Hydroacoustic assessment of the fish stock of Neusiedlersee in 1999

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1. Introduction

The year 1999was the fourth year of hydroacoustic monitoring of Neusiedlersee using Simrad EY500 split-beam echosounder. The methods applied during the three subsequent years were very similar. It was found that the weather conditions are extremely important for the estimate of fish quantity. 1999 survey was carried under the conditions of changing weather (good start, rather rough conditions after the first sampling night). This change was again crucial for the results and certain parts of the lake could not be sampled due to rough weather.

2. Material and methods

2.1. Acoustical survey.

The sonar system was deployed on specially equipped Dory 13 boat powered with 15 HP combustion engine. The transducers were held by a remotely controlled aluminium plate, which enabled various orientations of the beam (overall view of the system is given on Fig. 1, the detailed view of the transducer holder is on the Fig. 2 of the 1996 report). The system used was SIMRAD EY 500 split-beam echosounder operating with the frequency of 120 kHz. Nominal beam angles of the elliptical low side-lobes split beam transducer were 4.3 and 9.1 degrees and it was set in the most efficient way, i.e. with the wide ellipse horizontally. The echosounder was driven by the Chicony 486 Dx personal computer. All data from the echosounder were immediately stored on the hard disc of the PC for subsequent processing.

Whole sonar system was calibrated using 32-mm tungsten carbide standard target centered in the beam using split beam centering. The gain of the sounder was calculated according to Foote et al. (1987). Whole sonar system and PC was powered by accumulator 12 V battery. The SIMRAD EY 500 software was set to create a new data file after collection one MB of data. This represents 2-8 minutes of surveying of the lake depending on the amount of information being collected.

2.2. Interferences

The report on 1996 survey provides a thorough analysis of the interferences encountered during the hydroacoustic survey. All these interferences were encountered during current survey, but were usually less serious.

2.2.1. Reverberation noise

If the system is properly calibrated and noise thresholds for single targets counting and echointegration are set properly, it is possible to estimate acoustic size of every single target (needs to be at least 18 cm apart or away from the nearest phase boundary; SIMRAD echosounders require one pulse length clearance between echoes, the pulse duration was set

0.1 ms) and to integrate overall 'acoustic biomass' of all targets with no respect to their position (must be more than 18 cm from the bottom). Single target processor scales echointegrator output as a certain amount of fish targets of certain size distribution. This procedure was performed in SIMRAD EP 500 post-processing software, which also enables to view collected data and to remove faulty or suspicious data sequences. For the data collection in the field SV - volume scattering strength threshold was -100 dB; TS - target strength threshold was -62 dB, for the data postprocessing and final calculations, the noise thresholds were -50 and -62 dB or more respectively.

Setting of noise thresholds was one of the most difficult procedures in the Neusiedlersee as the acoustic conditions varied dramatically across the lake. It was obviously intended to keep rather low noise threshold enabling to survey fish down to the size of fry (-62 dB for the target strength -TS of 40 log R time-varied-gain {TVG} data and -50 dB for volume scattering strength {SV} data of 20 log R TVG). This was possible during most cruises, but during some cruises the noise thresholds had to be lifted

Of the four main interferences named in 1996 report only some were significant:
1. By shortening of the usable range due to rocking (usually negligible effect in 1999).
2. By the increasing of the background noise level by the entrained air and by resuspending silt particles (only significant in cruises 1,2,8,11).
3. By side-lobe reflections from the rough surface (negligible effect in 1999).
4. By distorting the pulse shape of some valid single targets so they may not be accepted as single targets (negligible effect in 1999, mainly in cruises named under 2.).

Usual way of expressing data is down to the highest possible resolution towards even the smallest fish, thus if the conditions were favourable, the lowest possible threshold was applied. The thresholding examples of the 1996 report show that the biomass of fish present appears much more robust in relation to different thresholds in different noise conditions. Most often in balanced fish populations, the most biomass is presented in smaller number of bigger fish and these are not affected by noise thresholds. The overall fish biomass can be directly compared in different parts of the lake and used as a good indicator of fish presence. The calculation of the biomass required the use of universal length/weight relationship for the Neusiedlersee fish. Of the data for the most common fish species given by Herzig et al. (1994) we have chosen the length/weight relationship for the pikeperch, as it has rather intermediate position amongst other species (Fig. 11 in Kubecka et al. 1997) and also large individuals in the open water are likely to be pikeperch (?). The relationship can be replaced by the different one in the Microsoft Excel spreadsheets supplied on the floppy disk.

2.2.2. Macrophytes

Macrophyte beds were found frequently in nearshore areas of the lake. Detection, recognition and quantification of macrophyte distribution and density was subject of a separate study (Kubecka et al. in prep.). Using the criteria developed in above report, all macrophyte records

were separated from fish data. The macrophyte report gives the ratio of the energies of fish and macrophyte echoes detected in various parts of the lake.

2.3. Fish sizing

Sizes of acoustically detected fish were identified from the relationships developed for 10 European freshwater species by Kubecka and Duncan, (1998) for similar frequency of 200 kHz. Target strength (TS) of horizontally recorded fish was identified as fish length using the deconvolution procedure (Kubecka et al., 1994). The biomasses of fish were calculated by using the pikeperch length-weight relationship.

2.4. Density estimates

SIMRAD EP 500 post-processing software provides fish density estimates for vertical beaming (all the parameters of fish density are useless from the view of fish density estimate by the horizontal beaming). The area backscattering strength in m^2 of the beam sidescan was transferred into the backscattering strength of one m^3 of horizontally ensonified water volume. This value (Volume scattering strength, SV in m^2/m^3) was than compared with the average backscattering strength of fish (BXS in m^2/fish) in order to calculate the fish density per 1 m^3. The hectaric abundance was calculated assuming the average depth of 1.8 m.

2.5. Survey design

The survey was carried out during 28. August – 1. September 1999, but only the first two nights had favourable conditions for fish surveying. Further time was dedicated to macrophyte surveying in protected parts of the lake while it was not possible to survey open water regions. Due to rough weather, it was also not possible to carry out the survey of the southernmost part of the lake. Consequently, the 1999 data are unfortunately without the data from the National park area, which was not sampled. The main lacustrine part of the lake was covered by 11 cruises whose spatial coverage is given on Fig. 23. Most cruises had favourable conditions for fish recording with nearly no wind.

The survey consisted from a number of cruises (longitudinal run in one direction). Each cruise consisted from a variable number of transects which represented an elementary unit for which the fish number, biomass and size composition was calculated. Computer-connected GPS sensor for the positioning of the boat was not available during the survey, but it was replaced by the navigation with compass and VDO-Logic boat log trajectory integrator. Log integrator provides real-time distance from any starting point of the survey grid.

3. Results

3.1. Data format

Tables with odd numbers (1, 3, ...21) give the summaries of quantitative results of individual cruises. The Tables give number of transects, numbers of acoustic pings (ultrasonic sound emissions) start and end of horizontally surveyed range, total targets bacscattering cross section per one hectare of side-scan (SA), the same for single (non-overlapping) fish echoes, percentual proportion of single targets in the whole fish population, volume scattering strength (SV = sum of fishes backscattering cross sections per 1 m^3, SV is given in arithmetic and logarithmic form), average fish backscattering cross sections (BXS) of a given transect, fish density per m^3 and per 1 ha of the Lake. The average fish weights were calculated with pikeperch length/weight relationship and with the length-frequency distribution obtained from deconvoluted data from every transect. These average weights are used for calculation of fish biomass.

TS frequency distributions of fish targets were omitted in printed form of data tables because with horizontally recorded data, the TS frequency is only indirect measure of fish sizes, real length-frequency composition had to be obtained by deconvolution procedure. All recorded targets are contained in tables on diskette. Summary tables 23-25 contain the total TS-frequency distribution of all targets recorded in individual cruises.

Unlike 1996-7 reports, 1998 report contains the calculation of water volume sampled in every transect. The tables contain intermediate calculations of the shape of elliptical beam (A1, B1, A2, B2, V1 and V2 these values are not very important for the report) and the sampling volume of one ping and of whole transect. The reason for including the volumes was the requirement of sampling-volume-weighted results of fish density and biomass. For this reason, each transect column also contains the multiplication *abundance*volume* and *biomass*volume*, which are being used for calculation of weighted results in the end of each cruise table. Weighted values of abundance and biomass are often higher than unweighted. The reason the fact that the transects with higher fish presence are usually calmer and it is possible to record fish in further ranges.

The tables with even numbers (Tab. 2,4,....22) give deconvoluted fish size frequency distribution in individual transects of survey cruises. Headings give the intervals of side aspect TS with equivalent total lengths (TL, cm) and weight (W, g). Observed frequencies of fish are given in rows, the first column gives the number of the transect. The last row and column provide the sum of observed fish.

3.2.Night one

The first cruise was directed from Illmitzer Bucht towards Rust. There was slight wind and the weather conditions can be considered as moderate. The quantitative parameters of the cruise are given in Tab. 1. Average fish biomass was 27 kg/ha with reasonable variation. Due to wind, the sampling range had to be shortened and the sampling volume was not too large (over 41 000 m2). The largest fish biomass was recorded in the Illmitzer Bucht and also in the

western part of the cruise (Fig. 1). The length frequency distribution was dominated by 0+ fish, but the dominance was not so high when compared with earlier years. Small frequency peak was also apparent at the length of about 20 cm.

Fish density was relatively low in most of cruise 2, aiming Northwest from Rust to between Podersdorf and Illmitz. Most transects show the biomass bellow 10 kg/ha. During this cruise, the wind was calming down and the acoustic conditions were improving rapidly in the second half of the cruise. In the eastern end of the cruise, fish biomass of 30-90 kg/ha were recorded. Average volume-unweighted biomass was 15.2 kg/ha, volume weighted biomass was over 20 kg/ha. The length-frequency distribution (Fig. 4, Tab. 4) shows again the dominance of 0+ fish and small frequency peak at about 20 cm length.

During the cruise 3, significantly higher fish densities were recorded (Tab. 5, Fig 5). The biomass was continually increasing from the start from the middle of the transect, in several cases, the biomass exceeded 100 kg/ha. Unweighted average biomass was about 58 kg/ha, weighted average was nearly 70 kg/ha. The length-frequency distribution is again dominated by 0+ fish, the level of dominance was high because of a low noise threshold and calm conditions. Nevertheless, there is a noticeable contribution of many sizes of larger fish (Tab and Fig. 6).

Even much higher fish biomass values were recorded during the cruise 4 (Tab and Fig. 7). The cruise was situated in the true open water region of the lake between Donnerskirchen and Podersdorf and shows that even in the very exposed areas there can be recorded very high fish densities during good conditions. The biomass rarely fell bellow 100 kg/ha. Eight transects exceeded 200 kg/ha and one transect reached 350 kg/ha. Average fish biomass of the cruise 4 was about 170 kg/ha. The length-frequency distribution (Fig. and Tab. 8) was dominated by 0+ fish with a significant share of larger fish.

Fish presence was also high during the cruise 5 (Fig and Tab. 9). The biomass usually exceeded 100 kg/ha and the average value was nearly 170 kg/ha. The length-frequency distribution (Fig. and Tab. 10) shows clearly two peaks of fish larger than 0+ and significant contribution of larger fish.

It is interesting that significantly less fish were present in more inshore location around Neusiedl/See in the cruise 6 (Fig. and Tab. 11). The biomass of fish did not exceed 100 kg/ha and the average value was under 40 kg/ha. The length-frequency distribution (Fig and Tab. 12) showed two modal groups and significantly smaller proportion of larger fish.

Higher fish presence was found in Cruise 7 along the western shore of the lake. This area is usually exposed to the wind and the conditions for fish recording are usually difficult here. During 1999 survey, the conditions were optimal here and the fish biomass was often exceeding 100 kg/ha. By the Podersdorfer Insel, the biomass of fish was extraordinarily high – over 350 kg/ha. Average volume weighted biomass was in this case significantly higher – 192 kg/ha (the regions with the highest fish biomass had also the highest sampling volume). Length

frequency distributions given in Fig. and Table 14 show a significant proportion of fish larger than 0+.

Cruise 8 was situated in a very similar part of the lake like the cruise 5 (Fig. 23) going from Podersdorf towards North of Breitenbrunn Islands. But the weather conditions started to deteriorate very abruptly during the start of cruise 8. The wind was increasing and the waves started to rise. The noise threshold had to be risen to the TS level of –56 or –53 dB and the sampling volume was significantly reduced. Some transects could not be analysed at all. Consequently both large and small fish were missing from the records. Large fish seem to leave the open water as a consequence of rough weather while small fish were discarded by increased noise thresholds. As a consequence, the fish biomass estimate was usually under 10 kg/ha (Fig. and Tab. 15) with the exception of starting and finishing transects. Average fish biomass in all transects of the cruise 8 dropped to 8.5 kg/ha). Transects in relatively calm areas at the start and by the end of the cruise have larger sampling volume, so the volume weighted value of the fish biomass is significantly higher – 14.4 kg/ha. However the unsampled volumes, which could not be surveyed due to waves in the middle of the cruise, would be very large and it can be concluded that very low fish biomass was recorded during the cruise 8. The length frequency distribution (Fig. and Tab. 16) was dominated by 0+ fish while the fish over 35 cm were absent.

Increase of western wind was the reason why the cruise 8 was aimed towards the protected western shore. With usual western wind, several hundreds meters from western shore provide the only area of the lake, where the data can be collected with low noise thresholds. Protected western areas were surveyed every year and during 1999 it was the only part of the main lake basin left not surveyed. This is why the main effort of remaining cruises was put in this area. Cruise 9 was aimed South along the western shore of the lake (Fig. 23). At Donnerskirchen area the cruise had to be stopped because of dense rain which made both data acquisition and navigation impossible. The fish quantity was incomparably higher than in cruise 8 (Fig and Tab. 17). The fish biomass rarely dropped bellow 100 kg/ha and maximum values reached over 500 kg/ha in individual transects. Total average estimated biomass was over 180 kg/ha, volume weighted average was nearly 240 kg/ha. The length-frequency distribution was again dominated by 0+ fish (Fig. and Tab. 18), but the share of larger fish was very significant (average fish weight was over 41 g).

3. 3.Night two

The survey continued from the same point where it had to be stopped due to heavy rain. Cruise 10 was a longitudinal run from Donnerskirchen to Morbish along the western shore of the lake. Fish biomass was usually smaller than during the cruise 9, but still quite high – Fig and Tab. 19. Average fish biomass was 93 kg/ha. The cruise was split into two halves in order to facilitate traditional way of expression of the data for the central and northern parts of the lake. Fish quantity in both halves of the cruise was very similar (Tab. 19). The length-frequency distribution was again dominated by 0+ fish (good conditions for recording) but the share of larger fish was significant (Fig. and Tab. 20).

The last cruise No. 11 was situated from Morbish towards Illmitz. Unfortunately, most of this cruise was again influenced by the wind. The fish biomass estimated was usually bellow 50 kg/ha (Fig. and Tab. 21) with the exception of short transect 6 where high fish occurrence was found. Especially in the transects in the eastern part of the lake, the biomass was rather low. Fish length-frequency distribution shows rather small share of larger fish (Fig. and Tab. 22).

3.4. Whole lake summary and comparison with previous surveys.

Table 23 gives the summary of quantitative data for the central part of the lake. The best quality data in the central part were recorded during the cruise 10, other cruises were probably influenced by the wind even if it was not too strong (see Discussion). Average fish biomass was on the level of 43-44 kg/ha, higher densities were recorded by the west side.

Table 24 gives the summary of fish quantity for the Northern part of the lake, which is the largest open water territory. Most of these cruises with the exception of cruise 8 were recorded under optimal weather conditions. The values of fish biomass were usually high and all sizes of fish were present. Average fish biomass was 107 kg/ha (volume non-weighted) or 122 kg/ha (weighted biomass).

Table 25 compares the results of all observations of the four consecutive surveys. Three earlier surveys were grouped into two groups according to the weather conditions. In 1996 and 1998, the biomass estimates ranged between 70 and 80 kg/ha, while in 1997 under very calm and warm weather conditions, the fish presence was much higher (the biomass estimate reached 240 kg/ha). 1999 survey had most transects done in good conditions and the position of this survey with the biomass estimate of 94-106 kg/ha is intermediate between the two above cases. Fish estimate in 1999 would be probably even higher if it would be possible to survey the Southernmost area of the lake (National park), where the fish presence used to be regularly higher than in open parts.

The best comparison of change of fish presence in different areas of the Neusiedlersee would be to use calm weather cruises, which contain most fish (Table 26). It is possible to group these best cruises for similar regions of the lake like it is done for western and central regions of the lake in Tables 27-28. The comparison of four surveys in the protected western side of the lake shows that in good conditions, the average fish biomass was always close to 200 kg/ha. Only in 1998 in rather unusual circumstances of north-eastern wind, all parameters of fish biomass were much smaller. The comparisons in the open areas of the lake are more diverse (Tab. 28). The highest values were recorded in 1997, which was the most favourable survey with extremely good conditions. It appears that the fish were both abundant and relatively large in the central part of the lake in 1997. In 1999, the fish biomass in open water parts of cruises 3,4 and 5 was also over 100 kg/ha and average weight was rather big. Fish size was much lower during 1996 and 98 in even in these relatively calm transects specially selected for the comparison.

4. Discussion

4.1. Weather and fish biomass

1999 fish survey underlined the need for very calm weather for every cruise. The comparison of cruises 5 and 8 showed that the fish biomass decreased more than 10 times at similar location during two and half hours after building-up a wind. This example shows that there is a little reason for any surveying if there is even a moderate wind (wind during the 1999 survey was never very high). Every acoustic surveying of Neusiedlersee **must** be carried out at really calm conditions. Such calm conditions are actually rather rare in Neusiedlersee and any further surveys must take in account a significant 'waiting time' for good weather. About two weeks have to be allocated for the survey in order to make sure that there is enough of good weather to do proper surveying of the lake. It is clear that when the wind starts to blow and water currents start to move, larger fish dip to the bottom, where they can hardly be seen by the echosounder. Longer migrations of fish from the reed belt to the open water still may play their role in fish distribution, but the short term shift in vertical direction seems to be extremely significant. To understand completely the change of fish behaviour as a consequence of weather, it would be highly desirable to set-up a several days fixed location echosounder station in the open water of the lake and to monitor fish behaviour at different depths at different weather conditions. Such study may provide direct estimate of what is happening in the open water during the change of wind, light etc.

4.2. Fish sizes

The changes of fish biomass in the open water happens mainly as a consequence of change of the presence or absence of larger size groups of fish. It was shown in earlier reports, that fish biomass is much more robust parameter than fish numbers, which are influenced by the abundant presence of 0+ fish and also eventually by the noise, which can overlap in size with less reflective aspects of small fish. In areas exposed to wind, large fish disappear, what can be seen on the SA and SV values (Tab. 27 and 28) and on the values of average weight of whole cruise (Tab. 30). The best illustration of the absence of large fish in the open water of exposed areas would be their share on the total length-frequency distribution. Fig 24 gives the length-frequency distribution zoomed in order to view the share of large fish. These fish are the most reliably recorded by the echosounder. On the other hand, they are rarely very abundant and the proportion of large fish may be difficult to see if the frequency of all lengths is expressed (Fig. 26 and 27). The most quantitative way to express the share of individual length groups in the population would be absolute fish abundance (Fig. 25 and Tab. 29) rather than percentual composition (Fig. 24).

In our 1999 survey, it appears that the sizes of 0+ fish peaks were not too different (Fig. 26,28) and the shares of larger fish were similar in both absolute and relative expressions. It can be seen, that significant proportion of large fish appears in the best cruises No. 3,4,5,7,9 and 10, which were the cruises with low wind. In windy cruises large fish over 50 cm were

nearly missing and also the fish of 20-40 cm were less frequent. Very striking is the comparison of cruises 5 and 8 in similar location but before and after the wind started to blow. While the overall length-frequency distribution may look similar (Fig. 26), the frequency of large fish differed significantly (Fig. 25). This comparison underlines the need of using only very calm weather for surveying.

Fig. 28 zooms into the length-frequency distribution of the smallest targets (the least reliable area of the length-frequency distribution, where some fish targets can be rejected and some false targets could penetrate into the data). Some length-frequency distributions show bimodal pattern or flat distribution. The interpretation of these patterns can be following. The first larger peak at about 4-5 cm can be considered as true 0+ fish. Then left peaks or side of the distribution represent the least reliable records. It would be still possible to analyze these records in greater detail by special more advanced software or on the basis of fixed location observations, which would provide much better resolution between fish and other targets. Such procedure would be much more laborious than the quantitative processing using EP 500 software and it would be difficult to apply it for extensive Neusiedlersee data sets. In our view it is more sensible to stick to the detection of larger fish (Fig. 25, Tab 29 – left part) and to expression the results in terms of biomass for which the uncertain area shown in Fig. 28 has negligible effect.

Superiority of fish biomass is again demonstrated in Tab. 30 which shows that individual cruises of 1999 survey differed little and irregularly in abundance but dramatically in biomass. Change of fish biomass and size composition in space and time is probably the best information we can extract from acoustic surveys of the Neusiedlersee.

4.3. Survey desgn

Another important need for future surveys is better spatial coverage of the lake and the implementation of GPS in the survey. Assuming the extensive size of the lake and considerable variability of fish and macrophyte presence it would be extremely desirable to standardise the survey transects. This was not achieved so far for two reasons:

1) There was no direct connection with GPS sensor available. GPS sensors were also artificially confused for defence purposes in the past years. It seems that this influence has been withdrawn and the accuracy of GPS has risen significantly.
2) The cruising of the lake was not always done in optimal weather conditions and the trajectories of the survey boat had to be adjusted according to the direction of wind rather than according to any sampling design. As it was stated above, the surveys have to be done at no wind and during optimum conditions it would be possible to keep to predetermined survey grid.

5. Summary

The fish stock of the Neusiedlersee has been sampled by the SIMRAD EY 500 split-beam elliptical echosounder with the elliptical low-side lobe transducer. The sampling period was 28.August to 1.September 1999. The conditions during the survey were usually optimal with the exception of some cruises 1,2,8 and 11 where there was a moderate wind forcing us to increase a noise threshold to the target strength level of about -56 dB. Even with this threshold it was possible to record many young-of-the-year fish and all bigger fish. . Rough weather prevented us from the survey of the southernmost basin in the national park. Average fish biomass recorded in the lake was about 100 kg/ha (volume weighted average was 106.3, unweighted average was 94.3). If we assume that the richest area (National park) was not surveyed, the 1999 results are intermediate between poorer 1996 and 1998 surveys and rich 1997 survey. The length frequency distribution of fish was dominated by 0+. The results further supported the hypothesis that the weather conditions play the most important role in the distribution of larger fish in the open water of the Lake and the need to work under very calm conditions only.

6. References

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Fig. 1 : The distribution of fish biomass in Neusiedlersee along the cruise 1 in 1999.

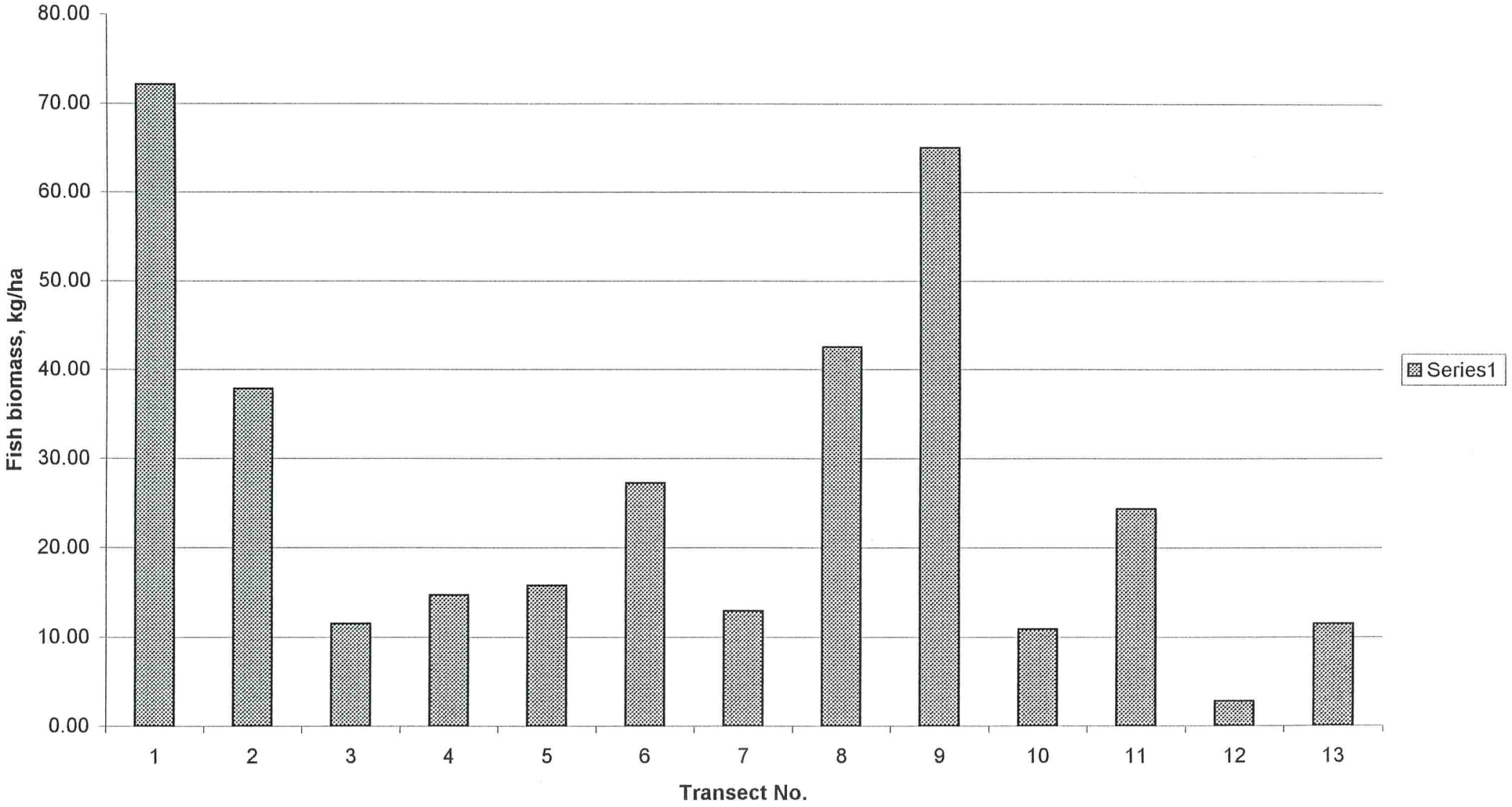


Fig. 2 : Length frequency distribution of the fish recorded during the cruise 1.

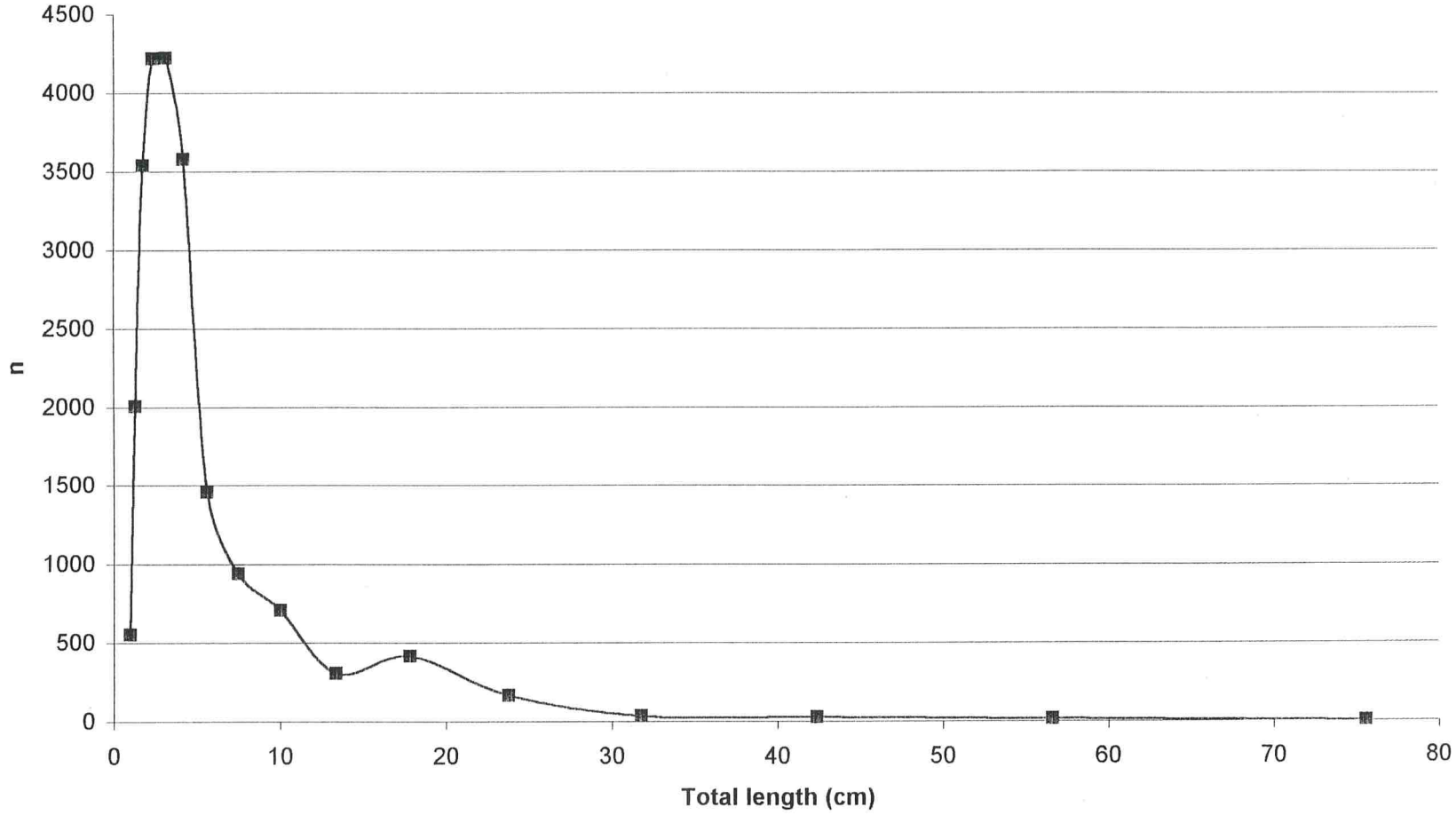


Fig. 3 : The distribution of fish biomass in Neusiedlersee along the cruise 2 in 1999.

