

VARIABILITY OF HARD PARTS OF OPISTHAPTOR IN *GYRODACTYLUS TRUTTAE* GLÄSER, 1974 (GYRODACTYLIDAE: MONOGENEA)

R. ERGENS

Institute of Parasitology, Czechoslovak Academy of Sciences, Prague

Dedicated to Academician B. Ryšavý on the occasion of his 60th birthday

Abstract. Data on the morphological and metrical variability of hard parts of opisthaptor in members of the local population of *Gyrodactylus truttae* Gläser, 1974 are presented. In contrast to regular, periodical changes in environmental temperature, the metrical changes in most of the hard parts of opisthaptor were found to occur quite irregularly. It is assumed that in this case the seasonal changes in environmental temperature were not pronounced enough to induce the changes in measurements of all hard parts of opisthaptor in the parasites.

Morphological and metrical changes in the hard parts of opisthaptor in members of local populations of *Gyrodactylus aphyae* Malmberg, 1957 and *G. macronychus* Malmberg, 1957 were observed all the year round (Ergens 1976) and they were found to occur in parallel with regular and periodical changes in environmental temperature. Since the temperature factor belongs to primary periodical, species non-specific, ecological factors, it was assumed that the changes in environmental temperature would be reflected not only in *G. aphyae* and *G. macronychus*, but also in the remaining species of the genus *Gyrodactylus*, particularly in those the hosts of which live in climatic zones with a regular change of seasons.

In order to make the knowledge of this problem more complete and exact, another *Gyrodactylus* species — *G. truttae* Gläser, 1974, an important parasite of *Salmo trutta* m. *fario*, was studied for 11 months in terms of the morphological and metrical changes in the hard parts of its opisthaptor. The results obtained are the subject of the present paper.

MATERIAL AND METHODS

The variability of hard parts of opisthaptor was studied using 755 specimens of *G. truttae* obtained from fins of 40 specimens of *Salmo trutta* m. *fario*. The host fish were caught from a stretch of a mountain stream about 120 km south of Prague at regular monthly intervals from November 1977 to September 1978. The fish were caught in such a number which would not affect their general state in the locality and at least 30 parasites were obtained at each collection. The size of the fish examined was 19—27 cm.

The water temperature was measured only while collecting the samples, mostly at 11 a.m. The lowest temperature (0 °C) occurred in February, the highest (13 °C) in August.

The methods used for the examination of fish and fixation, preservation, measuring and drawing of parasites were described elsewhere (Ergens and Lom 1970).

All measurements of the hard parts of opisthaptor are given in mm.

RESULTS

The measurements of hard parts of opisthaptor in all 755 specimens of *G. truttae* were as follows: total length of anchors 0.0539—0.0671, length of their shaft 0.0396

to 0.0434, point 0.0264—0.0330, root 0.0154—0.0220; ventral bar 0.006—0.007 \times 0.0242—0.0319, length of its shield 0.0132—0.0176; dorsal bar 0.001—0.002 \times 0.0187—0.0210; total length of marginal hooks 0.0275—0.0330, of hook proper 0.006—0.007.

It may be stated that most of the hard parts of opisthaptor in *G. truttae* exhibit a relatively small range of general metrical variability. The same concerns the morphological variability as it follows from Fig. 1.

