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DISTRIBUTION OF ROTIFERS IN A TRANSECT ACROSS THE LUNZ UNTERSEE

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During the OECD-Project on eutrophication of lakes (1974-1977) two participants of the UNESCO Training Course, Mr. Kardiyo Praptokardiyo and Mr. George Parayannilam, carried out a planktological transect of the Lunz Untersee supplemented by three additional samples in the longitudinal axis of the lake[1] (Fig.1). The purpose of the investigation was to assess possible major unconformities or patchiness of the zooplankton, which would render unreliable the routine sampling performed in one place only (near point 1). Such unconformities are well documented in lakes consisting of several basins (e.g. MIRACLE 1974, CAMPBELL 1941); they were, however, not to be expected in the Untersee, the morphology of its basin being uniform and bowl-shaped. In fact, no such unconformities were detected in the course of the experiment along the longitudinal axis.

For the transect, vertical profiles were taken on 7 points in 5 m steps (Fig. 1) by means of a closing net of 40 µ mesh size in triplicate parallel samples, the samples were counted separately. This procedure, designed for a rough orientation only, did not provide figures suitable to be published as far as crustaceans were concerned. Copepoda as well as cladocera were not numerous enough in the 5 to 5 m samples to show more than the differences between the litoral region and the open water of the lake already known previously (SIEBECK 1968). Patchiness, particularly important for the evaluation of the routine samples, has not been established.

However, the abundance of the 4 at the time dominant rotifer species Keratella cochlearis, Polyarthra vulgaris (including a very small part of Polyarthra major), Conochilus unicornis and Kellikottia longispina was sufficient to provide a picture of the distribution in depth as well as distance from the shore. Fig. 2 shows the mean numbers of the triplicate samples of the 4 species. In Keratella the numbers range between 200 and 400 ind./15 l in the upper 10 m and diminish with increasing depth; there is no conspicuous trend in horizontal direction but a slight accumulation can be assumed at the northern shore of the lake. Polyarthra tends clearly to accumulate in the open water of the midlake throughout the whole water column with numbers up to 700 ind./15 l in the 5-10 m layer; this trend seems reversed in the surface

[1] (Note on next page.)

layer, an explanation not being available. Counts of Conochilus are very much subject to error, due to the fact that the colonies of this species partly disintegrate through preservation, thereby artificially causing an uneven distribution in the sample. Hence, conclusions about the distribution in space are difficult to be made. There is, however, no doubt about a pronounced decrease with depth; horizontally, if anything, an increase near the southern shore can be suspected. Kellikottia occurs in rather small numbers of maximal 100 ind./15 l; nevertheless, the well known tendency of this species to accumulate in the depth of the lake is obvious; in the horizontal direction there may have been a slight accumulation towards the northern shore.

Fig.3 is an attempt to show the distribution across the transect for each species separately, divided into 5 categories of density according to the abundance of the particular species. Such a graph includes quite a bit of imagination; it is, moreover, a momentary picture which can change quickly as a consequence of wind, currents and temperature changes. BERZINS (1958) in a transect across the narrow meromictic lake Skärshult in Sweden (one of the few investigations of this kind), has already demonstrated these shortcomings. Nevertheless, our results seem to show that there exists in the Lunz Untersee some unconformity between the deep part of the lake basin and the parts above the slopes. I suspect that the disturbance of the strata, which are smooth in the middle of the lake, has something to do with litoral currents. Such currents are known to be sometimes quite strong and changing their direction with depth and distance from the shore (SIEBECK 1968).

References:

BERZINS, B., 1958: Rep.Inst.Freshwater Res.Drottningholm 39, 5-22

CAMPBELL, R.S., 1941: Ecolog. Monogr. 11, 1-19

MIRACLE, M.R., 1974: Ecology 55, 1306-1316

SIEBECK, O., 1968: Arch.Hydrobiol.Suppl. 35, 1-118

1 (previous page) I wish to emphasize that in this investigation the main task of sampling and counting has been carried out by the two Indian students to whom I am grateful for providing the data which I used to assess the properties concerning the rotifers.

