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HAEMOGLOBIN PATTERNS OF SECOND-GENERATION HYBRIDS BETWEEN PLAICE AND FLOUNDER

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Summary

Haemoglobin electrophoresis of F_2 hybrids between plaice and flounder revealed besides the parent and F_1 patterns only one new pattern, which is most likely due to trisomy or triploidy.

HYBRIDS between the two flatfish species, plaice (*Pleuronectes platessa*) and flounder (*Platichthys flesus*), can be produced in aquaria and are also known to occur in Nature. We have previously described the electrophoretic patterns of haemoglobins from the parent species and from their first generation hybrid (Sick *et al.*, 1963). Both species have multiple haemoglobins; the patterns, as these are revealed by agar electrophoresis (Sick, 1965) are, however, clearly different. The pattern of the F_1 hybrid is very complex, and it does not resemble a simple superposition of the parent patterns. These patterns are shown as Nos. 1-3 in fig. 1.

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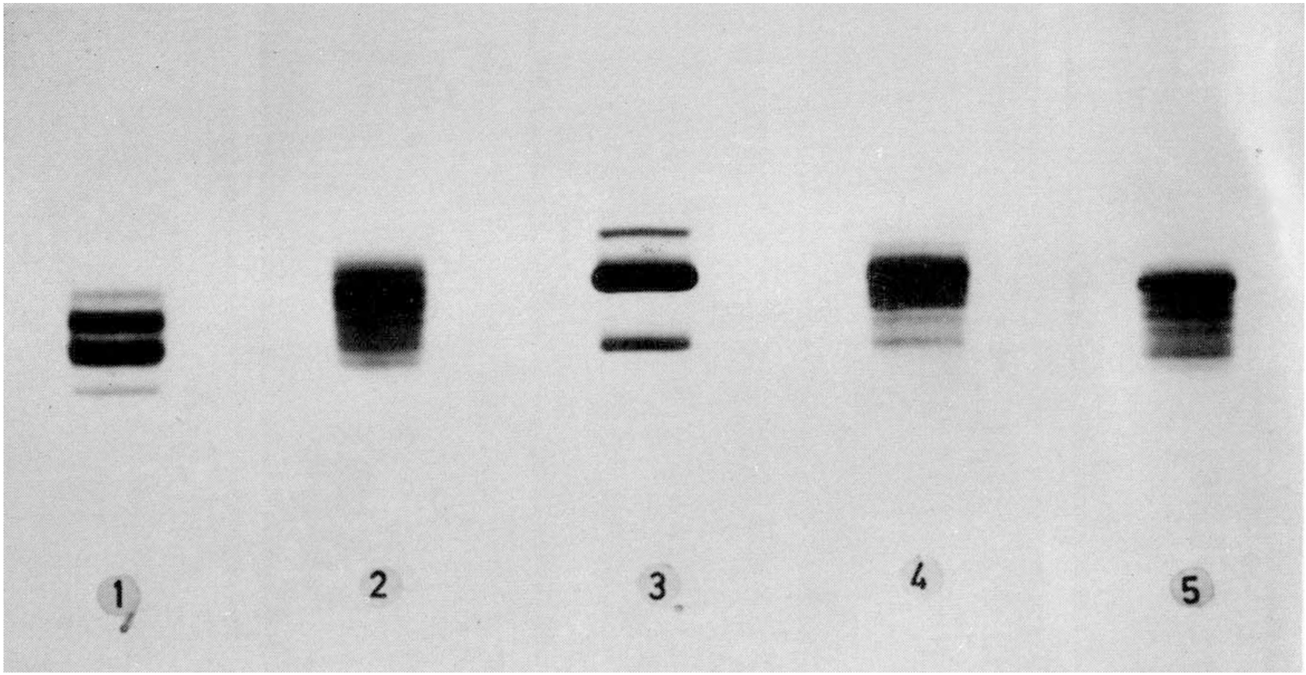

Fig. 1.—Haemoglobin patterns of plaice (1), flounder (3), F_1 hybrid (2), aberrant F_2 hybrid (4), and *in vitro* mixture of one part of flounder haemoglobin and two parts of haemoglobin from an F_1 hybrid (5).

We have studied the haemoglobin patterns of second generation hybrids (F_2). Assuming that a minimum of two genetic loci were responsible for the multiplicity of haemoglobins in these fishes, we expected that genetic recombination would give rise to a number of new patterns, and that the patterns of the two parent species would be rare among the F_2-offspring. This turned out not to be the case. Of the 40 F_2-specimens examined, 14 showed flounder pattern, 3 plaice pattern, 15 F_1-pattern, and 8 specimens revealed one and the same new pattern. This pattern, which appears as No. 4 in fig. 1, can be almost exactly reproduced by running an *in vitro* mixture of one part of flounder haemoglobin and two parts of haemoglobin from a first generation hybrid (No. 5 in fig. 1).

Since we are dealing with species hybrids, it is quite possible that the new pattern results from triploidy or trisomy rather than from genetic recombination by crossing over or by independent assortment of chromosome pairs. From morphometric and meristic measurements Purdom (1972) concludes that perfectly viable triploid plaice and plaice × flounder hybrids are very frequently produced by cold treatment of fertilised eggs. Although we have not attempted to determine the ploidy status of our material by such measurements or by chromosome counting, Purdom's observations clearly add support to the hypothesis of trisomy or triploidy as an explanation for the new haemoglobin pattern found among the F_2-material. Under all circumstances it seems safe to conclude from the high percentage of parental and F_1-patterns found in the F_2-generation that if more than one locus is coding for the multiple haemoglobins in these fishes, then the alleles of these loci do not assort independently, but segregate as groups of linked genes. The flatfish haemoglobins, therefore, provide an additional example to the list of cases, in which linkage between genes determining related proteins has been demonstrated (Lush, 1966; Ohno, 1970).

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