# Thesis Abstract

**Effects of Crossbreeding and Inbreeding on Growth Performance, Age at Sexual Maturity and Chromosome Morphology of Three Genetic Groups of the Philippine Native Chickens (Gallus gallus domesticus Linn.)**

by Sintje Lumatauw, PhD Animal Science, University of the Philippines Los Baños

Three genetic groups of the Philippine native chickens (the Banaba, the Paraoakan, and the Bolinao) and their crosses were used in this study. The different genetic groups were subjected to a 3x3 full diallel cross design to determine heterosis and combining abilities for growth performance and age at sexual maturity. The F1 progenies of the Banaba x Paraoakan cross consistently showed the highest body weight with high heterosis especially at 8, 10, 12, 14, and 20 weeks of age.

General combining ability, specific combining ability and reciprocal cross effects on body weight were significantly different ($P<0.05$). Both the Banaba and Paraoakan groups showed relatively high positive values for general combining ability indicating that the body weight at ages considered were governed primarily by additive gene action.

In a separate experiment, 180 heads of native chicken were used for a one-year inbreeding study. These chickens were produced from four different kinds of inbreeding, namely: parent offspring, full sib, paternal half sib and maternal half sib mating involving tthe Banaba, the Paraoakan, and the Bolinao..

Results indicated that mating closely related chickens under different systems in one generation resulted in differences in body weight of the three genetic groups studied. The Banaba group exhibited delay in their age of sexual maturity following in breeding under different systems of mating. The delay varied from 1 to 3 days or about 1.4 percent, 1.2 percent, 0.9 percent and 2.0 percent under parent offspring, full sib, and paternal half sib and maternal half sib mating, respectively. The Paraoakan group showed the delay of 1 to 4 days or about 1.1 percent, 2.8 percent and 0.9 percent under full sib, paternal half sib and maternal half sib mating, respectively.

The bone marrow of 48 heads of adult chickens were analyzed for karyotyping. The Banaba, the Paraoakan and the Bolinao chickens posess seven (7) identifiable macrochromosomes including the Z and W sex chromosomes. The first and second chromosome complement were of metacentric type. Chromosome 3 and 5 were acrocentric while chromosome 4 was submetacentric. The chromosome number 6 was telocentric. The Bolinao

had the highest centromeric index (37.59) followed by the Banaba (36.62) and the Paraoakan (35.80). The highest arm ratio was noted in the Paraoakan with 1.80, followed by the Banaba and the Bolinao with 1.74 and 1.67, respectively. The length of the chromosome complement of the three genetic groups did not show significant variations except for the chromosome number 4. The longest W and sex Z sex chromosomes noted in the Banaba x Paraoakan cross might contribute to the superiority of particular cross over the hybrids.