

Black, Bezoar And The British Feral Goat

Raymond Werner, August 2010

Summary

The commonly held view that the English goat was originally Bezoar colour pattern (rich tan with white belly and black dorsal and leg striping) is erroneous. It was certainly a common colour pattern, as reported in the south-east of England during Victorian times, although either black or white were if anything more typical. The British feral goat originated from multi-coloured domestic stock, although in some instances the founders of individual herds may have been mono-coloured. Of the ten colour patterns identified with the feral goat to date, six are associated with 'black' or grey as a base colour, while two of the others (white and black mask) are now quite rare, and the two tans (Bezoar and badgerface) are infrequent. This suggests that black and grey typify the feral goat at the present time, although more evidence is needed to confirm this. Whether or not herds were much more multi-coloured in the past, but have tended to become black with white patching more recently, is doubtful. On the Border Hills the opposite is true, in fact, with herds being mainly black and white sixty years ago but generally multi-coloured today. What is clear is that a herd is not likely to 'bottom out' with dominants being lost and recessives winning through. The factors that affect colour pattern trends appear to be random and natural selection, so there is no known reason why Bezoar, as a 'dominant' colour pattern should fare any better or worse than black, being the bottom 'recessive'. There is some evidence to suggest that the colour pattern bias in individual herds has changed historically, particularly in relation to man-management and the upheavals caused by the Forestry Commission. White spotting occurs on four separate loci in relation to feral goats, three of which are likely to be Dominant. We cannot, for this reason, think of pied as being recessive per se in goats.

Introduction

An interesting article, entitled 'One black, one white, and two khaki', appeared in Newsletter 70 (August, 2010) of the Old English Goat Society. Written by Dr. Thelma Rowell, it raised some interesting questions with regard to the colour of the British Feral Goat.

The article may be summarized as follows:

When Dr. Rowe first kept goats as bred by the English Goat Breeders' Association, she had been led to believe that the original colour of the English goat was the colour pattern we call Bezoar, which the Association claimed to have 'carefully restored'. Thus, Bezoar would have been the original colour of the British Feral goat too. However, contemporary feral goats in Britain nearly all seem to be black and white or occasionally roaned grey and white. She therefore went on to query whether this had always been so, or could it be that feral goats used to be more varied in colour, including Bezoar. Also, had this change occurred fairly recently?

In considering the cause of this possible change, Thelma went on to make the point that nowadays, feral goats are scattered in small herds, and when numbers increase, culls are organized. Bearing in mind that it must be very rare for a goat to transfer from one herd to another, she envisaged a kind of ratchet effect of repeated culling and consequent inbreeding of very small groups of initially mixed colouring, resulting in less variability in favour of black.

An explanation for this would be that Bezoar and white colour patterns are 'dominant' to all other colours, and black the bottom recessive. When the last Bezoar of white goat is lost from a herd, there would be no possibility of these colour patterns occurring again. This process would be faster if Bezoar and white were selected in particular for culling, the reason being unsure. It was suggested, even so, that Bezoar or white may be more easily seen, or their skins may have been more valuable.

Lastly, white patching, which Dr. Rowe believes to be a recessive, was mentioned, there being an additional query as to why this, too, has not been lost in the process, leaving only uniform black as opposed to pied.

The original colour of the English Goat

Firstly, Bezoar was by no means the original (as in only) colour pattern of the English goat. In domestication, the colour was quite variable, and to date ten colour patterns have been associated with it by the present writer. Four of these are basically black (no pattern black, mahogany, red cheeks and lightbelly), whilst two are basically grey (grey and blue). Two are tan-bodied (Bezoar and badgerface), whilst two more are either white (white/tan) or nearly so (blackmask). It would seem likely that all of these colour patterns were to be found in the remnant stock of the Old English goat preserved by the first English goat breeders' Association of 1920, the greys being typical and the Bezoar by no means significant.

