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CROSSBREEDING IN BEEF CATTLE

by 680

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INTRODUCTION

There are basically two breeding plans that are used by the stockman in livestock breeding. These are inbreeding and outbreeding. All breeding programs can be classified in varying degrees under one of these. Inbreeding is the mating of animals more closely related than average, while outbreeding is the mating of animals less related than average. Inbreeding programs tend to produce increased genotypic and phenotypic diversity.

This report is concerned with the effects of crossbreeding. Crossbreeding is a breeding plan classified under outbreeding, and involves the crossing of different breeds within a species or of different inbred lines within a breed.

Some past and present examples of crossbreeding are:

The crossing of improved English bulls and native Texas longhorn cattle to improve the meat production and quality of the Texas cattle. Presently, virtually all of the poultry, both layers and broilers, are produced by crossing inbred lines or breeds. The swine industry is also making use of crossbreeding to a large extent in the commercial production of market hog and breeding gilts. Hybrid corn is still another example of the crossing of inbred lines.

Much interest has developed lately in regard to crossbreeding in beef cattle. Although not as complete as in some other species of farm livestock, a good deal of research data is available on the effects of crossbreeding in beef cattle.

This report is a summary of reports on crossbreeding research within the United States and Canada and particularly within the Regional Project NC-1, "Improvement of Beef Cattle Through Breeding Methods." The states within this region with crossbreeding test in progress are Missouri, Nebraska, and Ohio.

Because of the long generation interval, low number of offspring per animal and the large financial investment involved, all the questions concerned with crossbreeding beef cattle can not be answered quickly. Thus, this report will not yield definite answers for all the questions concerning crossbreeding in beef cattle, but represents an attempt to explain the genetic basis for crossbreeding, presents a summary of the results of some of the crossbreeding research conducted to date, and suggests methods by which crossbreeding may be used to improve beef production.

GENETIC BASIS FOR CROSSBREEDING

The term crossbreeding is used rather braodly in reference to various types of animal outbreeding. Lasley (1963) and Rice et. al., (1957) give the following information as the genetic base for crossbreeding. Outbreeding is a breeding system that involves the mating of animals less closely related than the average of the group to which they belong. Breeding systems classified under outbreeding include crossbreeding, outcrossing, grading up, the crossing of inbred lines, and crosses between animals of different species.

Species hybridization is practiced in the crossing of horse and ass to produce the mule, which is the most common example of this type of outbreeding. Other examples are the hinny (stallion X jennet), the zebroid (zebra X horse), and the cattalo (bison X domestic cow). A characteristic of species hybridization is a high incidence of impared fertility or sterility among the offspring. This impared fertility or sterility is due in most cases, to differences in chromosome numbers or physiological differences.

As has already been mentioned, the best example of commercial crossing of inbred lines in animals is in the production of poultry, both broilers and layers.

Grading up is the practice of breeding purebred sires to inferior females generation after generation in order to increase the merit of grade herds. The usage of breeds of English bulls on Texas cattle was an example of this type of outbreeding.