EFFECT OF PLANE OF NUTRITION ON COMPARATIVE WEIGHT GAINS OF WHITE FULANI AND FRIESIAN X WHITE FULANI CROSSBRED BULLS

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SUMMARY

Weight gain of purebred White Fulani and 1/2-Friesian 1/2-White Fulani crossbred bulls were compared in 14 experiments. In all experiments food was offered ad libitum. In seven experiments food was offered on confined management, either in feedlot or in relatively large amounts on a limited area of land. In the other seven experiments the cattle were allowed to graze native, unimproved pasture (shrub savanna). Different quality rations on confined management supported weight gains of the White Fulani bulls varying from $-191$ to $+873$ g per day. Different quality range supported weight gains of White Fulanis varying from $-141$ to $+577$ g per day. On the range, crossbreds did not gain weight faster than the White Fulanis. On confined management, crossbreds gained weight faster than the White Fulanis but only significantly so on those experiments where the quality of the ration supported a daily gain of more than $450$ g in the White Fulanis.

We conclude that crossbreds can only be recommended to farmers who are willing and capable of feeding a high quality ration ad libitum, under conditions where prehension of the food is not a limiting factor for feed intake. The relative importance of replacing native cattle with crossbreds as a step towards improvement of the productivity of the beef industry in northern Nigeria is discussed.

INTRODUCTION

The productivity of the animal industry of northern Nigeria is low and improvement is needed to meet present and future demands for livestock products (F.A.O., 1966). At the present time work is being carried out on disease control, range management, pasture improvement and the nutrition and genetic improvement of livestock.

The breeding program at Shika Agricultural Research Station between 1929 and 1959 had as its main objective an increase in the genetic potential for milk yield of the White Fulani or Bunaji breed of cattle (Mason, 1969). The results were summarized by Foster (1960) and showed that during this period an annual increase of 1-1.5 per cent in the genetic potential for milk yield was obtained. In absolute terms this has meant an average annual increase of only 10-15 kg of milk per lactation. Therefore, in the early sixties a Friesian X White Fulani crossbreeding program was started. The results indicate that the crosses (F1) compare very favourably with the purebred White Fulanis in terms of birth weight, calf mortality, weight gain and milk production (Annual Report 1967, 1968, 1969, 1970). The crossbred also proved to be a better beef producer than the purebred White Fulani (Harbers, Schalles, Okoye & Zemmelink, 1972).

Visitors to the station and attendants at meetings and conferences are often impressed with the performance of the crosses and have on several occasions expressed the view that replacing the local cattle with crossbreds is one of the first steps to be

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taken towards improvement of the productivity of the livestock industry in this area. However, levels of disease control, management and feeding at Shika Agricultural Research Station and other similar stations are higher than is common outside. Hence, results obtained at Shika might only to a very limited extent be applicable to average conditions in northern Nigeria. Indeed, it has been observed that performance of crossbred stock in the tropics is often disappointing (Joubert, 1954; French, 1970). Rogerson, Ledger & Freeman (1968) suggest that even where adequate levels of disease control and management are maintained, tropical breeds of cattle might be the better performers under poor nutritional conditions because they have a lower maintenance food requirement.

So far, however, no data are available to indicate what plane of nutrition is required to obtain a better economic performance from crossbred or purebred exotic breeds than from the local breeds of cattle. More factual information is required before it can be established whether introduction of exotic stock under a particular set of conditions can be recommended.

This paper summarizes a series of experiments and observations on the comparative performance of purebred White Fulani and Friesian X White Fulani (F1) crossbred bulls under feeding conditions varying from ad libitum concentrate feeding to grazing on dry season rangeland (unimproved shrub savanna).

MATERIALS AND METHODS

Table 1 gives a brief description of the experiments and observations reported in this paper. In all experiments, young White Fulani bulls were compared with crossbred bulls under the same conditions. In most experiments only one kind of food was available to the animals. This was offered ad libitum, so that weight gains were determined by the quality rather than the quantity of food offered. In some trials a supplement of up to 800 g of groundnut cake or cottonseed was given each day. In most cases these small amounts of supplementary concentrates were given individually to each animal; where this was not possible, White Fulani and crossbred bulls were fed separately. The experimental period in some cases was extremely short, e.g., in treatments 1 and 4. These are part of one period of 62 days, but are shown separately because of a marked difference in weight gain of the animals between the first and second half of this period. As all the animals had been on this treatment for at least one month before the first 31-day period, the change in weight gain can be considered as a reflection of deteriorating quality of the pasture.

The preliminary analysis of the data indicated that it would be useful to analyze the data in two separate groups, one of which comprises the data from experiments on unimproved shrub savanna (experiment 1 to 7 in Tables 1 and 2). We will refer to these as "experiments on range". The other group includes all the other experiments. Some of these were done in feedlot, others on sown pasture or crop residues in the field. A common feature was the availability of a large quantity of food on a limited area of land so that collecting the food was no limitation for feed intake. We will refer to the latter group as "experiments on confined management". Within these two groups the experiments are listed according to increasing weight gain of the White Fulanis (within the two management systems) was considered as a reflection of the quality of the offered feed, or plane of nutrition. Weight gains of White Fulanis and crossbreds were compared on each experiment, while regression analysis of mean liveweight gain of both White Fulanis and crossbreds are subject to error and Bartlett's test proved the variances to be heterogeneous.