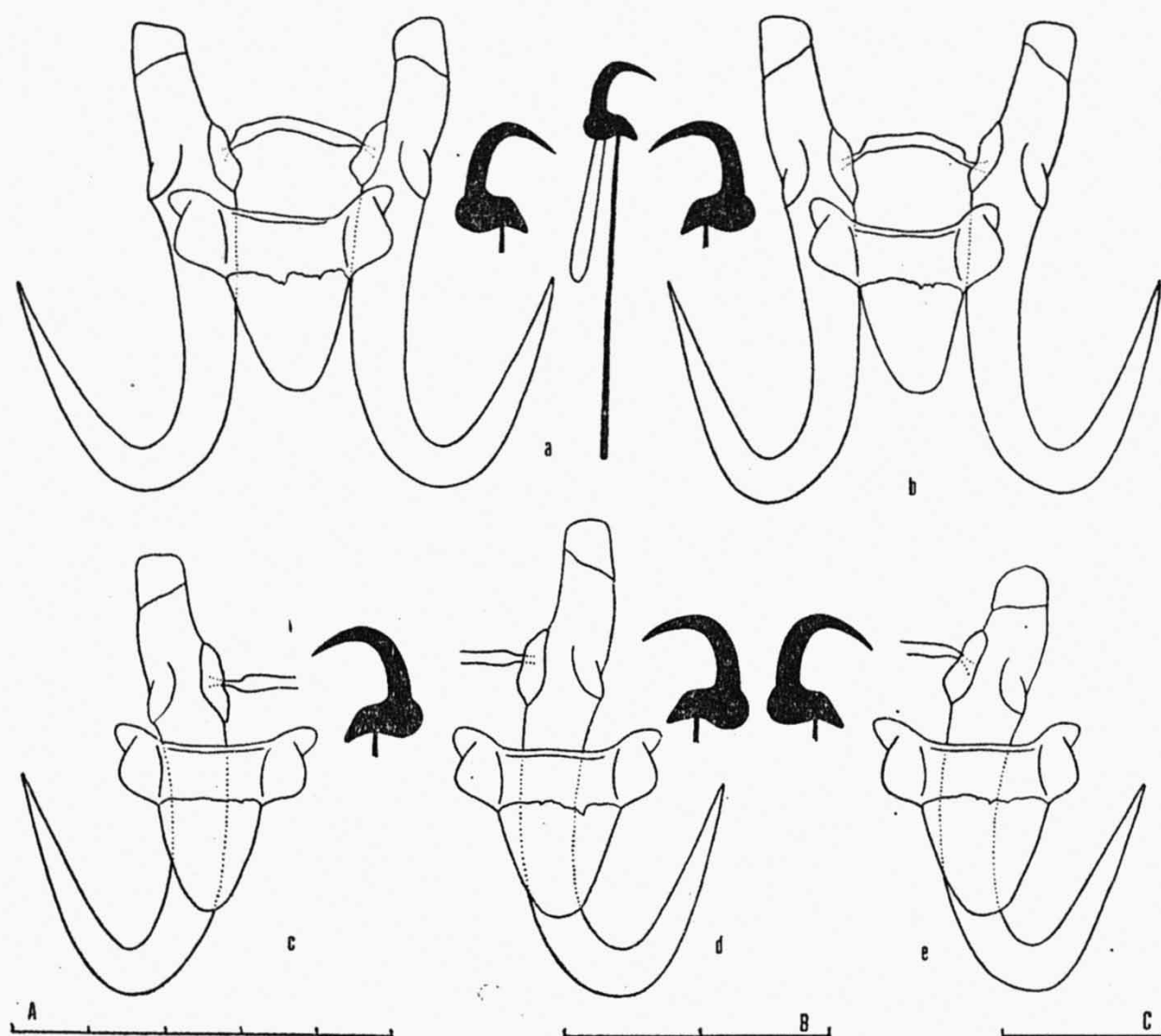


Fig. 1. Morphological variability of hard parts of opisthaptor in local population of *Gyrodactylus truttae* Gläser, 1974. a — specimen originating from November; b — specimen originating from May; c — specimen originating from December; d — specimen originating from January; e — specimen originating from February. Scales (1 part = 0.01 mm): A — for anchors, B — for marginal hook, C — for hook proper.

The range of general metrical variability of total length of anchors, length of shaft, length of point, length of root, width of ventral bar, length of its shield and total length of marginal hooks in specimens from each collected sample and the frequency of measured values (in %) are illustrated in form of histograms (Figs. 2, 3). The length of ventral bar, length of hook proper of marginal hooks and size of dorsal bar are almost constant in all of the 755 specimens and therefore the graphical illustration of metrical variability is useless in these cases.