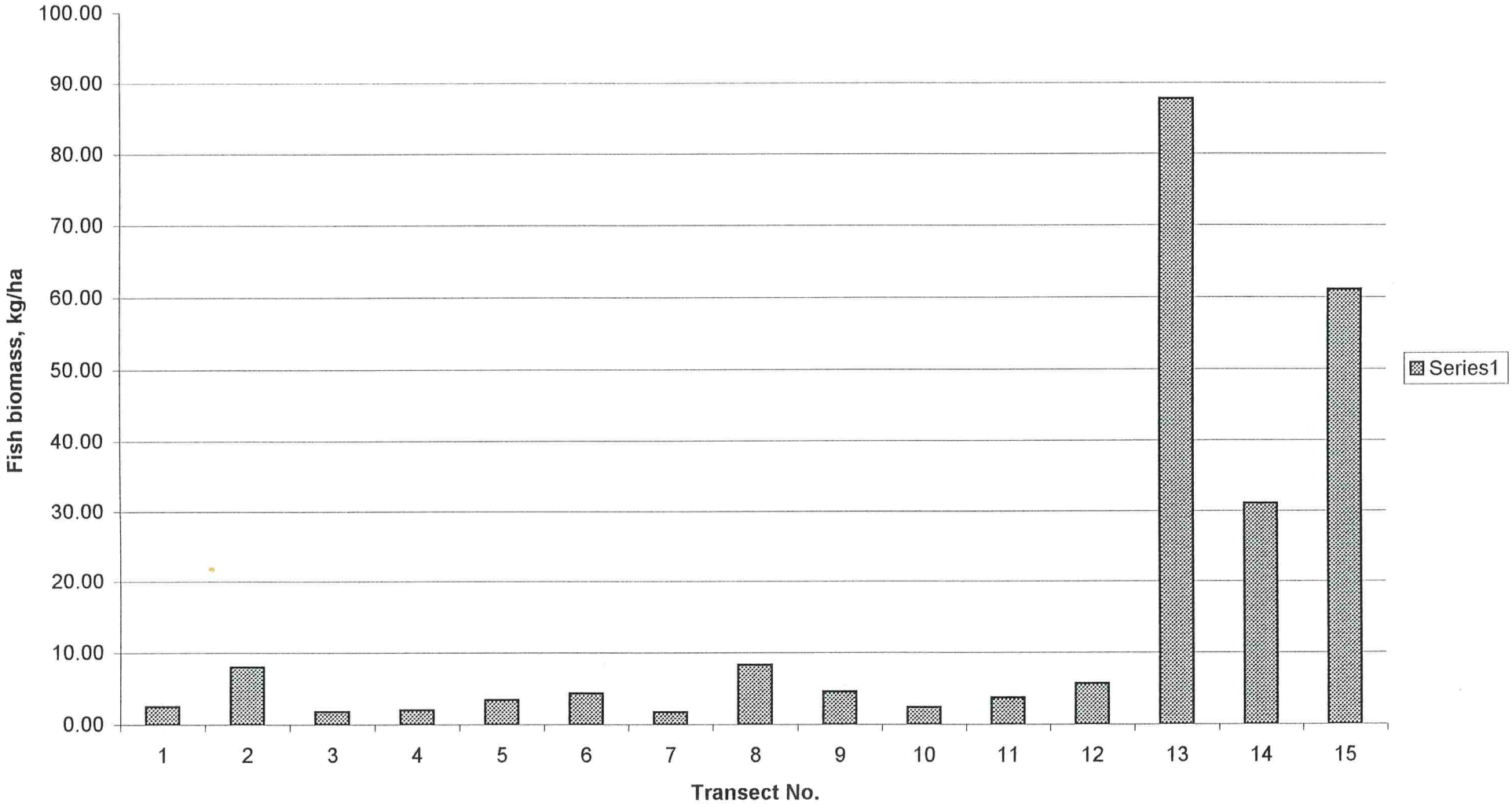


Fig. 4 : Length frequency distribution of the fish recorded during the cruise 2.

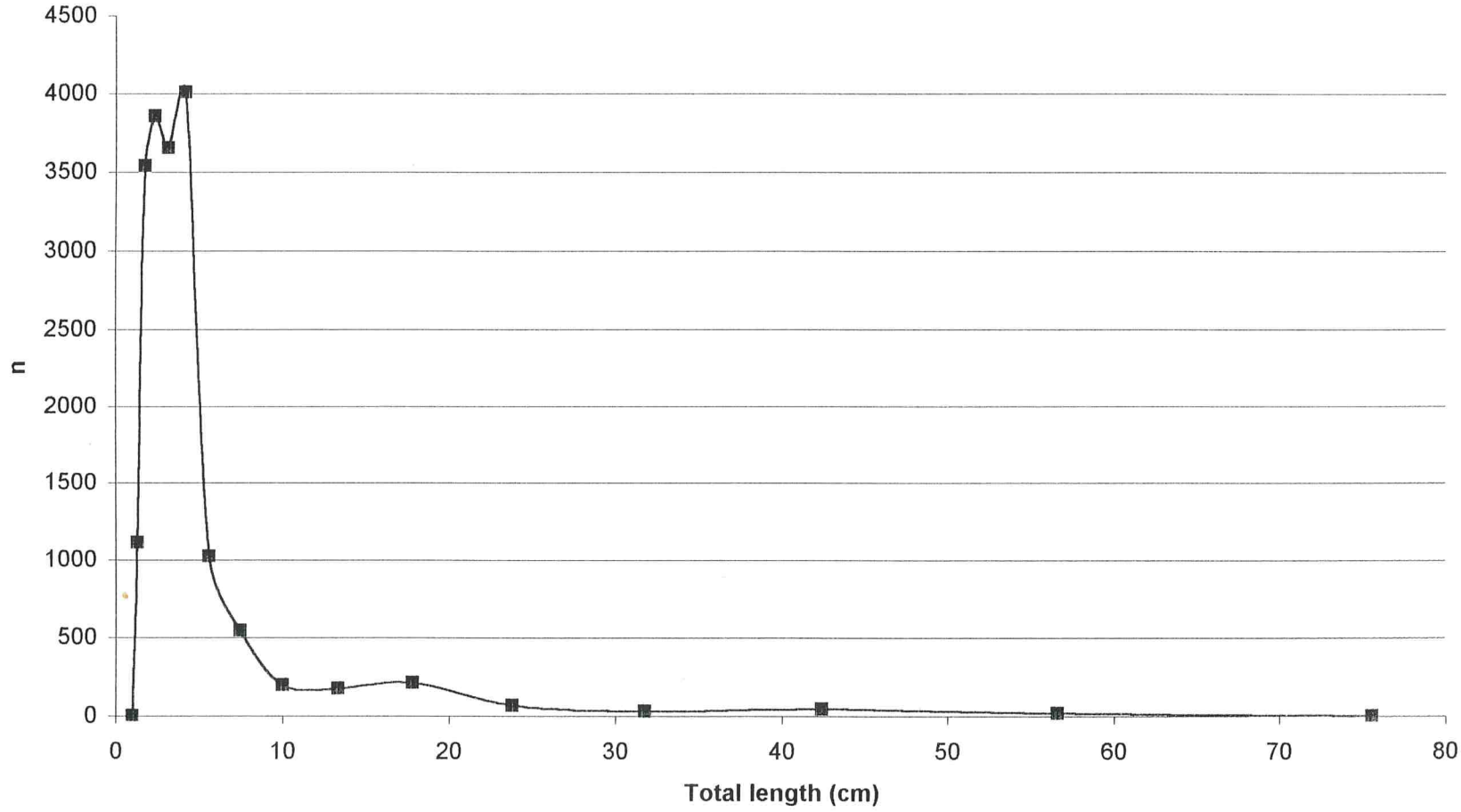


Fig. 5 : The distribution of fish biomass in Neusiedlersee along the cruise 3 in 1999.

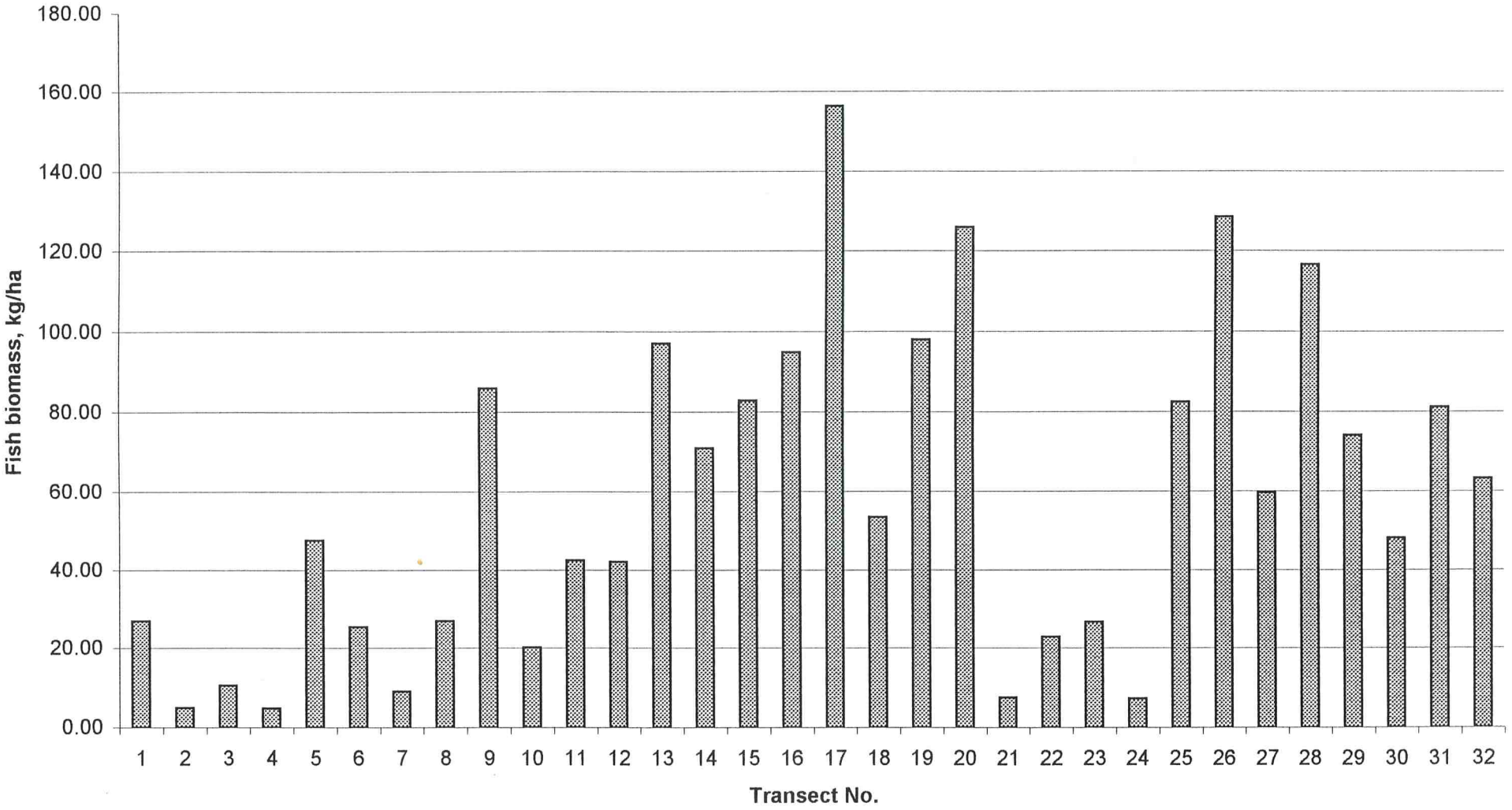


Fig. 6 : Length frequency distribution of the fish recorded during the cruise 3.

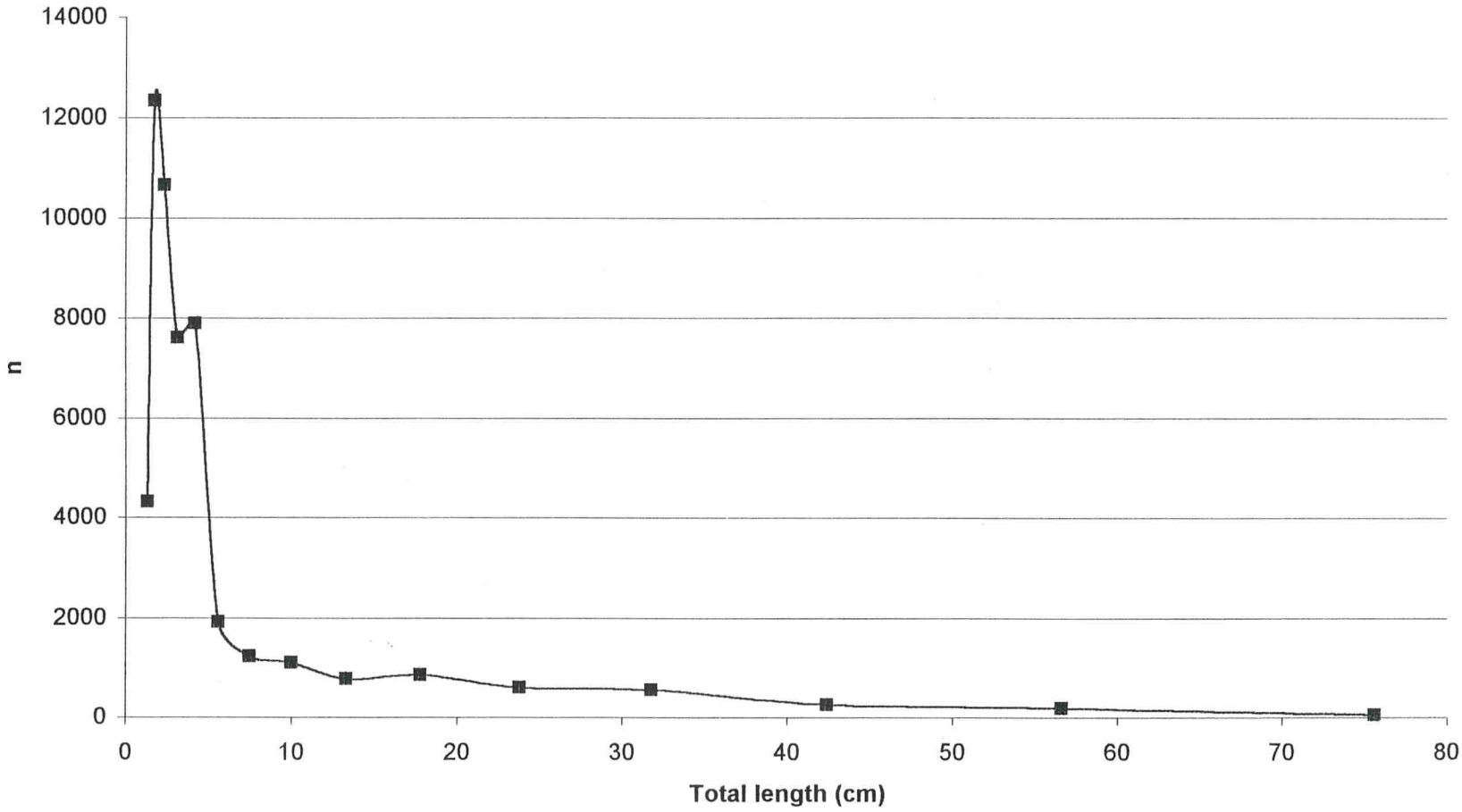


Fig. 7 : The distribution of fish biomass in Neusiedlersee along the cruise 4 in 1999.

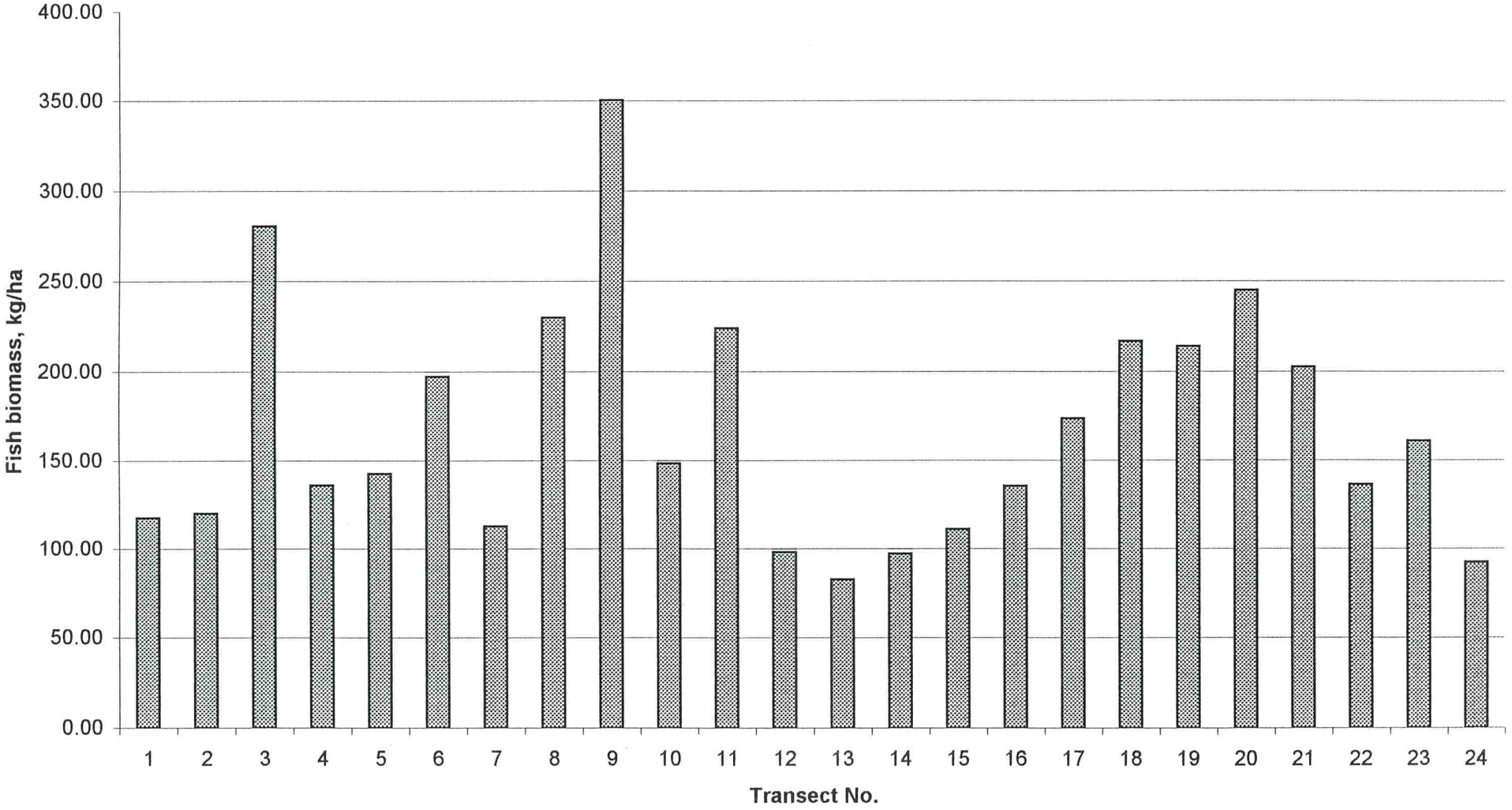


Fig. 8 : Length frequency distribution of the fish recorded during the cruise 4.

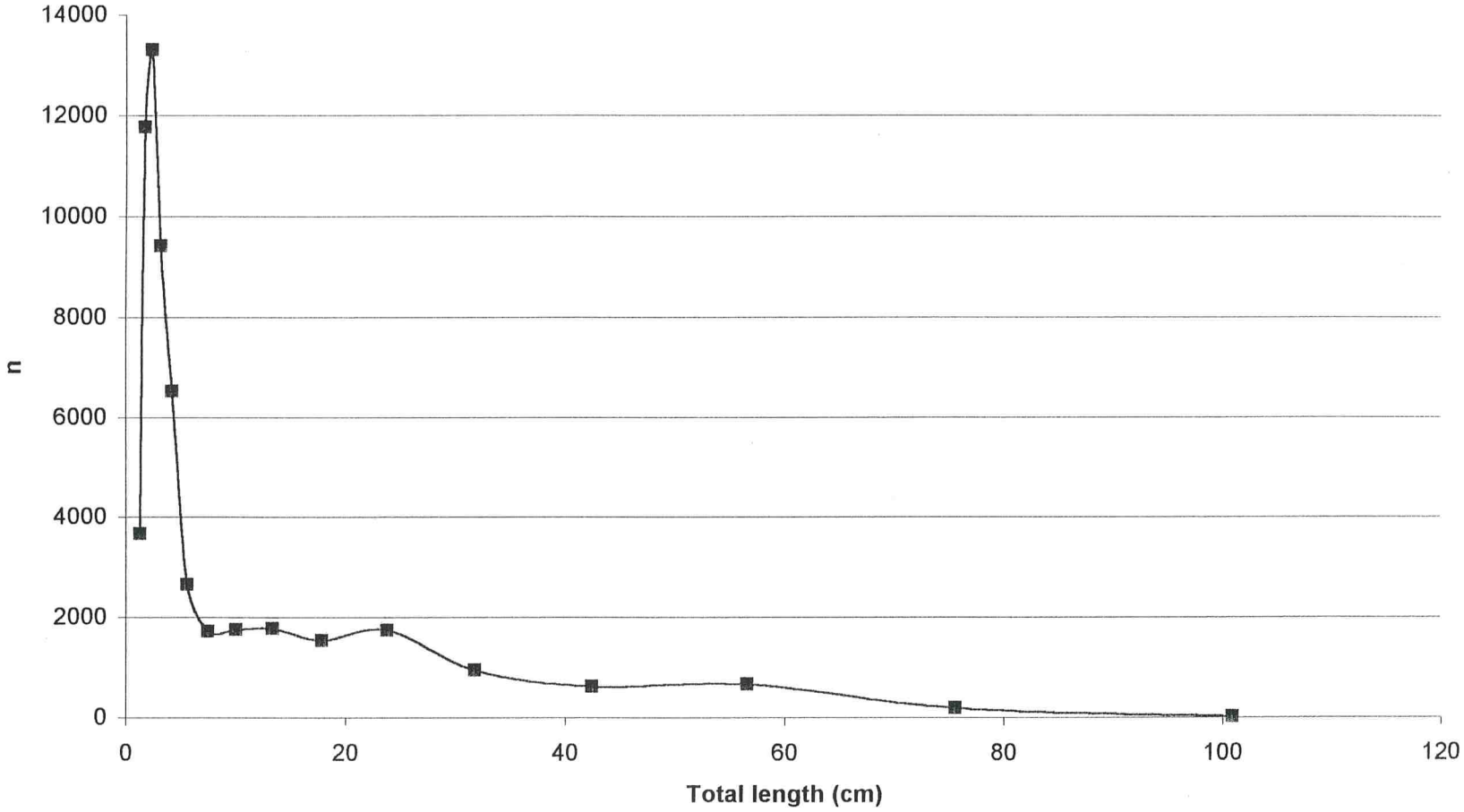


Fig. 9 : The distribution of fish biomass in Neusiedlersee along the cruise 5 in 1999.

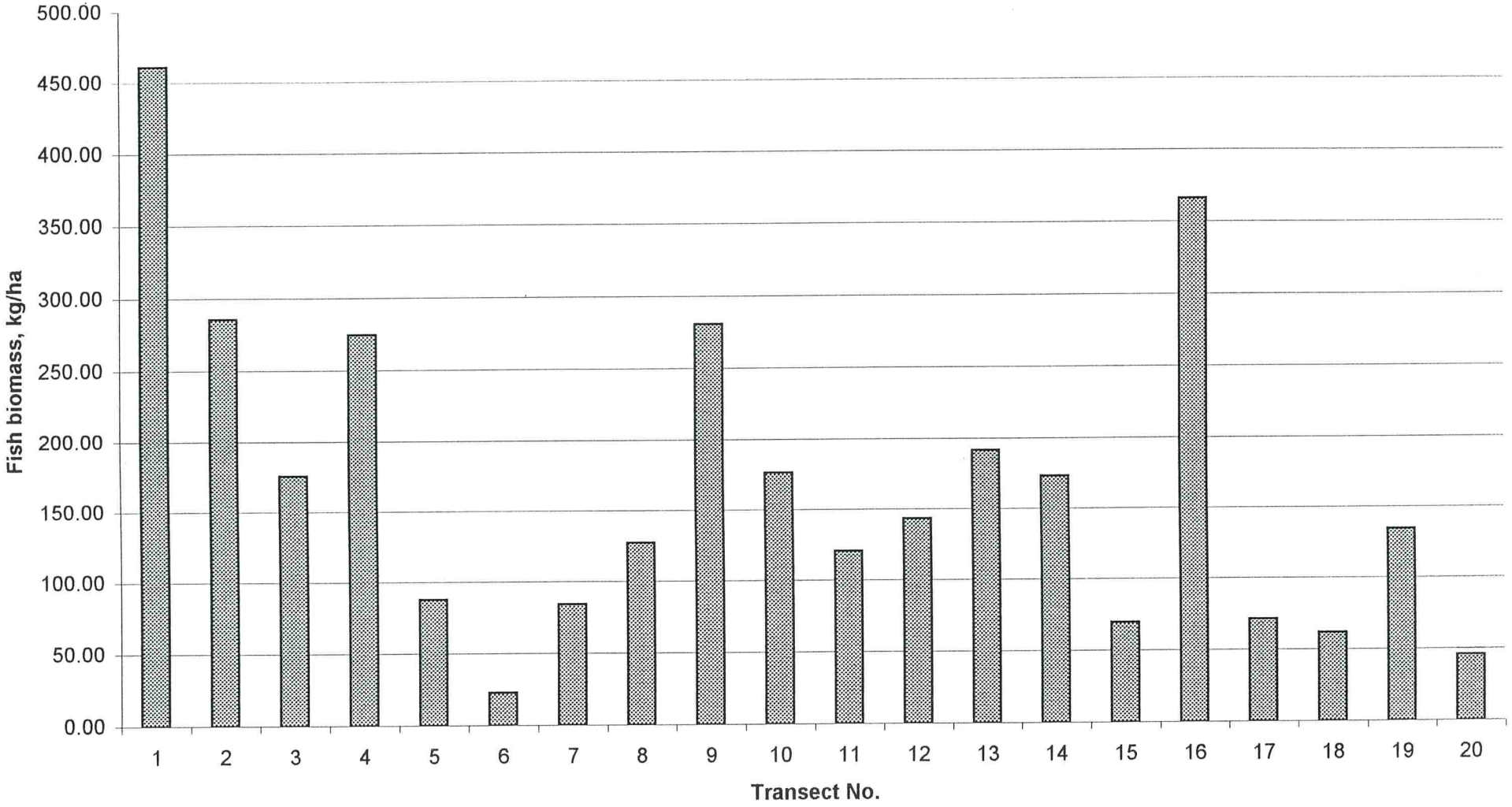


Fig. 11 : Length frequency distribution of the fish recorded during the cruise 5.

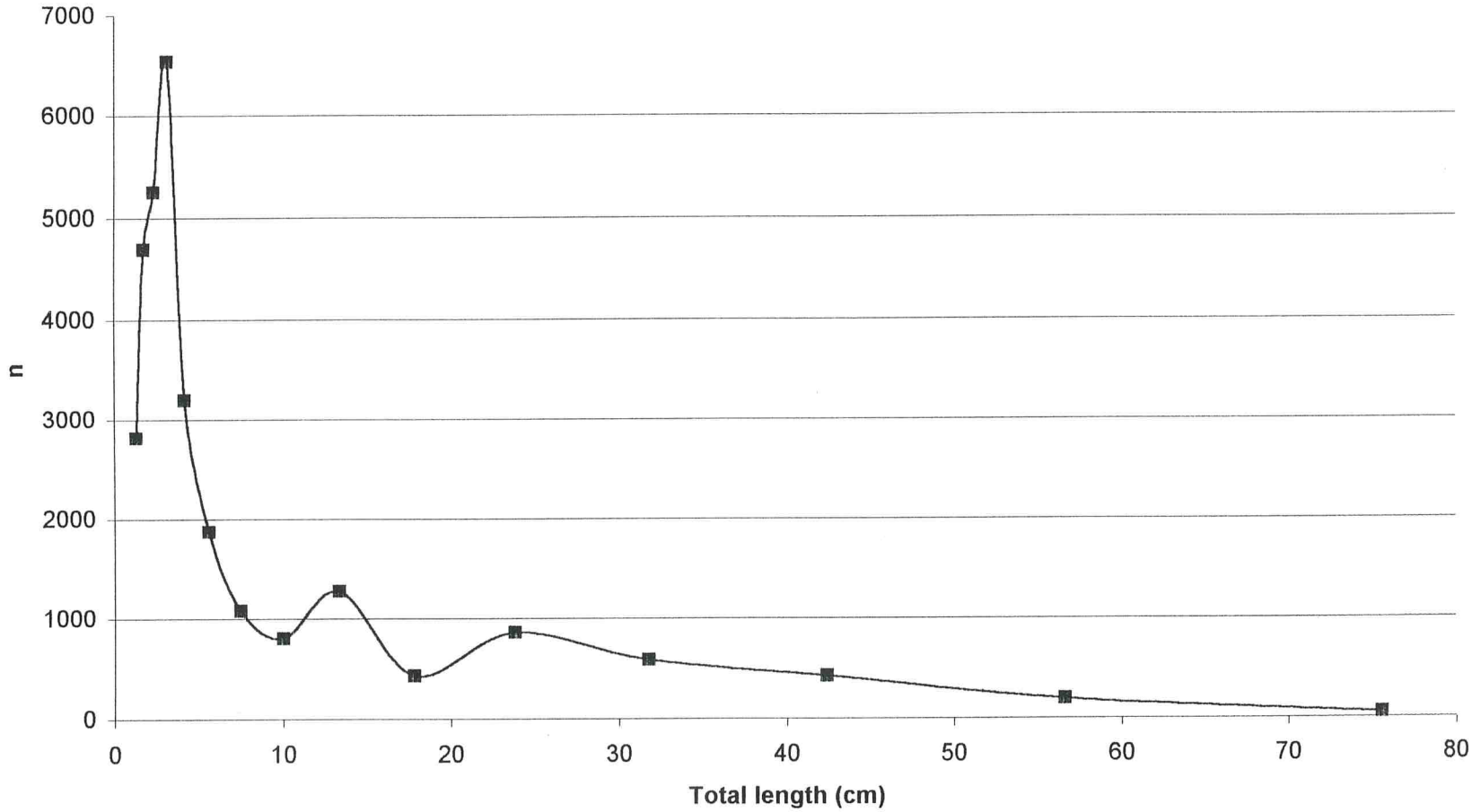


Fig. 11 : The distribution of fish biomass in Neusiedlersee along the cruise 6 in 1999.

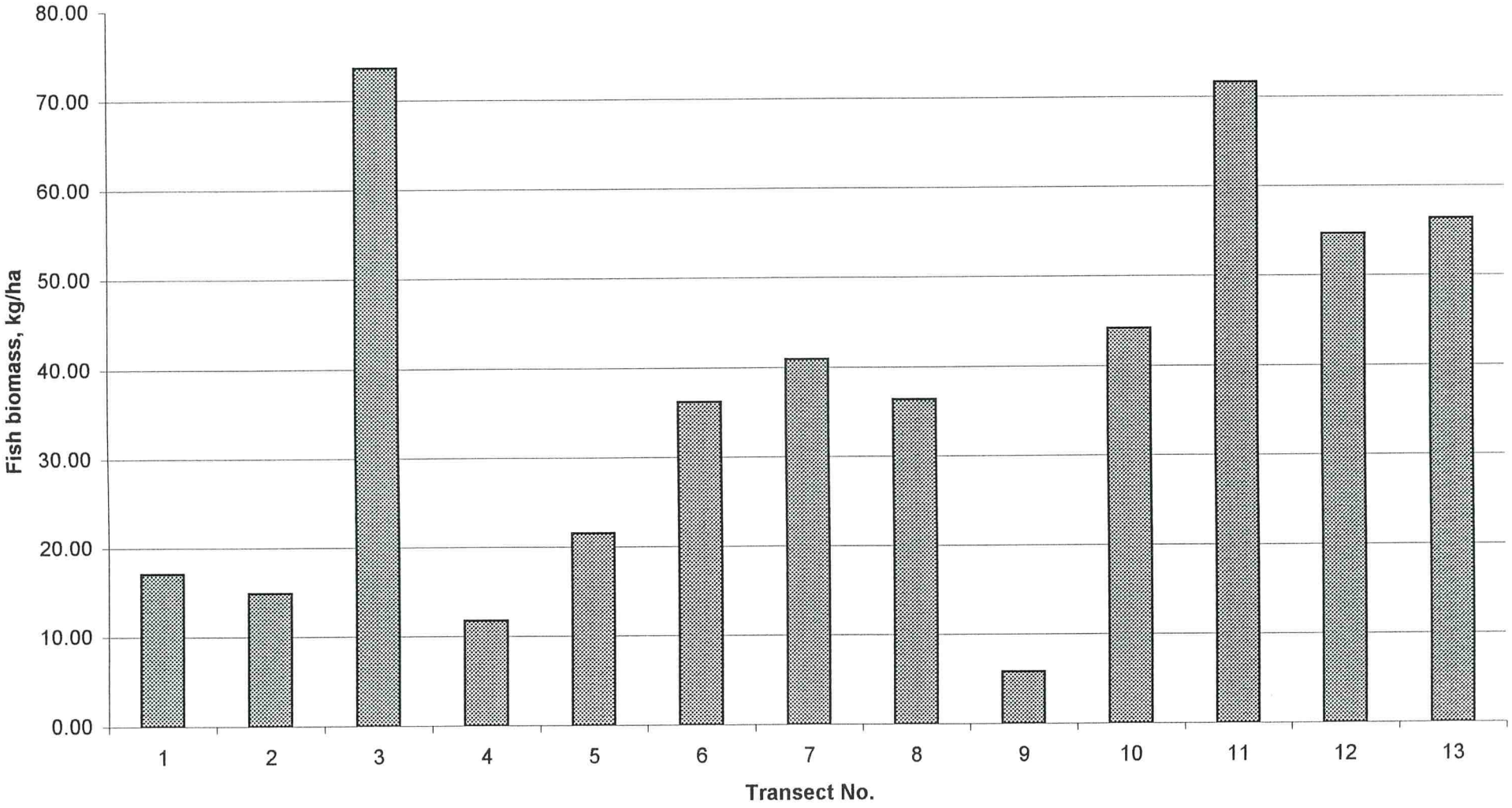


Fig.42 : Length frequency distribution of the fish recorded during the cruise 6.

