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The Effect of the Water Discharge on the Catch of Eel in Rivers

by

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In Germany eel is the most important fish in river fishery. The abundance of eel and the possibilities of catch are decisive for the profitableness of this branch of fishery. It is known that the migrating eel uses that part of the river with the maximum water speed. The fishermen take advantage of this habit of the eel and set up their fishing gear, as far as possible, at places with the strongest current. These places are known to the fishermen since years. They go there time after time and call them "Hamenplätze", i.e. places for stow nets, the gear mainly used in river fishery. If a river changes the bed, the type of current also changes so that the places used so far are deserted and new ones are found. It is possible to compare the yields obtained in one place during several years, as certain fishing grounds are used over many years, and besides, the fishing gear being of same construction also facilitates such a comparison.

The Institut für Küsten- und Binnenfischerei studies since many years the eel fishery in the river Elbe, and interesting results were obtained of the relation between eel catch and water discharge. In order to control the course of fishery during different years, use was made of the statistics of some fishery enterprises. From these data the eel catch/day in a stow net was calculated and called the catch per day of a "standard" stow net. The figures obtained in this way (kg/eel/day) were entered in a diagram together with the water temperature and the water discharge of each day. Fig. 1 represents the values of the year 1959. The fishery starts in spring, yielding only a few kg per day, this increases soon to several kg/day, and very soon 10 kg/day are obtained. As soon as floods are approaching, the catches increase, and decrease when the river Elbe has again a normal

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water discharge. The daily catches amount to 80 to 100 kg, if the floods during summer are very strong.

A comparison of the diagrams of several years shows a distinct connection between the water discharge of the whole year and the size of the catch. From the total catch and the number of fishing days per year the average catch/day was calculated for each year and compared with the average water discharge (Table 1).

From Table 1 it follows that years, when the river carries much water, yield a good eel catch whereas in other years catches are smaller. The latter was especially noticeable during the years 1960, 1963 and 1964. The year 1957, however, did not comply with this rule: the water discharge was good, 904 m^3/sec so that also the average eel catch should have been good. In order to find out why this was not the case, the water discharge of each month was examined, and it was found that, peculiar to 1957 only, the water discharge during the first month of the season (April) was high, but during the months of May and June very low, and not until August did the river Elbe carry again much water. These differences in the various months explain the small catches in 1957. Similar conditions also apply to the year 1967. During this year the average catch/day should have amounted to 15 kg, as the average water discharge was very strong (1060 m^3/sec), but in fact only 12,2 kg on the average were caught. The figures of the water discharge during the various months of that year show that the river Elbe carried but little water in spring.

Thus our studies show that the water discharge of a river has a great effect on the eel catches. Years, when a river carries much water, yield a good catch, whereas in years, when this is not the case, the catch is small. Further, the floods in spring are of special significance for the catch.

Water discharge and the catch of eels in the Elbe

year	water discharge m^3/sec	kg eel/stow net/day
1956	877	15,22
1957	904	10,18
1958	920	18,12
1959	571	7,24
1960	499	5,98
1961	918	19,95
1962	705	10,74
1963	403	4,70
1964	403	4,60
1965	944	20,90
1966	1000	15,24
1967	1060	12,22
average 1956/67	767	9,83

discharge m^3/sec

water temperature °C

1959

discharge at the gauge of Darchau
m^3/sec

1000
800
600
400

°C
20
10
0

kg eel / stow net / day

40
30
20
10

1.4. 10.4. 20.4. 1.5. 10.5. 20.5. 1.6. 10.6. 20.6. 1.7. 10.7. 20.7. 1.8. 10.8. 20.8. 1.9. 10.9. 20.9. 1.10.