If the peaks of individual histograms representing the most frequently occurring values in individual samples are connected, the curve obtained indicates the directions

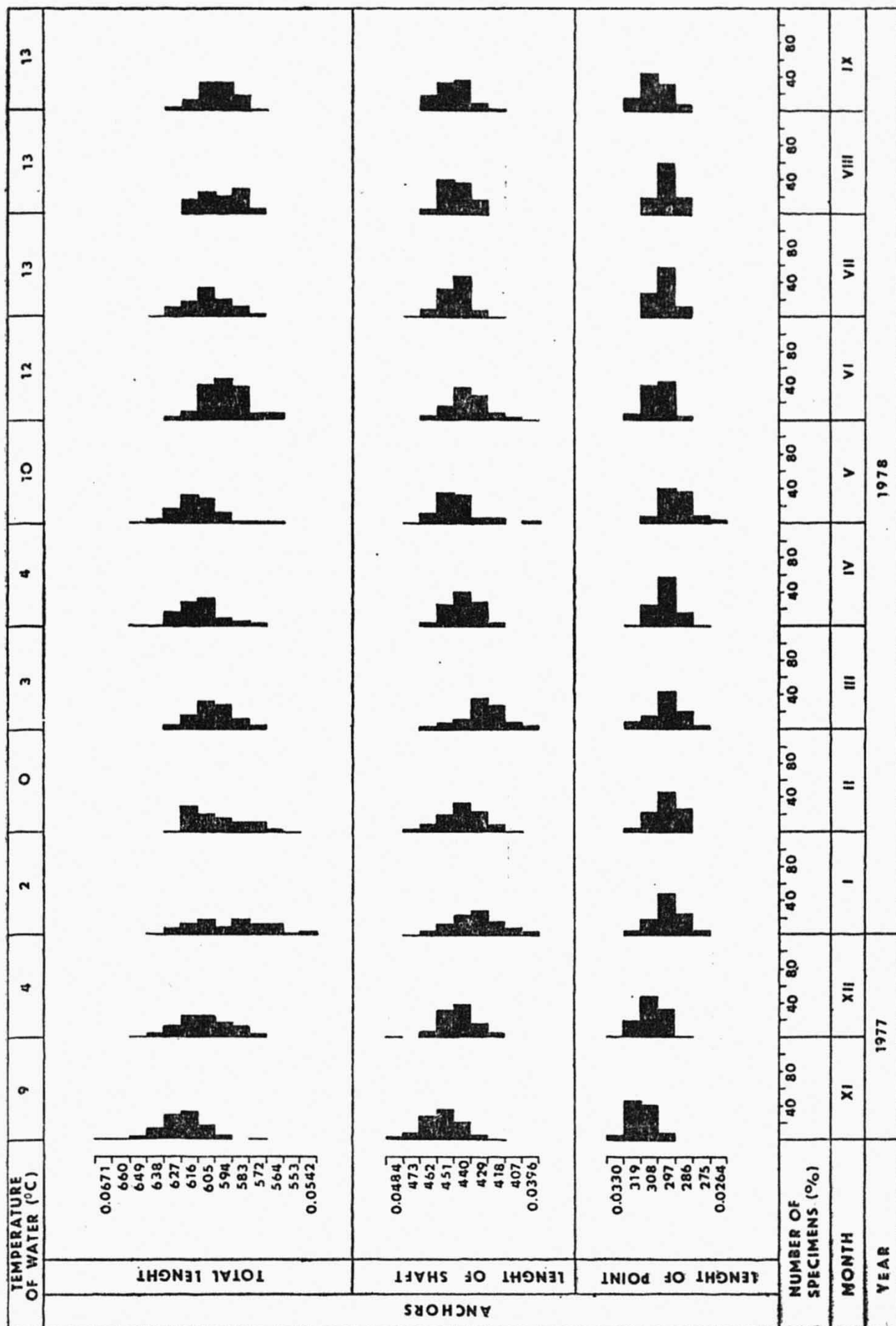


Fig. 2. *Gyrodactylus truttae* Gläser, 1974. Metrical variability of total length of anchors, length of their shaft and point during 11-month period.