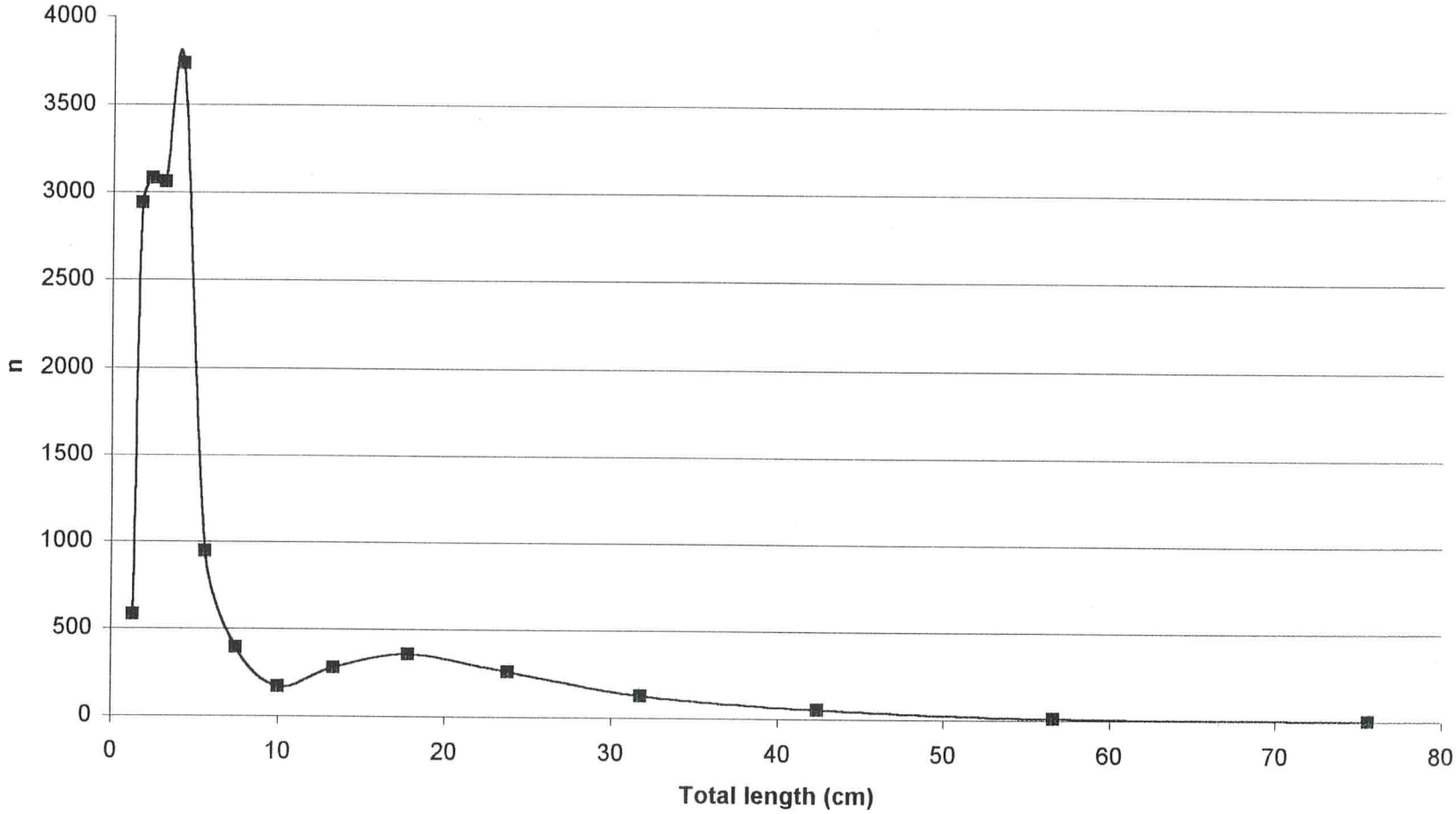


Fig. 13 : The distribution of fish biomass in Neusiedlersee along the cruise 7 in 1999.

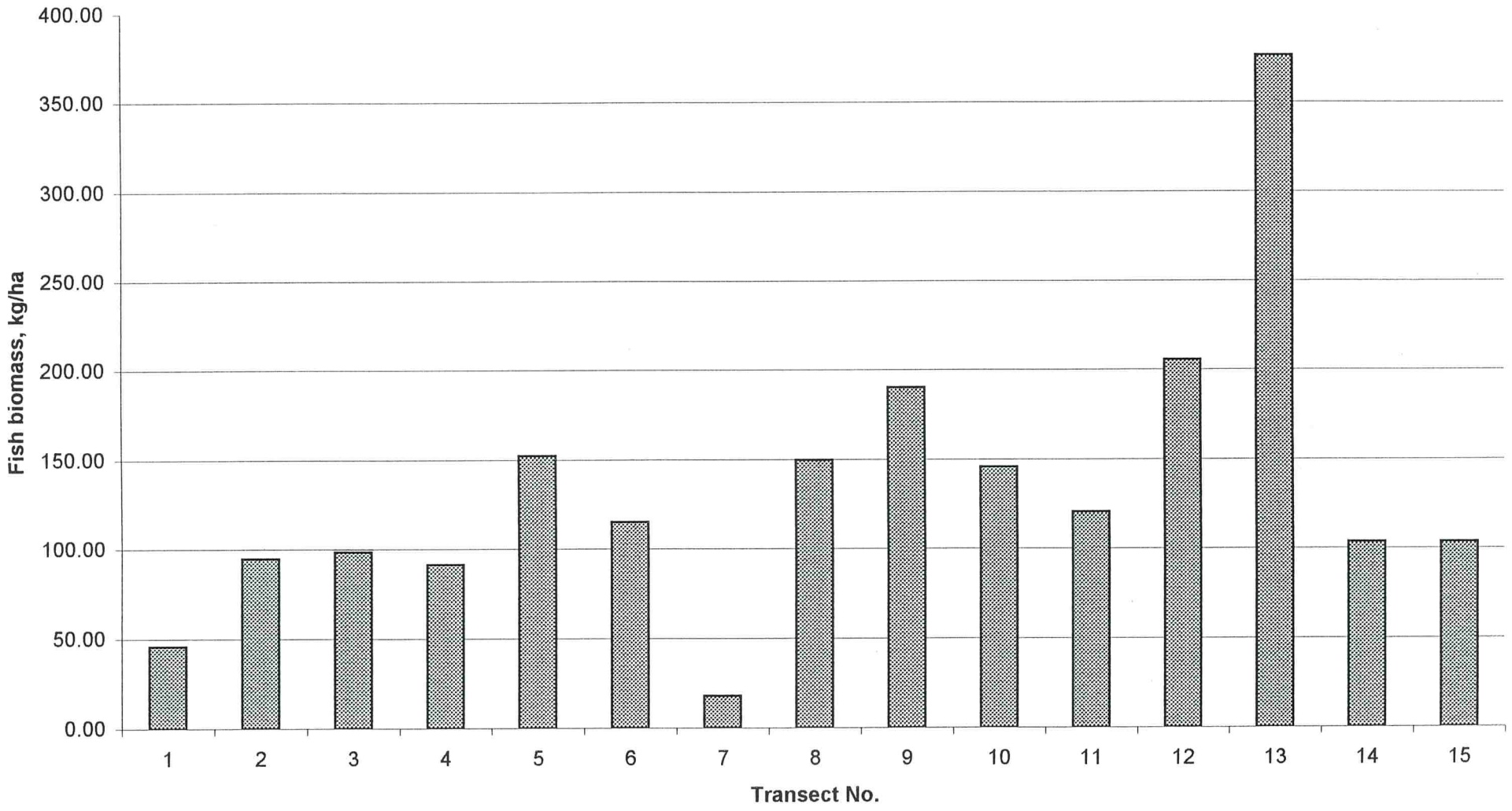


Fig. 14 : Length frequency distribution of the fish recorded during the cruise 7.

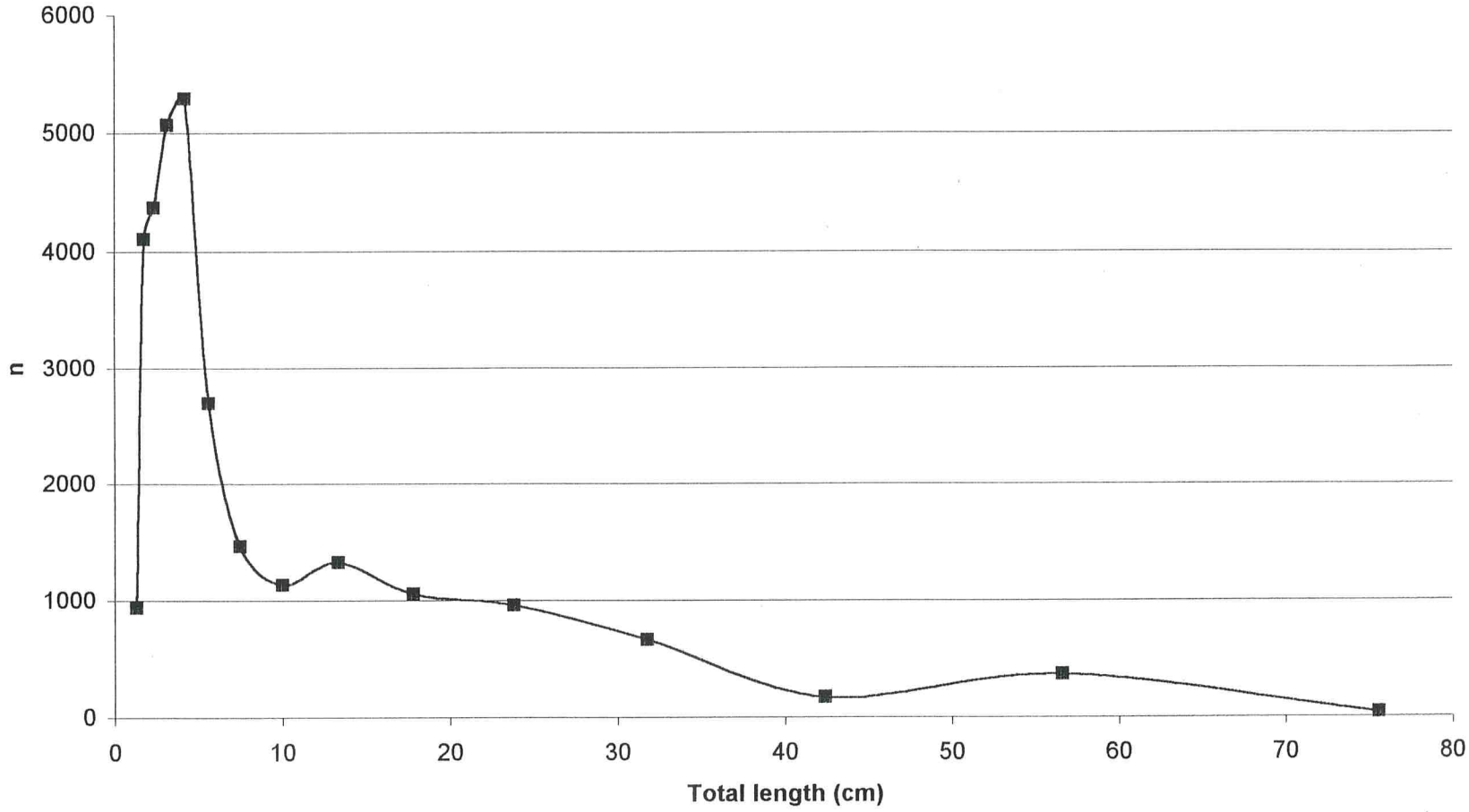


Fig. 15 : The distribution of fish biomass in Neusiedlersee along the cruise 8 in 1999.

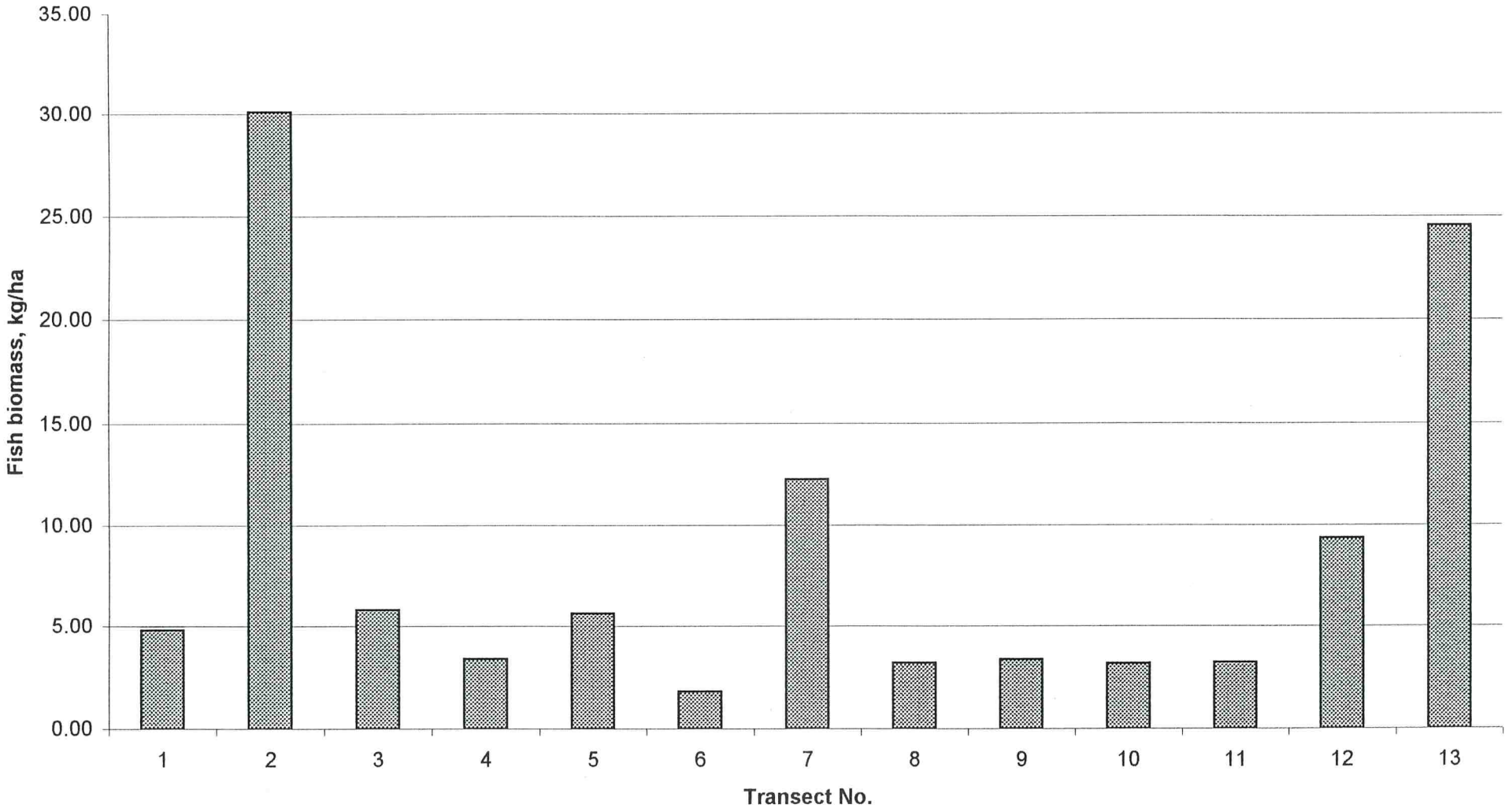


Fig. 16 : Length frequency distribution of the fish recorded during the cruise 8.

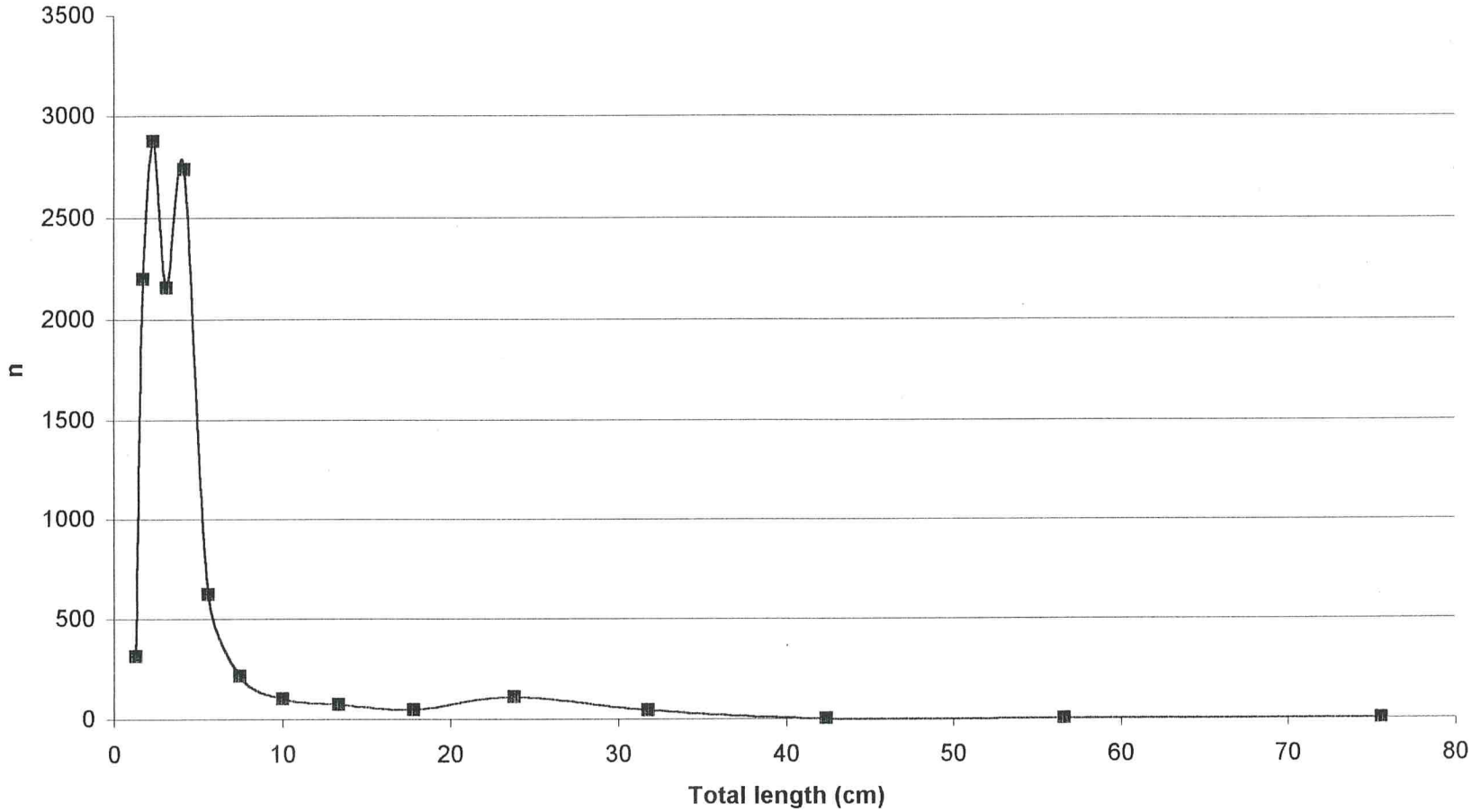


Fig. 17 : The distribution of fish biomass in Neusiedlersee along the cruise 9 in 1999.

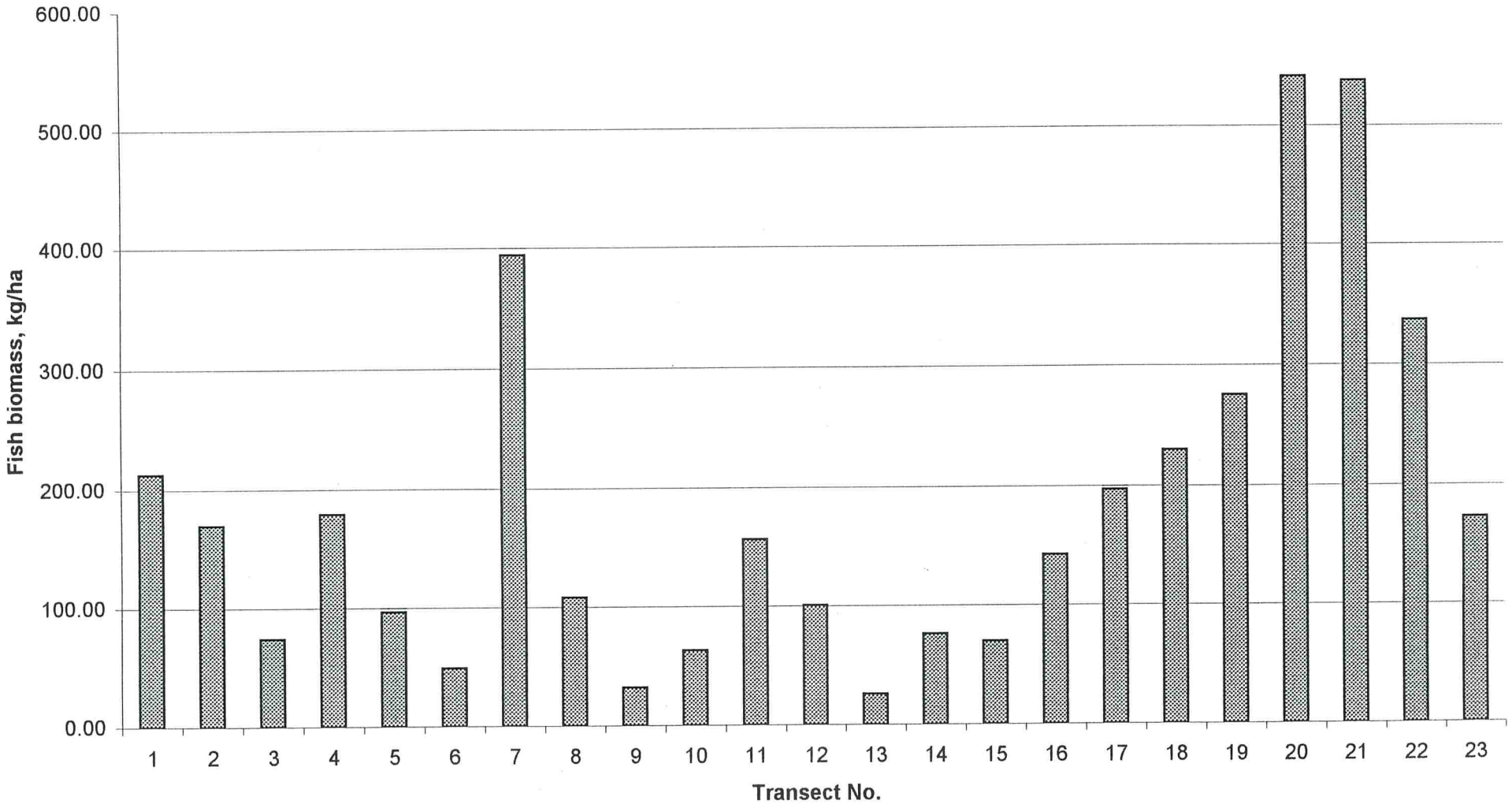


Fig. 18 : **Length frequency distribution of the fish recorded during the cruise 9.**

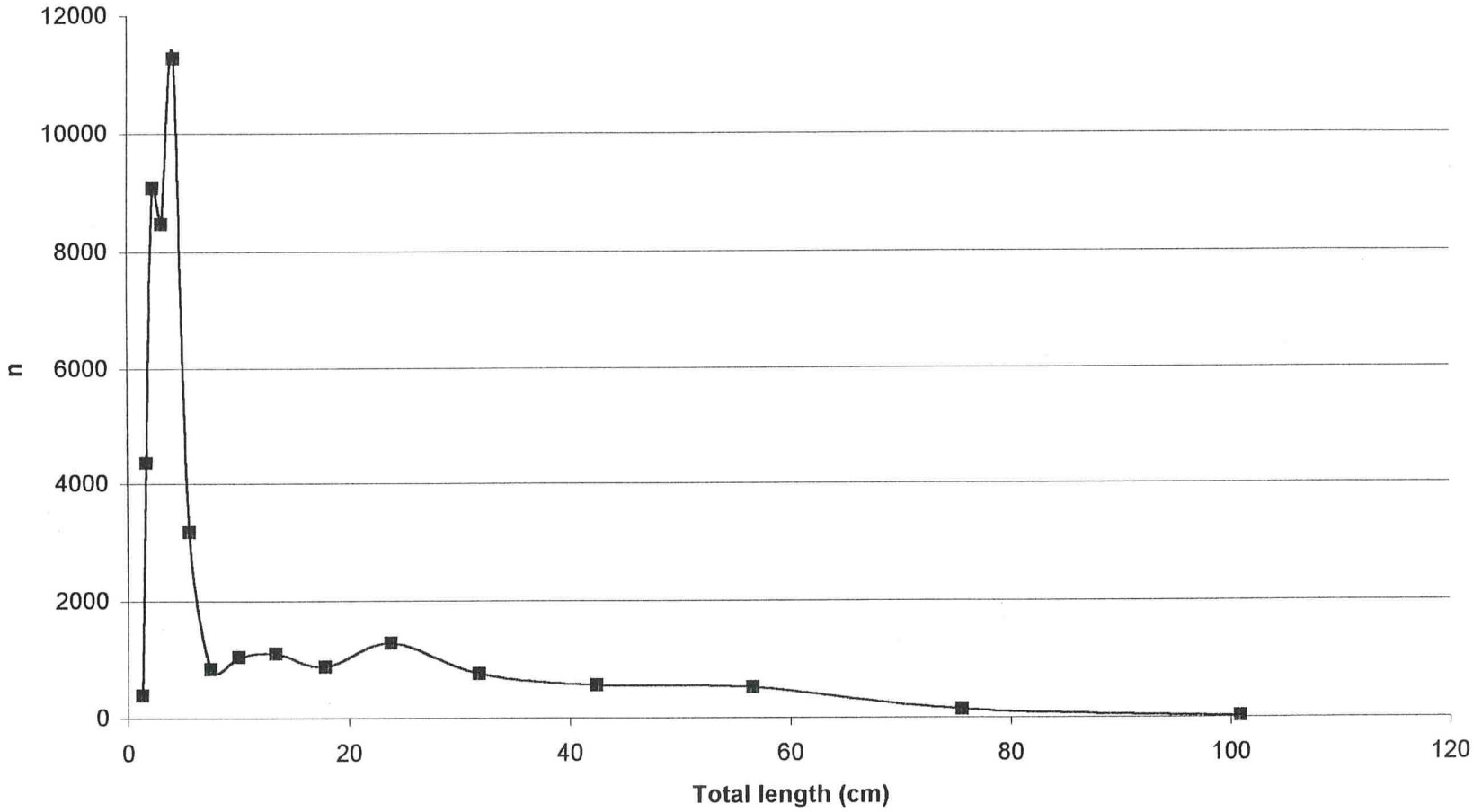


Fig. 19 : The distribution of fish biomass in Neusiedlersee along the cruise 10 in 1999.

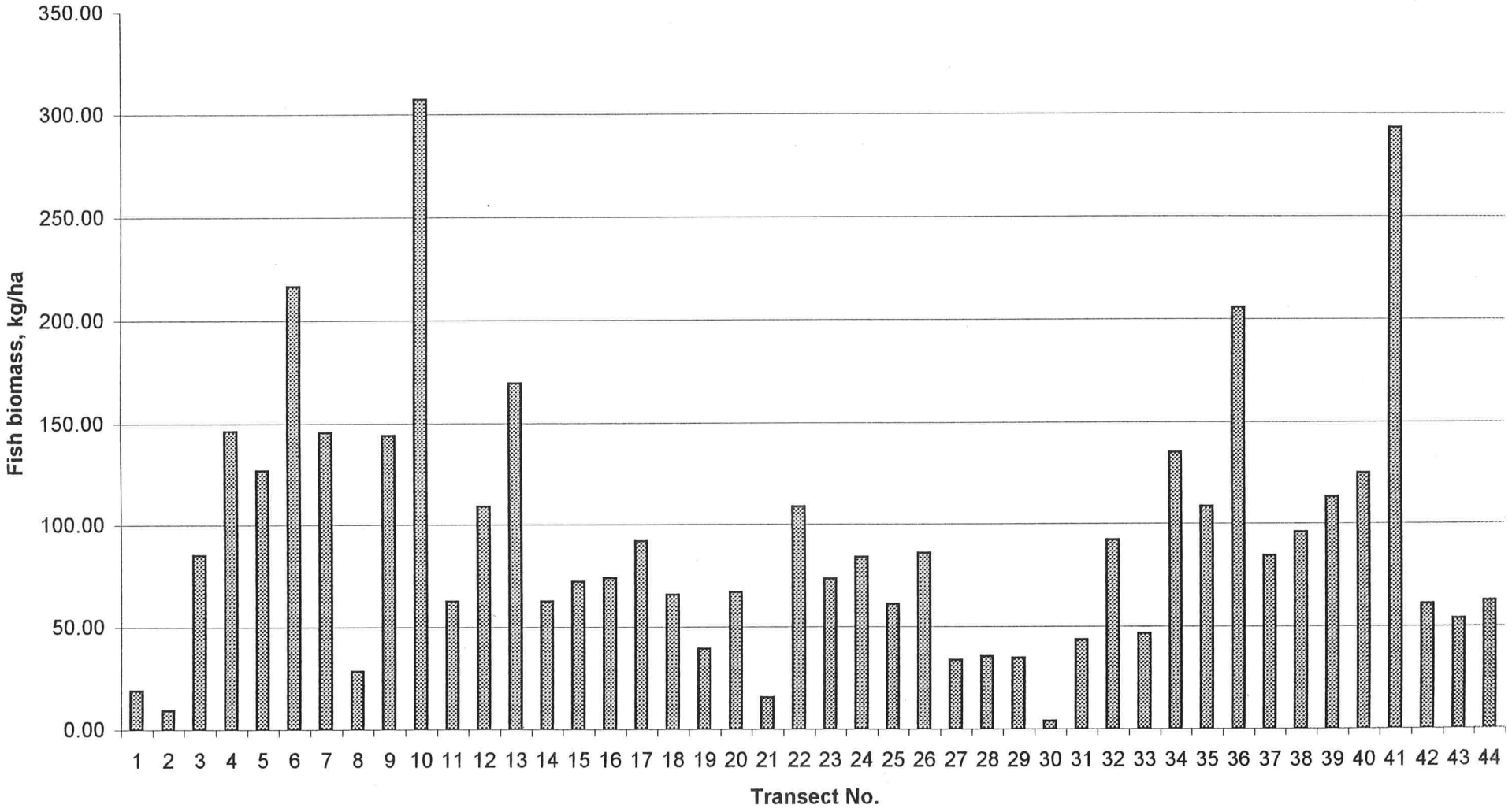


Fig. 20: Length frequency distribution of the fish recorded during the cruise 10.

