ヨーロッパウナギの養鰻池における性と成長に関する二,三

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Notes on Sex and Growth of European Eels in Freshwater Eel-rearing Ponds

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A huge number of elvers of *Anguilla anguilla* were imported from France to Japan in the spring of 1969 for the purpose of meeting a great shortage of elvers of *A. japonica* in the year. Since then they have been cultured, without satisfactory results, in not a few eel-farms in Shizuoka Prefecture. In regard to the cultivation of the species the following question was raised as a basic problem by experts on eels. In *A. japonica*, elvers, when cultured in freshwater ponds, develop for the most part into males[1], which normally reach a marketable size of 120 to 180 mg (roughly, 42–48 cm) within two years. Natural males exceeding a length of 50 cm are not uncommon. While the males of *A. anguilla* in natural waters are reported to rarely exceed a length of 50 cm[2]. According to EHRENBAUM[3], for instance, about 99% of the males which he examined were less than 40 cm long. According to KOOPS (private communication), most of the males from natural waters are less than 100 gm in weight. So provided that *A. anguilla* produces chiefly males of small size in fishponds, we cannot but feel a doubt as to the suitability of the species for cultivation. The present investigation was made to answer this question.

Material and Method

The material used consisted of 232 specimens of *A. anguilla*, ranging in body length from 32.2 to 54.3 cm, which were reared from elvers for the period April, 1969 to October, 1970 in a pond of the Marukawa Fish Farm at Yaizu City. After the body length and body weight of the fish were noted, they were dissected for sex determinations, which were made macroscopically on their gonads. Moreover, with eels measuring less than 45 cm and those measuring over 45 cm and having underdeveloped ovaries, microscopic examinations were made of sections prepared from the gonads. This re-examination revealed that the macroscopic discrimination between male and female was reliable.

Results and Discussion

The results are given in Fig. 1. Of the 232 eels, 147 (63%) were males. The percentage of males, however, varied markedly according to size. Of the 155 eels measuring

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less than 43 cm, 138 (89%) were males, while 68 (88%) of the 77 eels measuring 43 cm or over were females. This result suggests that unlike *A. japonica*, *A. anguilla* may produce females in ponds in a relatively high percentage, though the sex-ratio of the population from which the material was taken could not be determined because of practical difficulties in investigating the size frequency distribution of the population.

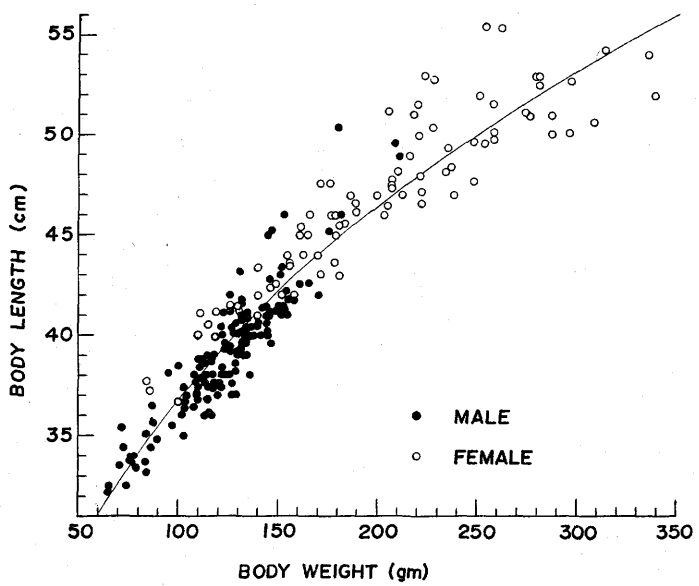

Fig. 1. The influence of sex on the growth and the length-weight relationship of pond-reared *Anguilla anguilla*. The curve is a graph of the equation, $W=2.0L^3$.

From Fig. 1 it will be seen that the large majority of the males can grow to over 120 gm, though it seems that their growth, on an average, stops at a size of 40 cm or so. Further it is noticed that values of condition factor of the material fish (mean, 2.01; range, 1.39–2.55) are comparatively higher than those of pond-reared individuals of *A. japonica* of similar sizes and in the same season (mean, 1.71; range, 1.22–2.37; number of samples, 210: unpublished data).

From these findings it may be tentatively concluded that *A. anguilla* has no serious cultural handicaps in connection with sex and growth.

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References

1) I. MATSUI: *J. Shimonoseki Coll. Fish.* **2**(2), 1–245 (1952).
2) L. BERTIN: Eels. A Biological Survey. Cleaver-Hume Press, London, pp. 192 (1956).
3) E. HHRENBAUM: Der Flußaal, *Anguilla vulgaris* TURT. Handbuch der Binnenfischerei Mitteleuropas, Band II, Stuttgart (1930).