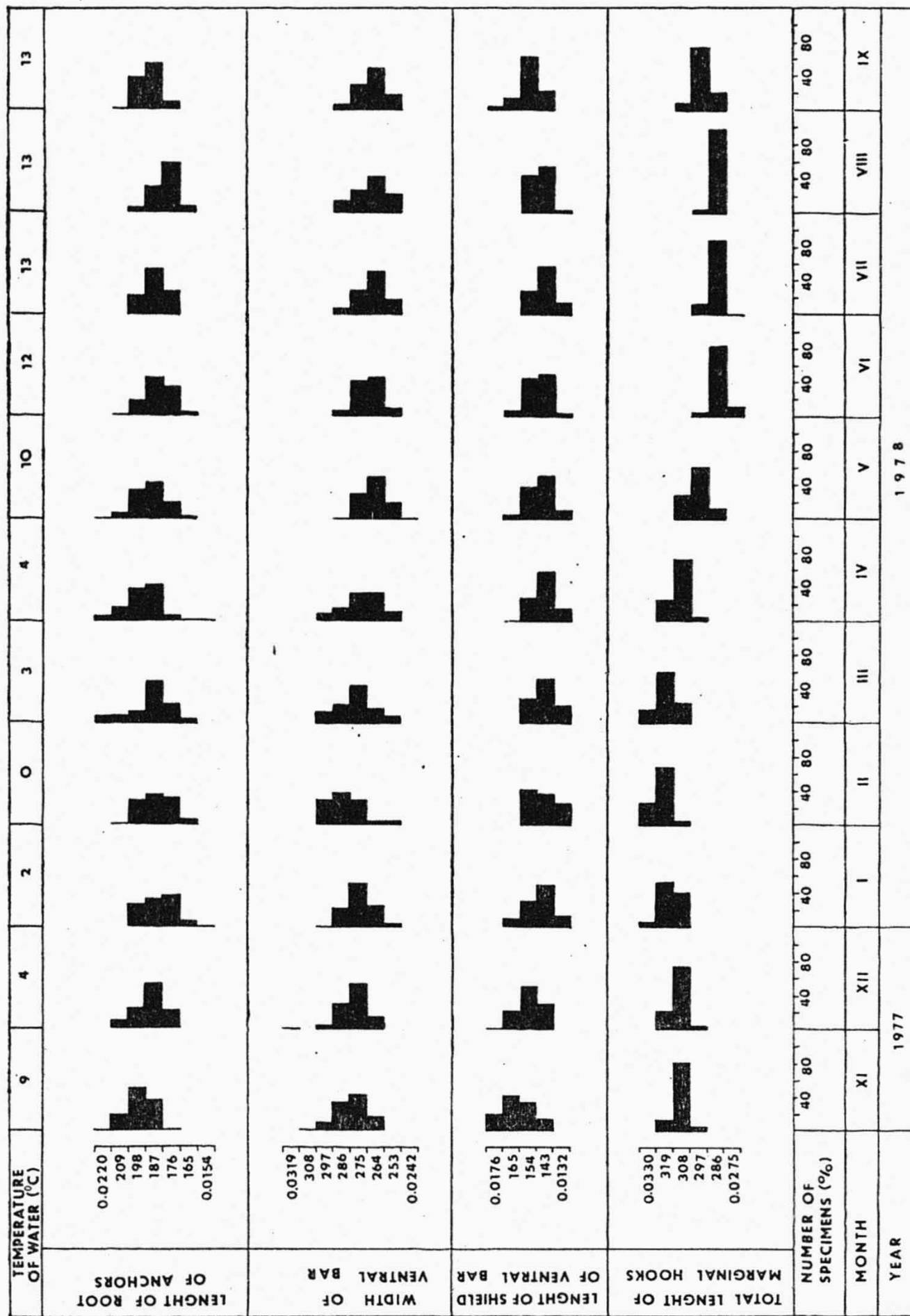


Fig. 3. *Gyrodactylus truttae* Gläser, 1974. Metrical variability of length of root of anchors, of width of ventral bar, length of its shield and total length of marginal hooks during 11-month period.