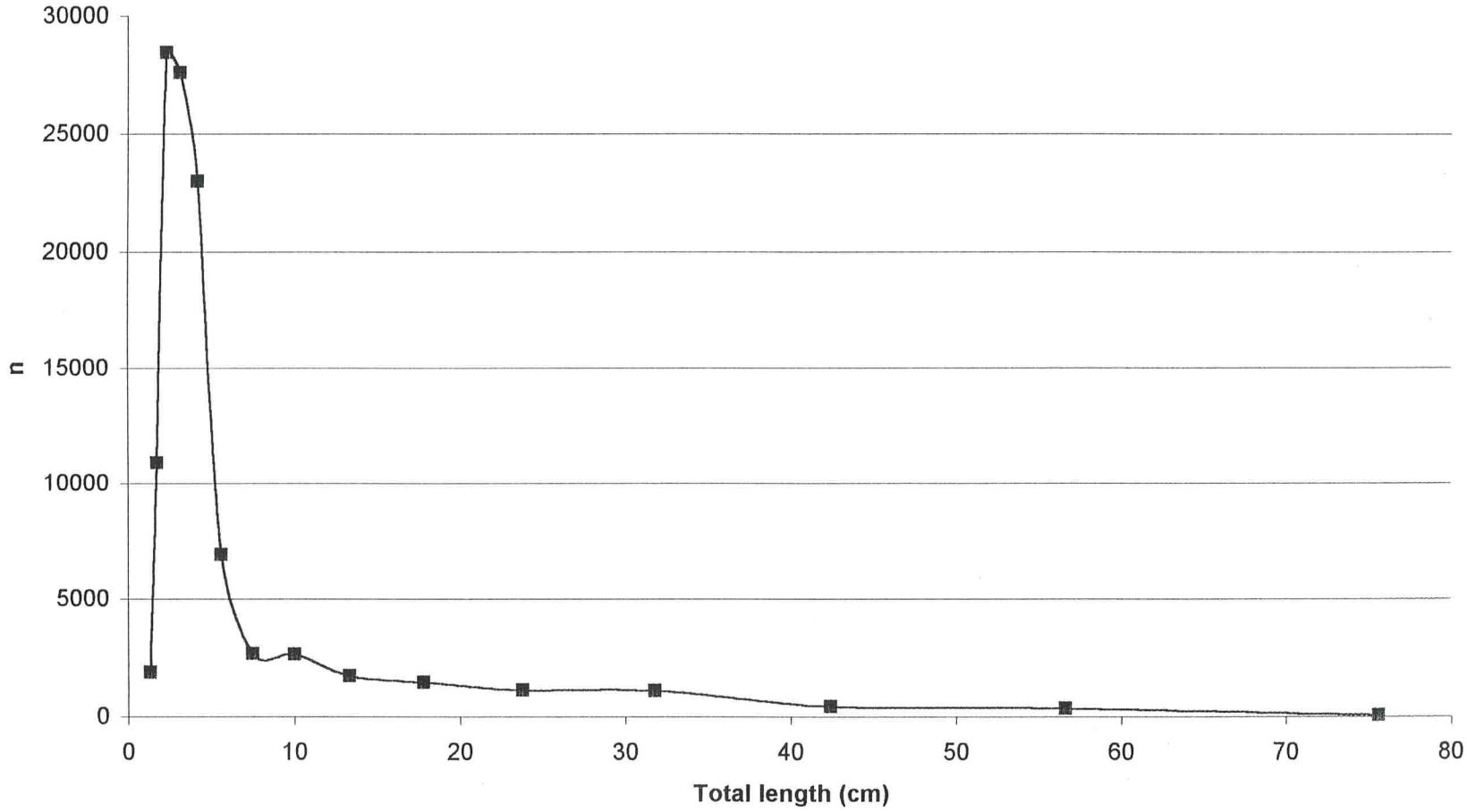


Fig. 21 : The distribution of fish biomass in Neusiedlersee along the cruise 11 in 1999.

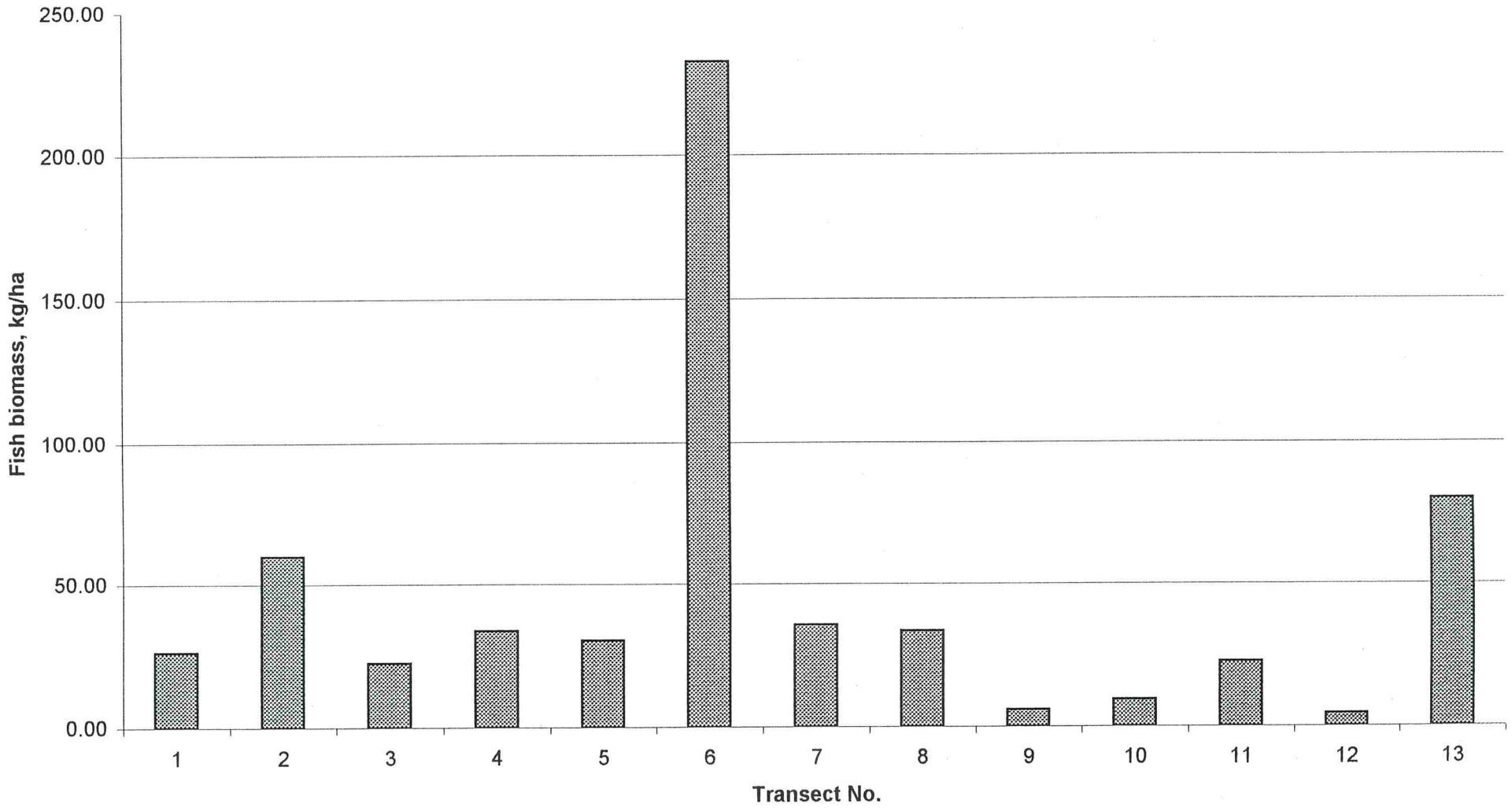
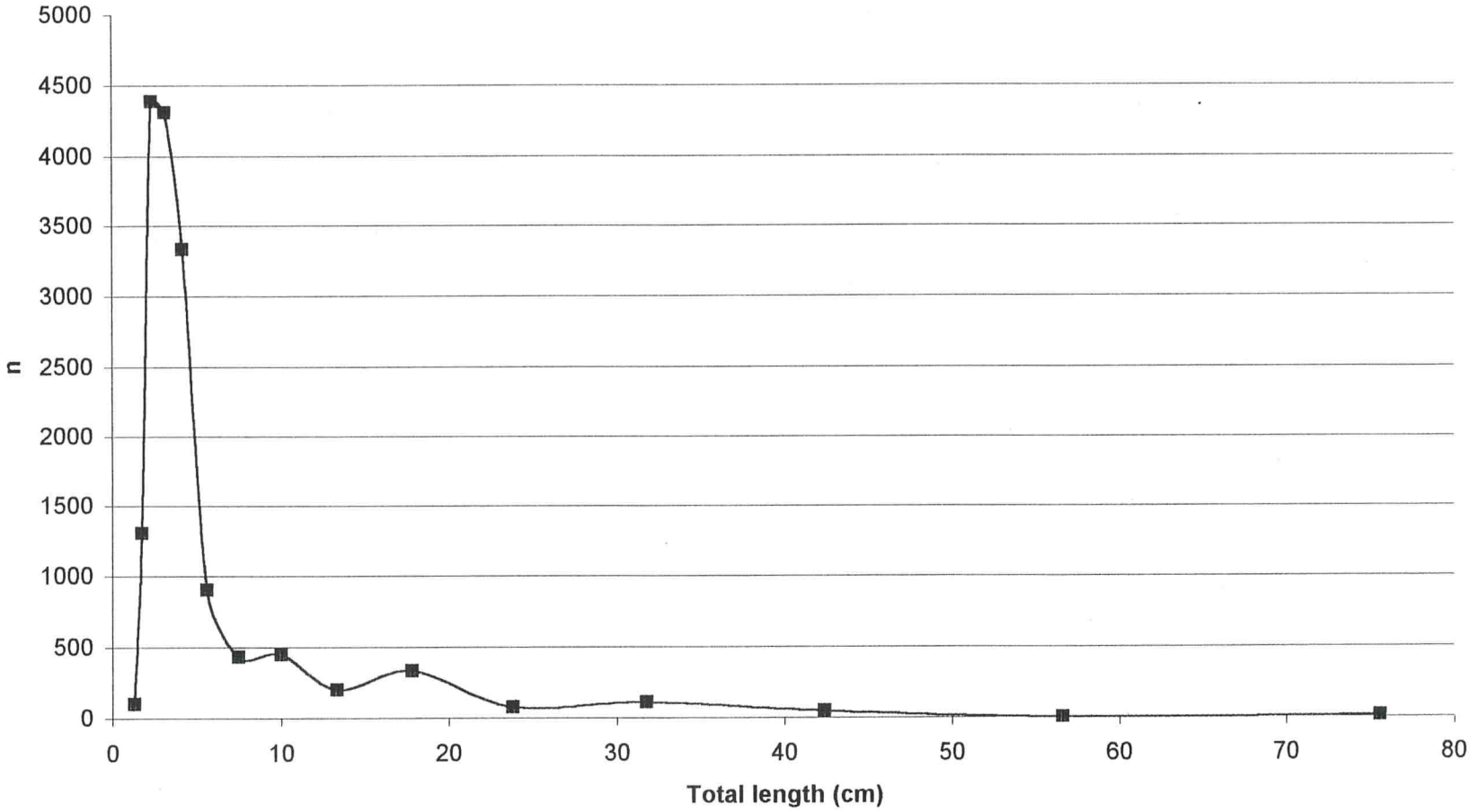


Fig. 22: Length frequency distribution of the fish recorded during the cruise 11.



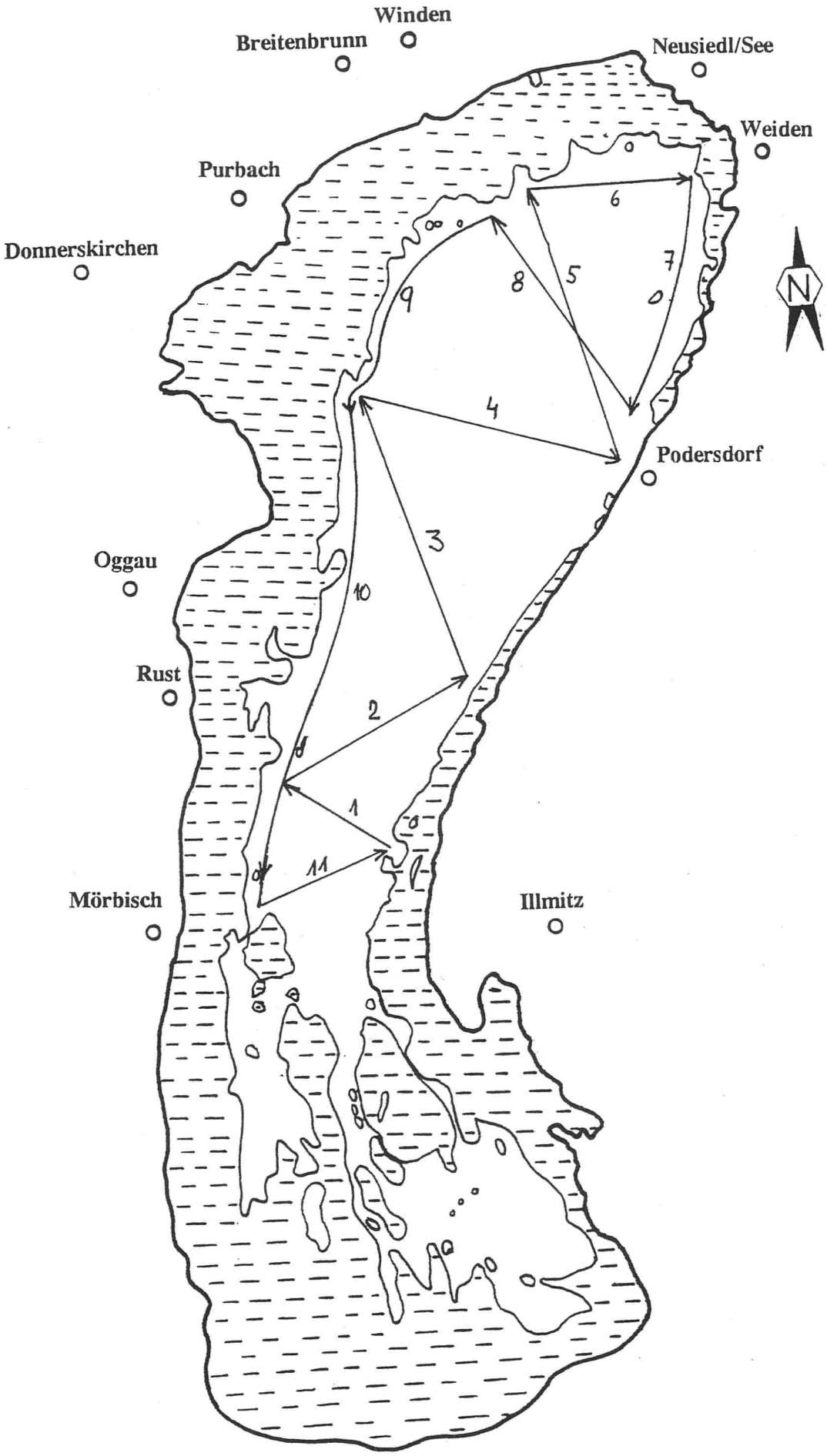


Fig. 23: Map of the Neusiedlersee showing the position of individual cruises of the 1999 survey.

Fig. 24 : Length frequency distribution of fish > 9 cm recorded during 11 cruises of 1999 survey.

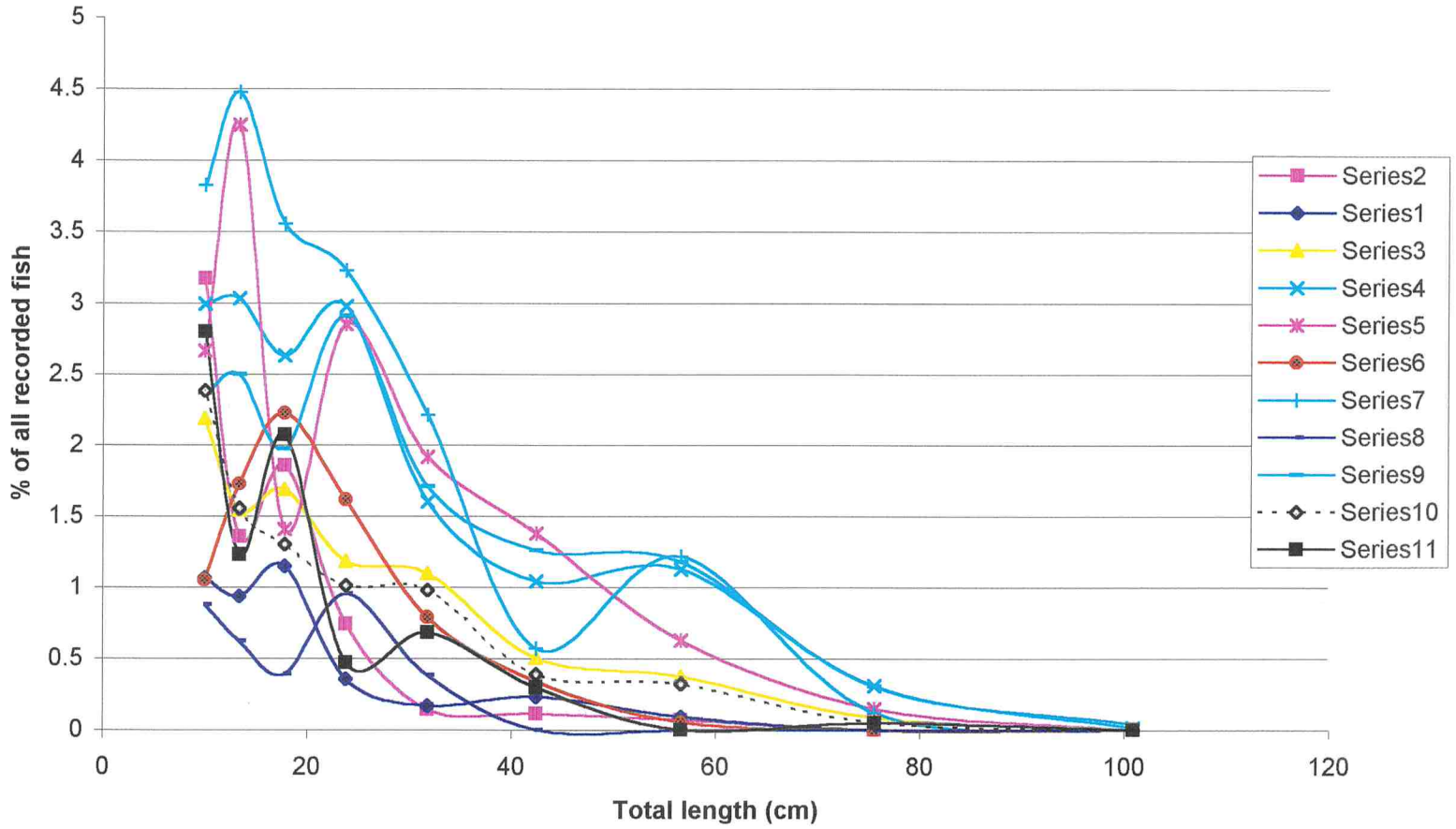


Fig. 25 : Length frequency distribution of fish > 9 cm recorded during 11 cruises of 1999 survey. The frequencies are given as absolute abundancies of individual age groups per lake hectare.

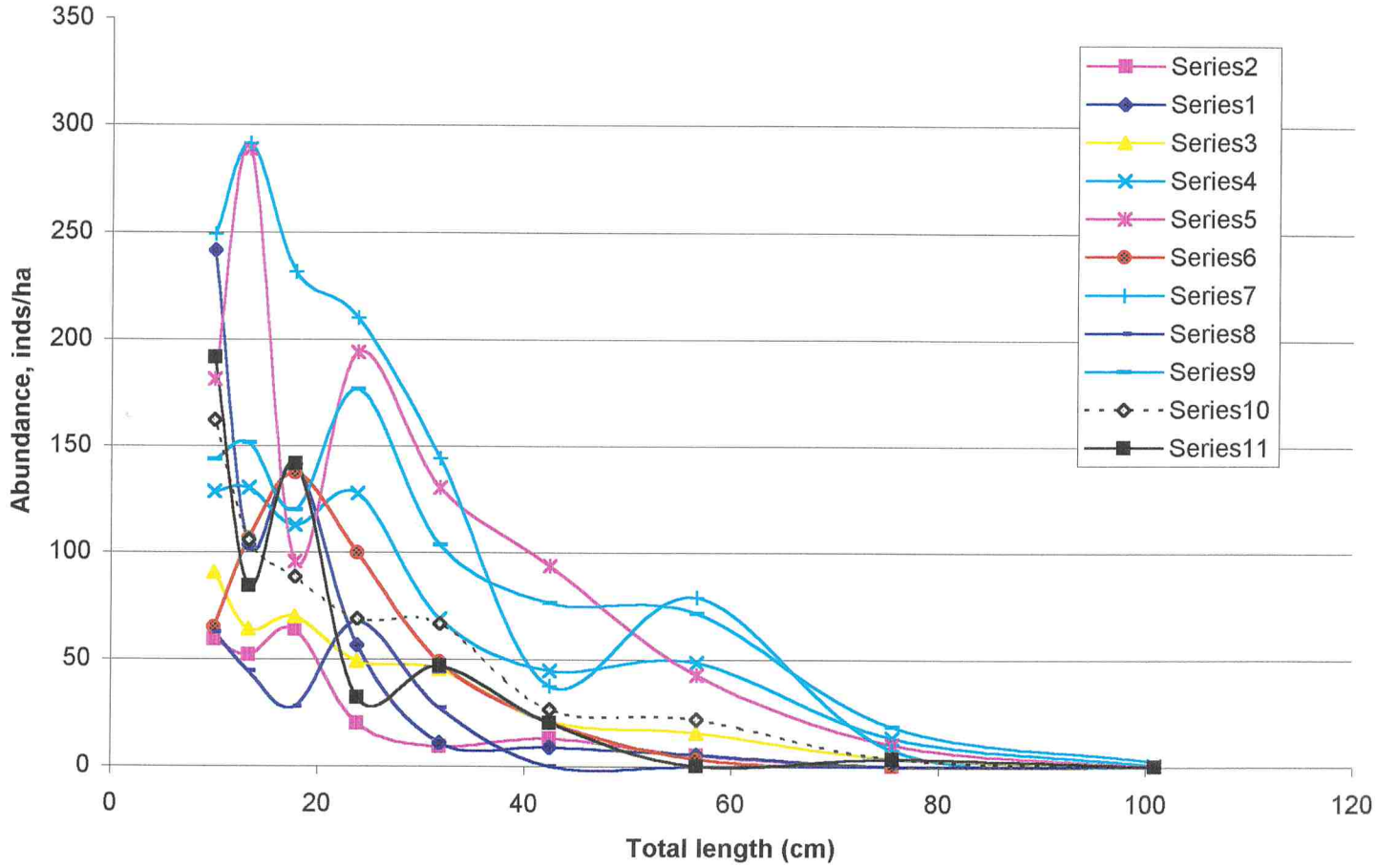


Fig. 26 : Length frequency distribution of all fish recorded during 11 cruises of 1999 survey. The frequencies are given as absolute abundancies of individual age groups per lake hectare.

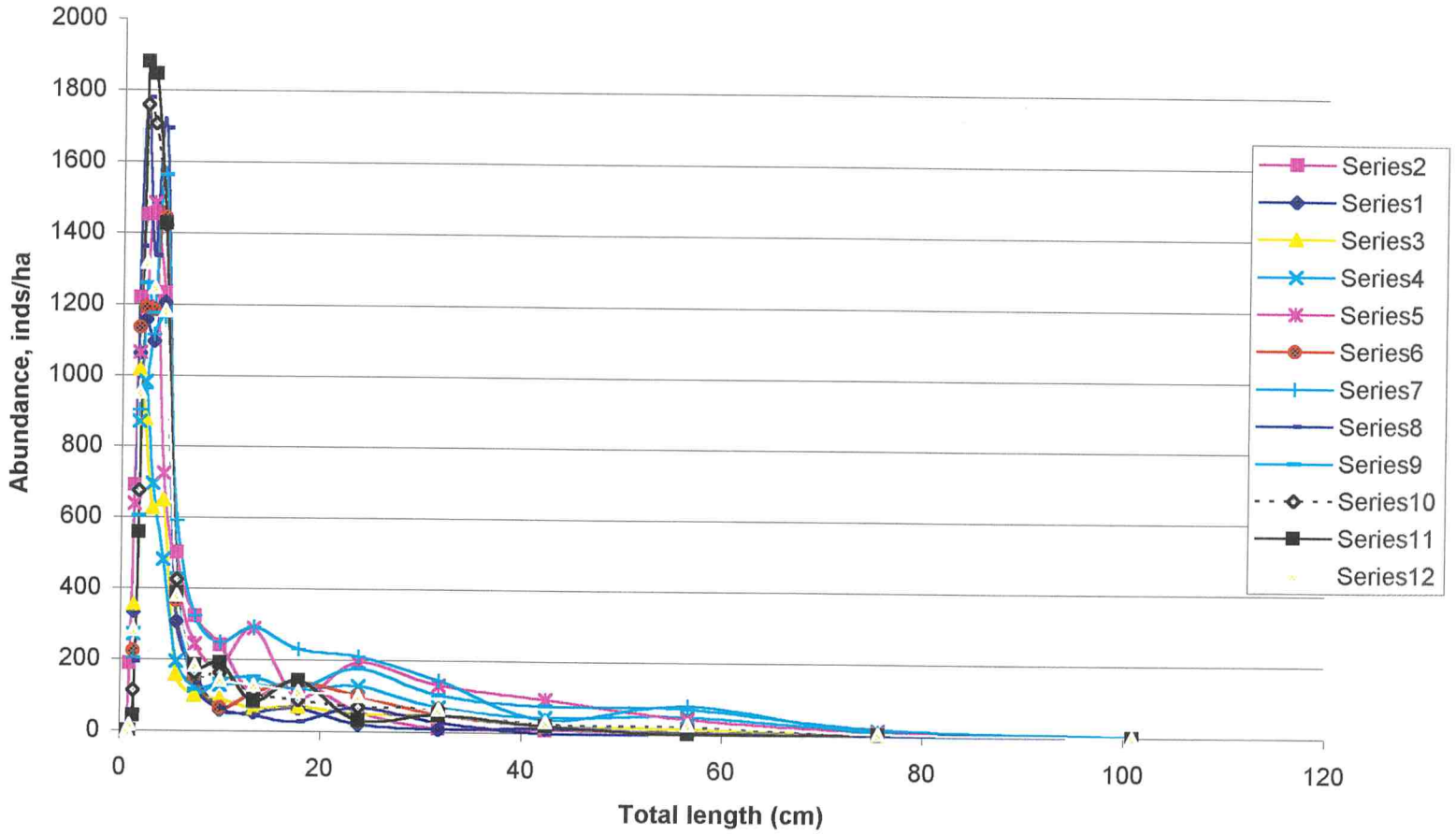


Fig. 27: Length frequency distribution of all fish recorded during 11 cruises of 1999 survey.

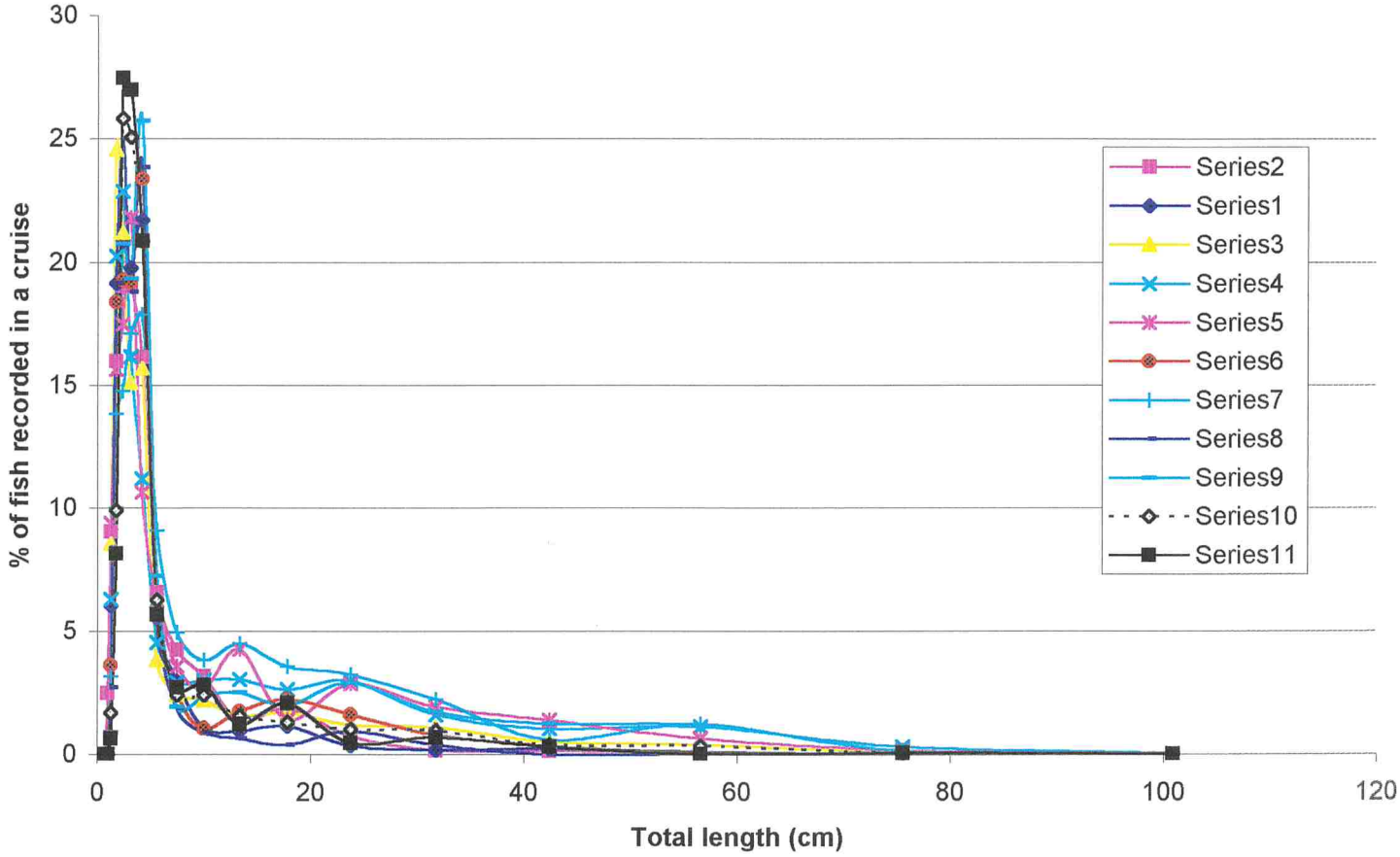


Fig. 28 : Length frequency distribution of fish <10 cm recorded during 11 cruises of 1999 survey. The frequencies are given as absolute abundancies of individual age groups per lake hectare.

