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Diamesa martae sp. n. (Diptera: Chironomidae)
and geographical distribution of the species
of *Diamesa latitarsis* group

Diamesa martae sp. n. (Diptera: Chironomidae)
i geograficzne rozmieszczenie gatunków z grupy
Diamesa latitarsis

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Abstract — *Diamesa martae* sp. n. is described from the High Caucasus Mts and Ötztaler Alps. The geographical distribution of the other species the *Diamesa latitarsis* group are discussed. Most of the species of these groups are distributed inside the palearctic region, especially its European part. The available information permits to distinguish two developmental centres of that group: the Alps and the Caucasus. The larvae and pupae of these species live in very cold water in glacial or high mountain streams.

In the material collected from the High Caucasus Mts in the Azerbaijan SRR from the stream Talačaj (Zakataly region) one male specimen of the genus *Diamesa* WALTZ was found on 19th March 1970. In the valley of the stream Gurgler below Obergurgl, Ötztaler Alps, six males of the same species were collected on 1st March 1976. Upon comparing the found specimens with the slides at the authors' disposal and descriptions of species of the genus *Diamesa* well known in Europe (Serra-Tosio 1971) and those considered as uncertain (Goetghebuer 1938, 1949, 1950), as well as with the Asian species (Sing 1958, Reiss 1968, Kaul 1970, Tokunaga 1936, Kownacki, Kownacka 1973a, 1973b), it was recognized as a new species.

Diamesa martae* sp. n.

Imago ♂: body length 6.5 mm, wing length 4.4 mm, general colour of the body dark brown.

Antenna: 14 flagellomeres, relation of length to width of particular flagellomeres expressed in μm is: 80:140, 120:52, 40:40, 48:40, 40:32, 40:32, 36:28, 36:24, 40:28, 48:28, 44:28, 52:24, 52:24, 616:40; AR = 1.04; non-plumose; on particular flagellomeres individual, very short setae ($160 \mu\text{m}$); pedicel spherical, on its lateral side a group of 4 setae; on the second flagellomere on the antenna one seta, on the third to the thirteenth 3 hair-like setae on each, in the upper part of the second flagellomere to the sixth on big setae Scf (sensille chetiformes) are situated, on the fourteenth flagellomere in its basal part some hair-like setae are present,



Fig. 1. *Diamesa martae* sp. n. (Diptera, Chironomidae); antenna

Ryc. 1. *Diamesa martae* sp. n. (Diptera, Chironomidae); czułek

* The name suggested by the first author.

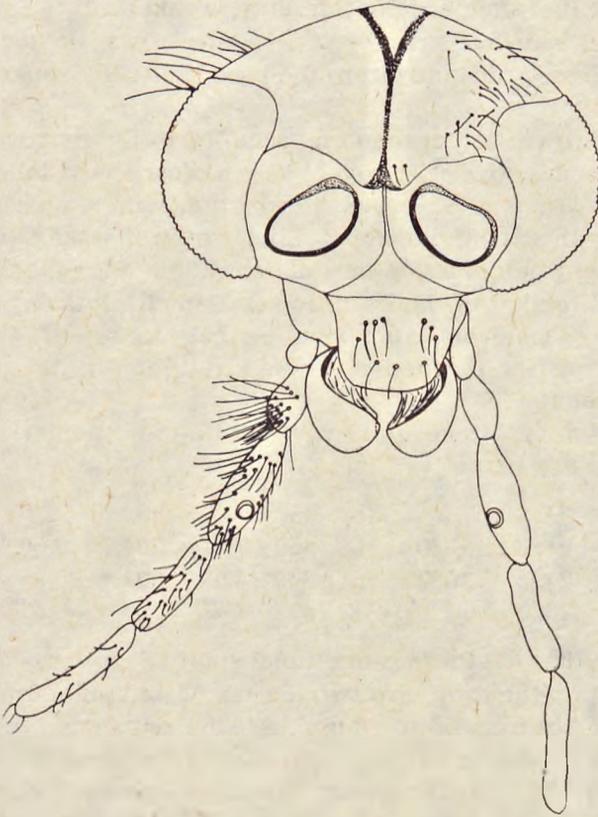


Fig. 2. *Diamesa martae* sp. n. (Diptera: Chironomidae); head

Ryc. 2. *Diamesa martae* sp. n. (Diptera: Chironomidae); głowa

whereas the top part from about half of the length is densely covered with setae Scf with two apical setae at the end; pedicel and other flagellomeres of the antenna are densely covered with sensillae (fig. 1).