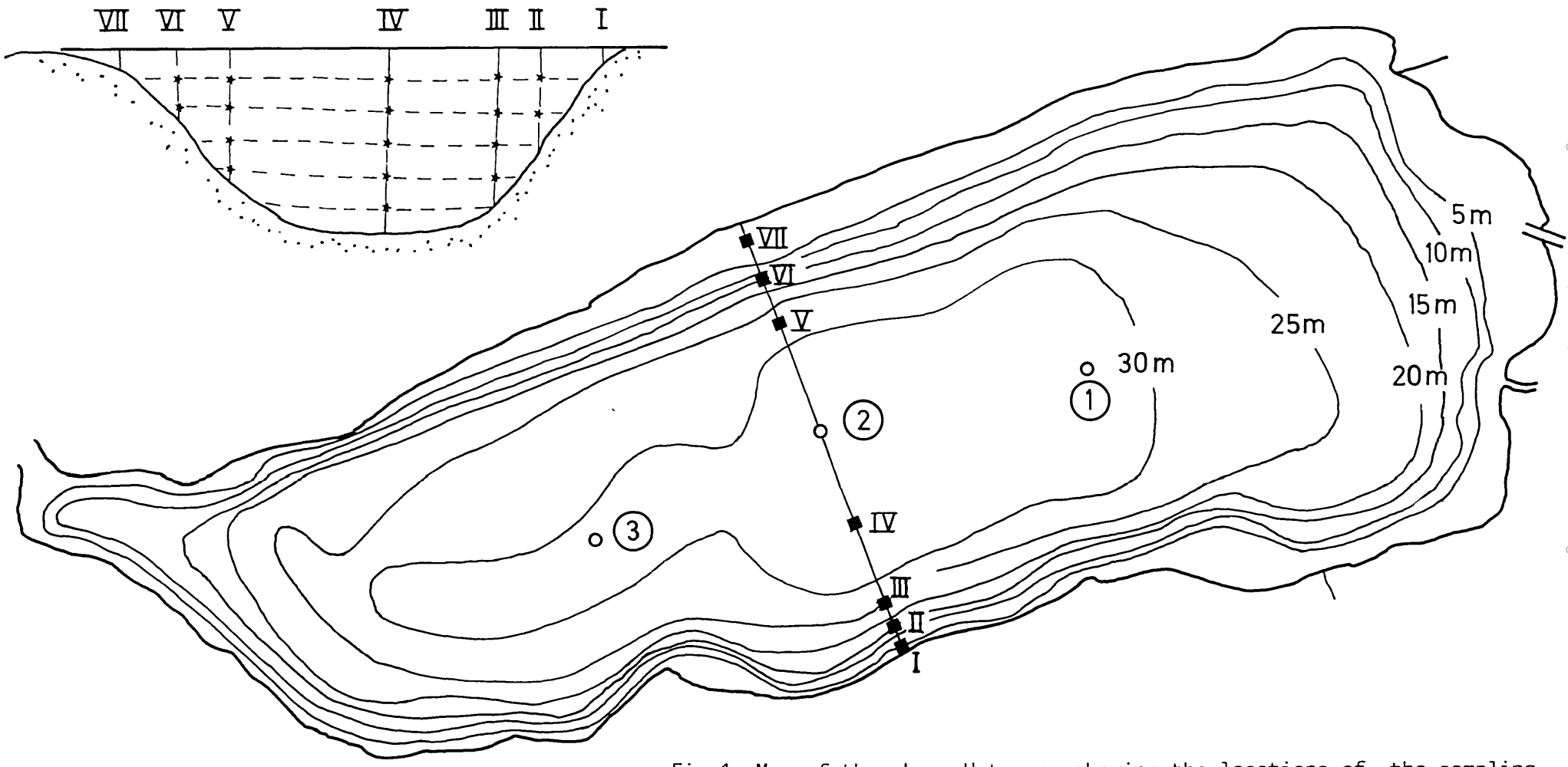

Fig.1: Map of the Lunz Untersee showing the locations of the sampling points: I to VII of the transect, and 1,2,3 of the length profile.

