

**EVALUATION OF DIFFERENT CHICKEN LAYER BREEDS FOR USE IN  
INTEGRATED AQUACULTURE–POULTRY PRODUCTION SYSTEMS  
IN GAUTENG, SOUTH AFRICA**

**By**

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**in the**

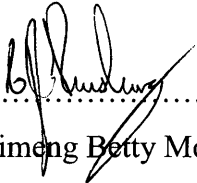
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## DECLARATION

I, Ikgadimeng Betty Motiang, declare that this thesis for the degree MSc (Agric) Animal Science degree at University of Pretoria, has not been submitted by me for a degree at any university.



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## ABSTRACT

Hunger and malnutrition remain amongst the most devastating problems facing the world's poor and needy. About 80-90 million people have to be fed yearly and most of them are in developing countries in Africa. The majority of South African families live in poverty with a limited variety of foods available in their homes. Integrated aquaculture-poultry production systems can accommodate the demand for food. Integrated fish farming systems has been shown to can provide the vital animal protein necessary to relieve much of the prevailing problems of malnutrition in rural areas. Commercially orientated integrated aquaculture has been investigated in South Africa over the last two decades and intensive studies were done, yet little is known about the concept of aquaculture-agriculture systems in South African rural populations. Integrated fish-chicken farming has the potential to impact positively on the livelihood of rural populations because it can provide food, employment opportunities and recirculation of waste products for maximum utilization. The production from two farming enterprises integrated together, will therefore contribute much to poverty alleviation and provision of employment or income. The South African rural communities are more commonly involved in layer production with indigenous breeds which produce few eggs compared to commercial breeds. There is however a need to identify a suitable layer breed that can best perform when used in an integrated fish farming system. Since the purpose of promoting this system is to provide food security and regular sources of income to the poor, the best performing layer breed will be able to produce enough eggs for consumption and selling while the fish will be sold to increase profit. The spent hens will also provide meat and an income to the farmer at the end of the production cycle. Three hundred and twenty layer chickens of eight breeds were randomly assigned to either a conventional (control) layer house or a treatment house that was an open-sided layer house constructed over a dam (160 chickens/treatment). The eight layer breeds used were two lines of indigenous breeds (i.e. Potchefstroom Koekoek and Ovambo), dual purpose breeds (i.e. New Hampshire and Black Australorp) and commercial breeds (i.e. Hyline-Silver and Hyline-Brown; Lohmann-Silver and Lohmann-Brown). The design used for the study was a randomized block design. The houses were blocked in five blocks with one replicate per treatment (breed) in each of the blocks. Each replicate comprised of four hens, individually caged in adjacent cages. Parameters measured over the five month trial period were egg production, egg weight, feed intake, feed conversion ratio and hen day production %. Egg quality parameters were also measured i.e. egg shell strength, specific gravity, albumen height, Haugh unit and meat and blood spots. The mortality and economic efficiency of all the layer breeds was calculated over the five months trial period. The commercial breeds produced significantly more eggs, heavier eggs, had better FCR and higher hen day production % than the dual purpose and indigenous breeds in both the house that was constructed over a dam and a conventional house system. However, the feed intake of laying hens did not differ significantly in both the housing systems. The housing systems did not significantly affect egg quality parameters of laying hens. Mortality

per breed was higher in the conventional house than the dam house. The commercial breeds showed to be economically viable in an integrated chicken-fish farming system with a high profitability than the dual purpose and indigenous breeds.