T.V.Mikhaevich. Lenght-weight characteristic of *Gammarus lacustris Sars (Crustacea, Amphipoda)* from different habitats. "The questions of experimental zoology", Minsk, Belarus, "Sciences and Technology", 1983, pp. 18-22 (In Russian).

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Key words: populations, habitat areas, peninsula Kamchatka, geothermal source, high temperature influence, lake Lyazkie, Bialowieza Forest, juveniles, males, females, reproduction, maturity, lenght-weight correlation, content of dry substance.

Amphipod *G.lacustris* lives in the temperate zone in Europe, Asia and North America. This is eurithermal and eurybiontic form with benthic lifestyle. In the western zone of the existence *G.lacustris* studied well enough.
The inhabitants of hot geothermal sources have been little studied. It's interesting to compare certain parameters of gammarus living in the conditions of the constant high temperatures and in the temperate zone.
The samples have been collected in the summer 1979 and in the spring 1981 on the Kamchatka Peninsula in the stream Teply. The material have been elaborated by the conventional methods *(Methods of determination of the production of aquatic animals, 1968).* The data from the lake Lyazkie from the years 1972-1975 have been used for the comparative analysis.
Lyazkie lake located in the Bialowieza Forest (Belarus) and is a typical temperate-zone reservoir in which the temperature during the year varies from 1° to 25°C. In the stream Teply amphipod lives in the relatively stable environmental conditions, as the exits of geothermal sources are supported by nearly constant temperature during the year - 16-24°C. In the observed spring-summer period the average temperature in the stream Teply was 19°C.
Have been established that the temperature differences are responsible first for the change size and weight characteristics of the animals. Permanent effect of the hight temperature led to small sizes of amphipod in the stream Teply. The maximum size of males in the Lyazkie lake reach 17-20 mm, in the stream Teply - only 14 mm. In the first case, females become sexually mature at average body weight of 30-35 mg and 12-16 mm of length, on the Kamchatka Peninsula - at the weight of 10-20 mg and 7-10 mm of length. The average maximum weight of females (70 mg) from the temperate zone habitat was 2.7 times higher than the mass of females (26 mg) from the geothermal stream. Available literature data also indicate the decrease in linear dimensions of the body in case of temperature rises (Mina, Klevesal,1976; Galkovskaya, Sushchenya, 1978). Thus, the reproduction of the amphipod in two areas of habitat occurs at different sizes and weight range. But the ratio of the maximum size of females to the size at which the bulk of females starting to reproduce, remains constant in both habitats.
Ratio of the size-weight parameters have been described by the parabolic dependence. The equations of the correlation of the length with body weight for a population of *G.lacustris* from the stream Teply (19 °C) have been calculated for 22 points, averaged according to the 475 determinations. The coefficients of the equations for *Gammarus* from 2 zones are characterized by close values (Table 1). Straight line for the ovigerous females from

the western zone is located within the error of coefficient *a* of the equations for the animals from the geothermal stream (Fig. 1).

The correlation between the dry weight ($\hat{W}$, mg) and wet weight (W, mg) for the Kamchatka population *G.lacustris* have been described by the following equation:

$$\hat{W} = 0.14\ W + 0.16 \qquad \delta=0.41$$

About the nature of the relations between the dry and wet weight of the Kamchatka populations and ovigerous females from the Bialowieza Forest gives information Fig. 2. As can be seen from the figure, the dry matter of *Gammarus* from the Belarusian reservoir is slightly higher than in animals from the geothermal stream.

Table 1.
The coefficients and statistical parameters in the equation of the correlation between the length and body weight of *G.lacustris*, $y = ax^b$, where y – the body weight, mg, x – the body length, mm.