How, then, did the Bezoar colour pattern come to be associated with the English goat? It originated with Holmes Pegler's description of the breed, as found in his *The Book of the Goat*, 3rd edition, 1886. In this work, he described the English goat as 'ranging from black to white, but is more often light or dark fawn, with a darker line along the back, and black on the legs'. Firstly, it should be noted that the breed showed a wide variation in colour, although one colour pattern occurred 'more often'. Was this Bezoar? Pegler's type description of fawn with dark along the back and on the legs is not actually diagnostic, being an apt description of either Bezoar or badgerface with no way of knowing which was meant. His two illustrations of 'English' nannies do show the Bezoar pattern, however, and this may have been significant in the second English Goat Breeders' Association defining the breed as Bezoar. 'More often' may have been Pegler's perception, but more often where? Pegler's overall description was quite precise - 'features most prevalent at the time' - and he was living in Hertfordshire but working in London during the 1880's. In an attempt to confirm that the English goat of Pegler's personal experience was more often either Bezoar or Badgerface in the London area at this time, a study was made of English goats offered for sale in the Bazaar, Exchange and Mart. It clearly demonstrated that this sample, which is taken to be typical, was 'more often' either black or white than fawn.

Colour patterns in the British Feral Goat

Having confirmed that our original breed was multi-coloured in domestication, how did it fare in respect of this in the feral state?

Goat breeders who remembered the English goat of the Great War period and inter-war years (say 1910-1930's) held differing opinions regarding its colour, believing it to be both localized and regionalized. It was blue-grey and never white in the West Country, for example, and nearly all were a pinkish-fawn in Surrey. If this were so, then in principle it would logically have had a local or regional effect on the colour of newly-established feral herds. We know that white goats were considered to be the best milkers in mid-Victorian times, but there is no general evidence of colour preference in the breed. Why, then, would particular colours have been associated with districts, assuming this to have been the case? The known explanation is husbandry. The period in question was a time when villages were self-contained- the pony and cart days- and a goat owner might have to walk her nanny in heat for half a day and over many fields to get her served. We can imagine that the 'local' male goat, followed in time by one of his sons, and visited by all the local nannies and their offspring, might well have stamped his colour on a particular district, although the weight of evidence would suggest that casual observation (as with Pegler on the train) and an overall impression (as with the Great War and beyond) were significant factors.

All this notwithstanding, it should be remembered that in all the areas where feral herds became firmly established (Snowdonia, the border Hills, Ireland and Scotland), the pattern of husbandry was typically multi-purpose herding, often based upon a transhumance/sheiling system. These goats were kept in the main by crofters, shepherds, farmers and villagers whose seasonal lives took them to, or involved, the 'high ground'. Under these circumstances the goat was a herding animal kept in reasonable numbers; males were generally useful (meat, skins, fat, hair, horn), and not just breeding machines, and it was expected to be semi-independent, sometimes being left on the hills to over-winter in Scotland, and allowed to run completely wild in Snowdonia to be shot in the autumn for their fat. By the time that the livestock generally was to be moved to lower ground, the rut was in full-swing, and in keeping with a higher proportion of males generally within a herding system, breeding was likely to have been indiscriminate and selection for colour generally unimportant.

With the exception of white, that is. There is evidence that white was at one time the preferred colour of goats in Snowdonia as it was more easily detectable on the mountainside. White goats were therefore run with the black cattle to locate free-ranging stock more easily. In Eighteenth Century Scotland white was also popular, but this was due to the demands of the whig-making industry. Aside of these examples, there is no known preference for colour, and it should be noted that the Snowdonian feral goat was not noted for being white during the last century.

If we can reasonably assume that the domestic sources of our modern-day feral hers were multi-coloured in principle, can we establish that our feral herds were originally variable in colour but have tended to become less so over time?

None of the feral herds of the Border Hills, from Galloway to the College valley, are characterized by being mono-coloured at the present time, although sixty years ago the herds north of the border were generally multi-coloured whilst those on the English side were mostly black and white. But the feral goat history of the border region is more complicated than that.

Prior to the founding of the Forestry commission in 1920, the upland region of the Border hills was an open system for feral goats in which billies could move freely between herds, and the goats were little disturbed apart from the occasional letting of estates for trophy shooting. By and large, feral herds were rarely seen, little disturbed, and appreciated for a

variety of reasons by shepherds and farmers alike. The change came, and with large scale tree-planting by the Forestry commission, from the late 1940's onwards. Herds were eliminated, decimated or displaced, with small groups of goats turning up where they had never been seen before, and the survivors of massacres elsewhere attempting to establish themselves on new home ranges. The Kielder herd is one such story. It came from nowhere, established itself on Kielderhead Moor, and is likely to have had only three founders that may have been seen first at Carter Bar, to the north. Into the 1950's and '60's the uplands became a tree-scape dissected by wire fencing, the movements of goats becoming increasingly restricted. Thus, the old open system broke down, and wandering and peregrinating males had less access to other herds. All of this was within the context of small and isolated herds anyway, with twenty to thirty goats being reported as the herd.

