

Update on the colour genetics of Appleyards 2021

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R George Jaap's research papers from 1933/34 formalised the scene for modern duck genetics, furthered in 1963 by FM Lancaster. Jaap distinguished the triple allele series of mallard, dusky mallard and mallard restricted. In the infant fluff, the mallard pattern (M^+) has the familiar four-spot pattern on the dorsal surface. Dusky (m^d) has a uniform pattern, and the restricted (M^R) has dark areas 'restricted to a patch on the head and tail' (see pages 17,20 and 43 of *Colour Breeding* for infant examples).

The M^R adults illustrated by Jaap were a mystery to us. Even by the 1990s, no one we knew had seen such birds. The modern exhibition M^R bird is very different. Jaap described his M^R birds as almost indistinguishable from M^+ except that the wing front and bow showed considerable white spotting in the males. In the females, the white spotted feathers of the wing front and bow were lighter in colour than the mallard, with extremely wide pencilling of light brown or buff on each feather. An explanation of the existence of these birds arrived by accident in 2009 when our Miniature Appleyard male produced ducklings with a wild mallard female.

Jaap used birds pure for M^R , M^+ and m^d for his experiments and concluded that M^+ is a simple dominant to m^d ; also that M^R is allelic to M^+ and m^d and that the M^R pattern in the fluff is dominant. Jaap did say that all the possible homozygous and heterozygous combinations of the three alleles had been obtained, and his statistics (based on the appearance of the ducklings in the fluff) verify this. However, in view for the similarity of our F_1 (M^R/M^+) crosses to Jaap's Restricted birds, it would be interesting to test for the appearance of M^R/M^R Li/Li to compare with our obvious heterozygous form.

Jaap's experimental M^R birds were from three sources in Wisconsin and Pekins were later used. Reginald Appleyard UK probably developed his 'Appleyards' from crosses with Pekin ducks and incorporated the distinctive grizzle face markings (also acquired from the Pekin); these birds were first exhibited in 1947; then standardized on Tom Bartlett's work in 1982; and also added in miniature form in 1987 (see Ashton 2002).

UK birds were tested by Lancaster and found to be light phase restricted. He comments that li pigmentation (although paler than Li) is more extensive on the dorsal wing surface than in li^h where much of the dorsal wing surface is white. Although li^h exhibition birds in Abacot and Welsh Harlequin are now bred with coloured wing coverts, the dead white smaller coverts in some 'Appleyards' could indicate li^h , especially where this feature is accompanied by a brown hood.



These eight F_1 wild mallard x Appleyard ducklings show the Mohawk stripe when split for M^R . They are M^R/M^+ , Li/li [Li is dominant over li]. The under-down was dark, and they were not yellow at 3 weeks. That is in contrast to M^R ducklings believed to be M^R/M^R li/li . As the 2009 birds came into juvenile feathers (below), they were very dark in colour, rather than 'Appleyard'. They correspond with the 1934 illustration of Jaap's restricted birds.



Above: Female with white wing fronts and patterned coverts. This F_1 heterozygote is similar to those described by Jaap.

From Jaap's evidence, he may not have seen adult homozygous restricted birds. In his results, white Pekins were the source of M^R in parent birds homozygous for this allele, hidden by c/c .

A: Light phase M^R ducklings have yellower fluff than dark phase at hatching, but still retain some dark pigment in the underdown. Those with a less pronounced stripe could be li/li^h . The fluff is yellow to the base of the down in li^h/li^h (Lancaster p 333)

B: The same ducklings growing juvenile feathers at 3-4 weeks



Miniature female showing a continuous stripe of pencilled feathers down the back of the neck to the back of the body. The rump and smaller back feathers should also be clearly pencilled. Harlequin phase is thought to interfere with the regular pattern.

Observations

M^R in the fluff always shows the Mohawk stripe even when birds are heterozygous for M^R . This applies to dark phase and light phase.

Selection for the M^R and the Appleyard breed must always use Mohawks. Two heterozygotes will breed 25% not-Mohawk as well as 50% heterozygotes and 25% pure

However, since pure bred to not-pure will breed 100% mohawk, test breeding can be tedious, especially if harlequin phase is present.

Thus the duck A from 2007 (p.44) was in fact also impure for M^R in order to produce a proportion of the not-Mohawk ducklings illustrated in picture C 2007.

Many birds exhibited as 'Appleyards' are far too dark and may not be M^R at all i.e. lack Mohawk in the fluff. Any new stock purchased is best confirmed with photographs of the hatching group as ducklings.

Appleyards must show evidence of restricted colour in the plumage e.g. light/white feathers in the split claret chest of the male and a broad band of white on the female breast; claret less extensive along the male flank than in li^h ; light coloured underbody (not grey); light coloured but patterned wing coverts; an unbroken band of colour down the neck of the duck and on to the back (as in light phase Trout/Rouen Clair).

The typical 'Appleyard' light-coloured throat and facial stripes, of the drake, are regarded as the stamp of the 'Appleyard'. Unfortunately, although closely linked to M^R , that pattern can also be achieved with M^+ , or even lost with M^R . Birds in the show pen are often judged (incorrectly) largely on facial markings.

Until recently, harlequin phase does not seem to have been a problem in the UK. It is now evident that Lancaster's brief statement regarding harlequin phase reducing the M^R duckling mohawk stripe is very relevant.

Since li^h is not wanted in the Appleyard breed, the term 'silver' in the name should be dropped (since it traditionally denotes harlequin phase).

'Like breeds like' does not work because of the dominance of the M^R allele and the recessive nature of harlequin phase. Don't expect to breed pure Appleyards from undocumented birds.

This is not a breed for the beginner and it helps if a basic knowledge of colour genetics is employed; also colour patterns should be observed at all stages of growth.