* G.O. Sars, 1864 and *G. wigrensis* Micherdziński, 1959 the width of this protruding part of basis is distinctly less than half the width of ischium (usually about ⅓) whereas at the same time the angle is rounded (fig. 3 A-E). According to Cărăuşu et al. there exists a group of 3 short setules on the inner surface of this projection of basis of P7 in *G. kischineffensis*. In our material we have found neither setules nor spines in this place. In *G. lacustris* and *G. wigrensis* 1 or 2 setules are found here, while in the *G. pulex*- and *G. balcanicus*-groups the posterodistal corner of the basis usually bears 1 spine (sometimes also 1 or 2 setules).

3) The outer margin of exopodite of the 3rd uropod is sparsely armed with setae (usually 6 to 14, in larger specimens up to 20 setae are present); some of these setae (1 to 10) are feathered. In this feature *G. kischineffensis* resembles *G. wigrensis*. It is worth adding that even in young specimens, of 5-6 mm long, at least one plumose seta is always present (fig. 3 F-G).

4) The flagellum of A2 is in ♂♂ *G. kischineffensis* somewhat "*pulex*-like" (slightly expanded proximally and with a sort of brush on the inner side, not so dense however as in *G. pulex*).

5) The setosity on the hind margins of P3 and P4 is of medium density - richer than in *balcanicus* group, slightly sparser than in *G. wigrensis*, distinctly sparser than in *G. lacustris* and in the *pulex*-group.

6) The hind corner of the 2nd epimeral plate is acutely produced, but not to the extent as in the *lacustris*-group (fig. 4 A-E).

7) The feature in which *G. kischineffensis* differs from *G. wigrensis* is the comparatively shorter gland cone in the first species; in *G. kischineffensis* the end of this cone never reaches the distal end of the 3rd peduncular segment of A2, while in *G. wigrensis* the gland cone even reache beyond the end of this segment (fig. 4 F-G).

8) A minor but useful feature to separate young and female specimens of *G. kischineffensis* from the respective representatives of the *balcanicus*-group (which are often found together with *G. kischineffensis*), especially when 3rd uropods are lacking, is the armature of the lower, inner side of the peduncle of A1. In *G. kischineffensis* there exists a group of comparatively long setules (depending on the size of the animal from 1 to 3 setules per group) on the third peduncle segment. The length of the longest setule always attains or exceeds the width of the segment. In the *balcanicus*-group this segment sometimes bears here a group of setules as well (usually 1 or 2 setules), but the length of the longest seta does not exceed half the width of the segment. On the inner side of the second segment of A1, larger specimens of *G. kischineffensis* usually possess two groups of setae, *G. balcanicus* only one. (fig. 4 H-K).

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REFERENCES

CĂRĂUŞU, S., E. DOBREANU & C. MANOLACHE, 1955. Amphipoda, forme salmastre şi de apă dulce. Fauna Rep. pop. Romîne, Crustacea, 4 (4): 1-409.

DEDJU, I.I., 1967. Amfipody i mizidy bassejnov rek Dnestra i Pruta (Amphipods and mysids of the basins of the rivers Dniester and Prut). 1-172. (Izd. Nauka). (in Russian).

DOBREANU, E. & C. MANOLACHE, 1939. Amphipodes de eau douce de Roumanie. Bol. Soc. nat. Romînia, 14: 28-40.

JALYNSKAJA, N.S., 1968. Značenie troficeskogo faktora v zaraženiī rakoobraznych (Amphipoda) parasitami. (Importance of the trophic factor in infection of Amphipoda with parasites). Gidrobiol. Zhurn., 4 (1): 50-58. (in Russian).

----------, 1970. Ekologo-fiziologičeskie svjazi nastojaščich gregarin (Eugregarinida) s bokoplavami (Amphipoda) istokov Dnestra. (Ecologo-physiological connections of Eugregarinida with Gammarus (Amphipoda) from the sources of the Dniester). Vestnik Zool., 4: 3-9. (in Russian).

MICHERDZIŃSKI, W., 1959. Kiełże rodzaju Gammarus Fabricius (Amphipoda) w wodach Polski. Acta zool. cracov., 4 (10): 527-637.

SCHELLENBERG, A., 1937. Kritische Bemerkungen zur Systematik der Süsswassergammariden. Zool. Jahrb. (Syst.), 69 (5/6): 469-516.

STRAŠKRABA, M., 1962. Amphipoden der Tsechoslovakei nach den Sammlungen von Prof. Hrabě, 1. Věstnik Českolov. zool. Spol., 26 (2): 117-145.

----------, 1967. Amphipoda. In: J. ILLIES (ed.), Limnofauna Europaea: 202-209 (Gustav Fischer, Stuttgart).

----------, 1969. Review of I.I. Dedju, 1967,"Amphipods and mysids of the basins of the rivers Dniester and Prut". Crustaceana, 17 (1): 110-112.