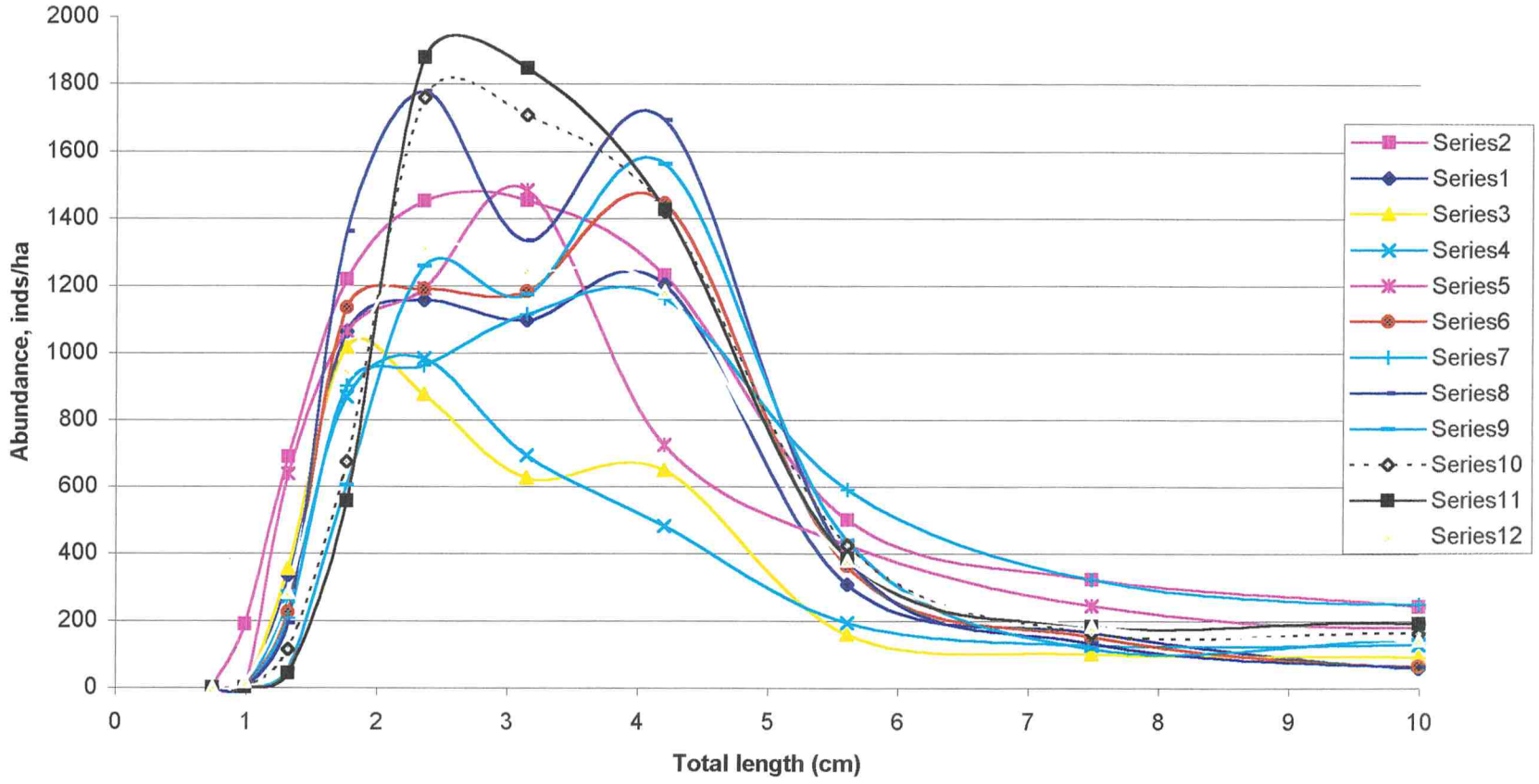


Table 1 : Summary of quantitative results of the night horizontal survey in the Neusedlersee, August 1999, Cruise 1.									
Transect				1	2	3	4	5	6	7
Number of pings				305	329	243	400	557	345	265
range start (m)				3.96	3.96	4.08	3.96	3.96	3.96	3.96
range end (m)				13.62	11.82	10.14	13.62	14.22	13.62	17.22
tot SA (m^2/ha)				14.32	7.297	2.901	3.863	3.372	6.882	7.89
single trac SA (m^2/ha)				9.507	4.238	1.952	2.938	2.729	5.95	3.39
Share of single tgts(%)				66.39	58.08	67.29	76.05	80.93	86.46	42.97
SV (m^2/m^3)				1.17969E-05	7.38796E-06	3.80959E-06	3.18237E-06	2.61543E-06	5.66944E-06	4.73518E-06
LogSV				-49.28	-51.31	-54.19	-54.97	-55.82	-52.46	-53.25
Aver BXS				2.98802E-05	1.97301E-05	8.26112E-06	8.67852E-06	7.34726E-06	7.64203E-06	9.3355E-06
fish/m^3				0.3948	0.3745	0.4611	0.3667	0.3560	0.7419	0.5072
fish/ha				7106.53	6740.11	8300.64	6600.51	6407.52	13353.78	9130.02
aver.w. (g)				10.15	5.62	1.39	2.23	2.47	2.04	1.42
biomass (kg/ha)				72.14	37.86	11.55	14.69	15.81	27.25	12.96
abund*volume(/1000)				16712.16	11026.07	6150.75	20356.93	31413.28	35522.09	38181.61
biomass*volume (/1000)				169.64	61.93	8.56	45.31	77.51	72.49	54.18
A1				0.297	0.297	0.306	0.297	0.297	0.297	0.297
B1				0.630	0.630	0.649	0.630	0.630	0.630	0.630
A2				1.023	0.887	0.761	1.023	1.068	1.023	1.293
B2				2.168	1.881	1.614	2.168	2.263	2.168	2.741
V1				0.194	0.194	0.212	0.194	0.194	0.194	0.194
V2				7.905	5.167	3.262	7.905	8.996	7.905	15.975
V/ping				7.710	4.972	3.049	7.710	8.802	7.710	15.781
V/total				2352	1636	741	3084	4903	2660	4182

TAB. 1 CONT.									
8	9	10	11	12	13		Average	SD	cv
626	600	287	215	600	773		426.54	180.9	42.41
3.96	3.96	3.96	3.96	3.96	3.96		3.97	0.033	0.84
16.02	13.62	12.42	13.62	11.22	11.2		13.26	1.953	14.73
11.861	7.749	3.466	6.35	1.698	2.343		6.15	3.784	61.50
5.296	5.025	2.289	4.747	0.847	1.837		3.90	2.277	58.33
44.65	64.85	66.04	74.76	49.88	78.40		65.90	13.8	20.94
7.82667E-06	6.38369E-06	3.26033E-06	5.23118E-06	1.86125E-06	2.57535E-06		0.00001	3E-06	54.09
-51.06	-51.95	-54.87	-52.81	-57.30	-55.89		-52.921983	-55.59	105.04
1.76739E-05	1.59695E-05	7.42708E-06	1.25664E-05	6.80641E-06	7.77948E-06		0.00001	7E-06	56.09
0.4428	0.3997	0.4390	0.4163	0.2735	0.3310		0.42	0.113	26.68
7971.09	7195.38	7901.61	7493.09	4922.19	5958.79		7621.63	2033	26.68
5.34	9.04	1.38	3.25	0.57	1.94		3.60	3.053	84.76
42.55	65.03	10.91	24.39	2.78	11.54		26.88	21.69	80.71
63215.16	33287.40	13152.35	12421.51	12477.09	19351.29	weighted abundan	7600.13		
337.45	300.86	18.15	40.43	7.05	37.47	weighted biomass	29.87		
0.297	0.297	0.297	0.297	0.297	0.297				
0.630	0.630	0.630	0.630	0.630	0.630				
1.203	1.023	0.933	1.023	0.842	0.841				
2.550	2.168	1.977	2.168	1.786	1.783				
0.194	0.194	0.194	0.194	0.194	0.194				
12.863	7.905	5.994	7.905	4.419	4.395				
12.669	7.710	5.800	7.710	4.225	4.201				
7931	4626	1665	1658	2535	3248		41218.73		

Table 1 : Length frequency distribution of fish in individual transects of the night horizontal survey in Neusiedlersee August 1999, Cruise 1.																			
TS (dB)	-15.5	-18.5	-21.5	-24.5	-27.5	-30.5	-33.5	-36.5	-39.5	-42.5	-45.5	-48.5	-51.5	-54.5	-57.5	-60.5	-63.5	-67	N
TL (cm)	100.9	75.6	56.61	42.4	31.76	23.79	17.8179	13.3458	9.99615	7.48721	5.608	4.20044	3.14617	2.35651	1.76505	1.32204	0.99022	0.74	
W (g)	8984.8	3631	1467	593	239.7	96.85	39.1398	15.8175	6.39227	2.58329	1.04398	0.4219	0.1705	0.0689	0.02785	0.01125	0.00455	0	
Trans.1	0	0	0	8.55	0	37.5	77	70.4	126	198	38.8	87.525	404.443	275.45	0	49.765	36.5675	0	1410
2	0	0	0	0	0	30	42	0	66	27.5	111.55	139.5	161.7	119	74.85	161.7	2.2	0	936
3	0	0	0	0	0	0	0	25.6	12	5.5	38.8	36	38.5	39.9	105.9	71.6	32.2	0	406
4	0	0	0	0	0	15	42	0	36	55	48.5	99	130.9	259	370.5	405.2	163.9	0	1625
5	0	0	0	8.55	0	0	7	44.8	54	115.5	101.85	200.025	310.118	427.7	676.35	721.315	168.793	0	2836
6	0	0	0	0	8	0	35	19.2	12	88	14.55	193.5	288.75	335.3	532.95	328.6	145.15	0	2001
7	0	0	0	0	0	6.5	0	19.2	84	44	194	248	343.5	356.6	97.2	0	0	0	1393
8	0	0	0	8.55	16	37.5	56	96	138	220	300.7	1009.8	783.15	621	201.3	0	0	0	3488
9	0	0	16	0	0	15	91	0	108	82.5	237.65	571.5	793.1	735	583.7	95.55	0	0	3329
10	0	0	0	0	0	0	32	0	0	0	72.75	256.5	227.15	261	174.5	62.1	0	0	1086
11	0	0	0	0	0	22.5	22	0	0	16.5	92.15	280	316.5	233	52.35	0	0	0	1035
12	0	0	0	0	0	0	0	0	6	66	160.05	240	180	136	133.95	0	0	0	922
13	0	0	0	0	8	0	7	25.6	60	16.5	43.65	216	242.55	415.2	532.9	108.6	0	0	1676
Total numbers for the transect																			0
Total	0	0	16	25.65	32	164	411	300.8	702	935	1455	3577.35	4220.36	4214.15	3536.45	2004.43	548.81	0	22143

Table 3 : Summary of quantitative results of the night horizontal survey in the Neusedlersee, August 1999, Cruise 2.								
Transect				1	2	3	4	5	6	7
Number of pings				762	744	741	658	740	741	671
range start (m)				3.96	3.96	3.96	3.96	3.96	3.96	3.96
range end (m)				12.42	13.02	12.42	13.02	11.22	11.82	10.02
tot SA (m^2/ha)				1.337	2.334	0.831	1.027	1.037	1.378	0.859
single trac SA (m^2/ha)				1.047	1.49	0.76	0.922	1.005	1.167	0.679
Share of single tgts(%)				78.31	63.84	91.46	89.78	96.91	84.69	79.05
SV (m^2/m^3)				1.25766E-06	2.0501E-06	7.81688E-07	9.0208E-07	1.1367E-06	1.39518E-06	1.12804E-06
LogSV				-59.00	-56.88	-61.07	-60.45	-59.44	-58.55	-59.48
Aver BXS				4.57459E-06	6.68125E-06	5.1774E-06	4.87449E-06	5.13836E-06	5.31129E-06	3.28839E-06
fish/m^3				0.2749	0.3068	0.1510	0.1851	0.2212	0.2627	0.3430
fish/ha				4948.62	5523.20	2717.66	3331.11	3981.93	4728.27	6174.66
aver.w. (g)				0.51	1.46	0.66	0.59	0.85	0.91	0.27
biomass (kg/ha)				2.51	8.04	1.80	1.96	3.38	4.30	1.67
abund*volume(/1000)				21869.84	27577.43	11679.36	14709.73	12448.83	17421.20	12235.42
biomass*volume (/1000)				11.11	40.14	7.72	8.65	10.56	15.86	3.31
A1				0.297	0.297	0.297	0.297	0.297	0.297	0.297
B1				0.630	0.630	0.630	0.630	0.630	0.630	0.630
A2				0.933	0.978	0.933	0.978	0.842	0.887	0.752
B2				1.977	2.072	1.977	2.072	1.786	1.881	1.595
V1				0.194	0.194	0.194	0.194	0.194	0.194	0.194
V2				5.994	6.905	5.994	6.905	4.419	5.167	3.147
V/ping				5.800	6.711	5.800	6.711	4.225	4.972	2.953
V/total				4419	4993	4298	4416	3126	3684	1982

			Table 3 continnues					
8	9	10	11	12	13	14	15	
248	600	325	345	630	405	261	643	
3.96	3.96	3.96	3.96	3.96	3.96	3.96	3.96	
13.02	8.82	9.42	9.42	9.12	14.22	9.42	15.42	
3.433	1.858	1.418	1.828	1.85	11.311	5.13	9.043	
2.169	0.608	0.633	0.676	0.714	7.57	2.836	7.482	
63.18	32.72	44.64	36.98	38.59	66.93	55.28	82.74	
3.01543E-06	3.04237E-06	2.06674E-06	2.66432E-06	2.85315E-06	8.77317E-06	7.477E-06	6.27958E-06	
-55.21	-55.17	-56.85	-55.74	-55.45	-50.57	-51.26	-52.02	
1.21074E-05	8.97524E-06	4.59315E-06	5.82427E-06	6.24141E-06	2.33879E-05	2.20988E-05	2.95862E-05	
0.2491	0.3390	0.4500	0.4575	0.4571	0.3751	0.3383	0.2122	
4483.01	6101.53	8099.31	8234.13	8228.39	6752.09	6090.20	3820.45	
1.85	0.74	0.29	0.45	0.69	12.99	5.09	15.99	
8.29	4.51	2.32	3.68	5.72	87.69	31.01	61.11	
7461.25	7147.38	6372.51	6877.26	11295.29	24069.20	3848.14	27702.03	weighted abundance
13.79	5.29	1.82	3.07	7.85	312.58	19.59	443.09	weighted biomass
0.297	0.297	0.297	0.297	0.297	0.297	0.297	0.297	
0.630	0.630	0.630	0.630	0.630	0.630	0.630	0.630	
0.978	0.662	0.707	0.707	0.685	1.068	0.707	1.158	
2.072	1.404	1.499	1.499	1.452	2.263	1.499	2.454	
0.194	0.194	0.194	0.194	0.194	0.194	0.194	0.194	
6.905	2.147	2.615	2.615	2.373	8.996	2.615	11.471	
6.711	1.952	2.421	2.421	2.179	8.802	2.421	11.277	
1664	1171	787	835	1373	3565	632	7251	

Table 3 continnues		
Average	SD	cv
567.60		
3.96	0	0.00
11.52	2.063	17.91
2.98	3.159	106.06
1.98	2.335	117.68
67.01	21.36	31.88
0.00000	3E-06	83.87
-55.245882	-56.01	101.38
0.00001	8E-06	83.83
0.31	0.098	31.91
5547.64	1770	31.91
2.89	4.89	169.28
15.20	25.59	168.40
4812.96		
20.46		
44196.23		

Table 4: Length frequency distribution of fish in individual transects of the night horizontal survey in Neusiedlersee August 1999, Cruise 2.																			
TS (dB)	-15.5	-18.5	-21.5	-24.5	-27.5	-30.5	-33.5	-36.5	-39.5	-42.5	-45.5	-48.5	-51.5	-54.5	-57.5	-60.5	-63.5	-67	N
TL (cm)	100.9	75.6	56.61	42.4	31.76	23.79	17.82	13.35	9.996	7.487	5.608	4.2	3.1462	2.3565	1.76505	1.322	0.99	0.74	
W (g)	8984.8	3631	1467	593	239.7	96.85	39.14	15.82	6.392	2.583	1.044	0.422	0.1705	0.0689	0.02785	0.0113	0.005	0	
Trans.1	0	0	0	0	0	0	7	12.8	12	38.5	101.9	310.5	308	567.6	476.9	125.85	0	0	1961
2	0	0	0	0	7	0	14	19.2	18	60.5	77.6	495	465.85	491.4	394.2	167.25	0	0	2210
3	0	0	0	0	0	0	14	0	18	27.5	43.65	342	431.2	231	309.7	130.95	0	0	1548
4	0	0	0	0	0	0	12	0	18	33	77.6	360	450.45	261	350.8	154.15	0	0	1717
5	0	0	0	0	0	6.5	0	0	6	55	19.4	162	179.03	319.5	317.2	68.375	0	0	1133
6	0	0	0	0	0	0	27	0	0	11	48.5	220.5	269.5	273	463	124.5	0	0	1437
7	0	0	0	0	0	0	0	6.4	0	33	4.85	112.5	184.8	304.8	361.1	110.55	0	0	1118
8	0	0	0	0	0	6.5	0	0	18	55	68	258	165	22.5	0	0	0	0	593
9	0	0	0	0	0	0	0	6.4	6	10	56	159	136	56.6	0	0	0	0	430
10	0	0	0	0	0	0	0	0	0	11	19.4	72	78	80	90.6	0	0	0	351
11	0	0	0	0	0	0	0	0	0	22	67.9	36	102	58	87.1	0	0	0	373
12	0	0	0	0	0	0	6	0	0	22	53.35	192	180	120	103.65	0	0	0	677
13	0	0	8	0	24	45.5	0	51.2	30	16.5	150.4	414	298.38	459.9	240.7	60.475	0	0	1799
14	0	0	0	0	0	0	27	0	17	0	16	117	12	54	0	0	0	0	243
15	0	0	9	42.75	0	7.5	105	76.8	54	148.5	218.3	757.1	389.81	554.1	342.1	171.06	0	0	2876
Total numbers for the transect																			0
Total	0	0	17	42.75	31	66	212	172.8	197	543.5	1023	4008	3650	3853.4	3537.05	1113.2	0	0	18466

Table 5: Summary of quantitative results of the night horizontal survey in the Neusedlersee, Sept.1999, Cruise 3.								
Transect	1	2	3	4	5	6	7
Number of pings	590	235	421	335	699	1072	345
range start (m)	3.96	3.96	3.96	3.96	3.96	3.96	3.6
range end (m)	13.02	11.82	16.02	14.46	14.16	12.66	15.66
tot SA (m^2/ha)	4.684	1.639	3.733	1.93	5.9	5.262	3.96
single trac SA (m^2/ha)	4.056	1.453	2.635	1.413	4.253	3.893	2.586
Share of single tgts(%)	86.59	88.65	70.59	73.21	72.08	73.98	65.30
SV (m^2/m^3)	4.11426E-06	1.65943E-06	2.46328E-06	1.46275E-06	4.60315E-06	4.81321E-06	2.61307E-06
LogSV	-53.86	-57.80	-56.08	-58.35	-53.37	-53.18	-55.83
Aver BXS	1.57032E-05	8.05776E-06	1.08558E-05	6.28076E-06	2.16048E-05	1.50431E-05	9.47411E-06
fish/m^3	0.2620	0.2059	0.2269	0.2329	0.2131	0.3200	0.2758
fish/ha	4716.02	3706.95	4084.37	4192.10	3835.10	5759.29	4964.61
aver.w. (g)	5.70	1.32	2.57	1.14	12.39	4.40	1.81
biomass (kg/ha)	26.86	4.88	10.49	4.76	47.51	25.31	8.97
abund*volume(/1000)	18673.15	4331.54	21783.95	13011.27	23291.12	37994.20	20329.29
biomass*volume (/1000)	106.36	5.71	55.97	14.78	288.51	167.00	36.73
A1	0.297	0.297	0.297	0.297	0.297	0.297	0.270
B1	0.630	0.630	0.630	0.630	0.630	0.630	0.573
A2	0.978	0.887	1.203	1.086	1.063	0.951	1.176
B2	2.072	1.881	2.550	2.301	2.254	2.015	2.492
V1	0.194	0.194	0.194	0.194	0.194	0.194	0.146
V2	6.905	5.167	12.863	9.459	8.883	6.348	12.015
V/ping	6.711	4.972	12.669	9.265	8.688	6.154	11.869
V/total	3960	1168	5333	3104	6073	6597	4095

							Table 5 continnues	
8	9	10	11	12	13	14	15	16
722	1025	340	756	959	993	929	1175	440
3.6	3.6	4.14	3.96	3.96	3.96	3.96	3.96	3.96
12.66	13.86	16.8	11.22	14.82	14.82	15.42	11.22	13.02
4.086	10.217	6.484	6.017	6.645	8.796	9.359	6.815	8.791
3.062	8.429	4.099	3.554	4.095	6.416	5.837	4.784	6.873
74.94	82.50	63.22	59.07	61.63	72.94	62.37	70.20	78.18
3.589E-06	7.92463E-06	4.07579E-06	6.59548E-06	4.86932E-06	6.44553E-06	6.49902E-06	7.4702E-06	7.7217E-06
-54.45	-51.01	-53.90	-51.81	-53.13	-51.91	-51.87	-51.27	-51.12
1.86411E-05	3.19087E-05	1.26126E-05	1.32903E-05	1.73924E-05	3.5291E-05	3.48033E-05	4.07763E-05	3.11752E-05
0.1925	0.2484	0.3232	0.4963	0.2800	0.1826	0.1867	0.1832	0.2477
3465.57	4470.36	5816.73	8932.76	5039.43	3287.51	3361.24	3297.59	4458.37
7.75	19.21	3.44	4.76	8.34	29.52	21.06	25.13	21.29
26.88	85.86	20.01	42.50	42.02	97.05	70.80	82.85	94.91
15518.93	37499.88	28899.37	28530.62	48275.88	32609.70	35212.83	16369.62	13164.95
120.35	720.24	99.43	135.75	402.53	962.65	741.75	411.30	280.26
0.270	0.270	0.311	0.297	0.297	0.297	0.297	0.297	0.297
0.573	0.573	0.659	0.630	0.630	0.630	0.630	0.630	0.630
0.951	1.041	1.261	0.842	1.113	1.113	1.158	0.842	0.978
2.015	2.206	2.674	1.786	2.359	2.359	2.454	1.786	2.072
0.146	0.146	0.222	0.194	0.194	0.194	0.194	0.194	0.194
6.348	8.330	14.835	4.419	10.183	10.183	11.471	4.419	6.905
6.202	8.184	14.613	4.225	9.989	9.989	11.277	4.225	6.711
4478	8389	4968	3194	9580	9919	10476	4964	2953

				Table 5 continnues				
17	18	19	20	21	22	23	24	25
365	1062	941	987	315	260	305	188	1045
3.96	3.96	3.96	3.96	3.96	3.96	3.96	3.96	3.96
13.62	13.62	15.42	14.82	11.22	10.62	11.22	11.22	12.42
13.047	7.731	11.602	13.87	1.998	3.329	4.411	2.035	8.544
7.508	5.021	9.466	11.473	1.229	1.809	2.495	1.056	5.78
57.55	64.95	81.59	82.72	61.51	54.34	56.56	51.89	67.65
1.07482E-05	6.36886E-06	8.05659E-06	1.01636E-05	2.19009E-06	3.9778E-06	4.83508E-06	2.23065E-06	8.037E-06
-49.69	-51.96	-50.94	-49.93	-56.60	-54.00	-53.16	-56.52	-50.95
4.70216E-05	2.414E-05	2.73684E-05	4.37609E-05	9.18625E-06	2.17998E-05	2.08434E-05	1.16026E-05	3.87303E-05
0.2286	0.2638	0.2944	0.2323	0.2384	0.1825	0.2320	0.1923	0.2075
4114.44	4748.93	5298.76	4180.57	4291.37	3284.44	4175.49	3460.56	3735.21
38.00	11.26	18.48	30.14	1.72	6.94	6.37	2.09	22.07
156.36	53.47	97.95	125.99	7.40	22.80	26.59	7.22	82.44
11579.21	38886.20	56227.63	41217.67	5710.98	3034.16	5380.36	2748.58	22637.98
440.05	437.80	1039.35	1242.14	9.84	21.06	34.27	5.73	499.66
0.297	0.297	0.297	0.297	0.297	0.297	0.297	0.297	0.297
0.630	0.630	0.630	0.630	0.630	0.630	0.630	0.630	0.630
1.023	1.023	1.158	1.113	0.842	0.797	0.842	0.842	0.933
2.168	2.168	2.454	2.359	1.786	1.690	1.786	1.786	1.977
0.194	0.194	0.194	0.194	0.194	0.194	0.194	0.194	0.194
7.905	7.905	11.471	10.183	4.419	3.747	4.419	4.419	5.994
7.710	7.710	11.277	9.989	4.225	3.553	4.225	4.225	5.800
2814	8188	10611	9859	1331	924	1289	794	6061

TABS CONT.							
26	27	28	29	30	31	32	
1081	335	601	199	175	600	245	
3.96	3.96	3.96	3.96	3.96	3.96	3.96	
14.22	16.62	15.42	15.42	14.34	14.22	13.62	
10.909	12.932	13.424	10.806	6.426	8.925	8.507	
7.939	7.189	9.194	5.089	5.58	6.651	6.352	
72.77	55.59	68.49	47.09	86.83	74.52	74.67	
8.46137E-06	8.12896E-06	9.32181E-06	7.50384E-06	4.92659E-06	6.92251E-06	7.00813E-06	
-50.73	-50.90	-50.30	-51.25	-53.07	-51.60	-51.54	
4.33682E-05	1.92754E-05	4.37443E-05	6.0112E-05	2.60222E-05	3.7674E-05	3.51293E-05	
0.1951	0.4217	0.2131	0.1248	0.1893	0.1837	0.1995	
3511.90	7591.09	3835.76	2246.95	3407.81	3307.46	3590.91	
36.58	7.84	30.40	32.93	14.11	24.56	17.60	
128.46	59.55	116.60	74.00	48.10	81.22	63.22	
33414.54	36031.18	25996.31	5042.35	5386.03	17466.83	6783.38	weighted abundance
1222.22	282.66	790.21	166.06	76.02	428.91	119.42	weighted biomass
0.297	0.297	0.297	0.297	0.297	0.297	0.297	
0.630	0.630	0.630	0.630	0.630	0.630	0.630	
1.068	1.248	1.158	1.158	1.077	1.068	1.023	
2.263	2.645	2.454	2.454	2.282	2.263	2.168	
0.194	0.194	0.194	0.194	0.194	0.194	0.194	
8.996	14.363	11.471	11.471	9.226	8.996	7.905	
8.802	14.169	11.277	11.277	9.031	8.802	7.710	
9515	4747	6777	2244	1580	5281	1889	

	Table 5 continnues	
Average	SD	cv
616.88		
3.93	0.113	2.87
13.74	1.734	12.62
7.28	3.61	49.62
5.04	2.639	52.36
69.19	10.75	15.53
0.00001	3E-06	43.64
-52.361021	-55.96	106.88
0.00003	1E-05	52.91
0.24	0.073	30.23
4317.80	1305	30.23
14.72	11.56	78.58
57.59	41.35	71.80
4370.30		
69.66		
163155.95		

Table 6: Length frequency distribution of fish in individual transects of the night horizontal survey in Neusiedlersee August 1999, Cruise 3.

	TS (dB)	-15.5	-18.5	-21.5	-24.5	-27.5	-30.5	-33.5	-36.5	-39.5	-42.5	-45.5	-48.5	-51.5	-54.5	-57.5	-60.5	-63.5	-67	N
	TL (cm)	100.9	75.6	56.61	42.4	31.76	23.79	17.82	13.35	9.996	7.487	5.608	4.2	3.1462	2.3565	1.76505	1.322	0.99	0.74	
	W (g)	8984.8	3631	1467	593	239.7	96.85	39.14	15.82	6.392	2.583	1.044	0.422	0.1705	0.0689	0.02785	0.0113	0.005	0	
	Trans.1	0	0	0	0	24	35.5	0	38.8	0	66	97	414	490.88	137.1	377.6	137.13	0	0	1818
	2	0	0	0	0	0	0	7	12.8	0	11	58.2	112.5	65.45	72.6	103.2	37.25	0	0	480
	3	0	0	0	0	8	15	7	32	36	132	194	567	488.95	177	252	141.05	0	0	2050
	4	0	0	0	0	0	6.5	0	32	12	27.5	43.65	211.5	213.68	319.5	311.7	130.98	0	0	1309
	5	0	0	9	17.1	16	6.5	0	64	78	77	58.2	413.6	410.41	472.5	589.6	200.14	0	0	2412
	6	0	0	0	0	8	22.5	63	51.2	90	11	87.3	139.5	144.38	297.9	691.8	257.43	0	0	1864
	7	0	0	0	0	0	0	42	0	6	82.5	116.4	261	115.5	258	222.2	98.4	0	0	1202
	8	0	0	0	8.55	0	7.5	42	24.6	0	88	24.25	65.03	100.29	200.7	256.7	233.38	0	0	1051
	9	0	0	9	51.3	0	98	0	25.6	30	33	164.9	363.2	497.81	631.2	711.4	210.65	0	0	2826
	10	0	0	0	0	0	30	57	0	0	55	63.05	342	392.7	414	231.9	39.35	0	0	1625
	11	0	0	0	0	16	22.5	19	0	36	11	29.1	144	386.93	409.5	441.975	0	0	0	1516
	12	0	0	8	0	24	7.5	89	0	204	0	72.75	432	375.38	688.5	728.5	176.38	0	0	2806
	13	0	9	30	0	0	22.5	94	0	66	93.5	184.3	486	175.18	670.5	750.4	254.63	0	0	2836
	14	0	0	27	8.55	32	52.5	14	198.4	24	60.5	63.05	690.5	450.64	588.3	523.7	206.83	0	0	2940
	15	0	0	18	0	16	37.5	77	32	84	0	0	103.5	136.68	310.5	486	212.83	0	0	1514
	16	0	0	8	0	32	0	7	10.8	0	33	4.85	121.5	219.45	213.6	227.9	63.9	0	0	942
	17	0	0	16	7.55	0	0	7	12.8	36	27.5	24.25	146	56.018	129.6	176.1	120.16	0	0	759
	18	0	0	0	17.1	55	0	84	44.8	48	33	48.5	328.1	227.54	552.6	730.6	317.82	0	0	2487
	19	0	9	0	8.55	40	59	0	38.4	30	153	0	528.5	360.17	772.8	686.8	267.76	0	0	2954
	20	0	9	9	17.1	80	37.5	0	64	114	66	140.7	256.1	344.96	748.5	640.7	164.54	0	0	2692
	21	0	0	0	0	0	0	7	12.8	6	22	9.7	54	15.4	99.6	98.2	33.3	0	0	358
	22	0	0	0	0	0	15	0	19.2	0	5.5	9.7	45	53.9	2.4	72	38.3	0	0	261
	23	0	0	0	0	0	15	14	11.8	0	11	43.65	73	0	45.6	128.3	18.65	0	0	361
	24	0	0	0	0	0	0	0	19.2	6	5.5	4.85	36	30.45	0	61.3	20.7	0	0	184
	25	0	0	0	51.3	40	7.5	61	0	36	55	92.15	156.2	207.13	550.5	529.7	195.57	0	0	1982
	26	0	18	18	17.1	8	37.5	62	0	89	0	126.1	503.6	637.56	643.5	785.8	87.89	0	0	3034
	27	0	0	0	0	40	0	14	32	42	22	14.55	211.5	315.7	306	338.9	85.35	0	0	1422
	28	0	0	27	0	24	60	23	0	10	0	77.6	220.5	257.95	372	448.8	203.15	0	0	1724
	29	0	0	0	17.1	26	0	0	0	0	0	19.4	130.1	65.835	69	139.2	33.415	0	0	500
	30	0	0	0	7.55	0	0	9	0	0	0	14.55	47.03	59.868	81	98.9	28.108	0	0	346
	31	0	0	9	17.1	36	0	40	0	18	38.5	9.7	188.6	200.59	303	349.6	170.97	0	0	1381
	32	0	0	0	7.55	27	0	9	0	0	0	19.4	92.03	102.22	114	153.2	122.61	0	0	647
		Total numbers for the cruise																		0
	Total	0	45	188	253.5	552	595.5	848	777.2	1101	1220	1916	7883	7599.6	10652	12344.7	4308.6	0	0	50283

Table 7 : Summary of quantitative results of the night horizontal survey in the Neusedlersee, Aug.1999, Cruise 4.