Head: dark brown, vertex has a distinct y-shaped coronal suture, forming an evident coronal triangle not covered with setae; the lower vertex edge bi-topical in its medial line, interocular setae, outer vertical setae and inner vertical setae do not form on the vertex evident separate groups but join with one another changing gradually into a distinct uniserial row of postocular setae; the antennal socket cut with an inter-antennal bar. Eyes not produced dorsally to the medial line, bare (microtrichia between ommatidial do not reach even half of the ommatidial lens, visible only at magnification 400 \times); clypeus covered with 10 strong setae. Maxillar palpus four-segmented of the length to width ratio of particular segments in μm equal 72:60, 200:60, 172:40, 220:40, the first and second segment covered with long, strong setae, on

the fourth segment the setae are considerably, weaker, all the segments covered with small sensillae arranged in regular rows, on the second segment, more or less $\frac{2}{3}$ distance from the base there is a sunken organ (fig. 2).

Thorax: dark brown. Anteprenotum seen laterally narrows in its dorsal part, seen from above it is covered by a mesonotum lobe, on the antenopronotum a group of 13 setae. Mesonotum with a uniserial row consisting of 14 to 16 strong, dark brown dorsocentral setae situated on clearly visible, bright fields; in the medial dorsal line a long, bright field proceeded in the direction of the head by some small spots on which, at magnification $1000\times$, small setae are seen (acrostichial setae?), the group of prealar setae consists of four long setae. Scutellum in its upper half with two rows of setae.

Legs: dark brown, very long, slender, the ratio of particular segments in μm equals:

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV
P _I	2380	2533	1530	714	459	170	204	0.60	4.16
P _{II}	2635	2295	1037	554	340	170	204	0.45	4.71
P _{III}	2771	2686	1530	782	425	170	204	0.57	4.42

On the tibia of the first leg there is one tibial spur ($68\ \mu\text{m}$), on the second two ($64\ \mu\text{m}$, $56\ \mu\text{m}$) on the third also two ($88\ \mu\text{m}$, $64\ \mu\text{m}$) and a tibial comb consisting of 20 setae (from 48 to $80\ \mu\text{m}$). All the segments are covered with individual hairs (about $50\ \mu\text{m}$), and densely with small sensillae arranged in groups of three. The fourth tarsomere on the basal part with a characteristic spot structure, heart-shaped. The fifth tarsomere ends with two claws, sharp at the end, empodium arch-like bent as long as the claw.

Wings: yellow brown, veins only slightly darker than the wings, wing surface finely dotted, microtrichia visible at $400\times$ magnification; C only slightly to extend beyond the end R_{4+5} , R_{2+3} reaches the edge of the wing but at normal illumination of the microscope it is visible until about the half of the length R_1 ; m-cu begins a little behind f-cu and ends evidently before the junction of r-m with M, veins M, Cu_1 , Cu_2 are poorly visible in the wing colour; they reach the edge of the wing, Cu_2 curved, An_1 , An_2 occur but do not reach the wing end, veins R and R_1 throughout covered with short setae ($\pm 28\ \mu\text{m}$), vein R_{4+5} with setae only in the distal half, anal lobe situated at right angle, squama well developed with long setae.

Abdomen: dark brown; the surface of tergites covered with long bright brown bristles arising from brighter areas; sternites also covered with bristles but much more minute than on the tergites, arranged in groups; in the medial line of the sternite there runs a line consisting of more than ten setae arising from bright areas, laterally on the sternite,

