SOME FACTORS AFFECTING POULTRY PRODUCTION IN BAHRAIN

By

HASSAN MOHAMMED AJLAN

B.Sc. (Agric.)

THESIS

Submitted to the Faculty of Agriculture,
Ain Shams University, in Partial
Fulfilment of the Requirements for the

Degree of

MASTER OF SCIENCE

in poultry production

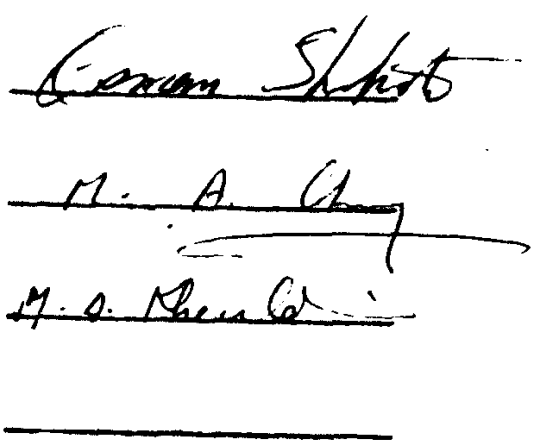
1970

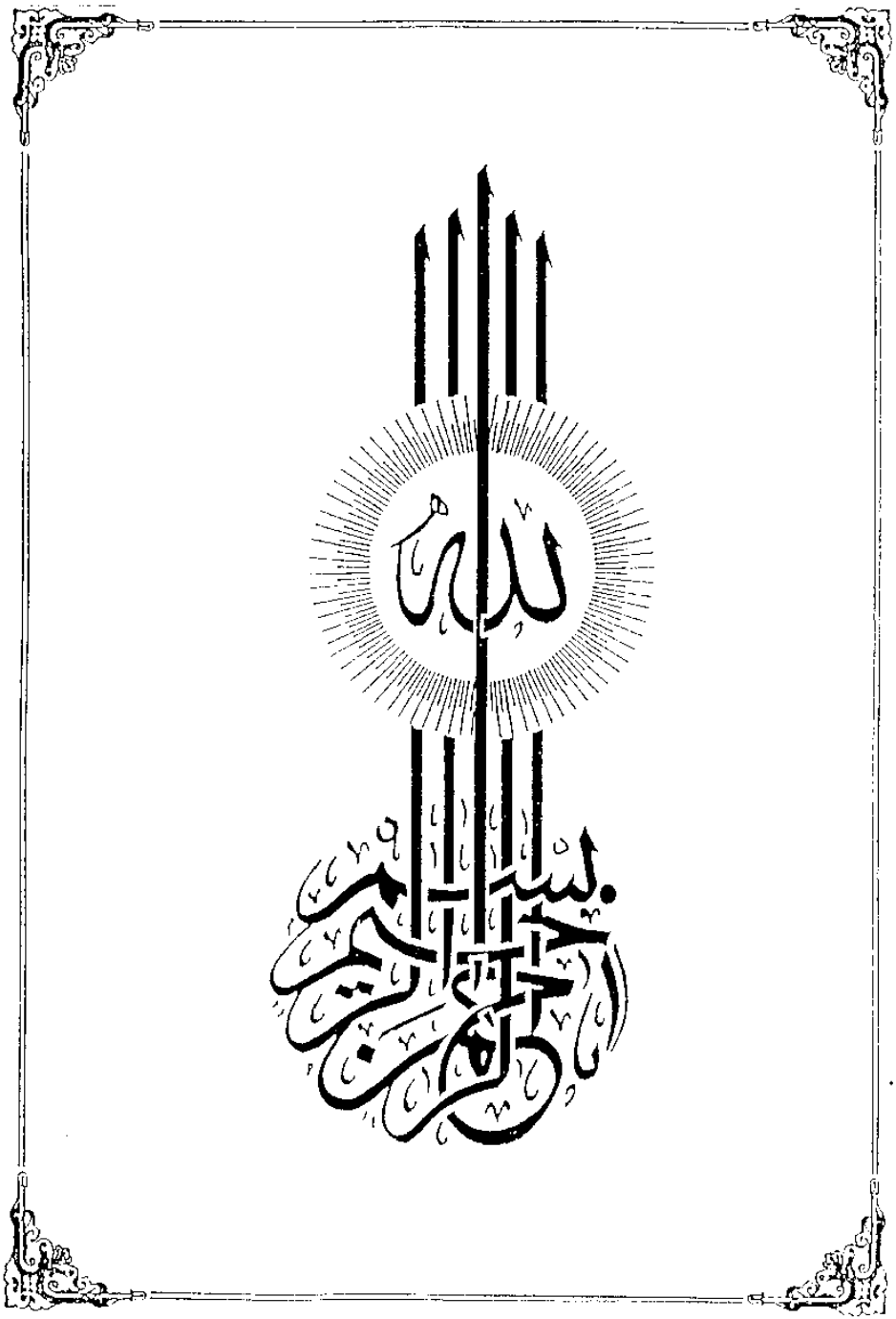
APPROVAL SHEET

Title of Thesis : SOME FACTORS AFFECTING POULTRY PRODUCTION IN BAHRAIN.