What this might mean in terms of the colour of feral herds historically is difficult to interpret. We know that the College Valley herd was originally grey, but that the introduction of a single Hounan feral male in the early 1950's, and when the herd numbered nine, added other colour patterns (mahogany and lightbelly, along with pied). We also know that during the 1950's and '60's, this herd was managed so as to restore it to grey, with only one male being maintained for every twenty females, but this endeavour failed. It is perfectly possible, therefore, for an open system to effect a change on the variability of colour patterns in a feral herd, but it might work both ways, and by introducing new colour patterns as well as closing down on variation. Thus, the question becomes one of whether or not some feral herds along the Border Hills were mono-coloured or less variable originally, but are now more so due to the upheavals and movements caused by the Forestry Commission after the Second World War. Additionally, this raises the question of the likelihood of the original stock being mono-coloured anyway. Put another way, is there overwhelming evidence in favour of feral herds being historically multi-coloured, including Bezoar? Seemingly not.

In his book entitled *The Wild Goats of Great Britain and Ireland*, G. Kenneth Whitehead (1972) included a gazetteer of known feral herds, living and extinct. Colour is mentioned thirty-seven times, of which thirty-three (89%) are described as mono-coloured (white, grey, brown and black). Of the four that are 'multi-coloured', only two colours (black-grey; black-white, and black-brown) are mentioned. Six (16%) are described as including pied goats.

It would seem, therefore that there was something of a whimsical element involved in the establishing of colour patterns in feral herds. Individual herds may have been founded upon single colour patterns or several. Over time, escapees would have joined the herd, wandering males would have left their mark, the 'dice' relating to dominant and recessive would have fallen where they may, culling would have been indiscriminate, and inbreeding would have had its effect. All this and we have yet to mention management. In the Hebrides, for example, Victorian estate owners developed a notion for all white feral herds, introducing white males and then shooting off all the coloured progeny. Trophy shooting may also have had some arbitrary effect, as selection for age/horn size may have had a disproportionate effect on the retention of colour patterns. All this would suggest that without historical evidence it is difficult to second guess how an individual herd had started out and subsequently developed with regard to colour patterns, and just as difficult to make generalizations for feral goats as a whole.

Lastly, and with regard to the colour of the British feral goat, we need to answer whether contemporary herds are nearly all black and white. Today, white/tan is rare enough for the assumption to be made that it originates from Saanen admixture. Black mask, nearly all

white with black on the head, backline and brisket is equally as rare. Badgerface and Bezoar occur, but are localized. This leaves the blacks and the greys. Of the six black and grey based colour patterns, two (grey and blue) are basically grey and four (lightbelly, black, mahogany and red cheeks) basically black, although mahogany does reveal itself to be a black-deep tan roan in a good light. Dark brown can appear to be black in the field, and the grey colour pattern is so variable as to appear black or blackish at a distance. It is therefore arguable that the typical feral goat is typically grey or black with twice as many colour patterns grouping around the latter. Research needs to be carried out, but it is possible that there could be an ‘impression’ that the feral goat is ‘more often’ black.

Factors influencing colour pattern maintainance in the Feral Goat

Having concluded that the Bezoar colour pattern was not the original one of either the English goat in domestication or the British feral goat; that we have yet to prove that the feral goat was originally more variable in colour, with the change being recent; and that black is the typical base colour, we move on to review the main thesis of the article, this being that a herd of variable colour can become virtually mono-coloured due to the disappearance, over time, of the top dominant colour patterns (Bezoar and white, but not forgetting black mask) in favour of black, the bottom recessive.

The reasoning is sound in theory, and the predicted possible outcomes have been studied in the field.

The present-day Lynton feral goat herd was founded on one male and two females in December, 1976, two of these goats being grey and one a dark lightbelly. One female was pregnant at the time of the introduction, dropping a grey male kid the following spring. As the herd developed, two other colour patterns appeared, one being mahogany and the other grey lightbelly. It would seem that the lightbelly introduction was a lightbelly-mahogany, and it is possible, although we will never know for sure, that either of the greys was grey-mahogany. Grey lightbelly is genotypic in sheep, although this has yet to be proven for goats. In the Lynton herd, it is a beautiful phenotypic colour pattern that combines all the markings of lightbelly with the grey coat of the grey colour pattern.