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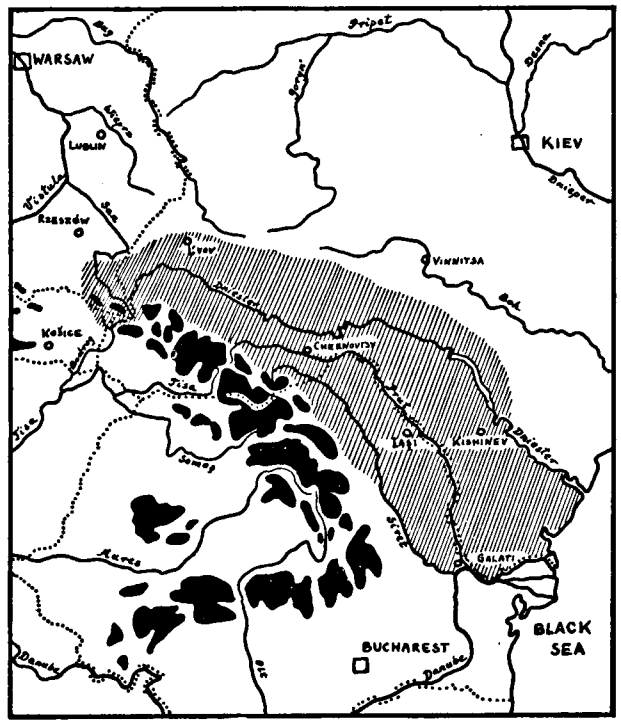

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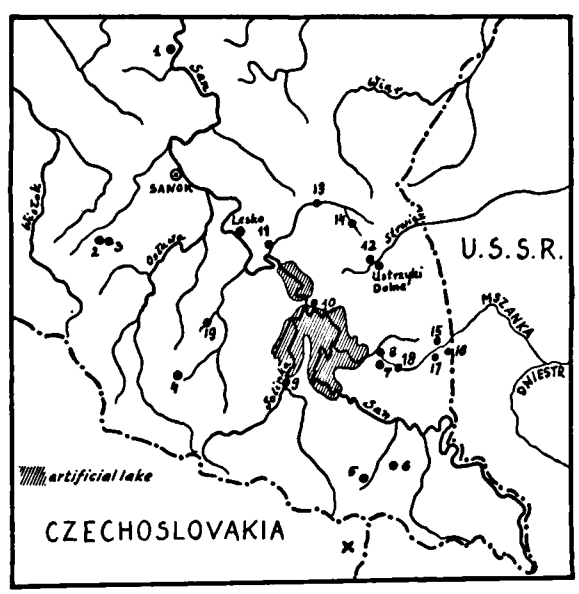

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Fig. 1 The approximate distribution area of *Gammarus kischineffensis* Schellenberg, 1937 in eastern Europe. Black areas indicate the Carpathian Mountain chain (altitude about 1000 m above sea level).

Fig. 2 Locations of *Gammarus kischineffensis* Schellenberg, 1937, in Poland. The small cross indecates the Slovakian site of this species in the affluent of the river Uh (Straškraba, 1962, 1969).