Name of Canditate: HASSAN MOHAMMED AJLAN.

Approved by :





Acknowledgement

The writer wishes to express his great indebtedness and sincere gratitude to Dr. . Sherif Professor of Animal Nutrition , Dr. S. S. Krishin professor of Animal Production , Dr. S. Nilly assistant professor of poultry production and Dr. S. Kotby lecturer of Animal Physiology , Animal Production Dept, Faculty of Agriculture, Ain Shams University , for their close supervision , valuable guidance, and useful criticism throughout the work of this thesis .

Special thanks to Dr. May F. Ali for her valuable criticism and half in preparation of this work .

The writer wishes also to acknowledge with utmost gratitude the encouragement of H. H. the ruler of Bahrain Sheikh Eisa Bin Salman Alkhalifa anf the Government of Bahrain for financing this research . He also extends his thanks to the director of Bahrain Agricultural Department Sheikh Ibrahim Bin Hamed Alkhalifa for his useful advice which made the execution of this work possible .

INTRODUCTION

One of the main problems which actually handicaps poultry production in Bahrain in summer is the environmental conditions characterized by high temperature and humidity which causes a marked depression in production. This depression reaches its maximum during June, July and August when both temperature and humidity mark their maximal figures (45 C. and 100 percent relative humidity).

Therefore this study was conducted to throw lights on the following objectives :

1. The efficiency of controlled environment house with air conditioning and its effect on live weight, feed efficiency and carcass weight.
2. To compare the flock under the controlled environment with those under the conventional one for the above factors.
3. To study the economical aspects of the controlled environment house in order to find out if it was beneficial to offset the cost.

* * *

REVIEW OF LITERATURE

The Influence of Temperature and Humidity on Broiler Performance

Body weight :- Kheir El-Din and Shaffner (1950) found that the growth rate of one-day old New Hampshire chicks was depressed when exposed to 110 F. and 30 percent relative humidity, and this effect was more pronounced during the first week after exposure. The effect of seasonal variation on the growth rate of Fayoumi pullets had been studied by Hafez and Kamar(1955). They found that the chicks hatched in summer (June, July and August) had a higher growth rate in comparison with those hatched in spring (March, April and May) However, chicks hatched in winter (December, January and February) and Autumn (September, October and November) were intermediate. Ragab and Kotby (1958) however, reported that the relative growth rate percent of November hatched Fayoumi chicks was higher than those groups hatched during December, January and February, throughout the period from hatching to 12 weeks of age.

Wilson, et al. (1957) reported that the body weight of White Leghorn pullets was improved at a temperature of approximately 48 F. Joiner and Huston (1957) found that the weight of immature New Hampshire,

White Plymouth Rock and White Leghorn chicks reared at 90 F. for 10 weeks of age was less by 0.4 pound as compared to those reared under normal brooding temperature (95 - 80 F.). Milligans and Winn (1964) exposed commercial broiler chicks to constant high temperature of 90-100 F. with 96 percent relative humidity and observed that gain, feed conversion, feattering and pigmentation were adversely affected. Winn and Godfrey (1967) also showed that chicks raised at 35 to 37.8 C. regardless of humidity did not perform satisfactory.

Huston (1965) studied the influence of different environmental temperatures on White Plymouth Rock males from one day to eight weeks of age. He concluded that the birds grown at environmental temperature of 19C. were larger than those kept at 30 or 8C. Abdou (1965) came to the same conclusion. He found that the growth rate of Fayoumi chicks at eight weeks of age was higher for the group started with a brooding temperature of 85 F. than those started with 90 and 95 F. Card and Nesheim (1967) reported that the growth rate of broiler chicks was high during the first nine weeks of age at constant temperature of 68 F. with 75 percent relative humidity.

Adams and Rogler (1968) found that the growth rate of White Mountain, Heisdorf and Nelson Leghorn chicks was higher at environmental temperature of 29 C. and 40 percent relative humidity as compared to those at 29C. and 80 percent relative humidity. They also demonstrated that the detrimental effect of the high humidity was greater for males than females.

Griffin, et al. (1969) studied the influence of cyclic ambient temperature on the performance of broiler chicks. They indicated that chikks brooded in room with a cyclic temperature of 4.4–15 C. had lower average body weight as compared to those brooded at constant temperature of 35, 32.2, 26.7 and 21.1 C. for the first four weeks respectively and 15.6 C. for the fifth through the eighth week of age.