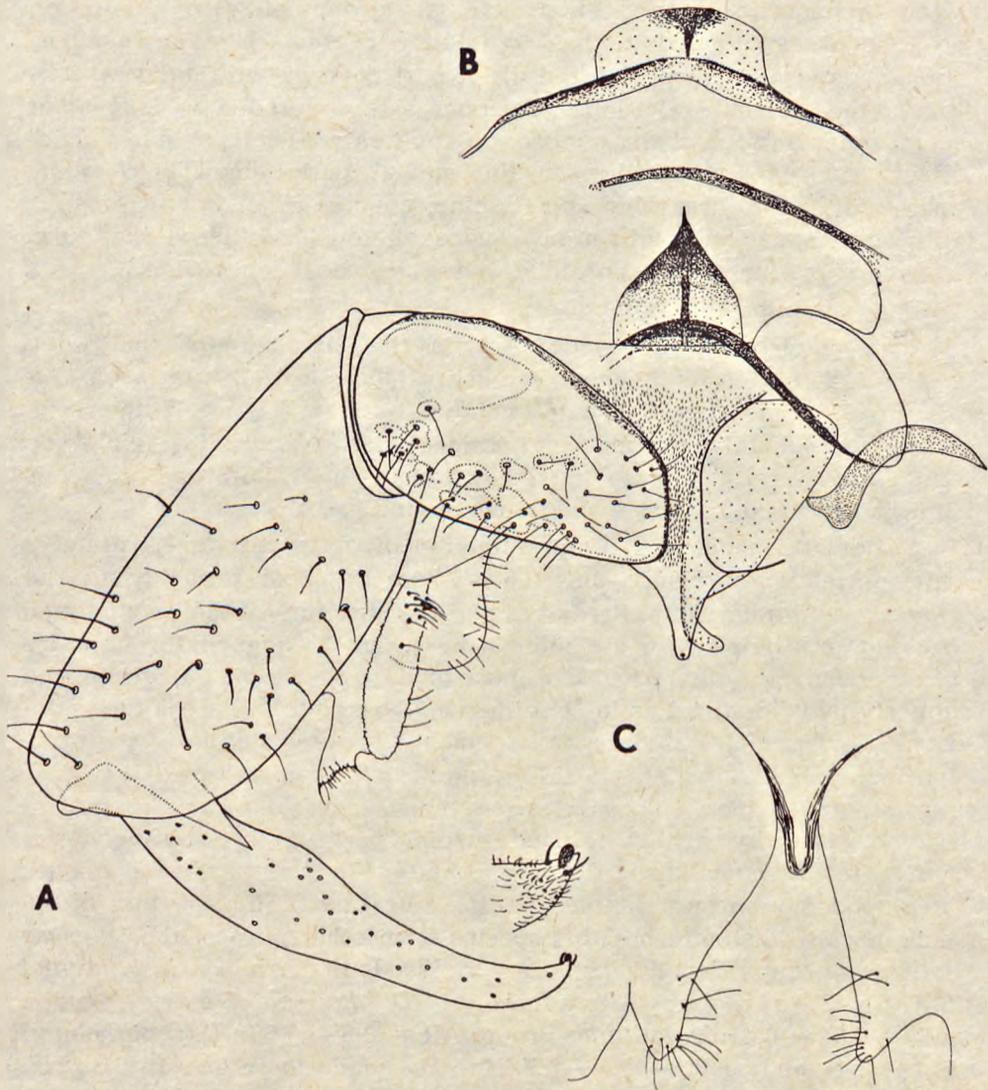


Fig. 3. *Diamesa martae* sp. n. (Diptera: Chironomidae); hypopygium: A — dorsal view; B — variation of sternapodeme; C — part of ventral view

Ryc. 3. *Diamesa martae* sp. n. (Diptera: Chironomidae); hypopygium: A — od strony grzbietowej; B — warianty budowy „sternapodeme”; C — fragment brzusznej strony

parallel to the medial line, two rows of smaller setae and two rows at the distal edge of the sternite, are running.

Hypopygium: tergite IX divided into two parts by a less chitinized surface passing into a short, also poorly chitinized anal point, on the

tergite symmetrically to the body axis two groups of setae situated on brighter areas; gonocoxite has two fairly characteristic appendages: appendage 1 mace-shaped in the distal part covered with delicate hair-like setae, appendage 2 lobe-like inner side covered with long stout setae; outer surface of the gonocoxite covered with longer hairs; gonostylus black-brown, slender, in the medial part somewhat swollen, ending with a not very big apical spine, covered wholly with sensilla, with short setae on bright areas; endoskeleton has a large triangular transverse sternapodeme and lobe-shaped aedeagal lobes (fig. 3).

Imago ♀, pupa, larva: unknown.