Habitat, length, mm	a	b	δ_x	δ_y	r	δ_a
		wet weight				
Lake Lyazkie, 1975 ovigerous females 11.5-16.0	0.040	2.7	-	-	-	-
Stream Teply, 1979 1981, for population 1.5-14.3	0.046	2.68	0.23	0.79	0.96	0.21
		dry weight				
Lake Lyazkie, 1975 ovigerous females 11.7-16.4	0.009	2.68	-	-	-	-
Stream Teply, 1979 1981, for population 1.5-14.3	0.006	2.78	0.23	0.64	0.94	0.22

The analysis of the individual samples of *G.lacustris* at the temperature gradient have been showed the tendency to decrease the part of dry matter in the unit of wet weight with the temperature increasing (Table 2).
The samples have been taken during the summer in Lake Lyazkie at average temperature between 16-21°C and for two local populations of *G.lacustris* from the stream Teply that live in almost constant temperatures - 19°C and 24°C. As can see from the Table 2, the bodies of juveniles and females of *Gammarus* from the Bialowieza Forest contains more percentage of dry matter.
In the stream Teply at 24°C the animals of all physiological groups contain the least amount of dry matter ($\hat{W}/W$, %). The differences for *Gammarus*, taken from the conditions of 19°C and 24°C, have hight reliability ($p<0.001$).
The temperature conditions in the upper part of stream Teply approach to the boundary for the species *G.lacustris*. The revealed tendency to decrease the part

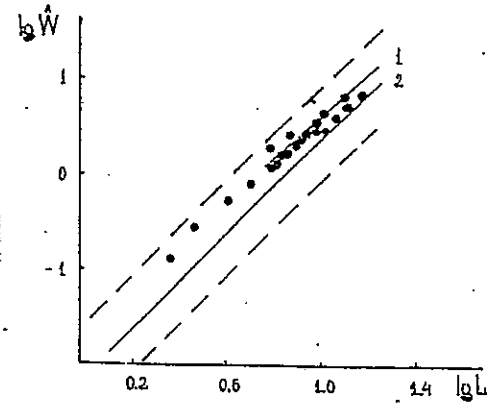

Fig. 1. The ratio between the length (L) and dry weight ($\hat{W}$) of the body of *G.lacustris* from the different habitat conditions:
1 - lake Lyazkie (the Bialowieza Forest, 1975) for ovigerous females;
2 – stream Teply (Kamchatka, 1979, 1981) for the population.

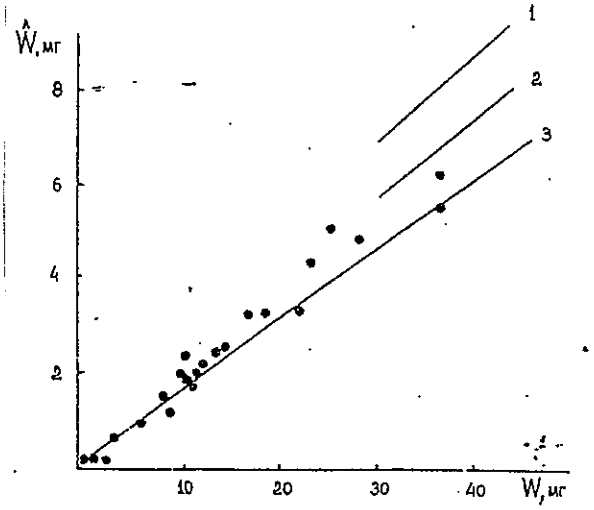

Fig. 2. The ratio between the dry ($\hat{W}$) and wet weight (W) of the body of *G.lacustris* from the different habitat conditions:
1 - lake Lyazkie (the Bialowieza Forest, 1975) for ovigerous females;
2 - lake Lyazkie (the Bialowieza Forest, 1973) for ovigerous females;
3 – stream Teply (Kamchatka, 1979, 1981) for the population.

of the dry matter is obviously the result of an adaptation of the populations to exist in high temperature conditions.

Table 2.
Dry matter content in *G.lacustris* from the different habitats

Basin	Physiological state	Number of determinations	Wet weight, mg	W/W, %
Lake Lyazkie,	Juvenils	55	5.50	22.1
1972-1973	Males	45	78.90	17.4
June_July	Females	69	51.20	18.2
16-21°C	without eggs			
Kamchatka,	Juvenils	23	2.50	17.50
Stream Teply,	Males	8	60.00	17.80
July, 1979	Females	13	18.40	16.50
19°C				
Kamchatka,	Juvenils	17	2.50	14.50
Stream Teply,	Males	9	31.00	14.60
August, 1979	Females	4	16.15	13.20
24°C				

The results of the further studying of the inhabitants of the thermal streams can be used in assessing of the impacts of the thermal discharges of the hydroelectric and nuclear power plants on the ecosystems.

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