On the Question of American Eels, *Anguilla rostrata* versus European Eels, *Anguilla anguilla*

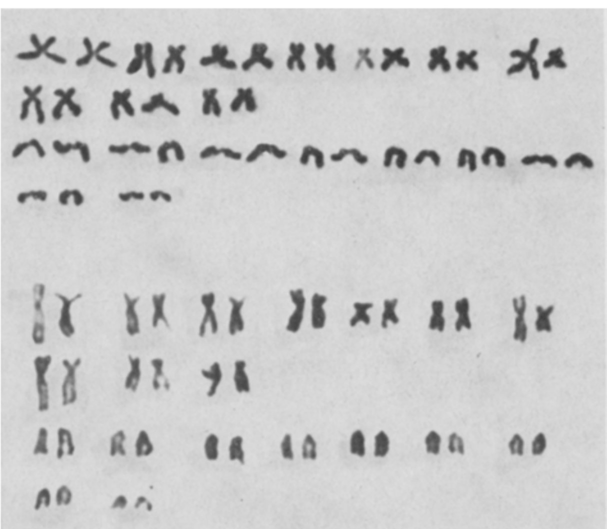
Eels of the genus *Anguilla* are catadromous fish. Only two, European eels, *A. anguilla*, and American eels, *A. rostrata*, are represented in the Atlantic.

Although the two have been regarded as separate species, the differences are small. The chief distinctive characteristic is the difference in the number of vertebrae: 110–119 for *A. anguilla* and 103–111 for *A. rostrata*[1]. Furthermore, it is believed that they share common or adjacent spawning areas in the Sargasso Sea near Bermuda which is the area of highest salinity in the North Atlantic[2].

Inasmuch as the distance between Europe and the Sargasso Sea is very great, and since the migration of mature silver *A. anguilla* to the Sargasso Sea has not been conclusively demonstrated[3,4], TUCKER[5] proposed a very ingenious hypothesis. He regards *A. anguilla* and *A. rostrata* as one and the same species always originating from the Sargasso Sea. Those eggs hatched in the southern part drift toward Europe and become recognized in fresh and littoral waters as *A. anguilla*. But *A. anguilla* represent dead-end populations, as their fate is not to return ot the origin of birth. Those eggs hatched in the northern part of the Sargasso Sea drift toward North America and become recognized as *A. rostrata*. It is *A. rostrata* which returns to the Sargasso Sea to function as the breeding stock for the next generation of both *A. anguilla* and *A. rostrata*.

Inasmuch as the karyotype of *A. anguilla* has recently been presented by CHIARELLI et al.[6], we decided to examine the chromosome complement of *A. rostrata*.

Materials and methods. Five silver eels with body weights of 210–350 g and body lengths of 52.0–57.5 cm were captured in Taylor County, Florida, and airmailed alive to us by the Gulf Specimen Co. For the Chromosome analysis, each eel received a single subcutaneous injection of 2 ml of 0.5% colchicine solution 2 h before the killing. Squash preparations were made from gills, spleen, kidney and gonads according to our method previously described in detail[7]. Gonads were also used for histological examination.



Diploid chromosome complements obtained from 2 individual eels. The one shown at the top shows a more severe effect of the colchicine treatment than that shown at the bottom. In each karyotype, 7 pairs of metacentrics including 1 heteromorphic pair (extreme right) are arranged on the top row. 3 pairs of subterminals are arranged on the middle row, and 10 pairs of acrocentrics on the 2 bottom rows.

Observations. The diploid chromosome number of all 5 eels was 38, the same as that reported for *A. anguilla*[6]. The chromosome complement, however, was strikingly different from that of *A. anguilla*. The diploid complement of *A. anguilla* whos found to consist of 12 pairs of metacentric chromosomes, 4 pairs of subterminals, and 3 pairs of acrocentrics[6]. We found that the 38 chromosomes of *A. rostrata* consist of 7 pairs of metacentrics, 3 pairs of subterminals, and 9 pairs of acrocentrics as shown in the Figure. Inasmuch as differences between the chromosome complements of *A. anguilla* and *A. rostrata* exceed either a simple Robertsonian fusion or a few pericentric inversions, there should no longer be any question that, despite the proximity of spawning areas in the Sargasso Sea, the 2 have been in complete reproductive isolation for a long period of time.

In recent years, CHEN et al.[8] began to report morphologically distinguishable sex chromosomes in a considerable number of divergent teleost species It is of interest to note that the chromosome complement of *A. anguilla* presented by CHIARELLI et al.[6] included a very conspicuous heteromorphic pair made of the largest and the smallest metacentrics. The sex of a specimen from which that chromosome complement was derived, however, was not specified. The gonads of all 5 *A. rostrata* which we examined under the microscope were clearly ovaries containing oocytes in various stages of maturation, and the chromosome complements of all 5 appeared to contain a heteromorphic pair, again made of the largest and the smallest metacentric (Figure). It is tempting to say that this indeed is the *ZW*-pair. However, eels, even in the silver phase, are notorious for their intersexlike characters. Thus, we should refrain from a definite statement until eels showing spermiogenesis are compared with eels containing mature oocytes.

Conclusion. The diploid chromosomes complement of *A. rostrata* ($2n = 38$) is made of 7 pairs of metacentrics, 3 pairs of suterminals, and 9 pairs of acrocentrics. It is distinctly different from the diploid complent of *A. anguilla* reported by CHIARELLI et al.[6].

Zusammenfassung. Der amerikanische Aal *Anguilla rostrata* ($2n = 38$; 20M + 18A) gehört einer anderen Spezies an als der europäische *Anguilla anguilla* ($2n = 38$; 32M + 6A).

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