Material: Holotype ♂ imago; Austria, the Ötztaler Alps, the valley of the stream Gurgler below the locality Obergurgl (1940 m a.s.l.), 1st March 1976. Paratypes: 5 ♂, date as above. 1 ♂, Azerbaijan SSR, the Great Caucasus, Zakataly region, River Talačaj, 19th March 1970. Holotype and paratypes are kept in the collection of the Laboratory of Water Biology of the Polish Academy of Sciences in Cracow.

Systematic remarks: the determination of the systematic position of this species is extremely difficult. It belongs most probably to the *Diamesa latitarsis* group. Bare eyes and the structure of the hypopygium provide an argument for including it here. On the gonocoxite there are two appendages, similarly as in most of the species of that group, the gonostylus is identical as in *D. latitarsis* Goetgh., whereas the endoskeleton resembles that in the species *Diamesa steinboeckii* group. Particularly characteristic is the triangular shape of the medial part of the sternapodeme. The species of the *Diamesa latitarsis* group are characterized by a thin, arched medial part of the sternapodeme. Only *D. tskhomelidzei* Kown. and Kown. have a bigger sternapodeme but not pointed at the apical part. The structure of the antenna also distinguishes this species from other ones of the *Diamesa latitarsis* group. Flagellar setae are reduced, similarly as in *D. lavillei* Serra-Tosio but AR equals 1 (*D. lavillei* Serra-Tosio AR = 0.31 — 0.41; *D. latitarsis* group: AR = 0.5 — 0.6 in *D. geotghebuerei* Pagast and AR = 1.4 — 1.7 in *D. modesta* Serra-Tosio). XIVth flagellomere of the antenna is in $\frac{1}{2}$ covered with Scf and ends with two apical setae, whereas in other species of that group the sensille chetiformes Scf cover $\frac{1}{3}$ of the XIVth flagellomere of the antenna (*D. geotghebuerei* Pagast or $\frac{1}{6}$ (*D. modesta* Serra-Tosio) and end with one apical seta. A precise determination of the systematic position of that species will be possible only after the pre-imago stages have been investigated.

Ecology: A winter species, lives in mountain streams originating from glaciers or snow patches. It has probably a very short emergence period.

**List and geographical distribution of the known species of
Diamesa latitarsis group**

Apart from the species described above the following ones also belong to the *Diamesa latitarsis* group: *D. latitarsis* Goetghebuer, 1921, *D. lindrothi* Goetghebuer, 1931, *D. goetghebueri* Pagast, 1947, *D. wuelkeri* Serra-Tosio, 1964, *D. laticauda* Serra-Tosio, 1964, *D. modesta* Serra-Tosio, 1967, *D. caucasica* Kownacki and Kownacka, 1973, *D. tskhomelidzeo* Kownacki and Kownacka, 1973. To this group belongs also *D. valkanovi* Saether, 1968. Serra-Tosio (1972) does not agree with this identification supposing that this might be a synonym of *D. goetghebueri* Pagast, but he does not give a final opinion in this matter. It seems that this species should be considered as certain because the differences in structure of the hypopygium, especially of the gonostylus, do not result from the fact that the described specimen was prepared from the male pupa. Probably one should include into that group also *D. admontensis* Goetghebuer, 1950. This species is characterized by several features which permit to include it into the discussed group. The eyes are bare, AR about 1.5, there are two appendages on the gonocoxite (it is, however, unknown whether these appendages have hairs at their end as it is in other species of that group). In shape they rather resemble those found in *D. valkanovi* Saether or in *D. goetghebueri* Pagast. The gonostylus is rounded and the apical spine is set on the prolongation of the stylus axis as in *D. valkanovi* Saether or in the *D. tskhomelidzei* Kownacki and Kownacka. On the other hand, none of the species of that group has longer setae on the anal point of the IXth segment as it was shown in the illustrations by Goetghebuer (1950).

Saether (1970) reports from the Rocky Mts in North America a description of a larva and pupa of *Diamesa* sp. C whose structure is similar to the previously described larvae and pupae of the *Diamesa latitarsis* group. To this group he includes also larvae of *Diamesa* spp.: D, E, F, and G. In a later description of the genus *Diamesa* from the territory of Nearctic (Hansen, Cook 1976) not a single species of that group was mentioned from the territory of North America. Only on the eastern shores of Greenland individual specimens of *D. lindrothi* Goetgh. were found.

