Applying the Principles of Poultry Breeding

PRINCIPLES and practices involved in poultry breeding have been described in previous articles in this series by F. C. Bobby, Superintendent, Poultry Industry, Department of Agriculture, Wellington, but so far only a limited attempt has been made to apply these principles to methods on the farm. This article, which will be continued next month, deals with the aspects of the subject and problems which face the poultry breeder. It includes a description of progeny testing, a subject much under discussion by people interested in the breeding of livestock.

IT is comparatively easy for poultry producers interested in breeding to study the fundamental principles of genetics, but putting those principles into practice with breeding birds is an entirely different problem, particularly if the poultry producer is interested mainly in raising the economic value of his flock, with increased average egg production as a major aim. The fancier, whose main objective is perfection in type and other breed characteristics in a bird has advantages over the poultry breeder interested in egg production and other factors of commercial value in that he can measure by eye the characteristics sought and include as breeders birds which carry these characteristics.

However, even the fancier cannot be sure that desirable characteristics present in the breeding male or female will be passed on to all or any of the progeny in a desirable manner. That is perhaps the major factor in breeding and is today a basic fact influencing poultry-breeding programmes for increased egg production.

Among economic characteristics desired by the commercial producer are heavy egg production, high hatchability rate, and liveability. As with those sought by the fancier, these characteristics can be measured, though not by eye, but by systems of recording, which often entail much labour, patience, and time. Furthermore, in breeding there are no short cuts to success and no golden rules which, if adhered to completely, must lead to success. Each breeder depends for success on the application of the principles of genetics, intelligent interpretation of the results obtained, and a thorough knowledge of his stock.

Difficulties to be Faced

The knowledgeable breeder selects a male bird which on sight and handling measures up to a desirable standard. The bird may be from a pen of hens known to have given good egg production, but there is no guarantee that this male will sire pullets which will give high average production. The value of that male bird as a stud breeder is not known until he has proved his worth by the class of pullet he has sired.

Similarly, a breeder may select a pullet or hen which appears to carry the characteristics of a good layer, or a hen whose pullet-year egg production has been recorded, yet again there can be no guarantee that this bird will throw pullets of high average production. Only by measuring or recording the production of those pullets is it possible to assess the true value of the hen as a breeding bird.

However, if the breeder has recorded his stock for a number of generations, so that information is available about the parentage of any breeding bird, male or female, predicting the possible value of such a bird becomes easier. Furthermore, selecting year by year what are considered to be the best birds on handling tends to maintain a standard or even to bring about some improvement.

Maintaining or Raising Production

When contemplating a breeding programme the poultry farmer must decide whether it is intended to maintain a reasonable standard of egg production or whether the object is to raise the level of production substantially. That refers not to a strictly limited number of high producers in a laying flock, but to the average production of the flock. More than one poultry breeder has won egg-laying competitions with birds giving outstanding production though on his farm the average for the rest of the pullets has hardly attained an economic level.

Statistics indicate that the average annual egg production for flocks of hens and pullets in New Zealand is about 11 dozen per bird. Without doubt there are flocks with averages well above this figure—say, 14 to 15 dozen; average production at this level has been attained by a breeding programme based mainly on selection by handling and observation, backed by first-class management at all stages. However, it is doubtful whether such flocks have shown much change in egg production over the years beyond limited fluctuations from season to season.

Progeny Testing

To make appreciable advances in egg production with such flocks and within a limited number of years it is likely that a definite programme of breeding based on progeny testing would have to be adopted. To appreciate what is envisaged it is first necessary to know what is meant by progeny testing.

The term implies assessing the worth of a male or female as a breeder by measuring the value of the progeny in terms of the characteristic for which a mating has been made—egg production, hatchability, liveability, disease resistance, or any other desirable characteristic. Not the unknown potential value but the actual breeding value of the male or female is under test—hence the terms "proven male" or "tested male."

Progeny testing takes time and labour, but if a male is found that throws progeny giving an egg average appreciably above the previous average for a flock, its value for as long as it will breed is great—far greater than that of any untried male or even an average tested male. Such males are hard to find.

The progeny testing of males entails less work than the testing of females. The male is often spoken of as being "half the breeding pen." There is little difficulty in obtaining, say, 40 or 50 pullets sired by a single male. If taken at random from all the pullets sired by a single male in a breeding season, that number of birds is a good representative sample and one which it is safe to use as a means of measuring the value of that male. A different and more difficult situation arises in the testing of females. All too often it appears possible to obtain only 4 or 5 mature pullet daughters of the hen being tested, but a sample of 8 to 10 is desirable.

Family Testing

Though testing males can lead to progress, the greatest advantages are obtained by "family testing"—that is, testing a number of females and eliminating as breeders any that do not reach a required standard.

Two highly desirable economic factors may be used for measuring the value of daughters of any hen—their rearability and their liveability as matured birds, the latter being associated with resistance to disease. Thus, if a hen's progeny suffer undue mortality during the rearing period or heavy losses during the first laying season, that hen and her progeny, male and female, should be eliminated from any future breeding pen. On the other hand, if the daughters of a hen rear well and show a low mortality rate as pullets in their first laying season, the value of the dam as a breeder may then be judged on their egg production; if it is satisfactory or obviously above the average for the strain of birds, she is valuable as a breeder for as long as she produces a reasonable number of normal hatching eggs. Furthermore, the full brothers to the pullets are more valuable than males about which little is known beyond their exterior characteristics.

Judging the value of a hen by the pullet-year records of her daughters is not as simple as it may appear, as is shown by the following figures for two hens mated to the same sire:—

Hen A, Family No. 1	Hen B, Family No. 2
Pullet-year egg records of daughters	
280	180
146	220
180	205
105	210
200	232
100	240