

# Fertility, Hatchability, and Egg Production of Poultry at Ambepussa

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## Introduction

A BREEDING project combining individual and family selection was initiated in September, 1951, at the Government Poultry Farm, Ambepussa, but this has since been abandoned for various reasons. Nevertheless, accurate egg production statistics for the breeding flock were maintained for a period of one year by daily trap-nesting, and data concerning the fertility and hatchability of 3,644 eggs were also collected. The birds were housed in breeding pens from September, 1951, to February, 1952, in the ratio of 8 to 10 females to 1 male. Of the females, approximately 75 per cent. were in their pullet year, while the remaining 25 per cent. had completed their first year's lay at the commencement of the breeding season. The males, however, were all cockerels. Eggs obtained by trap-nesting the birds from October to February were placed in specially constructed pedigree trays, incubated in a Mammoth Secura Incubator, and candled at eighteen days. The chicks were individually pedigreed at hatching. The entire data which relate to Australorps and Rhode Island Reds have now been statistically analysed, and the following is a brief résumé of the results obtained.

## Results

IRRESPECTIVE of breed, the average fertility of all eggs set, as determined by candling on the eighteenth day of incubation, worked out at 84.2 per cent. An analysis of variance was carried out for each breed to determine whether the fertility percentages varied significantly for the months in which the eggs were laid, and for the different sires that were used in the breeding pens. However, it was necessary in this connection to transform the percentages to a suitable scale so as to make the variance independent of the mean. The transformation actually employed was the  $\sin^{-1}\sqrt{p}$ , i.e., the angle of which the sine is the square root of the percentage.

The results for the Australorps, which are summarized in the table below to illustrate the method of analysis, showed that although there is some variation in average fertility ranging from the highest value of 89 per cent. in October to the lowest value of 83 per cent. in December, this was not statistically significant. This suggested that the months October to February are about equally favourable from the point of view of fertility. The influence of the sires on the fertility of the eggs laid by the dams was also not significant in this experiment.

### Analysis of Variance of Fertility (Australorps)

Source of Variation	d.f.	Mean Square	F	Significance
Total ..	221	458.7		
Between months ..	4	139.3		
Between sires ..	5	80.6		
Sire-month interaction ..	20	397.9		
Between hens within sires ..	47	1008.2	3.24	
Remainder ..	145	310.8		

Among the Rhode Island Reds, however, the differences in fertility between sires were found to be highly significant. A detailed study of the R. I. R. data revealed that this was almost entirely attributable to the influence of one particular sire. Elimination of the data from the breeding pen which housed this sire and which produced only 64 per cent. fertiles, showed that the differences in fertility due to the remaining sires were not statistically significant. The differences between months were also not significant.

The overall differences between breeds as regards fertility were also studied, and it was found that the breed differences in fertility between Australorps and Rhode Island Reds were not significant.

In regard to hatchability, the average value for the two breeds was found to be 81.1 per cent. on fertiles and 68.3 per cent. on all eggs set. By analysis of variance of data transformed by the  $\sin^{-1}\sqrt{p}$  transformation, it was found that there were no significant differences between months in the hatchability of fertile eggs in either breed. But the overall differences in hatchability between breeds, which averaged 83.4 per cent. for Australorps and 76.3 per cent. for Rhode Island Reds, were significant.

Total egg production figures for the year commencing September 1, 1951, and ending August 31, 1952, showed averages of 112.2 and 104.2 eggs respectively for survivors among the Australorps and Rhode Island Reds. The production of birds surviving the laying year is, however, not a very satisfactory criterion of egg yields in a flock, because it does not take into consideration mortality among the laying birds. The commercial objective of poultry farming is the production of a maximum number of eggs per original bird in the flock. A full economic accounting should therefore consider whether a bird died before producing enough eggs to pay for her replacement and other similar factors. But, practical considerations preclude the incorporation of all such factors in estimating the average production of a flock. Nevertheless, a satisfactory operational measure of the average production of a group could be arrived at on the basis of the original number of birds in the group, or on what is known as the hen-housed average or the production index. This is to be preferred to the hen-day or hen-month average not only because it takes into consideration the mortality picture in the computation of averages, but also because it preserves the randomness of the sample that is being investigated. For the flock studied, the production index was found to be 96.2 and 88.9 eggs for the Australorps and Rhode Island Reds respectively. While these figures are not very encouraging, they may nevertheless be accounted for as being largely due to the non-availability of uniform feeding stuffs throughout the year. Moreover, growth rates in early life are reputedly retarded in most tropical countries, resulting in delayed maturity and presumably in lowered production. In fact, the average age at first egg lay for the birds hatched out during the breeding season October, 1951-February, 1952, was found to be 209 days in the case of the Australorps and 255 days for the Rhode Island Reds. In recognition of this fact, plans are now afoot for a detailed study of the effects on growth and production of experimental chicken-starter, grower and layer-breeder rations compounded from home-grown feeding stuffs.