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Serum Progesterone Concentrations in Indigenous Nigerian Guinea Fowls

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Abstract: The serum progesterone concentrations of indigenous guinea fowls in Zaria were measured over a period of 12 months (January to December) using 480 adult female guinea fowls. The concentrations ranged between 1.04 and 3.50 ng/ml. The highest level, 3.50 ng/ml, was recorded in the month of June while the lowest level, 1.04 ng/ml was in October and December. Statistically, the serum concentrations of progesterone did not significantly ($p>0.05$) relate to the weights and total length of the reproductive organs. There were no uniform graphical correlations between the serum progesterone concentrations and the parameters of the reproductive organs.

Key words: Progesterone, concentration, indigenous, guinea fowls

Introduction

Progesterone activity was first demonstrated in the blood of cocks, laying and non-laying hens by Fraps *et al.* (1948, 1949); however, the levels were not measured. Rothchild and Fraps (1949) found that progesterone could be involved in the feed back mechanism of the release of luteinizing hormone. The earliest quantitative studies were carried out by Lytle and Lorenz (1958) who found the plasma level to be 5 ng/100ml. Later, Furr *et al.* (1973) reported that the plasma peak of progesterone in the domestic hen at four to seven hours before ovulation was 6.47 ng/ml. Etches *et al.* (1980) observed the peak to be 4.28 ng/ml at three hours before ovulation. Silver *et al.* (1974) determined the level to be 3.01 ng/ml in the female ring dove.

Ovarian hormones affect the reproductive state, the secondary sexual characters, metabolism and behavior in birds (Sturkie, 1965). Silver *et al.* (1974) observed a significant correlation between follicle development and progesterone.

Guinea fowl is currently gaining importance in Nigerian poultry industry. This calls for extensive and intensive studies into every aspect that is likely to contribute to the future improvement of this species of birds. Therefore, this study was undertaken to measure the progesterone levels in indigenous guinea fowls throughout the year and to see whether it fluctuates with the non-laying and laying seasons.

Materials and Methods

A total of 480 mature female guinea fowls were used for the study which lasted from January to December. The adult birds were from an open market bought and housed in a place that was protected adequately from the direct effects of the sun and rain. They were fed ad libitum with commercially compounded poultry feed.

A set of 10 birds were bought at a time, housed and fed for about a week within the Veterinary Faculty premises

and collectively slaughtered at the end of each week. Each blood serum collected was stored at B 20°C until subsequently analyzed for progesterone by RIA as described by Stabenfeldt *et al.* (1969).

The ovaries and oviducts were dissected out and the weights and total lengths recorded.

Results and Discussion

Rainy season in Nigeria is regarded as the laying period while dry season is the non-laying or resting period for indigenous guinea fowl. Rainy season is from mid May to mid October and dry season is from mid October to mid May.

Serum progesterone concentrations of these indigenous guinea fowls ranged between 1.04 and 3.50 ng/ml (Fig. 1). The highest level of progesterone (3.50 ng/ml) was recorded in the month of June (rainy season) while the lowest level, 1.04 ng/ml was recorded in October and December (dry season). Although the peak level was not determined immediately before and after each ovulation, the highest level obtained did not vary much from the peak value, 4.28 ng/ml, reported for the domestic hen (Etches *et al.*, 1980) and that of the female ring dove, 3.01 ng/ml, after courtship (Silver *et al.*, 1974). The number of eggs per year laid by these three different species of bird is known to vary greatly. The domestic fowl lays an average of 230 eggs per year while the guinea fowl lays between 40 and 70 eggs per year (Kosin, 1972). The ring dove on the other hand lays fewer than 20 eggs per year. The near similarity in peak progesterone levels in these three species and the wide range in the number of eggs they produce suggest that progesterone level may not be an important determining factor on the number of eggs laid per year in the different species of birds.

Statistical analysis, using linear correlation coefficient, showed there was no significant relationship ($p<0.05$) between the serum levels of progesterone and the

Onyeanus: Progesterone Level in Guinea Fowl Blood

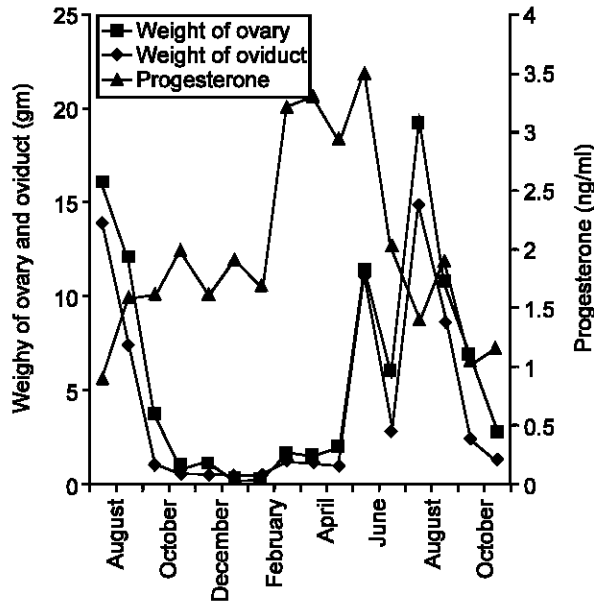


Fig. 1: Progesterone concentrations and their relationship to the weights of the ovaries and oviducts

weights of the reproductive organs or lengths of the oviducts of the guinea fowl. There were no direct continuous correlations between the curves in either case. One would infer from the above analysis and from the graph (Fig. 1) that the continued increase in the reproductive organs necessary for better egg laying does not depend on high amount of serum progesterone levels but on the presence of a basal quantity. The high increase in progesterone levels during March to June period may have to do with its function at increasing the protein synthesis and fat deposits in the guinea hen. The weights and lengths of the reproductive organs showed increase at this time. Progesterone in the birds influences the development of

follicles, synthesis of lipid and protein and synergistically with estrogen controls the albumin formation and secretion in magnum (Silver *et al.*, 1974).

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