

Congenital malformations of the feet in Mallard ducklings

DURING the 1961 breeding season at the Wildfowl Trust all ducklings in the collections, and all eggs that failed to hatch, were examined for deformities. Six examples of abnormal congenital development of the beak and skull have already been described (Harrison & Kear, 1962); in addition, one Mallard brood, hatched by a wild female that nested within the enclosures, contained a number of polydactylous ducklings.

The figure shows the three types of deformity found: (a) complete duplication of hind toe, (b) enlargement of middle toe with duplication of nail and terminal phalanges, (c) abnormal proportions and positioning of the toes. Seven ducklings of the brood had normal feet, two showed all defects on both feet, the tenth bird had all defects in one foot and (b) and (c) in the other, and the eleventh duckling had defects (b) and (c) of both feet.

The embryonic limb bud has a core of undifferentiated tissue, the mesenchyme, which is condensed and replaced by cartilage at the site of the long bones and separates into bars corresponding to the digits of a pentadactyl limb. The influence of a special region of the distal ectoderm, the apical ridge, appears necessary in many vertebrate groups for the growth and segregation of the mesenchymal components of the distal part of the limb (Saunders, 1948). Since the digital condensations have a specific size, any genetically-determined increase in the mesenchymal plate corresponding to the future foot will result in an excess of digital bars being produced (polydactyly). Where residual amounts of mesoderm are too small to form whole digits, only partial separation of the bars occurs (syndactyly).

Apart from genetic failures, various external factors may upset normal embryonic development, such as excessive ranges of temperature, X-ray irradiation (Bagg, 1929) and the administration of certain drugs. The variations in extent of the deformity in the brood described here make it likely that the condition was of external rather than genetic origin. The relatively high proportion of abnormality among ducklings in 1961 (10 out of 1767 examined) did not recur in 1962 (0 out of 934 examined), suggesting some specific injurious factor affecting, in one year only, a number of the breeding birds at Slimbridge.

A minor degree of digital malformation such as this allows almost normal function. The effect of an increased number of digits may, however, alter their positioning and the increased trauma at the joints can lead to arthritic changes in captive birds.

References

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