As the Lynton herd developed over time, it became increasingly biased towards ‘black’ (lightbelly and mahogany), with grey and grey lightbelly becoming rarer. This was interesting considering the original bias towards grey (three out of the four founders) and the fact that grey is ‘dominant’.

The obvious factors involved in terms of adult and kid survival were natural selection, and in particular the fine sieve of kid survival in January and February; the traditional poaching of kids for the freezer when they were better grown; the persistent random poaching of adults; wandering males, and non-selective culling (whichever goat was first within the gun sight).

Grey goats were better camouflaged in the similarly coloured Shelly Sandstone scree, although both the greys and the blacks were frequently pied, white standing out better than either of the base colours in the valley.

In culling, killing and poaching, there was sometimes a bias towards trophy horns. When they were poached in any numbers, it was whatever came to hand with regard to accessibility.

Other factors would have been involved. In relation to kidding success and age classes, the kid of a yearling nanny would have had a significantly lessened chance of survival than the kid of a five or six year old. This is linked to matrilineal family group success. An innately canny female with good mothering skills would found a dynasty of equally successful females by passing her skills with regard to food sources, shelter, kidding ranges, predator awareness etc to her offspring within the family group. But success might even out. The kid of a three year old nanny whose family group had been decimated by culling might have no better chance of survival than that of a yearling nanny whose own dam is a highly successful matriarch.

Survival would also have been skewed by gender, the males being less likely to reach maturity than the females. There was a year in which fifteen out of the sixteen kids born were males, which, dependant on the bias in colour patterns that year, could have affected the future development of colour in subsequent years. Rutting was spectacularly random in its outcomes, with no particular bias towards a 'king billy' taking all the trophies.

Colour-linked survival bias needs to be mentioned, although nothing is yet known with regard to the colour patterns found in the Valley of the Rocks. Colour has been linked to survival rates and growth in sheep, and there is a need to explore this area with regard to goats. What is known to date is that white has been linked to kid survival in a Swiss study.

Lastly, it wasn't uncommon for granddam, dam, daughter and the latest kid to exhibit a commonality of colour pattern, which has implications for the possibility of family groups being a factor in colour pattern bias. Thus, and in theory, a matriarch that was successful at kid rearing, and passed on her survival and mothering skills to her progeny, would not only have had more and equally successful descendants, but stamped her colour pattern more decisively on the herd as a whole.

It can therefore be seen that a wide range of factors, involving natural selection, population dynamics, behaviour, reproduction and random 'management' and predation may have interplayed to shape the colour bias in the Lynton feral goat. It would be tempting to conclude that the herd began with a significant bias towards grey in the founder population, continued with the lightbelly female demonstrably producing more viable young, then followed through with the herd developing a bias towards dark goats by way of consolidation within successful family groups along with 'sympathetic' random selection oversight. But how likely is this in practice?

If breeding outcomes really are linked initially to population dynamics in relation to the overall success rates of family groups, then even at this stage chance and random selection play an important part in the process. Meaning that it matters little what colour the kid is or what family group it is born into if it is dropped during a period of raging gales and began life chilled and soaked to the skin with dry beds at a premium. Likewise, any female in any family group could have been randomly culled, got mastitis, been run over or lost its kid to the freezer when it was a few months old. Some kids would always survive against the odds, and others, despite every advantage, succumb.

Even more telling is the fact that colour patterns that typify a family group may not persist over time, it having been shown that a family group based upon three mahogany goats could become mostly grey over three or four generations.

It would seem that chance and natural selection at every level- from the genotype of both males and females and how they combine, through mothering skills to the long-term weather

patterns and on to how the next cull might pan out- shaped the overall colour of the herd. And in this, there was no known selective advantage in being either black or grey.

This leads to the conclusion that a herd that begins life with variable colouring, including Bezoar and black, could easily become characteristically black by losing the Bezoar and other 'dominants' over time or due to a single catastrophic event. But it could just as easily remain variable or lose its Bezoar component, random and natural selection not favouring any particular colour pattern unless it can one day be shown that intelligence and temperament, along with innate mothering skills, are somehow linked to colour!