and intensity of shift of metrical variability in the course of the studies. If each of these curves is compared with the curve illustrating the changes in environmental temperature of second order (Fig. 4)³, the relationship between environmental temperature changes and changes in the sizes of hard parts of opisthaptor is distinctly visible only in case of total length of marginal hooks. This length is diminishing with increasing temperature and enlarging with its drop. Consequently, a majority of specimens originating

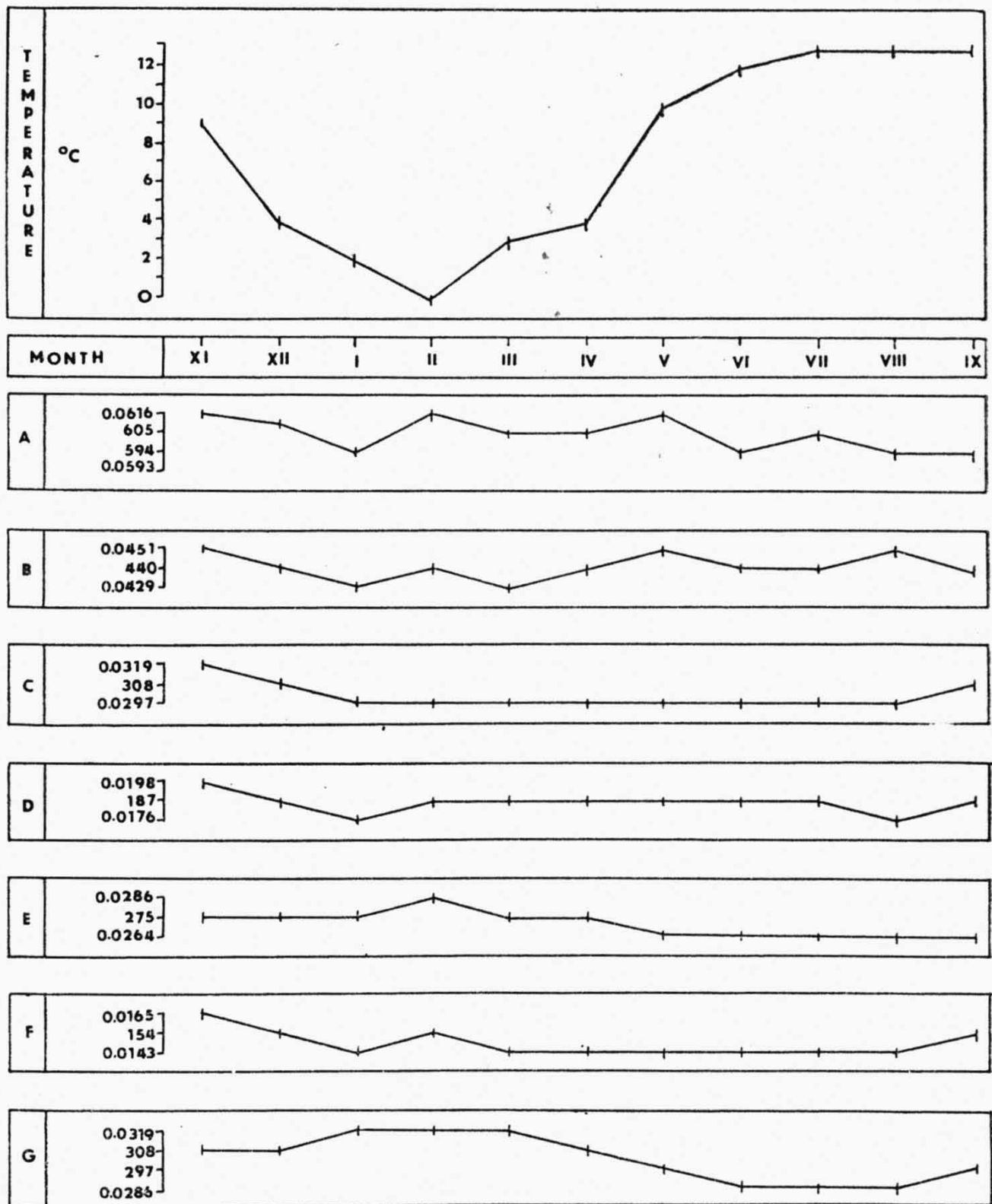


Fig. 4. *Gyrodactylus truttae* Gläser, 1974. Comparison of changes in environmental temperature and in variability of total length of anchors (A), length of their shaft (B), point (C) and root (D), width of ventral bar (E), length of its shield (F) and total length of marginal hooks (G).

from cold season possess marginal hooks of total length at upper level of general metrical variability and, vice versa, the values at lower level of variability occur in specimens from warm season. The changes in measurement of the remaining hard parts of opisthaptor, i.e., total length of anchors, length of their shaft, root and point, and width of ventral bar and its shield, occur quite irregularly compared to regular and periodical changes in the environmental temperature.

The results obtained during the studies of morphological and metrical variability of hard parts of opisthaptor in *G. truttae* differ to some extent from similar studies with *G. aphyae*, *G. macronychus* (Ergens 1976) and also *Gyrodactylus* sp. (Kulemina 1977). It is very probable that the reason was the relatively small range of water temperatures in the locality ($0-13^{\circ}\text{C}$) due to which the seasonal changes in the environmental temperature were not great enough to induce changes in the measurements of all hard parts of opisthaptor.