Transect	1	2	3	4	5	6	7	8	9
Number of pings	325	765	301	600	454	667	279	1000	1070
range start (m)	3.96	3.96	3.96	3.96	3.96	3.96	3.96	3.96	3.96
range end (m)	13.02	11.82	10.62	11.22	15.42	15.78	16.02	16.02	15.72
tot SA (m^2/ha)	15.231	10.367	13.896	11.132	14.846	22.631	19.492	19.469	40.01
single trac SA (m^2/ha)	10.122	7.468	9.392	10.327	9.516	19.135	12.425	15.627	32.782
Share of single tgts(%)	66.46	72.04	67.59	92.77	64.10	84.55	63.74	80.27	81.93
SV (m^2/m^3)	1.338E-05	1.05E-05	1.66E-05	1.22E-05	1.031E-05	1.524E-05	1.286E-05	1.285E-05	2.707E-05
LogSV	-48.74	-49.79	-47.80	-49.14	-49.87	-48.17	-48.91	-48.91	-45.67
Aver BXS	4.928E-05	5.541E-05	7.412E-05	4.849E-05	4.091E-05	5.996E-05	3.72E-05	8.086E-05	0.000115
fish/m^3	0.2715	0.1894	0.2240	0.2516	0.2520	0.2541	0.3457	0.1589	0.2353
fish/ha	4886.77	3409.92	4032.27	4529.60	4535.42	4573.74	6222.97	2859.70	4236.27
aver.w. (g)	24.06	35.24	69.55	30.04	31.46	43.11	18.13	80.39	82.70
biomass (kg/ha)	117.57	120.17	280.43	136.08	142.66	197.17	112.83	229.88	350.34
abund*volume(/1000)	10658.48	12970.71	4312.41	11481.93	23219.86	36910.58	21995.37	36228.42	54209.81
biomass*volume (/1000)	256.43	457.12	299.91	344.94	730.40	1591.15	398.82	2912.24	4483.14
A1	0.297	0.297	0.297	0.297	0.297	0.297	0.297	0.297	0.297
B1	0.630	0.630	0.630	0.630	0.630	0.630	0.630	0.630	0.630
A2	0.978	0.887	0.797	0.842	1.158	1.185	1.203	1.203	1.180
B2	2.072	1.881	1.690	1.786	2.454	2.512	2.550	2.550	2.502
V1	0.194	0.194	0.194	0.194	0.194	0.194	0.194	0.194	0.194
V2	6.905	5.167	3.747	4.419	11.471	12.293	12.863	12.863	12.154
V/ping	6.711	4.972	3.553	4.225	11.277	12.099	12.669	12.669	11.959
V/total	2181	3804	1069	2535	5120	8070	3535	12669	12797

Table 7 continnues

10	11	12	13	14	15	16	17	18	19	20
1024	1004	991	1029	583	452	912	883	919	885	920
3.96	3.96	3.96	3.96	3.96	3.56	3.96	3.96	3.96	4	4
16.02	17.94	17.94	16.02	15.42	18	18	18	18	19	19
18.384	27.56	15.57	9.101	10.15	13.504	17.964	22.892	28.527	32.481	34.7476
12.788	20.913	11.19	5.702	8.014	10.089	12.507	16.045	20.521	16.757	20.172
69.56	75.88	71.87	62.65	78.96	74.71	69.62	70.09	71.94	51.59	58.05
1.213E-05	1.569E-05	8.863E-06	6.005E-06	7.048E-06	7.442E-06	1.018E-05	1.298E-05	1.617E-05	1.723E-05	1.843E-05
-49.16	-48.04	-50.52	-52.21	-51.52	-51.28	-49.92	-48.87	-47.91	-47.64	-47.34
5.714E-05	7.634E-05	3.679E-05	4.561E-05	4.045E-05	4.327E-05	5.42E-05	6.771E-05	7.334E-05	6.185E-05	6.183E-05
0.2123	0.2055	0.2409	0.1317	0.1742	0.1720	0.1879	0.1916	0.2205	0.2786	0.2982
3821.49	3698.88	4336.86	2369.94	3136.10	3095.76	3381.68	3449.11	3968.34	5014.91	5366.74
38.82	60.51	22.58	34.86	31.02	35.89	40.08	50.36	54.61	42.64	45.62
148.37	223.83	97.92	82.61	97.27	111.11	135.53	173.69	216.71	213.83	244.85
49574.94	66363.03	76801.85	30894.51	20617.92	25333.91	55673.35	54977.84	65833.01	94351.18	104963.79
1924.70	4015.80	1734.14	1076.88	639.50	909.30	2231.20	2768.60	3595.09	4022.93	4788.88
0.297	0.297	0.297	0.297	0.297	0.267	0.297	0.297	0.297	0.300	0.300
0.630	0.630	0.630	0.630	0.630	0.567	0.630	0.630	0.630	0.637	0.637
1.203	1.347	1.347	1.203	1.158	1.352	1.352	1.352	1.352	1.427	1.427
2.550	2.855	2.855	2.550	2.454	2.865	2.865	2.865	2.865	3.024	3.024
0.194	0.194	0.194	0.194	0.194	0.141	0.194	0.194	0.194	0.200	0.200
12.863	18.064	18.064	12.863	11.471	18.246	18.246	18.246	18.246	21.459	21.459
12.669	17.870	17.870	12.669	11.277	18.105	18.052	18.052	18.052	21.259	21.259
12973	17941	17709	13036	6574	8183	16463	15940	16590	18814	19558

		Table 7 continnues					
21	22	23	24		Average	SD	cv
498	452	1076	940		751.21		
4	4	4	4		3.95	0.086	2.17
16.66	14.86	14.86	14.26		15.82	2.338	14.78
26.029	18.535	21.823	14.141		19.94	8.177	41.01
16.99	8.432	12.816	8.255		13.67	6.044	44.23
65.27	45.49	58.73	58.38		69.01	10.67	15.46
1.636E-05	1.358E-05	1.599E-05	1.097E-05		0.00001	4E-06	33.47
-47.86	-48.67	-47.96	-49.60		-48.749445	-53.5	109.75
5.765E-05	3.997E-05	5.336E-05	3.532E-05		0.00006	2E-05	31.96
0.2838	0.3398	0.2997	0.3105		0.24	0.057	23.98
5108.87	6116.17	5394.11	5589.24		4297.29	1031	23.98
39.63	22.30	29.83	16.54		40.83	17.97	44.00
202.45	136.42	160.92	92.46		167.71	67.07	39.99
36297.61	27827.34	58423.26	46611.99	weighted abundance	4166.37		
1438.36	620.67	1742.95	771.11	weighted biomass	177.58		
0.300	0.300	0.300	0.300				
0.637	0.637	0.637	0.637				
1.251	1.116	1.116	1.071				
2.652	2.365	2.365	2.270				
0.200	0.200	0.200	0.200				
14.467	10.266	10.266	9.072				
14.267	10.066	10.066	8.872				
7105	4550	10831	8340		246385.69		

Table 3 : Length frequency distribution of fish in individual transects of the night horizontal survey in Neusiedlersee Aug. 1999, Cruise 4.

TS (dB)	-15.5	-18.5	-21.5	-24.5	-27.5	-30.5	-33.5	-36.5	-39.5	-42.5	-45.5	-48.5	-51.5	-54.5	-57.5	-60.5	-63.5	-67	N
TL (cm)	100.9	75.6	56.61	42.4	31.76	23.79	17.82	13.35	9.996	7.487	5.608	4.2	3.1462	2.3565	1.76505	1.322	0.99	0.74	
W (g)	8984.8	3631	1467	593	239.7	96.85	39.14	15.82	6.392	2.583	1.044	0.422	0.1705	0.0689	0.02785	0.0113	0.005	0	
Trans.1	0	0	0	0	61	22	0	0	18	52	0	49.5	161.7	39	272	33.8	0	0	709
2	0	0	18	0	32	67.5	0	19.2	66	66.5	0	36	171.33	222.9	263.4	217.18	0	0	1180
3	0	0	15	0	0	13	0	4.4	0	0	0	27	38.5	97.8	94.8	45.5	0	0	336
4	0	0	0	42.75	8	7.5	33	0	12	37	0	64.13	128.01	205.5	250	195.11	0	0	983
5	0	8	0	0	56	22.5	21	19.2	26	0	48.5	207	186.73	342.9	391.4	137.78	0	0	1467
6	0	0	54	8.55	32	82.5	63	51.2	0	77	87.3	141.5	350.54	699.9	495.8	262.68	0	0	2406
7	0	0	0	17.1	16	22.5	56	25.6	63	0	0	31.05	156.31	254.7	257.2	160.54	0	0	1060
8	10	27	45	25.65	0	75	98	108.8	148	0	135.8	330.1	591.55	834.6	742	353.52	0	0	3525
9	0	18	18	248	32	150	175	44.8	29	0	97	463.7	454.11	663.6	607.6	254.22	0	0	3255
10	0	18	0	51.3	40	142.5	28	275.2	72	93.5	106.7	309.2	422.73	948.9	428	302.02	0	0	3238
11	0	9	104	0	40	165	63	160	132	16.5	155.2	378	577.5	948	532.6	309.2	0	0	3590
12	0	9	9	25.65	24	75	126	172.8	108	88	174.6	361.6	741.7	1185.6	380.4	205.67	0	0	3687
13	0	18	0	0	40	30	91	115.2	42	60.5	194	171	308	494.4	605.4	241.5	0	0	2411
14	0	0	27	0	0	0	18	0	6	71.5	67.9	108	154	348	337.2	175.4	0	0	1313
15	0	9	9	8.55	0	37.5	14	25.6	12	0	97	276.5	296.64	326.7	431.2	14.283	0	0	1558
16	0	9	45	8.55	8	90	140	19.2	120	126.5	140.7	263	564.22	650.4	698.1	154.36	0	0	3037
17	0	18	36	8.55	48	120	119	70.4	174	209	140.7	375.5	175.37	466.8	881.5	219.21	0	0	3062
18	0	18	72	0	144	67.5	161	172.8	78	192.5	67.9	616.5	829.68	863.1	794.025	0	0	0	4077
19	0	9	63	34.2	136	67.5	91	230.4	138	236.5	198.9	512.1	961.35	1050.3	784.1	35.705	0	0	4548
20	0	9	97	0	72	187.5	56	121.6	210	159.5	354.1	702	914.38	1052.7	782.1	43.175	0	0	4761
21	0	0	36	0	24	75	21	12.8	66	82.5	194	346.5	284.9	189.6	306.6	75.1	0	0	1714
22	0	0	0	25.65	32	0	14	25.6	18	22	63.05	190.6	156.5	214.2	265.1	58.323	0	0	1085
23	0	0	9	85.5	8	187.5	77	32	144	11	247.4	299.3	554.4	562.5	683.3	82.2	0	0	2983
24	0	0	0	17.1	80	22.5	63	57.6	60	104.5	67.9	260.6	221.76	638.7	482.4	87.99	0	0	2164
Total numbers for the transect																			0
Total	10	179	657	607.1	933	1730	1528	1764	1742	1707	2638	6520	9401.9	13301	11766.2	3664.5	0	0	58149

Table 9 : Summary of quantitative results of the night horizontal survey in the Neusedlersee, Sept.1999, Cruise 5.								
Transect	1	2	3	4	5	6	7
Number of pings	405	145	532	600	145	265	872
range start (m)	4	4	4	4	4	4	4
range end (m)	11.806	14.26	17.26	14.86	13.06	11.86	14.86
tot SA (m^2/ha)	50.292	57.401	34.72	30.138	13.032	5.299	11.188
single trac SA (m^2/ha)	24.143	21.823	20.961	21.6	6.333	2.264	6.149
Share of single tgts(%)	48.01	38.02	60.37	71.67	48.60	42.73	54.96
SV (m^2/m^3)	5.12712E-05	4.4522E-05	2.08372E-05	2.20845E-05	1.14468E-05	5.36506E-06	8.19833E-06
LogSV	-42.90	-43.51	-46.81	-46.56	-49.41	-52.70	-50.86
Aver BXS	6.00394E-05	4.16089E-05	5.0943E-05	8.85665E-05	2.5301E-05	1.01727E-05	3.41619E-05
fish/m^3	0.8540	1.0700	0.4090	0.2494	0.4524	0.5274	0.2400
fish/ha	15371.25	19260.24	7362.53	4488.39	8143.69	9493.14	4319.72
aver.w. (g)	29.98	14.82	23.82	61.12	10.75	2.38	19.51
biomass (kg/ha)	460.85	285.49	175.35	274.33	87.56	22.57	84.30
abund*volume(/1000)	30803.19	24776.90	62226.12	27107.88	7993.00	12626.18	37916.30
biomass*volume (/1000)	923.52	367.27	1481.99	1656.83	85.94	30.01	739.91
A1	0.300	0.300	0.300	0.300	0.300	0.300	0.300
B1	0.637	0.637	0.637	0.637	0.637	0.637	0.637
A2	0.886	1.071	1.296	1.116	0.981	0.891	1.116
B2	1.879	2.270	2.747	2.365	2.079	1.888	2.365
V1	0.200	0.200	0.200	0.200	0.200	0.200	0.200
V2	5.148	9.072	16.087	10.266	6.969	5.219	10.266
V/ping	4.948	8.872	15.887	10.066	6.769	5.019	10.066
V/total	2004	1286	8452	6040	981	1330	8777

							Table continnues	
8	9	10	11	12	13	14	15	16
514	482	555	499	1142	1136	1042	1050	350
4	4	4	4	4	4	4	4	12.16
19	14.86	15.46	15.46	16.66	17.14	16.06	12.46	17.02
20.59	25.681	27.04	16.152	20.625	28.494	24.4	7.351	11.932
10.242	16.432	10.92	8.56	14.656	14.234	9.681	4.384	7.4
49.74	63.99	40.38	53.00	71.06	49.95	39.68	59.64	62.02
1.09237E-05	1.88185E-05	1.87769E-05	1.12162E-05	1.29647E-05	1.72568E-05	1.61007E-05	6.91479E-06	1.9538E-05
-49.62	-47.25	-47.26	-49.50	-48.87	-47.63	-47.93	-51.60	-47.09
3.3948E-05	8.71507E-05	4.05914E-05	3.50714E-05	4.6053E-05	6.50862E-05	4.54468E-05	3.45136E-05	0.000166777
0.3218	0.2159	0.4626	0.3198	0.2815	0.2651	0.3543	0.2003	0.1172
5791.96	3886.75	8326.51	5756.57	5067.31	4772.48	6376.98	3606.30	2108.71
21.95	72.15	21.17	20.93	28.26	40.09	27.09	19.31	173.70
127.11	280.42	176.29	120.51	143.22	191.35	172.78	69.62	366.27
63289.22	18857.65	52498.62	32632.93	82559.58	84324.05	84782.86	22158.72	7232.72
1388.94	1360.52	1111.48	683.15	2333.37	3380.95	2297.17	427.81	1256.30
0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.913
0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637	1.935
1.427	1.116	1.161	1.161	1.251	1.287	1.206	0.936	1.278
3.024	2.365	2.461	2.461	2.652	2.728	2.556	1.983	2.709
0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	5.625
21.459	10.266	11.561	11.561	14.467	15.754	12.959	6.052	15.425
21.259	10.066	11.360	11.360	14.267	15.554	12.759	5.852	9.800
10927	4852	6305	5669	16293	17669	13295	6144	3430

	Table 9 continnues						
17	18	19	20		Average	SD	cv
600	384	225	195		556.90		
4	4	4	4		4.41	1.825	41.39
12.88	12.46	13.06	13.06		14.68	2.069	14.10
7.943	7.676	10.389	8.3		20.93	14.33	68.46
5.661	2.461	5.873	3.215		10.85	6.994	64.46
71.27	32.06	56.53	38.73		52.62	11.91	22.63
7.11827E-06	7.2205E-06	9.12533E-06	7.29042E-06		0.00002	1E-05	73.71
-51.48	-51.41	-50.40	-51.37		-47.864955	-49.19	102.77
2.92198E-05	1.79756E-05	4.35718E-05	1.97992E-05		0.00005	3E-05	70.64
0.2436	0.4017	0.2094	0.3682		0.38	0.227	60.03
4385.00	7230.29	3769.78	6627.92		6807.28	4086	60.03
16.24	8.53	35.56	6.92		32.71	37.29	114.00
71.23	61.67	134.07	45.84		167.54	114.5	68.34
17061.32	16247.29	5741.41	8748.48	weighted abundance	5713.92		
277.13	138.57	204.19	60.51	weighted biomass	165.03		
0.300	0.300	0.300	0.300				
0.637	0.637	0.637	0.637				
0.967	0.936	0.981	0.981				
2.050	1.983	2.079	2.079				
0.200	0.200	0.200	0.200				
6.685	6.052	6.969	6.969				
6.485	5.852	6.769	6.769				
3891	2247	1523	1320		122435.15		

Table 1c: Length frequency distribution of fish in individual transects of the night horizontal survey in Neusiedlersee Aug. 1999, Cruise 5.

TS (dB)	-15.5	-18.5	-21.5	-24.5	-27.5	-30.5	-33.5	-36.5	-39.5	-42.5	-45.5	-48.5	-51.5	-54.5	-57.5	-60.5	-63.5	-67	N
TL (cm)	100.9	75.6	56.61	42.4	31.76	23.79	17.82	13.35	9.996	7.487	5.608	4.2	3.1462	2.3565	1.76505	1.322	0.99	0.74	
W (g)	8984.8	3631	1467	593	239.7	96.85	39.14	15.82	6.392	2.583	1.044	0.422	0.1705	0.0689	0.02785	0.0113	0.005	0	
Trans.1	0	0	0	17.1	24	7.5	70	62.2	0	0	0	40.05	75.46	144.9	166.4	72.39	0	0	680
2	0	0	0	0	8	7.5	65	0	0	0	4.85	4.5	86.625	88.5	70.3	16.725	0	0	352
3	0	0	0	34.2	16	120	84	83.2	60	38.5	92.15	206.1	466.62	194.4	157.1	173.73	0	0	1726
4	0	0	27	97.6	0	125.5	0	79.2	0	148.5	213.4	199.8	231.39	312.9	298.6	93.115	0	0	1827
5	0	0	0	0	15	0	7	0	36	22	0	99	65.45	54	86	7.55	0	0	392
6	0	0	0	0	0	7.5	0	0	18	22	48.5	13.5	94.325	130.5	73	5.675	0	0	413
7	0	0	18	0	32	87	0	83.2	48	49.5	218.3	333	273.35	590.4	380.9	178.4	0	0	2292
8	0	0	25	0	40	61.5	0	25.6	60	143	310.4	720	394.63	494.7	150.4	40.775	0	0	2466
9	0	9	18	32.2	0	45	7	19.2	96	5.5	101.9	161.1	235.62	80.4	263.7	89.43	0	0	1164
10	0	0	9	0	48	71	0	138.8	0	0	87.3	117	415.8	318.6	193	208.5	0	0	1607
11	0	0	9	17.1	16	28	0	64	66	60.5	4.85	71.55	470.09	363	241.3	99.615	0	0	1511
12	0	9	0	42.75	120	30	70	160	54	93.5	194	172.1	880.69	546	687	338.94	0	0	3398
13	0	0	36	76.95	184	22.5	63	249.6	54	187	135.8	337.7	983.48	467.7	555.6	449.64	0	0	3803
14	0	9	0	34.2	64	153.5	0	160	156	99	29.1	287.1	826.6	574.5	589.8	239.21	0	0	3222
15	0	0	9	17.1	0	30	14	108.8	42	93.5	223.1	17.55	215.99	72.6	318.4	356.97	0	0	1519
16	0	18	29	0	0	0	7	32	6	33	24.25	63	169.4	114	77.5	53.85	0	0	627
17	0	0	0	24.65	0	43	0	0	42	22	126.1	64.58	218.1	270	163.8	215.77	0	0	1190
18	0	0	0	7.55	0	15	7	6.4	48	27.5	0	78.53	156.12	241.8	105.8	99.308	0	0	793
19	0	0	8	12.1	0	0	0	0	0	27.5	38.8	62.55	227.54	75	43.4	42.115	0	0	537
20	0	0	0	0	8	0	28	0	12	0	19.4	144	46.2	111	65.2	27.2	0	0	461
Total numbers for the transect																			0
Total	0	45	188	413.5	575	854.5	422	1272	798	1073	1872	3193	6533.5	5244.9	4687.2	2808.9	0	0	29980

Table M: Summary of quantitative results of the night horizontal survey in the Neusedlersee, Sept.1999, Cruise 6.

Transect	1	2	3	4	5	6	7
Number of pings	314	425	551	911	240	499	800
range start (m)	4	4	4	4	4	4	4
range end (m)	11.86	11.86	14.86	12.46	19	12.66	11.9
tot SA (m^2/ha)	4.461	2.178	8.25	2.326	5.39	4.672	6.324
single trac SA (m^2/ha)	2.222	1.283	4.98	1.637	2.82	3.195	3.771
Share of single tgts(%)	49.81	58.91	60.36	70.38	52.32	68.39	59.63
SV (m^2/m^3)	4.51661E-06	2.20515E-06	6.04543E-06	2.18797E-06	2.85957E-06	4.29327E-06	6.37041E-06
LogSV	-53.45	-56.57	-52.19	-56.60	-55.44	-53.67	-51.96
Aver BXS	9.20225E-06	1.3105E-05	3.39847E-05	1.24703E-05	1.63471E-05	2.37165E-05	2.19216E-05
fish/m^3	0.4908	0.1683	0.1779	0.1755	0.1749	0.1810	0.2906
fish/ha	8834.69	3028.83	3201.96	3158.20	3148.70	3258.43	5230.79
aver.w. (g)	1.93	4.91	22.99	3.72	6.84	11.11	7.82
biomass (kg/ha)	17.09	14.88	73.61	11.75	21.54	36.19	40.92
abund*volume(/1000)	13923.13	6460.70	17759.11	16836.51	16065.09	9996.39	21224.36
biomass*volume (/1000)	26.93	31.74	408.27	62.66	109.88	111.02	166.02
A1	0.300	0.300	0.300	0.300	0.300	0.300	0.300
B1	0.637	0.637	0.637	0.637	0.637	0.637	0.637
A2	0.891	0.891	1.116	0.936	1.427	0.951	0.894
B2	1.888	1.888	2.365	1.983	3.024	2.015	1.894
V1	0.200	0.200	0.200	0.200	0.200	0.200	0.200
V2	5.219	5.219	10.266	6.052	21.459	6.348	5.272
V/ping	5.019	5.019	10.066	5.852	21.259	6.148	5.072
V/total	1576	2133	5546	5331	5102	3068	4058

TAB 11 CONT.									
8	9	10	11	12	13		Average	SD	cv
784	305	600	600	600	600		556.08		
4	4	4	4	4	4		4.00	0	0.00
14.86	16.06	11.26	13.66	13.06	10.06		13.35	2.363	17.70
7.34	4.641	6.943	13.38	9.371	8.16		6.42	3.035	47.29
4.32	1.59	3.28	8.226	5.777	4.661		3.67	1.951	53.11
58.86	34.26	47.24	61.48	61.65	57.12		56.95	9.405	16.51
5.3786E-06	3.06244E-06	7.61051E-06	1.10225E-05	8.23115E-06	1.07157E-05		0.00001	3E-06	52.14
-52.69	-55.14	-51.19	-49.58	-50.85	-49.70		-52.417908	-55.25	105.39
1.82605E-05	7.80102E-06	1.25492E-05	2.34567E-05	1.96756E-05	1.73667E-05		0.00002	7E-06	40.11
0.2945	0.3926	0.6065	0.4699	0.4183	0.6170		0.34	0.167	48.80
5301.88	7066.24	10916.13	8458.38	7530.19	11106.49		6172.38	3012	48.80
6.86	0.82	4.04	8.47	7.25	5.07		7.06	5.529	78.26
36.38	5.79	44.13	71.63	54.63	56.31		37.30	22.41	60.08
41840.76	27498.79	27942.64	39454.62	30582.84	19891.93	weighted abundance	5601.99		
287.12	22.53	112.97	334.13	221.86	100.85	weighted biomass	38.63		
0.300	0.300	0.300	0.300	0.300	0.300				
0.637	0.637	0.637	0.637	0.637	0.637				
1.116	1.206	0.845	1.026	0.981	0.755				
2.365	2.556	1.792	2.174	2.079	1.601				
0.200	0.200	0.200	0.200	0.200	0.200				
10.266	12.959	4.466	7.975	6.969	3.185				
10.066	12.759	4.266	7.774	6.769	2.985				
7892	3892	2560	4665	4061	1791		51673.93		

Table 2: Length frequency distribution of fish in individual transects of the night horizontal survey in Neusiedlersee August 1999, Cruise 6.

TS (dB)	-15.5	-18.5	-21.5	-24.5	-27.5	-30.5	-33.5	-36.5	-39.5	-42.5	-45.5	-48.5	-51.5	-54.5	-57.5	-60.5	-63.5	-67	N
TL (cm)	100.9	75.6	56.61	42.4	31.76	23.79	17.82	13.35	9.996	7.487	5.608	4.2	3.1462	2.3565	1.76505	1.322	0.99	0.74	
W (g)	8984.8	3631	1467	593	239.7	96.85	39.14	15.82	6.392	2.583	1.044	0.422	0.1705	0.0689	0.02785	0.0113	0.005	0	
Trans.1	0	0	0	0	0	0	21	0	6	16.5	14.55	94.5	77	141	131.9	6.55	0	0	509
2	0	0	0	0	7	0	20	0	0	16.5	0	94.5	84.7	111	127	62.3	0	0	523
3	0	0	9	30.2	0	15	42	11.8	0	88	77.6	350.1	220.22	258.6	346.4	70.08	0	0	1519
4	0	0	0	0	0	37.5	0	45.2	0	16.5	58.2	126	202.13	240.9	391	109.58	0	0	1227
5	0	0	0	6.55	0	23	0	0	0	55	106.7	409.8	172.65	166	22.3	0	0	0	962
6	0	0	0	8.55	0	19.5	12	0	6	0	67.9	141.8	177.15	145	110.1	0	0	0	688
7	0	0	0	0	24	0	49	48.2	0	11	53.35	224	183	261.6	253.85	0	0	0	1108
8	0	0	0	8.55	24	43	0	57.6	54	0	198.9	793.8	583.65	430.8	271.75	0	0	0	2466
9	0	0	0	0	0	0	0	12.8	24	55	82.45	260	291	118.4	76.35	0	0	0	920
10	0	0	0	0	15	0	0	31	0	27.5	77.6	320	255	220	150.9	0	0	0	1097
11	0	0	0	0	24	75	105	0	18	44	72.75	459	485.1	342	410.5	59.65	0	0	2095
12	0	0	0	0	32	15	71	0	60	60.5	67.9	306	281.05	357	351.2	152.35	0	0	1754
13	0	0	0	0	0	30	35	68.8	0	0	63.05	153	46.2	285.6	291.5	117.85	0	0	1091
Total numbers for the transect																			0
Total	0	0	9	53.85	126	258	355	275.4	168	390.5	940.9	3733	3058.8	3077.9	2934.75	578.36	0	0	15959

Table 2: Length frequency distribution of fish in individual transects of the night horizontal survey in Neusiedlersee August 1999, Cruise 6.

TS (dB)	-15.5	-18.5	-21.5	-24.5	-27.5	-30.5	-33.5	-36.5	-39.5	-42.5	-45.5	-48.5	-51.5	-54.5	-57.5	-60.5	-63.5	-67	N
TL (cm)	100.9	75.6	56.61	42.4	31.76	23.79	17.82	13.35	9.996	7.487	5.608	4.2	3.1462	2.3565	1.76505	1.322	0.99	0.74	
W (g)	8984.8	3631	1467	593	239.7	96.85	39.14	15.82	6.392	2.583	1.044	0.422	0.1705	0.0689	0.02785	0.0113	0.005	0	
Trans.1	0	0	0	0	0	0	21	0	6	16.5	14.55	94.5	77	141	131.9	6.55	0	0	509
2	0	0	0	0	7	0	20	0	0	16.5	0	94.5	84.7	111	127	62.3	0	0	523
3	0	0	9	30.2	0	15	42	11.8	0	88	77.6	350.1	220.22	258.6	346.4	70.08	0	0	1519
4	0	0	0	0	0	37.5	0	45.2	0	16.5	58.2	126	202.13	240.9	391	109.58	0	0	1227
5	0	0	0	6.55	0	23	0	0	0	55	106.7	409.8	172.65	166	22.3	0	0	0	962
6	0	0	0	8.55	0	19.5	12	0	6	0	67.9	141.8	177.15	145	110.1	0	0	0	688
7	0	0	0	0	24	0	49	48.2	0	11	53.35	224	183	261.6	253.85	0	0	0	1108
8	0	0	0	8.55	24	43	0	57.6	54	0	198.9	793.8	583.65	430.8	271.75	0	0	0	2466
9	0	0	0	0	0	0	0	12.8	24	55	82.45	260	291	118.4	76.35	0	0	0	920
10	0	0	0	0	15	0	0	31	0	27.5	77.6	320	255	220	150.9	0	0	0	1097
11	0	0	0	0	24	75	105	0	18	44	72.75	459	485.1	342	410.5	59.65	0	0	2095
12	0	0	0	0	32	15	71	0	60	60.5	67.9	306	281.05	357	351.2	152.35	0	0	1754
13	0	0	0	0	0	30	35	68.8	0	0	63.05	153	46.2	285.6	291.5	117.85	0	0	1091
Total numbers for the transect																			0
Total	0	0	9	53.85	126	258	355	275.4	168	390.5	940.9	3733	3058.8	3077.9	2934.75	578.36	0	0	15959

Table 13: Summary of quantitative results of the night horizontal survey in the Neusedlersee, Sept.1999, Cruise 7.