Also larvae of *D. l. quadridens* Linevič described by Linevič (1963) from the tributary stream of the Lake Baykal may probably belong to that group. Brodskij (1976) mentions *Diamesa latitarsis* in his list of *Chironomidae* made on the basis of the larvae collected from the mountain streams Tien-Shan and also in the Table 62

depicting the distribution of the fauna along the course of the River Isyk. In the latter case he gives the name *Phenocladius* which was used by Hubalt (1927) in the description of pupae and larvae of the *Diamesa latitarsis* group. From the High Atlas Mts, Vaillant (1955) also reports larvae of the *Diamesa latitarsis* group.

Unfortunately, the very poor knowledge of larval stages in the genus *Diamesa* does not permit to accept these identifications as certain, particularly as some species of other groups (e.g. *D. bertrami*) have a similar anatomical structure. Therefore in this elaboration only the species and stations proved on the basis of imago stages were taken into regard.

In this group, the species with the largest distribution is *Diamesa lindrothi* Goetghebuer found at numerous localities in the mountains of Scandinavia (Thienemann 1941, 1945, Pagast 1947, Saether 1968, Steffan 1971, Kawecka, Kownacki, Kownacka 1978), on the Spitzbergen (Styczyński, Rakusa-Suszczewski 1963), from Island (Goetghebuer, Lindroth in Lindroth 1931) and on the eastern shores of Greenland (Edwards 1935). In the recent years it was also found in the French Alps (Serra-Tosio 1967, 1972) and in the Ötztaler Alps at the locality Obergurgl (Hansen, Cook 1976, the authors' own collection (unpublished data)) and in the Caucasus (Kownacki, Kownacka 1974) in the stream Slatisi (a tributary of the River Terrek, the basin of the Caspian Sea) in July, and in the stream Kviš (the catchment area of the River Inguri, the basin of the Black Sea) in August. The ecology of that species is also interesting. In boreal terrains it is found numerously along the whole length of the streams. In the stream Tarfalajakka in the north of Sweden pupae and adult individuals were found in masses down the front of the glacier at an altitude 1350 m up to mouth at an altitude 600 m (Kawecka et al. 1978), and in the River Aurland in Norway (Sognog Fjordane) even at an altitude 55 m (Serra-Tosio 1972). On the other hand in the Alps and in the Caucasus separate specimens of that species were found always at great altitudes (about 2000 m) and always in spring sectors of the streams or in glacial streams.

The next species *Diamesa latitarsis* Goetghebuer is common in the montane regions of Europe. It was found in Island, Scandinavia, England, the Black Forest, Vosges Mts in Belgium, in the whole range of the Alps, in the Tatra Mts, in the Rumanian part of the Southern Carpathian Mts (Sinaia), in the Pyrenees, Cantabrian Mts and in Sierra Nevada in Spain and in Corsica (Goetghebuer 1921, Edwards 1928, 1929, 1932, Pagast 1947, Brundin 1947, Wülker 1959, Albu 1967, Serra-Tosio 1967, 1972, Kownacki, Kownacka 1974, 1975, Jonsson, Sandlund 1975, Laville, Lavandier 1977, Lindegaard 1979). Murvanidze (1949)

signals the occurrence of that species in the Georgian SRR in the Small Caucasus in the vicinity of Borzomi, during spring. In spite of the fact that identification was based upon the imago material it should be considered uncertain. At that time most of the species of that group, known at present, were not yet described and it is possible that in this case it was *D. modesta* Serra-Tosio which is numerously found in the spring period in the streams of the High Caucasus. This species is found in the streams and rivers of Europe at an altitude from 380 to 2250 m (Serra-Tosio 1967, 1972) during the whole year.

Diamesa modesta Serra-Tosio, 1967 was found in the streams of the French Alps at an altitude 1100 to 2000 m from June till July (Serra-Tosio 1967, 1972), of the Ötztaler Alps at an altitude 1940 m from October till December (Kownacki, Kownacka 1975) and in the streams of the High Caucasus: Talacaj, Belokančaj, Daginmarčaj, Katechčaj (the tributaries of the River Alazani), the catchment area of the River Kura, the basin of the Caspian Sea, Azerbaijan SRR (at an altitude 1000 m) in March and Čcheri, Mnaisidon (upper tributaries of the River Terek) and in the upper course of the River Terek (basin of the Caspian Sea 1700 m a.s.l.) (Kownacki, Kownacka 1974).