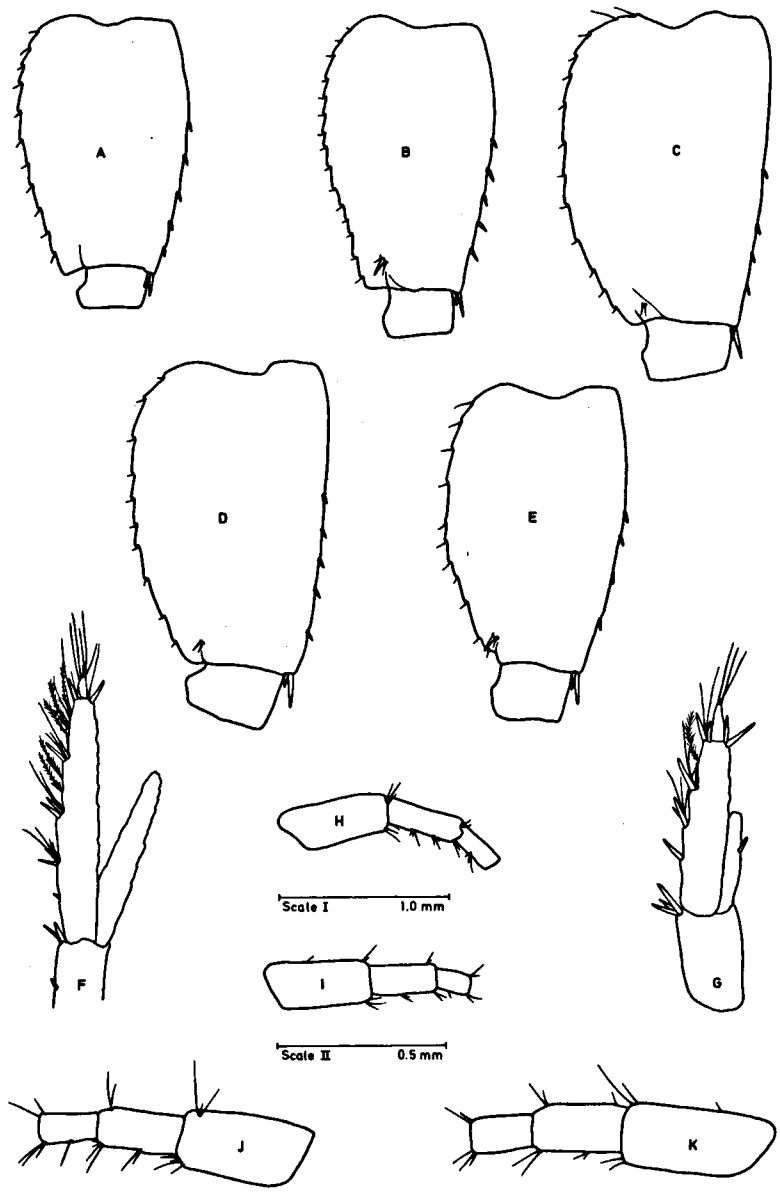

Fig. 3 A - E: The basis of the 7th peraeopod in some Polish *Gammarus* species (scale I): A, *G. kischineffensis*, ♂ 10.5 mm, from stream Prowcza, locality nr. 5; B, *G. balcanicus* (-group), ♂ 11 mm, spring in Bieszczady Mts.; C, *G. wigrensis*, ♂ 14 mm, river Czarna Háncza, paratype; D, *G. lacustris*, ♂ 12.5 mm, peat-pond in Błonie near Łęczyca; E, *G. pulex*, ♂ 13 mm, river Unieść in Sianów. Long setae inserted on the proximal part of the basis are omitted.

F and G: The third uropod of *Gammarus kischineffensis*: F, ♂ 13 mm, from river San, locality nr. 1 (scale I); G, juv. 5.5 mm, from the same locality (scale II). The armature of the endopodite and of the inner margin of the exopodite is omitted.

H - K: Peduncle segments of A1, from the inner side: H, *G. kischineffensis*, ♀ 10 mm, from river San, locality nr. 1 (scale I); I, *G. balcanicus* (-group), ♀ 9.5 mm, from stream flowing from Chryszczata Mts., locality nr. 4 (scale I); J, *G. kischineffensis*, juv. 5.5 mm, from locality nr. 4 (scale II); K, *G. balcanicus* (-group), juv. 6.5 mm, from spring in Komańcza, Bieszczady Mts. (scale II).

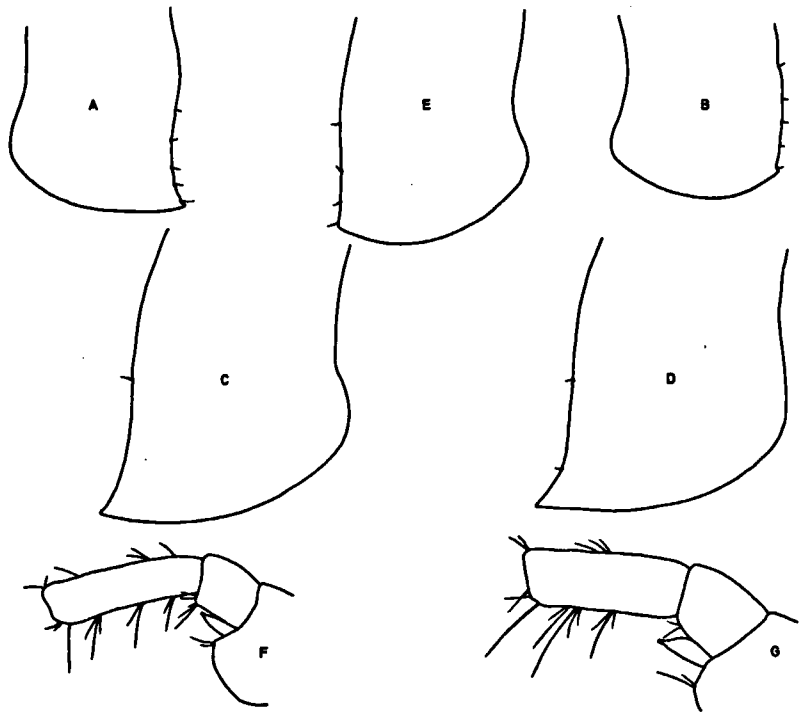

Fig. 4 A - E: Second epimeral plate in some Polish *Gammarus* species (all scale I)
A, *G. kischineffensis;*
B, *G. balcanicus;*
C, *G. wigrensis;*
D, *G. lacustris;*
E, *G. pulex.*

F and G: The proximal part of A2 (both scale I).
F, *G. kischineffensis;*
G, *G. wigrensis.*
The same specimens have been used as in fig. 3.