Realising added-value in native British breeds of beef cattle*

G.L.H. Alderson

Traditional Livestock Foundation, 6 Harnage, Shrewsbury, Shropshire SY5 6EJ, UK

Summary

Native breeds of beef cattle in Britain have been superseded by imported breeds since the 1960s, but a changing market in the 1990s has begun to restore traditional values. The distinctive qualities of native breeds are becoming more relevant, and the White Park is a prime example of their importance. This paper makes a critical evaluation of several studies of White Park cattle that have been carried out, namely productivity in non-intensive systems of management, assessment of type and function by linear measurements, quality of product (meat), and value in crossing programmes. It concludes that breeds such as the White Park derive significant added value as a result of their native adaptability and the high quality of their beef, and that they benefit from a market driven by consumers rather than supermarkets. The use of different linear measurements is proposed, and the effective use of White Park bulls in crossing programmes is demonstrated.

Key words: Beef cattle, White Park cattle, Non-intensive production, Linear measurements.

Introduction

Trends in the beef cattle industry in Britain during the period 1965 to 1995 increasingly favoured imported breeds and discriminated against native breeds. Controlled environment conditions and intensive systems of production were an integral part of performance recording assessments promoted by the Meat and Livestock Commission, and were responsible for the domination of the British beef industry by

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*Paper presented at the Rare Breeds International Mini Symposium "Characterisation of small populations of farm animal genetic resources with special initiatives and value added traits" held in Zurich, Switzerland, 20 August 1999
large animals from the mainland of Europe, distinguished by high yield of lean meat. These methods of evaluation did not recognise the distinctive qualities of most native British breeds of beef cattle. Characteristics such as native adaptability and product quality are not easily measured and have been disregarded by official bodies. However, changing market forces in the late 1990s have caused the resurgence of more traditional criteria, and programmes of characterisation within policies of genetic conservation have demonstrated the value of the special qualities of native breeds. The White Park is the most distinctive British breed, and it demonstrates most effectively the potential value of these breeds (Alderson, 1997). Comparative crossing trials from the 1970s onwards showed its superiority over several more popular commercial breeds, while analyses of type, conformation and systems of management in the 1990s have confirmed opportunities for the breed in the wider livestock industry by utilising its particular qualities to achieve added value.

Since the 1960s the market for beef cattle has been driven by two main factors. The combined force of supermarkets and partial scientific advice, one demanding product uniformity and the other condemning dietary animal fat, brought the market to almost total dependence on intensively-reared lean beef. This development was underpinned by programmes of the Meat and Livestock Commission which evolved selection criteria calculated to cater for this market, and which neglected the interests of other breeds with different qualities. Weight gain and withers height became standard measures of performance, both associated with large body size. Performance testing stations identified potential breeding animals that excelled in intensive systems. Intensively-reared beef animals, often entire bulls slaughtered at a young age, became the norm. As a result, large late-maturing breeds were given the opportunity to increase their popularity in Britain; first Charolais, followed by Limousin and finally Belgian Blue. At a later stage BLUP programmes were applied to permit further dominance in the industry by these breeds. Virtually all native beef breeds became marginalised, and their particular qualities were neglected in the mainstream marketplace.

A change occurred during the 1990s. It may have been triggered by the BSE crisis, but it had its roots in the increasing awareness of consumers. Their demands began to assume a greater importance than the dictates of supermarkets. Eating quality of meat played a significant role in this process, but factors associated with animal welfare, protection of the environment and human health also assumed a high priority. While the BSE crisis caused the collapse of mainstream beef sales in Britain during the following year, sales of beef from native rare breeds doubled during the same period. Consumers became aware of the close relationship between native breeds and non-intensive systems of production. The conservation of British breeds, reared in natural systems, was a strong promotional line for beef marketing.

The development and promotion of native breeds have been inhibited by lack of characterisation that stemmed from the focus of attention on popular imported breeds. Programmes of characterisation were necessary to realise the potential of native breeds in commercial systems, and this study has evaluated the progress that has been achieved with White Park cattle particularly with regard to defining performance in non-intensive production, developing a system of linear measurements, evaluating the quality of products, and demonstrating its value as a crossing breed.

**Methods**

Efficiency of production was calculated in a recorded pedigree herd of White Park cattle on upland pasture (Figures 1 and 2) during a four-year period (1995-1998 inclusive). Fertility, ease of parturition, longevity and growth rate were examined, and related to the system of management. In addition, other data were analysed and evaluated. Results from records of White Park cows included in a system of linear measurements for beef
cattle were related to production and performance. Quality of meat was evaluated by butcher and consumer assessments in the Traditional Breeds Meat Marketing scheme of the Rare Breeds Survival Trust (Lloyd-James, 1999). Data of comparative breed trials were evaluated to determine the value of White Park bulls as crossing sires.