Diamesa laticauda Serra-Tosio, 1974 was found in the French Alps at an altitude 1710 to 2070 m from June till September (Serra-Tosio 1964, 1972) in the Ötztaler Alps at an altitude of 1440 to 1880 m from October till November (Kownacki, Kownacka 1975), in the High Tatra Mts at an altitude 1770 m in September (Kownacki 1971) and in the Pyrenees at about 2000 m in August (Laville, Lavandier 1977).

Diamesa wuelkeri Serra-Tosio, 1964 was found in the French Alps, in the Swiss Alps and in the Pyrenees in glacial or high mountains streams from June till August (Serra-Tosio 1964, 1967, 1972, Laville, Lavandier 1977).

Diamesa goetghebueri Pagast, 1947 (= *D. berardensis* Serra-Tosio 1974). A species found exclusively in the French and Tyrolese Alps, mainly in glacial and high mountain streams at an altitude from 1700 to 2250 m from June till September (Pagast 1947, Serra-Tosio 1964, 1972).

Diamesa admontensis Goetghebuer, 1950 was found in the Austrian Alps at Admonton only. No data on its ecology are available.

Diamesa tskhomelidzei Kownacki and Kownacka, 1973 was found so far in the Caucasus in the upper part of the River Terek and its tributaries Čcheri, Suatysi (glacial streams) at an altitude from 1800 to 3000 m from May till July (Kownacki, Kownacka 1973b).

Diamesa caucasica Kownacki, and Kownacka, 1973. A species very common in glacial streams of the High Caucasus at an

altitude 2000 to 2700 m. Found from May till August in the upper course of the River Terek and its tributaries Suatsi, Mnaisidon, Čcheri (the basin of the Caspian Sea) and the stream Kviš and Čalad (the catchment area of the River Inguri, the basin of the Black Sea) (K o w n a c k i, K o w n a c k a 1973b).

Diamesa valkanovi Saether, 1968 found exclusively in the mountains of southern Norway in glacial streams in August (Saether 1968).

The available material seems to indicate that the distribution of this group is generally limited to the palearctic region, and especially its European part.

Most of them were found in Alps (8 species) and in Caucasus (5 species). 3 species were found in the Pyrenees and in Scandinavia. 2 species in Tatra Mts and in Iceland. While in the other mountains only one species of this group was reported. Our knowledge of the distribution