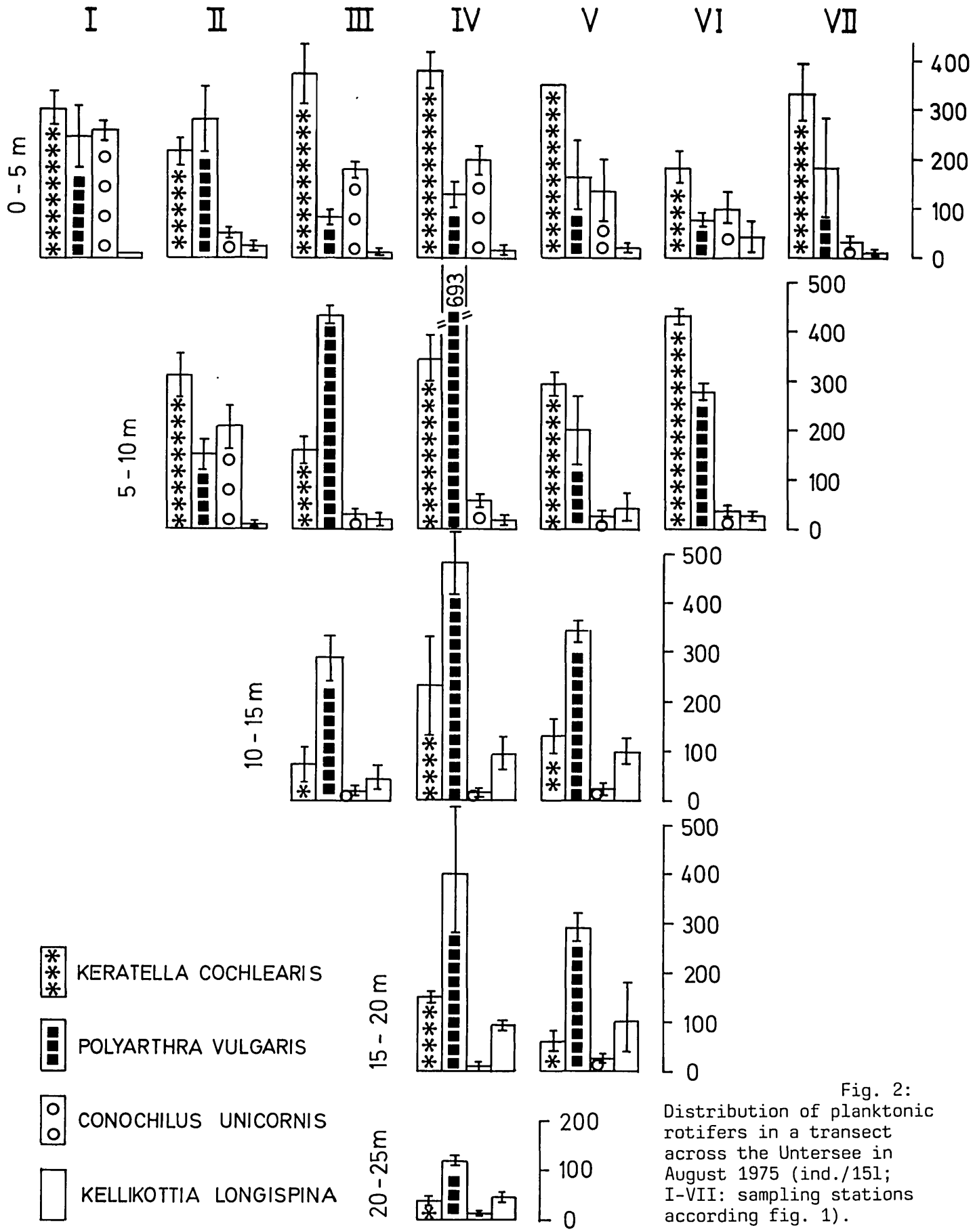

Fig. 2:
Distribution of planktonic rotifers in a transect across the Untersee in August 1975 (ind./15l; I-VII: sampling stations according fig. 1).