Non-Intensive System of Production

White Park cattle are adapted to a wide variety of conditions, ranging from lowland meadows and parkland to mountain pasture (Alderson, 1997). Performance records from an upland herd in central England have been analysed for four years (1995-1998 inclusive).

The herd was kept on exposed permanent pasture of coarse herbage 250 m above sea level. The breeding herd remained outdoors throughout the year with no housing, and received no extra feed at any time, in contrast to neighbouring herds of commercial crossbred cows. All cows were mated to a White Park bull, and all heifer replacements were homebred. Selection criteria, in order of priority, were:
1. Average weight of calf weaned.
2. Maternal breeding records of progeny,
3. Type (linear assessment).

The average herd size was 26-27 breeding cows.

A satisfactory level of fertility was achieved from a 75-day exposure to the bull. A calving rate of 93.2% (123 calvings) was realised from 132 calving opportunities. During the five-year period 21 cows left the herd, giving an average breeding life in the herd of 6.3 years. This did not provide an accurate assessment of longevity as 17 cows (average age 5.18 years) were sold for breeding. Only four animals were culled; two were barren (12 and 8 years of age) and two...
were aged (both 16 years of age). The age structure of the herd in 1999 was 5 cows (20%) 12-16 years of age, 5 cows (20%) 7-11 years, and 15 cows (60%) 3-6 years. The high proportion of young cows was due to the policy of selling proven breeding cows rather than first-calving heifers.

Calves and young stock were weighed at approximately 180, 500 and 900 days of age. Weights were adjusted for age, and corrected for sex, age of dam, and inbreeding. Average weight at 180 days of age was 199.04 kg (SD 17.4 kg) from a daily live weight gain of 0.91 kg. Comparative results for a small sector of the herd on lowland grazing showed a daily live weight gain of 1.195 kg. Weights at 500 and 900 days of age (circa 400-420 kg and 630-650 kg respectively) were more variable and susceptible to changes in climatic conditions and grass quality (Figure 3). White Park steers finished under intensive conditions averaged a daily live weight gain of 1.02 kg to give an average carcase weight of 277 kg at 496 days of age, with good commercial carcase grades ranging from O+3 to R4L. Grades are defined on a scale of E (best) through U, R, O and P (worst) for conformation, and 1 (leanest) to 5 (fattest) for fatness.

**Linear Measurements**

A study was carried out on White Park cattle in Britain (1994–1998) to explore the relationship between various linear measurements and ratios and production characteristics, and to establish norms of type and conformation for the breed (Alderson, 1999). A total of 315 female records were included, and the process was repeated on some animals after an interval of 2 to 3 years to study patterns of growth. The measurements showed a medium-sized animal, with a long body in relation to height and depth, and relatively short legs.

The study questioned the value of established criteria. It demonstrated that withers height was a poor indicator of weight or quality, and proposed instead the use of

*Figure 2. This White Park cow shows the typical beef characteristics of the breed.*
rump length or hip width as superior measures. It also recommended the use in breeding cows of a comparative index instead of weight as an indicator of productivity. The comparative index combined values for weight, body length and rump area. Although withers height was the least variable measure and the least affected by environment, it was of limited value. It had a high correlation only with length of leg, but poor correlation with both weight and the comparative index (0.566 and 0.446 respectively). The best measures were hip width (correlation 0.861 and 0.809) and length of rump from hip to pin (correlation 0.745 and 0.781, respectively). The analyses also indicated a negative phenotypic correlation between body weight and measures of productivity such as regularity of breeding, longevity and efficiency of production. For example, 27% of heavy cows (1SD above mean) and 40% of very heavy cows (+ 2SD) were culled for irregular breeding, compared with 18% and 29% for cows with the highest comparative index (+ 1SD and 2SD respectively). The longevity of heavy cows was shorter, but probably this was related to a poorer breeding record rather than directly to weight. There was a greater negative phenotypic correlation between productivity (total weight of calves weaned/number of years exposed to bull) and body weight (-0.543) than between productivity and comparative index (-0.407) but there was a negative correlation between efficiency of production (productivity/body weight) and comparative index (-0.663).