This, of course, relates to individual herds in individual circumstances. The question of whether or not our feral population as a whole has become significantly black over time is a separate issue. Overall, the evidence does not support this, and it is interesting in this context that Henry Tegner, a naturalist who had a particular interest in 'wild' goats, wrote during the 1950's that the herds located on the English side of the Border Hills were nearly all 'piebald', whereas we know from other sources that the herds on the Scottish side tended to be multi-coloured with a good representation of Bezoar. It has been noted elsewhere that the colouring of feral goats is traditionally discernibly regionalized in Scotland, so a useful aspect to any study of the changing nature of colour representation in British feral goats should include a consideration of regionalization with regard to the colour of founder and developing populations, along with their subsequent history.

White spotting as a recessive

The final aspect of the article was a query as to why white patching, being a recessive, had not been lost over time, but has become a significant aspect of feral goat colouring.

White patching is usually thought of as being random white spotting, typically rounded, anywhere on the body. At its extremes the animal can either appear to be all white or all dark with just a few white hairs on an inconspicuous part of the body, explaining why pied persisted for so long in the British Alpine. In both cases they can be mistaken for something other than spotting. This type of white spotting is generally known as pied or random spotting, and is located at the spotting locus. It is a recessive, but importantly the amount of spotting and its location on the body is decided by improperly understood modifiers that are located at other loci.

This isn't the whole story, even so, as three other kinds of white spotting may affect the British feral goat, each being found at a different locus.

The first is known as belted, and as its name implies, typically has the effect of producing a symmetrical ring around the barrel, a kind of caprine version of the belted Galloway. This has been seen in a variety of feral goat herds, notably those of Galloway. It is a dominant, and to complicate the issue is highly variable. At one extreme, the belt may be reduced to a side patch (rather like the one that used to typify the Cheviot goat), or even a side spot, usually lower down. At the other extreme, the white may extend towards the distal parts, so that only the head and tail are black, or only the shoulder and one or more legs, or only the rump and one or more legs. Another variant is white with black head and legs, which characterizes the Downs breeds of sheep such as the Suffolk. What is clear is that minimally spotted pied and minimally spotted belted may be very difficult to distinguish, although pied usually involves white on the head and legs, while belted tends to move outwards towards the distal parts from the centre of the body.

Belted is little known in its variety and even less regarded, and may be much more common than is realized in our feral herds. The colour pattern study based on the Macaulay Institute Cashmere goat, and which had a significant input from feral goats, concluded that white spotting was a dominant, albeit possibly an incomplete one, which may be a further indication of how common the belted form of spotting really is. The issue may be complicated to some extent by the fact that a goat may have both alleles: belted with random spotting.

The third kind of white spotting is known as Cou noir, although it would have made more sense to have called it Schwarzhal. This is also likely to be a dominant, and is typified by the idealized markings associated with the Bagot goat, the head and forequarters being black, the rest of the body white. This in no way implies that the Bagot goat is Cou noir, however, as it does not breed true with the idealized markings proving impossible to maintain. More likely the breed is random spotting in which modifiers have cul-de-saced towards the ideal.

The fourth kind of white spotting is known as 'star'. It is likely to be dominant as well, and the white patching is very limited, affecting only the top of the head, in a large symmetrical patch, and the tail.

Thus, white patching as we generally think of it is a recessive at the spotting locus, although the range of white patching found at different loci may be more typically dominant. If belted turns out to be much more common than is generally realized, possibly even being typical of the British feral goat, then white patching as such could be considered to be dominant.

Overall conclusion

By way of a conclusion, it should be pointed out that the Bezoar colour pattern has never typified the English goat as a breed, nor, by extension, been the typical colour pattern of the British feral goat. Bezoar, even so, is one of a number of colour patterns found in both. Colour may have to some extent been regionalized in the feral goat, although chance most likely dictated the founder colours of any herd, selecting from a pool of multi-coloured domestic stock. Chance and random selection would also have been instrumental in deciding how those colours were maintained over subsequent generations. There is no evidence to suggest that either Bezoar or black held any advantage in terms of survival and no reason to suggest that black has been any more or less common over time aside of, again, the effect of random chance and natural selection as factors other than colour. However, less variability would be definitive for black as this colour pattern cannot harbour others. In theory, a herd of white goats selected for colour could develop as a multi-coloured herd, whereas a herd of black goats does exactly what it says on the tin. White patching in goats is not necessarily recessive, and in the feral goat may be more commonly dominant. Lastly, the everyday lesson of Bezoar verses black is that once a 'dominant' is lost from a herd it is irretrievable. This implies that management should always work to a programme of maintaining all the colour patterns present rather than leave anything to chance.