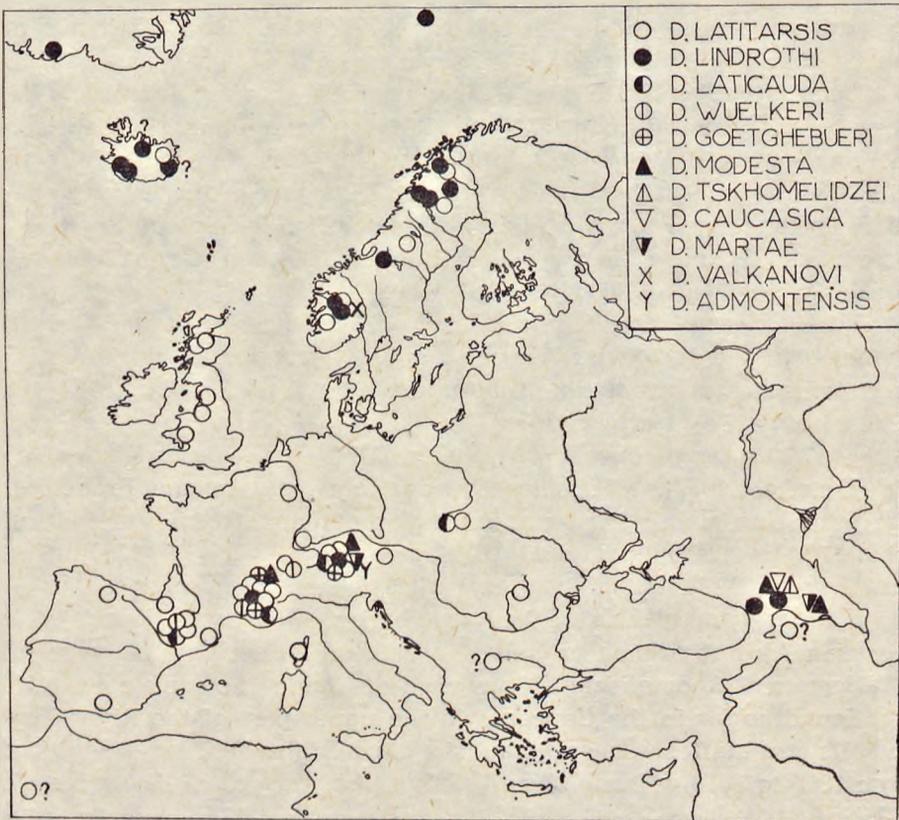


Fig. 4. Present distribution of species of *Diamesa latitarsis* group

Ryc. 4. Współczesne rozmieszczenie gatunków *Diamesa* grupa *latitarsis*

of species of that group is as yet not complete. There are no data for the Balcan Mts, the Pontic Mts in Turkey or from Asian mountains. However, on the basis of now available information, two developmental centres of that group can be distinguished: the Alps and Caucasus. This is confirmed by a great number of species collected there and by the relatively high percentage of species which have not been captured till now anywhere apart from these mountains.

In the investigated mountain massifs of Europe, there are no species which have not been found in the Alps. Only *D. valkanovi* is a species endemic for Scandinavia. Also all the species, apart from *D. laticauda*, are morphologically very similar. On the other hand, the Caucasian species *D. caucasica* and *D. tskhomelidzei* differ greatly from other species of that group. At present the influence range of the Caucasian center is not yet known, it may, however, be expected that it would be the Pontic Mts, the Taurus Mts, the Small Caucasus and the Iranian mountains.

All the discussed species live in very cold water in glacial or high mountain streams so that, in fact, they are isolated from one another and their migration abilities are very limited. Assuming that the ecology of these species did not undergo any greater changes their migration could have taken place in the periods of Pleistocene glaciation, whereas during the interglacial periods the isolation of particular populations and splitting into separate species took place.

STRESZCZENIE

Na podstawie materiałów pochodzących z Alp Otztaler (Austria) i Wielkiego Kaukazu (Azerbejdżańska SRR) opisano nowy gatunek dla nauki *Diamesa martae* sp. n. (Diptera: Chironomidae), który zaliczono do *Diamesa* grupą *latitarsis*. Od pozostałych gatunków z tej grupy różni się budową czułka (ryc. 1) i budową szkieletu wewnętrzznego hypopygu (ryc. 3).

Do grupy tej zaliczono 11 gatunków. Wzięto pod uwagę tylko te gatunki, które zostały opisane na podstawie stadiów imaginalnych.

Na podstawie materiałów, którymi obecnie dysponujemy można stwierdzić, że rozmieszczenie gatunków z tej grupy jest ograniczone w zasadzie do krainy palearktycznej, zwłaszcza jej części europejskiej (ryc. 4). W krainie nearktycznej jedynie na wschodnich wybrzeżach Grenlandii znaleziono pojedyncze okazy *D. lindrothi*. Najwięcej, bo aż osiem gatunków stwierdzono w Alpach. Z Kaukazu wykazano pięć gatunków. W pozostałych górach jedynie w Pirenejach i górach Skandynawii znaleziono po trzy gatunki, w Tatrach i na Islandii po dwa, a w pozostałych po jednym gatunku z tej grupy. Na podstawie aktualnie posiadanych informacji możemy wyróżnić dwa centra rozwojowe tej grupy: Alpy i Kaukaz. W zbadanych masywach górskich Europy nie ma gatunków, których nie znaleziono by w Alpach. Jedynie *D. valkanovi* jest gatunkiem endemicznym dla Skandynawii. Również wszystkie gatunki poza *D. laticauda* są morfolo-

gicznie bardzo podobne. Natomiast gatunki kaukaskie *D. caucasica*, *D. tskhomelidze* różnią się znacznie od innych gatunków z tej grupy.

Larwy tych gatunków żyją w bardzo zimnej wodzie wysokogórskich potoków.

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