

THE RANGE OF EXPRESSIONS - by Lesley Partridge

In order to study actual heritable characters, we must consider the fact that it is often the case that more than one gene determines a characteristic in an organism. This is called the multifactorial inheritance. Let us look closer at the possible reasons for this situation, based on our knowledge using the present breed standard requirement.

A particular gene product will normally be operating in the presence of countless different combination of other gene products.

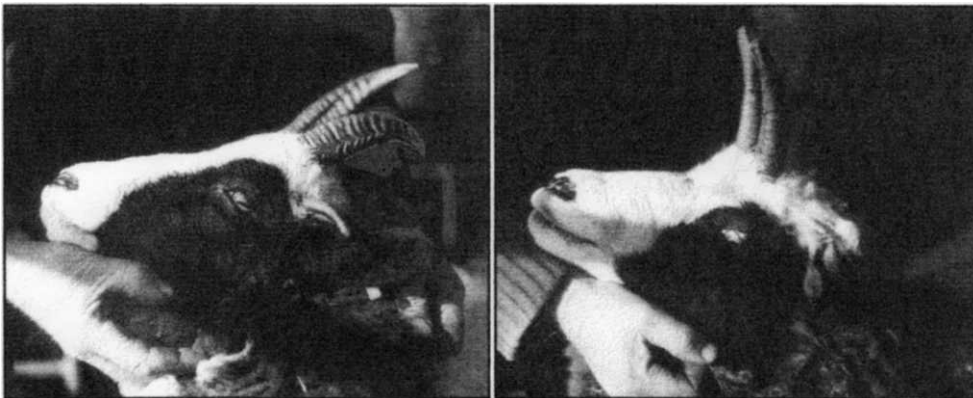
When the action of a certain gene product (eyelids/head wool) is particularly sensitive to the nature of other gene products (multiple horns) in a cell, its expression may well be variable from one individual to the next and in some cases inhibited altogether.

An incomplete penetrant gene finds expression in some individuals but not others. Incomplete penetrance is a property of many dominant genes. Once a gene is penetrant (finds expression) it will frequently exhibit variable expressivity. Meaning that the same gene produces a range of looks (phenotypes) in various penetrated individuals.

This is illustrated when an individual does not exhibit the trait yet passes it on to progeny.

Taking the assumption that polycerate (four/multiple) horns are dominant, and the two horn condition is recessive, figure 1 suggests multifactorial dominance in action.

References: Ursula Goodenough, R.P. Levine (Genetics) 1976, W.M. Roberts (Genetics)



Twin Sisters from Type D Parents (see Figure 1) showing contrasting eyelid and horn characteristics.
1997 Macdonald & Evans