The study identified useful linear measures for the evaluation of beef cattle, especially in relation to behaviour in non-intensive systems of management as a specialist grazing animal, and to meat yield. A long body gave good capacity for digestion of roughage, and a greater area for high-priced joints of meat. Rump area (hip width x rump length) also was related to production of high-priced joints of meat, and this confirmed the identification of pelvic width in a study of Belgian Blue cattle (Hanset et al., 1995) as the best indicator of muscularity and meat yield. Linear measures did not appear to be
correlated with other selection criteria, such as temperament or meat quality.

**Quality of Product**

White Park beef enjoys a particularly high reputation among butchers and consumers. Evaluation responses by both butchers and consumers were more positive than for any other breed, and White Park beef has been the preferred meat for speciality banquets. It is distinguished by a light fat covering and good marbling, and is claimed to have a high n-3 polyunsaturated fatty acids content, but measurement of meat quality has not yet been subjected to scientific evaluation.

The special quality of White Park beef has been exploited by the Traditional Breeds Meat Marketing Company, which fills a niche gourmet market in Britain and which demands high standards of taste, texture and traceability. The best quality beef is produced by cattle which are finished off grass at 36 months of age and this can command a price premium of more than 20%, but current legislation requires animals to be slaughtered before 30 months of age at which time White Park steers can achieve a liveweight of up to 650 kg. The beef is sold through a national network of specialist butchers, and is promoted not only for its eating quality, but also for related benefits to animal welfare, protection of the environment and human health. These factors are associated with non-intensive systems of production, for which White Park cattle are well suited by virtue of their medium size, grazing behaviour, good leg structure, efficiency of roughage conversion and body capacity.

**Crossing Bull**

While purebred White Park cattle have successfully filled a niche market, both as breeding herds in less favoured areas and as finished beef cattle through specialist outlets, their wider use will depend on their value in crossing programmes. Comparative crossing trials with White Park bulls have been carried out against Hereford and Welsh Black bulls in the 1970s (Ark, 1974), and against Limousin bulls in 1986 (Alderson, 1997). The results indicated that the crossbred progeny of White Park bulls benefit from a high level of hybrid vigour. The growth rate of calves by White Park bulls to circa 200 days of age exceeded that of their contemporaries by Welsh Black (+23.96%) Hereford (+16.67%) and Limousin bulls (+7.26%), indicating a hybrid vigour effect of circa 20%. This was a product of the genetic distance of White Park cattle from other breeds, which has been demonstrated in several studies (Royle, 1983 and Blott, 1997). Other advantages obtained by the use of White Park bulls were colour marking of progeny, ease of parturition and high fertility. The White Park colour pattern is dominant over any other colour or pattern. Ease of calving is experienced both by White Park cows and by other cows mated to White Park bulls. Scrotal circumference measurements from a small sample of bulls in the linear assessment programme indicated a good testicle size (average scrotal circumference 46.3 cm) in relation to body weight (955 kg). No assessment has been made of meat quality in crossbred progeny of White Park bulls.

**Conclusions**

The qualities which have caused native breeds to be excluded from the mainstream beef industry in Britain for three decades, are the same qualities which fit them for future markets.

1. Their natural adaptability to local conditions enables them to produce efficiently in non-intensive systems of production. The performance results for grassland systems, both upland and lowland, demonstrate a high level of productivity, but their output in intensive high-input systems can not compare with larger breeds.

2. As a group, they are characterised by ease of parturition, high fertility and longevity, and their behaviour shows grazing preference for coarse herbage and efficient use of extensive pasture.
3. Their conformation is that of a specialist grazing animal – relatively short legs and proportionately large body capacity. Their type is in contrast both to the very compact animals of breeds that were popular in Britain up to the 1960s, and to the tall continental style that superseded the earlier fashion.

4. The merit of their product is based on eating quality, especially flavour and tenderness. The meat quality of native breeds is the combined result of genetic merit and non-intensive systems of production.

Various studies of White Park cattle have confirmed the distinctive characteristics and qualities of the breed, but some results rely too heavily on anecdotal evidence that has not been subjected to scientific analysis. Special qualities, such as adaptation to grazing coarse herbage, are significant and deserve deeper study. Their level of productivity in non-intensive low-input systems offers an increasingly attractive alternative to intensive systems of beef production, and is reinforced by the premium value of the beef. The assessment by linear measurements demonstrated the irrelevance of withers height as an indicator of type, and the danger of using body weight as a priority selection criterion. The value of rump area as a superior indicator was determined, but the proposed comparative index seemed both complex and not closely correlated to some critical factors of production. The distinctiveness of the breed is particularly relevant with regard to genetic distance.

Added value is derived from the efficiency of production of the breed, from the high quality of the product, from the perception by the consumer of the safety of traditional beef from an historic native breed, and from the use of the breed in crossing programmes for hybrid vigour.

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