Transect	1	2	3	4	5	6	7
Number of pings	275	969	590	436	200	355	150
range start (m)	4	4	4	4	4	4	4
range end (m)	10.36	10.06	10.9	11.26	11.86	16.06	13.06
tot SA (m^2/ha)	5.775	12.868	11.603	11.395	13.509	21.476	4.361
single trac SA (m^2/ha)	3.604	7.383	7.637	7.072	7.891	12.947	2.364
Share of single tgts(%)	62.41	57.37	65.82	62.06	58.41	60.29	54.21
SV (m^2/m^3)	7.226E-06	1.68982E-05	1.33821E-05	1.24905E-05	1.36774E-05	1.41713E-05	3.83055E-06
LogSV	-51.41	-47.72	-48.73	-49.03	-48.64	-48.49	-54.17
Aver BXS	2.30981E-05	1.98786E-05	3.19057E-05	3.80607E-05	4.39327E-05	5.57969E-05	1.50163E-05
fish/m^3	0.3128	0.8501	0.4194	0.3282	0.3113	0.2540	0.2551
fish/ha	5631.11	15301.30	7549.67	5907.12	5603.88	4571.63	4591.66
aver.w. (g)	8.12	6.19	13.02	15.44	27.15	25.20	3.91
biomass (kg/ha)	45.75	94.66	98.30	91.20	152.16	115.18	17.96
abund*volume(/1000)	5077.06	44258.97	17155.36	10987.78	5625.16	20707.39	4662.10
biomass*volume (/1000)	41.25	273.80	223.37	169.65	152.74	521.72	18.24
A1	0.300	0.300	0.300	0.300	0.300	0.300	0.300
B1	0.637	0.637	0.637	0.637	0.637	0.637	0.637
A2	0.778	0.755	0.818	0.845	0.891	1.206	0.981
B2	1.649	1.601	1.735	1.792	1.888	2.556	2.079
V1	0.200	0.200	0.200	0.200	0.200	0.200	0.200
V2	3.479	3.185	4.052	4.466	5.219	12.959	6.969
V/ping	3.279	2.985	3.851	4.266	5.019	12.759	6.769
V/total	902	2892	2272	1860	1004	4530	1015

		Table 13 continnues					
8	9	10	11	12	13 island area	14	15
600	572	600	278	799	934	904	165
4	4	4	4	4	4	4	4
16.66	14.86	16.66	19	19	19	16.66	16.09
23.048	20.468	18.04	25.903	29.14	54.924	21.542	24.627
14.176	13.398	12.145	17.849	21.35	36.674	14.098	8.444
61.51	65.46	67.32	68.91	73.27	66.77	65.44	34.29
1.44878E-05	1.49985E-05	1.13398E-05	1.37424E-05	1.54597E-05	2.91389E-05	1.35411E-05	1.62102E-05
-48.39	-48.24	-49.45	-48.62	-48.11	-45.36	-48.68	-47.90
5.4018E-05	6.90274E-05	5.27929E-05	5.16559E-05	8.88296E-05	9.66197E-05	2.73741E-05	2.13959E-05
0.2682	0.2173	0.2148	0.2660	0.1740	0.3016	0.4947	0.7576
4827.66	3911.11	3866.37	4788.67	3132.68	5428.51	8904.05	13637.37
31.02	48.57	37.71	25.15	65.55	69.30	11.63	7.58
149.76	189.98	145.81	120.46	205.36	376.22	103.51	103.37
41324.88	22519.02	33096.16	28300.90	53211.30	107787.53	114836.38	28874.18
1281.95	1093.84	1248.10	711.90	3488.15	7470.07	1335.01	218.86
0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637
1.251	1.116	1.251	1.427	1.427	1.427	1.251	1.208
2.652	2.365	2.652	3.024	3.024	3.024	2.652	2.561
0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
14.467	10.266	14.467	21.459	21.459	21.459	14.467	13.032
14.267	10.066	14.267	21.259	21.259	21.259	14.267	12.832
8560	5758	8560	5910	16986	19856	12897	2117

	Table A3 continnues		
	Average	SD	cv
	521.80		
	4.00	0	0.00
	14.77	3.253	22.03
	19.91	12.14	60.95
	12.47	8.437	67.67
	61.57	8.975	14.58
	0.00001	5E-06	38.32
	-48.526441	-52.69	108.58
	0.00005	2E-05	53.77
	0.36	0.197	54.53
	6510.19	3550	54.53
	26.37	20.94	79.40
	133.98	82.77	61.78
weighted abundance	5660.53		
weighted biomass	191.85		
	95118.99		

Table/4: Length frequency distribution of fish in individual transects of the night horizontal survey in Neusiedlersee August 1999, Cruise 7.

TS (dB)	-15.5	-18.5	-21.5	-24.5	-27.5	-30.5	-33.5	-36.5	-39.5	-42.5	-45.5	-48.5	-51.5	-54.5	-57.5	-60.5	-63.5	-67	N
TL (cm)	100.9	75.6	56.61	42.4	31.76	23.79	17.82	13.35	9.996	7.487	5.608	4.2	3.1462	2.3565	1.76505	1.322	0.99	0.74	
W (g)	8984.8	3631	1467	593	239.7	96.85	39.14	15.82	6.392	2.583	1.044	0.422	0.1705	0.0689	0.02785	0.0113	0.005	0	
Trans.1	0	0	0	0	8	6.5	0	19.2	47	0	53.35	54	40.425	27.9	103.7	38.925	0	0	399
2	0	0	0	0	8	82.5	14	96	120	44	131	207	279.13	478.5	604.1	65.825	0	0	2130
3	0	0	0	8.55	8	30	73	0	42	55	184.3	69.53	152.27	126	227.4	54.958	0	0	1031
4	0	0	0	0	24	37.5	34	0	30	16.5	72.75	49.5	152.08	148.5	139.5	13.675	0	0	718
5	0	0	0	16.1	0	7.5	7	0	24	0	29.1	164.2	0	48.3	75.8	26.05	0	0	398
6	0	0	0	0	88	49.5	0	86.6	0	82.5	174.6	117	132.83	227.7	109	33.275	0	0	1101
7	0	0	0	0	0	7.5	7	0	12	27.5	19.4	72	70.575	0	53.2	40.825	0	0	310
8	0	0	18	25.65	56	52.5	63	76.8	102	143	203.7	402.1	366.33	209.1	332.2	54.648	0	0	2105
9	0	0	45	0	32	22.5	84	51.2	102	93.5	111.6	391.5	232.93	237.9	210.3	57.625	0	0	1672
10	0	0	48	0	0	60	105	115.2	162	115.5	271.6	684	161.7	269.4	94.2	144.4	0	0	2231
11	0	0	9	17.1	32	82.5	133	51.2	54	247.5	82.45	458.6	529.76	139.15	0	7.79	0	0	1844
12	0	9	132	0	104	187.5	140	345.6	168	60.5	305.6	607.5	1183.9	647.7	411.1	6.675	0	0	4309
13	0	27	108	59.85	248	142.5	308	300.8	168	253	582	918.7	802.15	650.1	697.6	289.33	0	0	5555
14	0	0	0	42.75	32	172.5	63	166.4	102	280.5	349.2	919.1	616.96	1077.3	993.4	101.86	0	0	4917
15	0	0	0	0	16	15	21	16.2	0	44	121.3	175.5	346.5	83.4	51.15	0	0	0	890
Total numbers for the transect																			0
Total	0	36	360	170	656	956	1052	1325	1133	1463	2692	5290	5067.5	4371	4102.65	935.86	0	0	29610

Table 15: Summary of quantitative results of the night horizontal survey in the Neusedlersee, Sept.1999, Cruise 8.									
Transect				1	2	3	4	5	6	7
Number of pings				145	440	195	245	225	300	265
range start (m)				4	4	4	4	4	4	4
range end (m)				14.26	10.66	10.66	14.86	10.66	10.66	10.66
tot SA (m^2/ha)				2.072	3.94	1.769	2.533	2.777	1.535	1.949
single trac SA (m^2/ha)				1.091	2.025	0.922	1.234	1.036	0.439	0.897
Share of single tgts(%)				52.65	51.40	52.12	48.72	37.31	28.60	46.02
SV (m^2/m^3)				1.60711E-06	4.70788E-06	2.11376E-06	1.85613E-06	3.31822E-06	1.83416E-06	2.32884E-06
LogSV				-57.94	-53.27	-56.75	-57.31	-54.79	-57.37	-56.33
Aver BXS				7.20162E-06	9.33036E-06	5.78206E-06	4.85688E-06	4.30278E-06	2.92861E-06	6.14125E-06
fish/m^3				0.2232	0.5046	0.3656	0.3822	0.7712	0.6263	0.3792
fish/ha				4016.87	9082.37	6580.31	6878.97	13881.23	11273.21	6825.84
aver.w. (g)				1.19	3.31	0.88	0.49	0.40	0.16	1.79
biomass (kg/ha)				4.79	30.10	5.78	3.37	5.61	1.80	12.25
abund*volume(/1000)				5167.41	14345.02	4606.07	16964.58	11211.40	12139.99	6493.09
biomass*volume (/1000)				6.17	47.55	4.05	8.32	4.53	1.93	11.65
A1				0.300	0.300	0.300	0.300	0.300	0.300	0.300
B1				0.637	0.637	0.637	0.637	0.637	0.637	0.637
A2				1.071	0.800	0.800	1.116	0.800	0.800	0.800
B2				2.270	1.697	1.697	2.365	1.697	1.697	1.697
V1				0.200	0.200	0.200	0.200	0.200	0.200	0.200
V2				9.072	3.790	3.790	10.266	3.790	3.790	3.790
V/ping				8.872	3.590	3.590	10.066	3.590	3.590	3.590
V/total				1286	1579	700	2466	808	1077	951

TAB. 1.5 CONT.									
8	9	10	11	12	13		Average	SD	cv
838	285	123	485	379	781		362.00		
4	4	4	4	4	4		4.00	0	0.00
9.46	11.26	14.26	16.06	11.26	19		12.59	2.826	22.44
1.037	1.197	2.401	2.054	1.478	8.1		2.53	1.838	72.76
0.498	0.416	1.258	1.541	0.837	4.873		1.31	1.16	88.37
48.02	34.75	52.39	75.02	56.63	60.16		49.52	11.77	23.77
1.51143E-06	1.31208E-06	1.86229E-06	1.35536E-06	1.6201E-06	4.29731E-06		0.00000	1E-06	48.73
-58.21	-58.82	-57.30	-58.68	-57.90	-53.67		-56.408262	-59.53	105.54
4.0124E-06	4.83417E-06	3.98299E-06	5.27499E-06	7.50714E-06	1.484E-05		0.00001	3E-06	49.87
0.3767	0.2714	0.4676	0.2569	0.2158	0.2896		0.39	0.164	41.44
6780.43	4885.52	8416.11	4624.95	3884.53	5212.36		7103.28	2944	41.44
0.47	0.69	0.37	0.69	2.40	4.71		1.35	1.365	100.97
3.17	3.35	3.16	3.21	9.34	24.55		8.50	8.903	104.75
13911.92	5940.23	9184.04	28620.32	6280.95	86541.79	weighted abundance	5882.99		
6.51	4.08	3.44	19.88	15.10	407.64	weighted biomass	14.37		
0.300	0.300	0.300	0.300	0.300	0.300				
0.637	0.637	0.637	0.637	0.637	0.637				
0.710	0.845	1.071	1.206	0.845	1.427				
1.506	1.792	2.270	2.556	1.792	3.024				
0.200	0.200	0.200	0.200	0.200	0.200				
2.649	4.466	9.072	12.959	4.466	21.459				
2.448	4.266	8.872	12.759	4.266	21.259				
2052	1216	1091	6188	1617	16603		37635.06		

Table 8: Length frequency distribution of fish in individual transects of the night horizontal survey in Neusiedlersee August 1999, Cruise 8.

TS (dB)	-15.5	-18.5	-21.5	-24.5	-27.5	-30.5	-33.5	-36.5	-39.5	-42.5	-45.5	-48.5	-51.5	-54.5	-57.5	-60.5	-63.5	-67	N
TL (cm)	100.9	75.6	56.61	42.4	31.76	23.79	17.82	13.35	9.996	7.487	5.608	4.2	3.1462	2.3565	1.76505	1.322	0.99	0.74	
W (g)	8984.8	3631	1467	593	239.7	96.85	39.14	15.82	6.392	2.583	1.044	0.422	0.1705	0.0689	0.02785	0.0113	0.005	0	
Trans.1	0	0	0	0	0	0	7	0	17	0	4.85	90	115.5	75	60.3	9.35	0	0	379
2	0	0	0	0	8	0	0	0	12	11	14.55	130.5	57.75	135	190.9	79.3	0	0	639
3	0	0	0	0	0	0	5	0	0	0	38.8	45	73.15	60	80.4	9.65	0	0	312
4	0	0	0	0	0	0	0	10.8	0	22	24.25	207	142.45	297.6	85.9	0	0	0	790
5	0	0	0	0	0	0	0	5.4	0	0	19.4	94.5	119.35	124.8	73.55	0	0	0	437
6	0	0	0	0	0	0	0	0	0	0	14.55	58.5	80.85	78	142.9	22.2	0	0	397
7	0	0	0	0	0	5.5	0	0	0	0	29.1	22.5	9.625	112.5	85.8	60.975	0	0	326
8	0	0	0	0	0	0	0	12.8	6	11	33.95	0	127.05	177.6	313.7	61.9	0	0	744
9	0	0	0	0	0	0	5	0	0	0	19.4	63	30.8	93	129.2	35.6	0	0	376
10	0	0	0	0	0	0	0	4.4	0	0	9.7	76.5	69.3	85.8	108.3	0	0	0	354
11	0	0	0	0	0	6.5	0	6.4	12	33	97	571.5	456.23	387.3	368.8	4.275	0	0	1943
12	0	0	0	0	4	0	0	0	0	21	0	63	53.9	99	172	28.1	0	0	441
13	0	0	0	0	32	97.5	28	32	54	115.5	315.3	1314	821.98	1147.5	388.275	0	0	0	4346
Total numbers for the transect																			0
Total	0	0	0	0	44	109.5	45	71.8	101	213.5	620.8	2736	2157.9	2873.1	2200.03	311.35	0	0	11484

Table 17: Summary of quantitative results of the night horizontal survey in the Neusedlersee, Sept.1999, Cruise 9.								
Transect	1	2	3	4	5	6	7	8
Number of pings	475	831	396	305	545	115	343	128
range start (m)	4	4	4	7.36	4	4	4	4
range end (m)	19	17.26	19	13.42	15.46	13.66	14.26	16.06
tot SA (m^2/ha)	24.575	23.723	18.93	10.656	15.422	10.54	22.488	29.514
single trac SA (m^2/ha)	17.922	13.45	10.649	6.93	8.156	6.327	12.91	18.177
Share of single tgts(%)	72.93	56.70	56.25	65.03	52.89	60.03	57.41	61.59
SV (m^2/m^3)	1.3038E-05	1.4237E-05	1.0043E-05	1.3993E-05	1.0709E-05	8.6829E-06	1.7442E-05	1.9475E-05
LogSV	-48.85	-48.47	-49.98	-48.54	-49.70	-50.61	-47.58	-47.11
Aver BXS	5.2649E-05	2.7176E-05	2.9162E-05	6.0934E-05	3.6672E-05	2.2106E-05	8.8559E-05	2.1708E-05
fish/m^3	0.2476	0.5239	0.3444	0.2296	0.2920	0.3928	0.1970	0.8972
fish/ha	4457.47	9430.00	6198.98	4133.68	5256.47	7070.02	3545.23	16148.79
aver.w. (g)	47.75	18.00	11.98	43.34	18.39	6.94	111.16	6.69
biomass (kg/ha)	212.84	169.72	74.25	179.16	96.65	49.08	394.09	108.03
abund*volume(/1000)	45011.39	124493.63	52186.24	7960.73	32544.87	6320.89	10788.36	26373.98
biomass*volume (/1000)	2149.27	2240.68	625.05	345.03	598.40	43.88	1199.23	176.44
A1	0.300	0.300	0.300	0.553	0.300	0.300	0.300	0.300
B1	0.637	0.637	0.637	1.171	0.637	0.637	0.637	0.637
A2	1.427	1.296	1.427	1.008	1.161	1.026	1.071	1.206
B2	3.024	2.747	3.024	2.136	2.461	2.174	2.270	2.556
V1	0.200	0.200	0.200	1.247	0.200	0.200	0.200	0.200
V2	21.459	16.087	21.459	7.562	11.561	7.975	9.072	12.959
V/ping	21.259	15.887	21.259	6.314	11.360	7.774	8.872	12.759
V/total	10098	13202	8419	1926	6191	894	3043	1633

Table 17 continnues

9	10	11	12	13	14	15	16	17	18
111	600	520	329	295	548	600	280	600	425
4	4	4	4	4	4	4	4	4	4
15.46	14.86	11.86	10.06	10.06	12.46	19	19	19	19
10.457	12.64	14.78	7.134	3.612	7.603	12.477	22.78	35.342	32.46
5.653	7.222	9.165	4.382	2.462	4.52	8.554	15.224	22.231	23.502
54.06	57.14	62.01	61.42	68.16	59.45	68.56	66.83	62.90	72.40
7.2615E-06	9.2623E-06	1.4964E-05	9.3684E-06	4.7433E-06	7.1518E-06	6.6194E-06	1.2086E-05	1.875E-05	1.7221E-05
-51.39	-50.33	-48.25	-50.28	-53.24	-51.46	-51.79	-49.18	-47.27	-47.64
9.1602E-06	2.2174E-05	3.7223E-05	2.9866E-05	1.4755E-05	2.8848E-05	4.0934E-05	5.8398E-05	7.7817E-05	9.8161E-05
0.7927	0.4177	0.4020	0.3137	0.3215	0.2479	0.1617	0.2070	0.2409	0.1754
14268.96	7518.64	7236.20	5646.16	5786.52	4462.46	2910.81	3725.14	4337.10	3157.86
2.25	8.40	21.63	17.80	4.41	17.12	24.07	38.25	45.37	72.77
32.09	63.16	156.52	100.49	25.51	76.39	70.06	142.49	196.77	229.78
17993.15	45409.22	18885.57	5544.95	5095.52	14310.32	37128.33	22173.90	55321.14	28531.36
40.46	381.47	408.51	98.69	22.46	244.98	893.65	848.18	2509.92	2076.10
0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637
1.161	1.116	0.891	0.755	0.755	0.936	1.427	1.427	1.427	1.427
2.461	2.365	1.888	1.601	1.601	1.983	3.024	3.024	3.024	3.024
0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
11.561	10.266	5.219	3.185	3.185	6.052	21.459	21.459	21.459	21.459
11.360	10.066	5.019	2.985	2.985	5.852	21.259	21.259	21.259	21.259
1261	6040	2610	982	881	3207	12755	5952	12755	9035

			Table 17 continnues					
19	20	21	22	23		Average	SD	cv
600	376	932	399	400		441.43		
4	4	4	4	4		4.15	0.701	16.90
19	19	19	19	19		16.26	3.136	19.29
43.446	67.4	61.81	46.64	28.771		24.49	17.07	69.73
30.9	50.64	39.879	34.581	21.904		16.32	12.6	77.21
71.12	75.13	64.52	74.14	76.13		64.21	7.077	11.02
2.3049E-05	3.5758E-05	3.2792E-05	2.4744E-05	1.5264E-05		0.00002	8E-06	53.13
-46.37	-44.47	-44.84	-46.07	-48.16		-48.218284	-50.97	105.70
6.7869E-05	0.00018767	0.00013984	8.8198E-05	4.9944E-05		0.00006	4E-05	76.25
0.3396	0.1905	0.2345	0.2806	0.3056		0.34	0.183	54.36
6113.11	3429.67	4220.91	5049.91	5501.14		6069.79	3300	54.36
45.04	157.92	127.43	66.70	31.38		41.08	41.46	100.93
275.32	541.61	537.87	336.84	172.64		184.41	146.6	79.50
77974.84	27414.51	83630.17	42834.84	46779.32	weighted abundanc	5268.56		
3511.83	4329.24	10657.01	2857.22	1468.09	weighted biomass	238.12		
0.300	0.300	0.300	0.300	0.300				
0.637	0.637	0.637	0.637	0.637				
1.427	1.427	1.427	1.427	1.427				
3.024	3.024	3.024	3.024	3.024				
0.200	0.200	0.200	0.200	0.200				
21.459	21.459	21.459	21.459	21.459				
21.259	21.259	21.259	21.259	21.259				
12755	7993	19813	8482	8504		158431.85		

Table 13: Length frequency distribution of fish in individual transects of the night horizontal survey in Neusiedlersee August 1999, Cruise 9.

TS (dB)	-15.5	-18.5	-21.5	-24.5	-27.5	-30.5	-33.5	-36.5	-39.5	-42.5	-45.5	-48.5	-51.5	-54.5	-57.5	-60.5	-63.5	-67	N
TL (cm)	100.9	75.6	56.61	42.4	31.76	23.79	17.82	13.35	9.996	7.487	5.608	4.2	3.1462	2.3565	1.76505	1.322	0.99	0.74	
W (g)	8984.8	3631	1467	593	239.7	96.85	39.14	15.82	6.392	2.583	1.044	0.422	0.1705	0.0689	0.02785	0.0113	0.005	0	
Trans.1	0	9	67	0	16	52.5	0	32	18	97.5	0	414	575.58	1018.5	655.925	0	0	0	2956
2	0	0	45	25.65	0	52.5	56	160	6	11	106.7	951.1	1136.3	1870.5	689.248	0	0	0	5110
3	0	0	0	17.1	24	97.5	28	19.2	138	60.5	310.4	679.1	606.76	213.9	122.6	62.99	0	0	2380
4	0	0	9	17.1	20	0	0	32	0	27.5	0	67.05	88.935	183	197	22.415	0	0	664
5	0	0	9	8.55	0	60	7	76.8	12	70	176	487.4	335.1	188.2	0	0	0	0	1430
6	0	0	0	0	0	15	11	0	0	0	9.7	124	51	32	39.3	0	0	0	282
7	9	0	0	0	24	0	35	38.4	0	11	38.8	276	177	95.2	94.6	0	0	0	799
8	0	0	0	0	0	30	7	12.8	41	0	33.95	103.5	207.9	105.6	21.25	0	0	0	563
9	0	0	0	0	0	6.5	5	0	0	0	43.65	54	105.88	118.5	76.475	0	0	0	410
10	0	0	0	17.1	0	45	63	76.8	90	44	198.9	724.1	377.69	417.6	227.9	37.015	0	0	2319
11	0	0	9	8.55	24	59	18	0	45	0	14.55	258.5	221.57	363	342.9	65.908	0	0	1430
12	0	0	0	15.1	0	0	21	12.8	21	0	24.25	35.55	77.385	120.6	185.1	59.215	0	0	572
13	0	0	0	0	0	12	0	0	0	16.5	14.55	36	42.35	30	85.9	45.7	0	0	283
14	0	0	9	0	8	37.5	7	6.4	42	0	82.45	166.5	240.63	201.3	251.9	93.325	0	0	1146
15	0	0	18	50.3	0	52.5	7	44.8	210	126.5	528.7	1047	251.4	255.4	110.65	0	0	0	2702
16	0	8	0	8.55	40	60	77	19.2	66	71.5	203.7	581.8	178.65	91.6	4	0	0	0	1410
17	0	0	27	34.2	120	105	63	121.6	66	38.5	300.7	727.2	384.6	198.8	115.4	0	0	0	2302
18	0	18	9	34.2	88	112.5	55	0	48	0	121.3	539.2	464.1	237	111.75	0	0	0	1838
19	0	9	18	111.2	72	37.5	119	96	72	137.5	305.6	1055	631.95	685	64.95	0	0	0	3415
20	0	9	126	17.1	88	57	0	68.4	0	27.5	92.15	411.6	375.3	241.2	106.75	0	0	0	1620
21	10	54	144	51.3	144	157.5	63	211.2	132	55	203.7	1215	962.4	806.6	382.5	0	0	0	4592
22	0	18	18	117.7	0	120	140	51.6	0	27.5	48.5	518.9	399.25	868.2	370.405	0	0	0	2698
23	0	9	9	17.1	80	105	84	12.8	30	11	305.6	791.6	570.3	736.4	102.25	0	0	0	2864
Total numbers for the transect																			0
Total	19	134	517	550.8	748	1275	866	1093	1037	833	3164	11264	8462	9078.1	4358.75	386.57	0	0	43785

Table 19: Summary of quantitative results of the night horizontal survey in the Neusedlersee, August 1999, Cruise 10.

Transect	1	2	3	4	5	6	7	8	9
Number of pings	763	410	255	143	362	265	323	235	285
range start (m)	3.96	3.96	3.96	3.84	3.96	4.96	4	4	4
range end (m)	17.94	18	18	18	15.42	16.42	12.46	10.66	11.86
tot SA (m^2/ha)	5.712	3.706	12.184	18.494	16.435	30.045	14.567	3.532	9.556
single trac SA (m^2/ha)	3.934	2.825	8.814	11.857	14.732	26.396	12.665	2.688	8.672
Share of single tgts(%)	68.87	76.23	72.34	64.11	89.64	87.85	86.94	76.10	90.75
SV (m^2/m^3)	3.2515E-06	2.1006E-06	6.906E-06	1.0394E-05	1.1413E-05	2.0864E-05	1.3703E-05	4.2204E-06	9.6751E-06
LogSV	-54.88	-56.78	-51.61	-49.83	-49.43	-46.81	-48.63	-53.75	-50.14
Aver BXS	1.6159E-05	1.0595E-05	3.1434E-05	5.4009E-05	3.7385E-05	3.933E-05	2.3006E-05	1.1796E-05	3.5187E-05
fish/m^3	0.2012	0.1983	0.2197	0.1924	0.3053	0.5305	0.5956	0.3578	0.2750
fish/ha	3621.86	3568.63	3954.61	3463.99	5494.89	9548.50	10721.02	6440.12	4949.40
aver.w. (g)	5.24	2.58	21.51	42.17	23.08	22.70	13.57	4.41	29.08
biomass (kg/ha)	18.97	9.21	85.06	146.06	126.84	216.74	145.46	28.41	143.93
abund*volume(/1000)	49383.18	26412.22	18203.88	8950.44	22431.23	34081.09	20264.35	5432.64	7079.67
biomass*volume (/1000)	258.63	68.18	391.55	377.41	517.80	773.60	274.93	23.96	205.87
A1	0.297	0.297	0.297	0.288	0.297	0.372	0.300	0.300	0.300
B1	0.630	0.630	0.630	0.611	0.630	0.789	0.637	0.637	0.637
A2	1.347	1.352	1.352	1.352	1.158	1.233	0.936	0.800	0.891
B2	2.855	2.865	2.865	2.865	2.454	2.613	1.983	1.697	1.888
V1	0.194	0.194	0.194	0.177	0.194	0.382	0.200	0.200	0.200
V2	18.064	18.246	18.246	18.246	11.471	13.851	6.052	3.790	5.219
V/ping	17.870	18.052	18.052	18.069	11.277	13.469	5.852	3.590	5.019
V/total	13635	7401	4603	2584	4082	3569	1890	844	1430

Table 19 continnues

10	11	12	13	14	15	16	17	18	19
255	565	600	165	295	275	295	405	500	306
4	4	4	4	4	4	4	4	4	4
13.06	19	17.81	17.86	12.28	19	14.26	19	17.86	13.66
21.854	15.05	15.732	18.788	8.644	15.872	9.651	18.646	14.523	6.963
16.45	11.1	11.258	13.809	5.201	13.722	8.253	13.204	9.841	5.602
75.27	73.75	71.56	73.50	60.17	86.45	85.51	70.81	67.76	80.45
1.9196E-05	7.9845E-06	9.0655E-06	1.0787E-05	8.3078E-06	8.4206E-06	7.4856E-06	9.8923E-06	8.3387E-06	5.7362E-06
-47.17	-50.98	-50.43	-49.67	-50.81	-50.75	-51.26	-50.05	-50.79	-52.41
4.1591E-05	1.8446E-05	2.9705E-05	3.68E-05	1.0085E-05	1.9516E-05	2.6878E-05	3.2544E-05	2.298E-05	1.8248E-05
0.4615	0.4329	0.3052	0.2931	0.8238	0.4315	0.2785	0.3040	0.3629	0.3143
8307.64	7791.56	5493.28	5276.54	14827.86	7766.33	5013.06	5471.41	6531.57	5658.21
36.97	8.00	19.81	32.15	4.20	9.28	14.72	16.75	10.06	6.93
307.14	62.33	108.83	169.64	62.34	72.09	73.81	91.62	65.71	39.21
14339.65	93586.64	57594.08	15343.42	24466.50	45403.49	13120.26	47108.07	57554.14	13460.47
530.14	748.68	1141.07	493.27	102.86	421.43	193.19	788.84	578.98	93.29
0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637
0.981	1.427	1.337	1.341	0.922	1.427	1.071	1.427	1.341	1.026
2.079	3.024	2.835	2.843	1.954	3.024	2.270	3.024	2.843	2.174
0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
6.969	21.459	17.674	17.824	5.794	21.459	9.072	21.459	17.824	7.975
6.769	21.259	17.474	17.623	5.593	21.259	8.872	21.259	17.623	7.774
1726	12011	10484	2908	1650	5846	2617	8610	8812	2379

			Table 19 continnues						
20	21	22	23	24	25	26	27	28	29
520	165	275	175	202	416	650	600	136	295
4	4	4	4	4	4	4	4	4	4
11.86	11.26	19	11.26	11	13.36	19	17.02	19	19
7.654	2.881	17.672	7.609	5.812	7.356	15.832	8.039	8.907	9.331
7.242	2.065	12.343	6.182	4.472	5.724	13.236	6.57	8.301	7.334
94.62	71.68	69.84	81.25	76.94	77.81	83.60	81.73	93.20	78.60
7.7494E-06	3.158E-06	9.3756E-06	8.3405E-06	6.6074E-06	6.2542E-06	8.3994E-06	4.9135E-06	4.7254E-06	4.9504E-06
-51.11	-55.01	-50.28	-50.79	-51.80	-52.04	-50.76	-53.09	-53.26	-53.05
1.8279E-05	1.0053E-05	3.0423E-05	2.3464E-05	2.514E-05	2.2459E-05	2.2049E-05	1.357E-05	1.2641E-05	1.3206E-05
0.4240	0.3141	0.3082	0.3555	0.2628	0.2785	0.3809	0.3621	0.3738	0.3749
7631.25	5654.62	5547.15	6398.40	4730.76	5012.41	6856.94	6517.41	6728.74	6747.62
8.75	2.72	19.57	11.45	17.73	12.14	12.51	5.13	5.23	5.12
66.81	15.38	108.57	73.24	83.87	60.84	85.80	33.46	35.18	34.54
19916.60	3980.48	32429.76	4777.02	3788.00	15138.94	94751.10	59536.33	19454.20	42316.88
174.37	10.83	634.72	54.68	67.16	183.75	1185.58	305.62	101.71	216.61
0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637
0.891	0.845	1.427	0.845	0.826	1.003	1.427	1.278	1.427	1.427
1.888	1.792	3.024	1.792	1.751	2.126	3.024	2.709	3.024	3.024
0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
5.219	4.466	21.459	4.466	4.164	7.461	21.459	15.425	21.459	21.459
5.019	4.266	21.259	4.266	3.964	7.260	21.259	15.225	21.259	21.259
2610	704	5846	747	801	3020	13818	9135	2891	6271

Table 19 continnues

30	31	32	33	34	35	36	37	38	39
200	172	411	367	733	468	185	275	275	179
6.16	4	4	4	4	4	4	4	4	4
19	19	19	19	19	19	19	14.86	11.26	15.46
2.856	11.6	19.415	9.847	26.68	20.692	29.519	14.466	10.674	16.115
2.528	9.734	15.749	6.323	16.85	15.063	20.023	9.645	7.796	10.971
88.52	83.91	81.12	64.21	63.16	72.80	67.83	66.67	73.04	68.08
1.7701E-06	6.1542E-06	1.03E-05	5.2241E-06	1.4155E-05	1.0978E-05	1.5661E-05	1.06E-05	1.17E-05	1.119E-05
-57.52	-52.11	-49.87	-52.82	-48.49	-49.59	-48.05	-49.75	-49.32	-49.51
5.1454E-06	1.6526E-05	2.3848E-05	1.8365E-05	4.06E-05	2.4377E-05	2.7664E-05	2.9267E-05	2.1959E-05	2.726E-05
0.3440	0.3724	0.4319	0.2845	0.3486	0.4503	0.5661	0.3622	0.5328	0.4105
6192.28	6702.91	7774.34	5120.41	6275.44	8106.08	10189.96	6519.41	9590.96	7389.26
0.60	6.49	11.84	9.09	21.50	13.38	20.20	12.92	9.98	15.29
3.72	43.50	92.04	46.56	134.93	108.50	205.85	84.21	95.73	112.99
25670.51	24509.40	67927.58	39949.51	97788.79	80648.71	40076.07	18046.58	11252.32	15026.09
15.41	159.04	804.20	363.23	2102.65	1079.47	809.58	233.10	112.31	229.76
0.463	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
0.980	0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637
1.427	1.427	1.427	1.427	1.427	1.427	1.427	1.116	0.845	1.161
3.024	3.024	3.024	3.024	3.024	3.024	3.024	2.365	1.792	2.461
0.731	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
21.459	21.459	21.459	21.459	21.459	21.459	21.459	10.266	4.466	11.561
20.728	21.259	21.259	21.259	21.259	21.259	21.259	10.066	4.266	11.360
4146	3657	8737	7802	15583	9949	3933	2768	1173	2034

			Table 19 continnues						North part	Central part
									of cruise	of cruise
40	41	42	43	44		Average	SD	cv	10	10
115	467	163	754	450		348.86			348.27	349.45
4	4	4	4	6.16		4.11	0.476	11.56	4.03	4.20
14.86	11.26	17.86	17.86	19		16.13	3.049	18.90	15.67	16.59
26.799	19.782	10.704	10.697	10.405		13.44	6.947	51.69	13.10	13.78
12.159	15.924	6.385	8.368	7.061		9.98	5.04	50.51	10.12	9.84
45.37	80.50	59.65	78.23	67.86		75.64	10.08	13.33	77.01	74.28
1.9638E-05	2.1684E-05	6.1459E-06	6.1419E-06	6.4488E-06		0.00001	5E-06	52.13	0.00	0.00
-47.07	-46.64	-52.11	-52.12	-51.91		-50.413866	-53.24	105.61	-50.457056	-50.371101
1.7846E-05	0.00013276	2.5615E-05	2.2928E-05	1.413E-05		0.00003	2E-05	73.24	0.00	0.00
1.1004	0.1633	0.2399	0.2679	0.4564		0.38	0.165	43.66	0.36	0.40
19806.90	2940.01	4318.76	4821.74	8215.17285		6811.12	2974	43.66	6487.89	7134.36
6.30	99.70	14.10	11.15	7.60		15.54	15.87	102.12	16.10	14.97
124.82	293.12	60.89	53.74	62.41		93.05	66.62	71.60	98.37	87.72
22928.09	5857.51	12406.13	64071.47	76627.25	weighted abundance	6367.51			5934.95	6734.85
144.49	584.00	174.93	714.10	582.09	weighted biomass	82.25			82.86	81.72
0.300	0.300	0.300	0.300	0.463						
0.637	0.637	0.637	0.637	0.980						
1.116	0.845	1.341	1.341	1.427						
2.365	1.792	2.843	2.843	3.024						
0.200	0.200	0.200	0.200	0.731						
10.266	4.466	17.824	17.824	21.459						
10.066	4.266	17.623	17.623	20.728						
1158	1992	2873	13288	9328		231344.98			106242.22	125102.76

Table 2c: Length frequency distribution of fish in individual transects of the night horizontal survey in Neusiedlersee August 1999, Cruise 10.