Nevertheless, the results allow to amend the deduction of the previous studies (Ergens 1976) in that the regular and periodical (seasonal) changes in the temperature can influence the hard parts of opisthaptor in *Gyrodactylus* species only in case that these changes appear in the living environment of their hosts. However, some high mountain lakes, mountain streams, stretches of rivers below deep dams, some warm-water reservoirs etc., where the temperature is more or less constant during the year, do not belong to such environments, even if they are in climatic zones with regular seasonal changes.

Salmo trutta m. *fario* is a fish which can live even in the environment where the summer temperature attains as much as 20°C , if only there is the necessary amount of oxygen required by the fish. The solution of problems of the extent and changes in morphological and metrical variability of hard parts of opisthaptor in *G. truttae* should be therefore complemented by the studies of parasites of hosts living just in this environment.

ИЗМЕНЧИВОСТЬ ТВЕРДЫХ ЧАСТЕЙ ПРИКРЕПИТЕЛЬНОГО ДИСКА *GYRODACTYLUS TRUTTAE* GLÄSER, 1974 (GYRODACTYLIDAE: MONOGENEA)

Р. Эргенс

Резюме. Приведены данные по морфологическо-метрической изменчивости твердых частей прикрепительного диска местной популяции *Gyrodactylus truttae* Gläser, 1974. Обнаружено, что, в отличие от регулярных, периодических изменений температуры среды, метрические изменения большинства твердых частей прикрепительного диска происходят совсем нерегулярно. Автор полагает, что в этом случае сезонные изменения температуры не были настолько выразительны, чтобы причинять изменения размеров всех твердых частей прикрепительного диска паразитов.

REFERENCES

- ERGENS R., Variability of hard parts of opisthaptor of two species of *Gyrodactylus* Nordmann, 1832 (Monogenoidea) from *Phoxinus phoxinus* (L.). Folia parasit. (Praha) 23: 111—126, 1976.
- , LOM J., Causative agents of fish parasitic diseases. Academia, Praha, 384 pp., 1970 (In Czech.)
- KULEMINA I. V., Role of temperature in the formation of opisthaptor in *Gyrodactylus* sp. from crucian carps. Vest. Leningr. Univ. 9: 12—18, 1977. (In Russian.)

Received 11 June 1980.

R. E., Parasitologický ústav ČSAV,
Flemingovo n. 2, 166 32 Praha 6,
ČSSR