

RELATION BETWEEN COLOUR AND PERFORMANCE IN CROSSBRED
EWES OF THE SYNTHETIC INRA LINE

COLORATION ET PERFORMANCES DES BREBIS CROISEES DE LA SOUCHE INRA

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Creation of a synthetic line with Berrichon du Cher and Romanov as parental breeds (matings between animals of the same generation F1, F2, F3,...) leads to production of white and coloured animals. The purpose of this study was to determine whether the white allele (white or tan A^{wh} allele) has an unfavourable pleiotropic effect on the reproduction performance as shown by ADALSTEINSSON (1970 and 1975), DYRMUNDSSON and ADALSTEINSSON (1980).

I. ANIMALS AND METHODS

This experiment was carried out at the "Domaine de la Sapinière" (INRA) near Bourges (Cher). Colour patterns were registered by the shepherds in F2 to F4 lambs born from 1971 to 1980. For the study concerning the relation between colour and fertility, we only used F2 and F4 ewes born from 1973 to 1977 (RICORDEAU et al, 1982). The least-squares analysis (fixed model) takes into account year of birth, birth-rearing class, generation order and colour patterns of the ewes.

II. RESULTS

1- The single hypothesis according to which white or tan is due to the dominant A^{wh} allele on all the other colours is acceptable (table 1); the differences between observed and expected percentages may be explained by a bad detection or a bad classification of lambs with small pigmented spots (drops).

2. After removal of the factors of variation, a significant effect was found of colour of ewe on growth and prolificacy: weights at 30, 50 and 70 days was higher for white than nonwhite ewe-lambs (+ 0.4 kg at 70 days = + 2%); litter size was lower for white than nonwhite ewes at the two first lambings (+ 0.09 and + 0.12, i.e a difference of 5 to 6%). This prolificacy advantage was similar to that observed by ADALSTEINSSON (1975) on Icelandic ewes (+ 0.12 and 0.18 at 2 and 3 years: table 2).

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TABLE 1 : PROPORTIONS OF COLOURED LAMBS ACCORDING TO THE MATING TYPE

MATING TYPE SIRE x DAM	n	p. 100	
		OBSERVED	EXPECTED
$A^{wh} A^{wh} \times [A^{wh}] \text{ or } [a]$	138	2,0	0
$A^{wh} a \times [A^{wh}]$	1682	24 - 28	16 to 25
$A^{wh} a \times [a]$	764	51 - 57	50
$aa \times [A^{wh}]$	700	45 - 49	33 to 50
$aa \times [a]$	308	95 - 92	100

$[A^{wh}]$ = white or tan phenotype ; $[a]$ = non white phenotype.

TABLE 2 : DIFFERENCE BETWEEN COLOURED (NONWHITE) EWES AND WHITE OR TAN EWES IN LITTER SIZE AT THE FIRST TWO LAMBINGS (NO. OF EWES).

	1st LAMBING	2nd LAMBING
coloured	1,71 (396)	1,93 (323)
white	1,62 (622)	1,81 (516)
difference	+0,09	+0,12

The fertility of coloured ewes was identical to that of white ewes at 1st mating in April-May, when they were 15 months old. They returned in oestrus 2-3 days before the white ewes at the 3rd post-partum mating in July-August, but this advantage was not significant. According to our data, there does not seem to be any relationship between out-of season or early-season fertility and colour contrary to the observations made by DYRMUNDSSON and ADALSTEINSSON (1980).

Finally, the confirmation of the depressing effect of the A^{wh} gene on ewe prolificacy shows the danger of discarding coloured phenotypes from selection schemes.

SUMMARY

The aim of this study is to give an account of the inheritance of the colours found in the crossbred lambs (F2, F3, F4) born from the two parental breeds Berrichon du Cher and Romanov, and the relation between colour, growth rate and reproductive traits in the females (1100 ewes born from 1973 to 1977).

The white ewe-lambs (homozygous or heterozygous for allele A^{wh} for white or tan) showed higher live weights at 30, 50 and 70 days versus the coloured one (2% to the maximum), but the litter size of the coloured ewes was significantly higher at the first two lambings (+ 0.08 and + 0.12, i.e 5 and 6%), confirming the observation of ADALSTEINSSON (1970 and 1975). In the contrary, there was no significant difference between white and coloured ewes in the fertility at out-of season first mating at the age of 15 months and at 3rd mating in July.

RESUME

Cette étude concerne le déterminisme de la coloration des agneaux F2, F3 et F4 issus des accouplements entre les 2 races parentales Berrichon du Cher et Romanov, et les relations entre la coloration et les performances des brebis (1100 brebis nées de 1973 à 1977).

Les agnelles blanches (homozygotes ou hétérozygotes pour l'allèle dominant A^{wh} blanc ou tan) ont des poids à 30, 50 et 70 jours supérieurs aux agnelles colorées (+ 2% au maximum), mais les brebis colorées ont une taille de portée significativement supérieure aux 2 premières mises bas (+ 0.08 et + 0.12, soit + 5 et 6%), ce qui confirme les observations d'ADALSTEINSSON (1970 and 1975). En revanche, les brebis blanches et colorées ne présentent aucune différence sensible de fertilité à la 1ère lutte de contre saison à 15 mois ou à la 3ème lutte en Juillet.

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