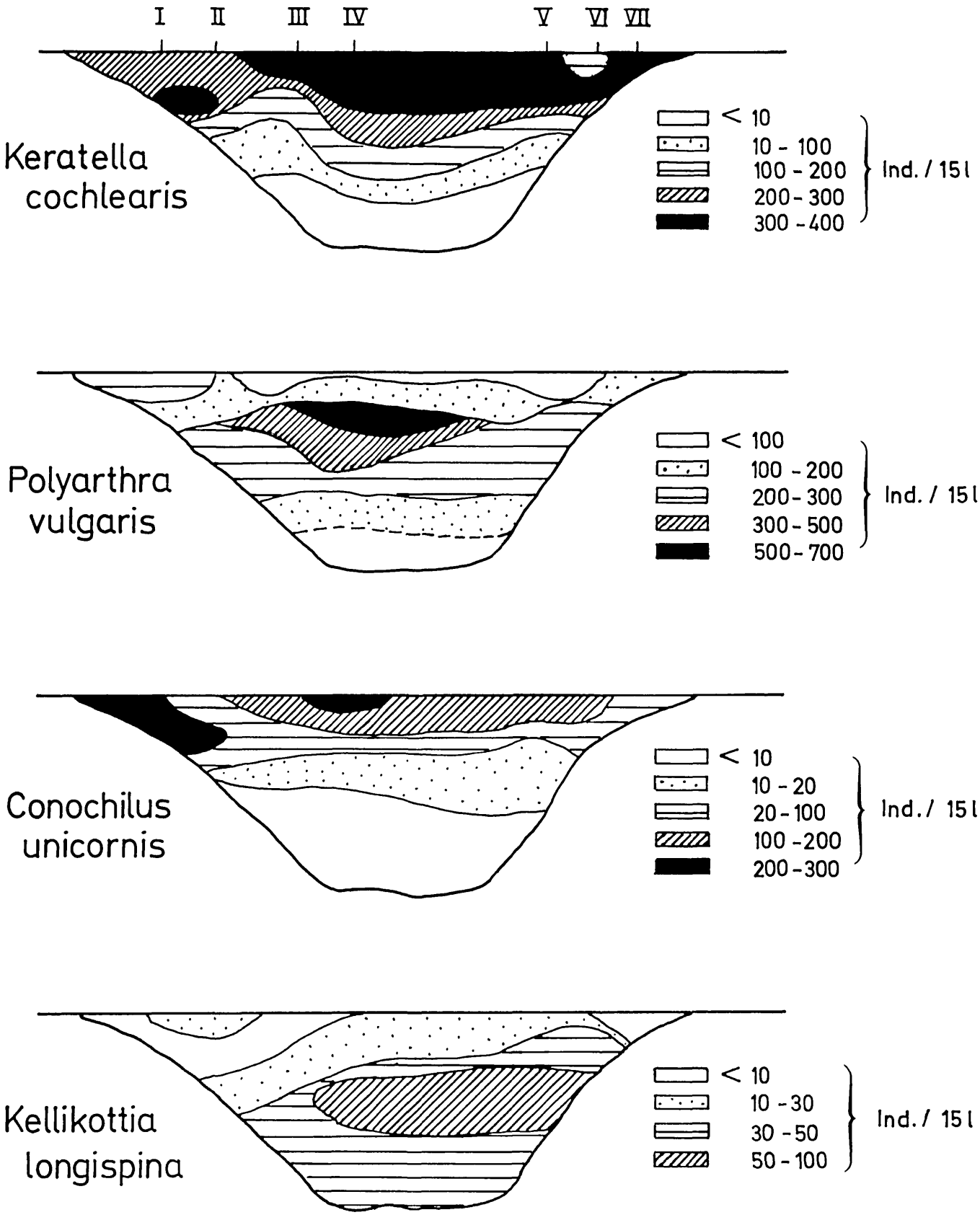

Fig.3: Cross section of the lake basin showing density layers of the 4 dominant rotifer species in the Untersee.