TS (dB)	-15.5	-18.5	-21.5	-24.5	-27.5	-30.5	-33.5	-36.5	-39.5	-42.5	-45.5	-48.5	-51.5	-54.5	-57.5	-60.5	-63.5	-67	N
TL (cm)	100.9	75.6	56.61	42.4	31.76	23.79	17.82	13.35	9.996	7.487	5.608	4.2	3.1462	2.3565	1.76505	1.322	0.99	0.74	
W (g)	8984.8	3631	1467	593	239.7	96.85	39.14	15.82	6.392	2.583	1.044	0.422	0.1705	0.0689	0.02785	0.0113	0.005	0	
Trans.1	0	0	0	0	78	0	49	89.6	138	176	771.2	1350	1220.5	460.2	150.9	287.7	0	0	4771
2	0	0	0	0	15	0	28	0	156	16.5	266.8	738	612.15	396	187.5	86.1	0	0	2502
3	0	7	0	0	16	30	56	19.2	6	49.5	295.9	904	263.65	5.8	0	0	0	0	1653
4	0	0	25	0	15	0	28	38.4	6	82.5	150.4	236	255	172.75	0	0	0	0	1009
5	0	0	18	17.1	24	45	35	0	102	38.5	126.1	458.6	369.99	465	288.8	143.97	0	0	2132
6	0	0	9	17.1	48	56	0	12.8	0	99	106.7	418.1	470.09	366.6	148.2	60.465	0	0	1812
7	0	0	9	0	0	30	7	19.2	40	0	77.6	216	369.6	248.4	179.2	72	0	0	1268
8	0	0	0	0	7	0	0	6.4	28	0	4.85	112.5	96.25	52.8	83.1	70.1	0	0	461
9	0	0	17	0	0	7.5	0	12.8	42	33	19.4	117	186.73	125.1	228.8	116.68	0	0	906
10	0	0	42	0	0	0	0	19.2	6	5.5	135.8	328.5	627.55	428.4	93.8	1.25	0	0	1688
11	0	0	9	8.55	96	22.5	21	102.4	126	253	402.6	1784	1736.5	1287.3	213.7	53.433	0	0	6116
12	0	9	27	17.1	40	75	7	115.2	102	143	334.7	1287	1409.5	1334.4	215.1	115.52	0	0	5231
13	0	0	31	0	0	7.5	7	6.4	54	16.5	194	342	429.28	273.3	65.8	48.225	0	0	1475
14	0	0	0	8.55	0	0	0	32	29	0	43.65	137	398.67	408	266.7	96.408	0	0	1420
15	0	0	9	0	40	0	56	57.6	60	27.5	140.7	729	1001	777.8	13.45	0	0	0	2912
16	0	0	9	0	8	22.5	49	19.2	18	55	87.3	220.5	263.73	312.9	245.8	50.075	0	0	1361
17	0	0	9	59.85	0	105	63	76.8	162	170.5	281.3	1198	823.32	813.6	94	26.953	0	0	3883
18	0	0	9	0	96	15	84	44.8	180	181.5	383.2	1026	1251.3	1074.6	68.7	0	0	0	4414
19	0	0	0	8.55	0	30	21	70.4	6	33	48.5	272	337.07	409.8	183.8	64.858	0	0	1485
20	0	0	0	16.1	7	19.5	0	25.6	42	44	53.35	242.6	244.86	542.7	344.5	33.84	0	0	1616
21	0	0	0	0	0	6.5	6	0	0	22	24.25	22.5	28.875	166.5	41.5	39.875	0	0	358
22	0	0	27	8.55	0	30	77	25.6	6	132	82.45	753.5	818.32	675.41	20.15	0	0	0	2656
23	0	0	0	0	22	0	0	0	29	0	9.7	0	65.45	150	162.6	41.25	0	0	480
24	0	0	0	12.1	0	0	0	0	6	11	33.95	17.55	61.985	54	158.1	57.315	0	0	412
25	0	0	9	0	0	30	35	12.8	66	22	58.2	333	215.6	414.6	247.2	75.6	0	0	1519
26	0	8	0	34.2	64	75	21	108.8	198	176	320.1	899.1	1637	1953.6	673.4	12.78	0	0	6181
27	0	0	0	17.1	24	22.5	84	81.2	0	159.5	106.7	620.6	1211.2	1536.9	758	7.34	0	0	4629
28	0	0	0	7.55	0	22.5	7	0	54	38.5	19.4	128	512.24	502.5	157.283	0	0	0	1449
29	0	0	0	8.55	24	15	49	25.6	0	55	87.3	366.5	745.17	1246.2	348.658	0	0	0	2971
30	0	0	0	0	0	0	7	0	36	0	101.9	153	281.05	477	213.1	0	0	0	1269
31	0	0	0	0	40	15	14	25.6	12	27.5	72.75	274.5	450.45	727.2	262	0	0	0	1921
32	0	0	9	25.65	40	67.5	105	38.4	89	0	203.7	618.1	1090.1	1428.3	559.248	0	0	0	4274
33	0	0	9	8.55	8	42	0	6.4	36	66	349.2	877.8	838.65	451.2	131.2	0	0	0	2824
34	0	18	9	59.85	168	22.5	35	172.8	174	225.5	358.9	1643	1934	1814.1	985.128	0	0	0	7620
35	0	0	18	42.75	8	45	119	89.6	138	71.5	179.5	689.6	1007.7	1750.2	770.138	0	0	0	4929
36	0	8	0	8.55	24	36.5	0	38.4	36	11	184.3	699.5	866.44	299.18	12.1	0	0	0	2224
37	0	0	0	8.55	32	0	56	38.4	42	38.5	33.95	137	240.82	277.8	277.9	61.058	0	0	1244
38	0	0	0	8.55	8	0	42	19.2	30	0	0	65.03	121.47	272.4	282.4	72.958	0	0	922

TAB. 2C CONTINUES

39	0	0	9	0	8	30	49	18.2	10	0	43.65	234	238.7	455.4	155.1	90.95	0	0	1342
40	0	0	0	0	8	13	28	0	0	0	63.05	85.5	177.1	261	49.9	16.45	0	0	702
41	0	9	0	17.1	8	86	0	40.8	30	0	60	122.7	90.2	78.2	0	0	0	0	542
42	0	0	7	0	0	15	28	51.2	36	5.5	169.8	342	234.85	47.4	49.9	23.4	0	0	1010
43	0	0	18	8.55	96	30	133	102.4	162	126.5	257.1	1235	1507.5	1633.8	655.7	24.507	0	0	5990
44	0	0	17	0	8	45	28	51.2	132	33	155.2	544.5	870.1	1823.4	866.6	0	0	0	4574
Total numbers for the transect																			0
Total	0	59	355	429.1	1080	1115	1434	1715	2625	2646	6899	22978	27612	28452	10909.2	1851	0	0	110157

Table 21 : Summary of quantitative results of the night horizontal survey in the Neusedlersee, August 1999, Cruise 11.

Transect	1	2	3	4	5	6	7	8
Number of pings	65	205	443	181	490	310	516	853
range start (m)	4	4	4	4	4	4	4	4
range end (m)	19	19	17.26	16.66	11.26	10.66	10.66	10.66
tot SA (m^2/ha)	7.888	15.147	6.053	6.833	4.263	11.169	5.814	6.184
single trac SA (m^2/ha)	6.109	11.45	4.168	6.386	3.397	9.87	3.215	3.374
Share of single tgts(%)	77.45	75.59	68.86	93.46	79.69	88.37	55.30	54.56
SV (m^2/m^3)	4.18484E-06	8.03597E-06	3.6327E-06	4.29517E-06	4.67285E-06	1.33458E-05	6.9471E-06	7.38921E-06
LogSV	-53.78	-50.95	-54.40	-53.67	-53.30	-48.75	-51.58	-51.31
Aver BXS	8.12776E-06	1.65796E-05	1.26699E-05	1.54406E-05	1.05578E-05	5.56818E-05	1.92991E-05	1.96649E-05
fish/m^3	0.5149	0.4847	0.2867	0.2782	0.4426	0.2397	0.3600	0.3758
fish/ha	9267.87	8724.43	5160.94	5007.13	7966.74	4314.22	6479.47	6763.63
aver.w. (g)	2.83	6.87	4.38	6.74	3.82	53.91	5.50	4.96
biomass (kg/ha)	26.25	59.92	22.59	33.77	30.43	232.60	35.64	33.53
abund*volume(/1000)	12806.62	38021.73	36321.72	12929.79	16654.21	4800.80	12001.58	20709.91
biomass*volume (/1000)	36.27	261.14	158.96	87.20	63.61	258.83	66.02	102.66
A1	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
B1	0.637	0.637	0.637	0.637	0.637	0.637	0.637	0.637
A2	1.427	1.427	1.296	1.251	0.845	0.800	0.800	0.800
B2	3.024	3.024	2.747	2.652	1.792	1.697	1.697	1.697
V1	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
V2	21.459	21.459	16.087	14.467	4.466	3.790	3.790	3.790
V/ping	21.259	21.259	15.887	14.267	4.266	3.590	3.590	3.590
V/total	1382	4358	7038	2582	2090	1113	1852	3062

	TAB. 21 CONT.							
9	10	11	12	13		Average	SD	cv
777	772	768	320	215		455.00		
4	4	4	4	4		4.00	0	0.00
10.06	10.66	10.06	11.86	15.94		13.36	3.582	26.80
2.129	3.485	5.345	3.367	17.828		7.35	4.679	63.69
1.191	2.233	2.88	1.923	11.997		5.25	3.673	70.01
55.94	64.07	53.88	57.11	67.29		68.58	13.43	19.58
2.7958E-06	4.1642E-06	7.01905E-06	3.40897E-06	1.18823E-05		0.00001	3E-06	52.20
-55.53	-53.80	-51.54	-54.67	-49.25		-52.013284	-54.84	105.43
1.13951E-05	1.09193E-05	1.24412E-05	8.39618E-06	3.26666E-05		0.00002	1E-05	72.60
0.2454	0.3814	0.5642	0.4060	0.3637		0.38	0.102	26.87
4416.32	6864.50	10155.17	7308.27	6547.41		6844.31	1839	26.87
1.34	1.38	2.23	0.61	12.24		8.22	14.07	171.30
5.91	9.49	22.66	4.47	80.11		45.95	59.85	130.24
10243.07	19022.84	23280.78	11737.63	17555.23	weighted abundance	6716.94		
13.72	26.30	51.96	7.18	214.79	weighted biomass	38.37		
0.300	0.300	0.300	0.300	0.300				
0.637	0.637	0.637	0.637	0.637				
0.755	0.800	0.755	0.891	1.197				
1.601	1.697	1.601	1.888	2.537				
0.200	0.200	0.200	0.200	0.200				
3.185	3.790	3.185	5.219	12.671				
2.985	3.590	2.985	5.019	12.471				
2319	2771	2293	1606	2681		35147.84		

Table 11: Length frequency distribution of fish in individual transects of the night horizontal survey in Neusiedlersee August 1999, Cruise 11.

TS (dB)	-15.5	-18.5	-21.5	-24.5	-27.5	-30.5	-33.5	-36.5	-39.5	-42.5	-45.5	-48.5	-51.5	-54.5	-57.5	-60.5	-63.5	-67	N
TL (cm)	100.9	75.6	56.61	42.4	31.76	23.79	17.82	13.35	9.996	7.487	5.608	4.2	3.1462	2.3565	1.76505	1.322	0.99	0.74	
W (g)	8984.8	3631	1467	593	239.7	96.85	39.14	15.82	6.392	2.583	1.044	0.422	0.1705	0.0689	0.02785	0.0113	0.005	0	
Trans.1	0	0	0	0	7	0	0	0	0	33	19.4	117	169.4	180	137.2	0	0	0	663
2	0	0	0	8.55	14	0	65	0	0	55	43.65	273.8	472.65	512	214.35	0	0	0	1659
3	0	0	0	8.55	16	15	40	0	42	82.5	106.7	605.8	889.65	932	230.8	0	0	0	2969
4	0	0	0	8.55	16	0	14	19.2	49	0	9.7	258.5	417.92	611.61	123.5	0	0	0	1528
5	0	0	0	0	16	0	13	0	0	22	48.5	198	134.75	414	285	71.75	0	0	1203
6	0	8	0	13.1	0	0	0	17.2	0	5.5	19.4	62.55	215.99	125.4	194.6	28.265	0	0	690
7	0	0	0	0	8	7.5	20	0	51	0	88	168	243	135.5	0	0	0	0	721
8	0	0	0	0	0	15	102	0	0	0	112	273	322	337	0	0	0	0	1161
9	0	0	0	0	0	0	0	19.2	54	45	32	189	174	173.8	0	0	0	0	687
10	0	0	0	0	0	0	21	0	48	75	88	366	364	229	0	0	0	0	1191
11	0	0	0	0	0	7.5	28	12.8	0	35	80	324	357	236.7	0	0	0	0	1081
12	0	0	0	0	0	0	0	0	29	0	116	261	202	146	0	0	0	0	754
13	0	0	0	8.55	32	30	28	128	174	77	140.7	233.8	346.65	354	115.35	0	0	0	1668
Total numbers for the transect																			0
Total	0	8	0	47.3	109	75	331	196.4	447	430	904	3330	4309	4387	1300.8	100.02	0	0	15975

Table23: Summary of quantitative results of surveys in the Central basin in 1999.						
cruise		1	2	10 centr.	11	average/total
Time						
Number of pings		426.54	567.60	349.45	455.00	449.65
range start (m)		3.97	3.96	4.20	4.00	4.03
range end (m)		13.26	11.52	16.59	13.36	13.68
tot SA (m^2/ha)		6.15	2.98	13.78	7.35	7.56
single trac SA (m^2/h		3.90	1.98	9.84	5.25	5.24
Share of single tgts(%		65.90	67.01	74.28	68.58	68.94
SV (m^2/m^3)		5.1027E-06	2.9882E-06	9.181E-06	6.2903E-06	5.89056E-06
LogSV		-52.921983	-55.245882	-50.371101	-52.013284	-52.63806247
Aver BXS		1.2238E-05	9.8573E-06	2.6401E-05	1.7988E-05	1.6621E-05
fish/m^3		0.4234	0.3082	0.3964	0.3802	0.3771
fish/ha		7621.6	5547.6	7134.4	6844.3	6787.0
aver.w. (g)		3.60	2.89	14.97	8.22	7.42
biomass (kg/ha)		26.88	15.20	87.72	45.95	43.94
weighted abundance		7600.1	4813.0	6734.9	6716.9	6466.2
weighted biomass		29.87	20.46	81.72	38.37	42.61
[illegible]		41219	44196	125103	35148	245666
		Total	Total	Total	Total	0
-65	-63.5	2215	0	0	0	2215
-62	-60.5	4032	4905	13434	1110	23481
-59	-57.5	5666	5064	17031	3679	31440
-56	-54.5	4230	3785	13208	5572	26795
-53	-51.5	2765	2421	7421	3044	15651
-50	-48.5	1566	1383	3731	1422	8102
-47	-45.5	725	429	1473	478	3105
-44	-42.5	423	211	871	257	1762
-41	-39.5	253	112	685	178	1228
-38	-36.5	133	73	467	100	773
-35	-33.5	90	44	317	82	533
-32	-30.5	31	20	204	26	281
-29	-27.5	9	11	119	18	157
-26	-24.5	3	6	47	7	63
-23	-21.5	2	2	15	1	20
-20	-18.5	0	0	5	1	6
-17	-15.5	0	0	0	0	0
-14	-12.5	0	0	1	0	1
sum		22143	18466	54415	15975	110999

Table23: Summary of quantitative results of surveys in the Central basin in 1999.						
cruise		1	2	10 centr.	11	average/total
Time						
Number of pings		426.54	567.60	349.45	455.00	449.65
range start (m)		3.97	3.96	4.20	4.00	4.03
range end (m)		13.26	11.52	16.59	13.36	13.68
tot SA (m^2/ha)		6.15	2.98	13.78	7.35	7.56
single trac SA (m^2/h		3.90	1.98	9.84	5.25	5.24
Share of single tgts(%		65.90	67.01	74.28	68.58	68.94
SV (m^2/m^3)		5.1027E-06	2.9882E-06	9.181E-06	6.2903E-06	5.89056E-06
LogSV		-52.921983	-55.245882	-50.371101	-52.013284	-52.63806247
Aver BXS		1.2238E-05	9.8573E-06	2.6401E-05	1.7988E-05	1.6621E-05
fish/m^3		0.4234	0.3082	0.3964	0.3802	0.3771
fish/ha		7621.6	5547.6	7134.4	6844.3	6787.0
aver.w. (g)		3.60	2.89	14.97	8.22	7.42
biomass (kg/ha)		26.88	15.20	87.72	45.95	43.94
weighted abundance		7600.1	4813.0	6734.9	6716.9	6466.2
weighted biomass		29.87	20.46	81.72	38.37	42.61
total volume(m^3)		41219	44196	125103	35148	245666
		Total	Total	Total	Total	0
-65	-63.5	2215	0	0	0	2215
-62	-60.5	4032	4905	13434	1110	23481
-59	-57.5	5666	5064	17031	3679	31440
-56	-54.5	4230	3785	13208	5572	26795
-53	-51.5	2765	2421	7421	3044	15651
-50	-48.5	1566	1383	3731	1422	8102
-47	-45.5	725	429	1473	478	3105
-44	-42.5	423	211	871	257	1762
-41	-39.5	253	112	685	178	1228
-38	-36.5	133	73	467	100	773
-35	-33.5	90	44	317	82	533
-32	-30.5	31	20	204	26	281
-29	-27.5	9	11	119	18	157
-26	-24.5	3	6	47	7	63
-23	-21.5	2	2	15	1	20
-20	-18.5	0	0	5	1	6
-17	-15.5	0	0	0	0	0
-14	-12.5	0	0	1	0	1
sum		22143	18466	54415	15975	110999

Table 24: Summary of quantitative results of surveys in the Northern basin in 1999.										
Cruise		3	4	5	6	7	8	9	10	average
Number of pings		616.88	751.21	556.90	556.08	521.80	362.00	441.43	348.27	519.32
range start (m)		3.93	3.95	4.41	4.00	4.00	4.00	4.15	4.03	4.06
range end (m)		13.74	15.82	14.68	13.35	14.77	12.59	16.26	15.67	14.61
tot SA (m^2/ha)		7.28	19.94	20.93	6.42	19.91	2.53	24.49	13.10	14.32
single trac SA (m^2/ha)		5.04	13.67	10.85	3.67	12.47	1.31	16.32	10.12	9.18
Share of single tgts(%)		69.19	69.01	52.62	56.95	61.57	49.52	64.21	77.01	62.51
SV (m^2/m^3)		5.8E-06	1.3E-05	1.6E-05	5.7E-06	1.4E-05	2.3E-06	1.5E-05	9E-06	0.00
LogSV		-52.361	-48.749	-47.865	-52.418	-48.526	-56.408	-48.218	-50.457	-50.63
Aver BXS		2.6E-05	5.7E-05	4.9E-05	1.8E-05	4.6E-05	6.2E-06	5.6E-05	2.6E-05	0.00
fish/m^3		0.2399	0.2387	0.3782	0.3429	0.3617	0.3946	0.3372	0.3604	0.33
fish/ha		4317.8	4297.3	6807.3	6172.4	6510.2	7103.3	6069.8	6487.9	5970.74
aver.w. (g)		14.72	40.83	32.71	7.06	26.37	1.35	41.08	16.10	22.53
biomass (kg/ha)		57.59	167.71	167.54	37.30	133.98	8.50	184.41	98.37	106.93
weighted abundance		4370.3	4166.4	5713.9	5602.0	5660.5	5883.0	5268.6	5935.0	5324.95
weighted biomass		69.66	177.58	165.03	38.63	191.85	14.37	238.12	82.86	122.26
Total volume sampled		163156	246386	122435	51674	95119	37635	158432	106242	981079
TS		Total	Total	Total	Total	Total	Total	Total	Total	0
-65	-63.5	0	0	0	0	0	0	0	0	0
-62	-60.5	12781	16150	8698	2666	6155	3129	4950	10497	65026
-59	-57.5	10715	14247	6924	5166	6590	3375	12090	12441	71548
-56	-54.5	6341	9210	4950	3367	5055	2315	10094	11433	52765
-53	-51.5	3790	5474	3444	2216	3921	1379	6694	7953	34871
-50	-48.5	2398	3349	1905	1337	2767	832	4333	4583	21504
-47	-45.5	1019	2046	1234	452	1640	223	1668	1725	10007
-44	-42.5	688	1540	848	256	1088	92	1018	891	6421
-41	-39.5	493	1261	642	169	817	51	865	609	4907
-38	-36.5	342	964	530	138	629	37	688	388	3716
-35	-33.5	226	704	305	106	422	25	526	255	2569
-32	-30.5	145	498	261	58	275	20	402	173	1832
-29	-27.5	72	268	134	19	145	6	230	108	982
-26	-24.5	31	157	73	8	57	0	135	40	501
-23	-21.5	19	95	27	1	45	0	73	31	291
-20	-18.5	3	21	5	0	4	0	17	2	52
-17	-15.5	0	1	0	0	0	0	2	0	3
-14	-12.5	0	0	0	0	0	0	0	0	0
sum		39063	55985	29980	15959	29610	11484	43785	50795	276661

Table 25: Summary of results surveys of individual lake basins in 1999 compared							
with three earlier surveys.				Weighted averages			
basin		Central	Northern	Total	Total	Total	Total
year		1999	1999	1999	1998	1997	1996
Number of pings		449.65	519.32	505.37	735.65		
range start (m)		4.03	4.06	4.05	3.93	4.07	
range end (m)		13.68	14.61	14.42	15.11	13.11	
tot SA (m^2/ha)		7.56	14.32	12.97	11.54	23.76	
single trac SA (m^2/h		5.24	9.18	8.39	6.88	12.71	
Share of single tgts(%		68.94	62.51	63.80	66.03	56.77	
SV (m^2/m^3)		0.0000059	0.0000102	0.0000093	0.0000078	0.0000200	
LogSV		-52.63806247	-50.6254216	-51.0284693	-52.39560028	-47.66807	
Aver BXS		0.0000166	0.0000355	0.0000317	0.0000280	0.0000680	
fish/m^3		0.3771	0.3317	0.3408	0.2751	0.3800	
fish/ha		6787.0	5970.7	6134.2	4951.9	6859.6	
aver.w. (g)		7.42	22.53	19.50	14.41	44.57	
biomass (kg/ha)		43.94	106.93	94.31	74.22	242.55	78.00
weighted abundance		6466.2	5325.0	5553.5	4859.3		
weighted biomass		42.61	122.26	106.31	76.96		73.70
Total volume sampled		245666	981079	1226744	3312210		
TS		0	0	0	0		
-65	-63.5	2215	0	2215	81780		
-62	-60.5	23481	65026	88507	132488		
-59	-57.5	31440	71548	102988	144296		
-56	-54.5	26795	52765	79560	154652		
-53	-51.5	15651	34871	50522	159344		
-50	-48.5	8102	21504	29606	95549		
-47	-45.5	3105	10007	13112	51404		
-44	-42.5	1762	6421	8183	21799		
-41	-39.5	1228	4907	6135	12451		
-38	-36.5	773	3716	4489	8241		
-35	-33.5	533	2569	3102	5947		
-32	-30.5	281	1832	2113	3929		
-29	-27.5	157	982	1139	2046		
-26	-24.5	63	501	564	836		
-23	-21.5	20	291	311	294		
-20	-18.5	6	52	58	80		
-17	-15.5	0	3	3	14		
-14	-12.5	1	0	1	4		
sum		110999	276661	387660	873884		

Table 26: Calm weather cruises during five surveys of Neusiedlersee		
Year		Cruise No.
IV 1996		4,6,7,(8), (11)
VIII 1996		8, 11, 13,17, (14)
1997		1.4., 1.5., 1.7., 2.1., 2.2., 2.3., 2.4., 2.5., 2.7., 2.8., 2.9., 3.1., 3.2.
1998		1.3., 1.7., 2.1. To 2.10.
1999		3,4,5,6,7,8,9,10

Table 27: Summary of quantitative records in west shore transects in four consecutive years.

Year	1996	1997	1998	1999
Cruise	Cr. 13	Cr. 3.1 and 3.2	Cr. 3.1.	Cr. 9
			No good	
range start (m)	3.36	3.96	4.00	4.15
range end (m)	11.00	11.13	17.23	16.26
tot SA (m^2/ha)	22.91	19.04	12.33	24.49
single trac SA (m^2/ha)	14.84	11.19	8.45	16.32
Share of single tgts(%)	65.04	57.03	71.39	64.21
SV (m^2/m^3)	0.0000200	0.0000210	0.0000073	0.0000151
LogSV	-46.99	-46.80	-51.39	-48.22
Aver BXS	0.0000500	0.0000366	0.0000230	0.0000561
fish/m^3	0.59	0.67	0.33	0.34
fish/ha	11756.80	12037.35	6010.18	6069.79
aver.w.(g)	20.69	21.79	6.04	41.08
biomass (kg/ha)	186.66	212.12	32.01	184.41

Table 28: Summary of quantitative records in west shore transects in four consecutive years.

	1996	1997	1998	1999
Cruise	8	3.4.	2.1.	3,4,5 middle
Number of pings				
range start (m)	3.64	3.96	4.34	3.95
range end (m)	10.24	11.49	12.97	15.34
tot SA (m^2/ha)	6.99	15.99	2.85	15.86
single trac SA (m^2/ha)	3.89	7.84	1.92	10.14
Share of single tgts(%)	60.30	55.39	70.45	63.81
SV (m^2/m^3)	0.0000080	0.0000158	0.0000027	0.0000106
LogSV	-50.97	-48.01	-55.74	-50.34
Aver BXS	0.0000030	0.0000376	0.0000280	0.0000438
fish/m^3	0.46	0.52	0.10	0.26
fish/ha	9223.97	9434.89	1872.10	4695.46
aver.w.(g)	10.12	24.85	11.66	29.93
biomass (kg/ha)	46.22	187.40	19.35	125.18

Tab. 29: Absolute abundances of fish (inds/ha) estimated in individual size classes during all cruises of 1999 survey.

TS (dB)	-15.5	-18.5	-21.5	-24.5	-27.5	-30.5	-33.5	-36.5	-39.5	-42.5	-45.5	-48.5	-51.5	-54.5	-57.5	-60.5	-63.5	-66.5
TL (cm)	101	76	57	42	32	24	18	13	10	7	6	4	3	2	2	1	1	1
Cruise 1	0	0	6	9	11	56	141	104	242	322	501	1231	1453	1451	1217	690	189	0
2	0	0	5	13	9	20	64	52	59	163	307	1204	1097	1158	1063	334	0	0
3	0	4	15	21	45	49	70	64	91	100	158	649	625	876	1016	354	0	0
4	1	13	49	45	69	128	113	130	129	126	195	482	695	983	869	271	0	0
5	0	10	43	94	131	194	96	289	181	244	425	725	1483	1191	1064	638	0	0
6	0	0	3	21	49	100	137	107	65	151	364	1444	1183	1190	1135	224	0	0
7	0	8	79	37	144	210	231	291	249	322	592	1163	1114	961	902	206	0	0
8	0	0	0	0	27	68	28	44	62	132	384	1692	1335	1777	1361	193	0	0
9	3	19	72	76	104	177	120	151	144	115	439	1562	1173	1259	604	54	0	0
10	0	4	22	27	67	69	89	106	162	164	427	1421	1707	1759	675	114	0	0
11	0	3	0	20	47	32	142	84	192	184	387	1427	1846	1879	557	43	0	0
average	0	6	27	33	64	100	112	129	143	184	380	1182	1246	1317	951	284	17	0

Tab. 30: Values of fish abundance, biomass and average weight in individual cruises of 1999 survey.
Average values weighted by the sampling volume are compared with unweighted values.

	biomass kg/ha	biomass kg/ha	Average weight (g)	Average weight (g)	abundance inds/ha	abundance inds/ha
Cruise	volume unweighted	volume weighted	volume unweighted	volume weighted	volume unweighted	volume weighted
1	26.88	29.87	3.60	3.93	7622	7600
2	15.20	20.46	2.89	4.25	5548	4813
3	57.59	69.66	14.72	15.94	4137	4370
4	167.71	177.58	40.83	42.63	4297	4166
5	167.54	165.03	32.71	28.88	6807	5714
6	37.30	38.63	7.06	6.90	6172	5602
7	133.98	191.85	26.37	33.89	6510	5661
8	8.50	14.37	1.35	2.44	7103	5883
9	184.41	238.12	41.08	45.19	6070	5269
10	93.05	82.25	15.54	12.92	6811	6368
11	45.95	38.37	8.22	5.71	6844	6717
average	85.28	96.93	17.67	18.43	6175	5651