Hutt (1938) and Yeates, et al. (1941) reported that Single Comb White Leghorn had greater resistance to body temperature disorders than Barred Plymouth Rock or Rhode Island Red chicks. Sturkie (1965) reported differences in heat tolerance between different breeds or strains and individuals within strains. He stated that White Leghorns were more heat-tolerant than other breeds. This difference might be due to the white colour of their plumage and to their faster

rate of growth.

Feed consumption and feed efficiency :- Warren and Schnepel (1940) stated that when the air temperature increased from 60-95 F. the Single Comb Rhode Island Red and Single Comb White Leghorn chicks consumed about 26 percent less feed. Heywang (1947) found that the White Leghorn and Rhode Island Red chicks kept at 70-92 F. from one-day to 12 weeks of age consumed more food and had greater body weight as compared to those kept at 95-104 F. Barott and Pringle (1947) studied the effect of various temperatures on feed consumption of Rhode Island Red chicks during the first 18 days of age. They found that the feed consumption was higher in the group brooded in batteries at 94 F. and was reduced gradually to 80 F., as compared to those brooded under hovers with regular brooding temperature and those brooded in brooders with irregular brooding temperature. Heninger, et al. (1960) found that at various environmental temperatures of 75, 95 and 105 F. with 45 percent relative humidity, the increase in body weight of two-days old White Leghorn chicks for three weeks of age was 300, 253.4 and 144 g. and the average feed consumption per bird was 483.5, 369.1 and 250.2 g.

respectively. Reduction in body weight at the higher temperatures was thought to be a result of decreased feed consumption due to loss of appetite.

The effect of sudden rise (4 F./hr.) and gradual rise (5 F./day) in ambient temperature on the feed consumption of Maryland strain, Cornell Randombred White Leghorn and Rhode Island Red chicks had been studied by Campos, et al. (1960). They reported a marked reduction in feed consumption, which was slightly greater with sudden than with gradual rises in temperature. This depression in feed consumption followed the rises in air temperature immediately. Mickelbery, et al. (1966) exposed White Hubbord cross males from four to eight weeks of age to 29 C. and found that the feed consumption was markedly reduced. Card and Nesheim (1967) stated that the feed consumption of two-pound broilers increased by 0.6 pound of feed per 1000 broilers per day for each degree in temperature decreased below 75 F.

Joiner and Huston (1957) indicated that the feed required per pound of gain of immature New Hampshire, White Plymouth Rock and White Leghorn chicks at

90 F. for 10 weeks of age was 2.76 pounds as compared to 2.79 pounds for those at 69 F. Prince, et al. (1961) reported that the feed consumption of broiler chicks from four to eight weeks of age was reduced by 9.4 percent while feed efficiency increased by 11.4 percent when the temperature was increased from 45 to 65 F.

Milligans and Winn (1964) found that the optimum constant temperature for feed conversion of broiler chicks was 60 F.

The effect of humidity on feed conversion had been studied by Winn and Godfrey (1967). They reported that the optimum range of relative humidity for chickens after brooding was between 50 and 70 percent. They also showed that higher humidities favoured better feed conversion if sanitary precautions were practiced. Adams and Rogler (1968) found that the feed conversion of male chicks kept under constant temperature of 29 C. from four to eight weeks of age was higher at 40 than 80 percent relative humidity. No significant differences were observed in the females.

Body temperature :- Jull (1951) and Sturkie (1965) indicated that body temperature of birds was affected by the variation in the environmental temperature and humidity. Sturkie (1965) stated that the highest environmental temperatures that the birds can tolerate without progressive increase in their body temperature depends upon the humidity of the air. However, the humidity of the air had little effect on the body temperature of the chickens when the environmental temperature was lower than 32 C.

Wilson (1948) studied the effect of increasing environmental temperature from 70 to 105 F. on body temperature of Single Comb White Leghorns. He reported that the birds were able only to tolerate temperatures of 80 to 90 F.

The effect of temperature on mature birds had been studied by Winter and Funk (1960). They reported that mature chickens suffer more from extreme warm weather than from extreme cold weather. However, some died from heat prostration when the temperature reached 100 F. or more. A mature bird rarely freeze to death.

Kamar and Khalifa (1967) found that the body temperature of Fayoumi males increased when air temperature and relative humidity were high(32 C. and 65 % respectively), and decreased when the air temperature was low (15 C).

Adams and Rogler (1968) studied the effect of humidity on body temperature of White Mountain, Heisdorf and Nelson Leghorn chicks. They reported that the body temperature under constant temperature of 29 C. was lower at 40 than 80 percent relative humidity.

Edible and non-edible weights :- Newell and Shaffner (1950), Card and Nesheim (1967) reported that the broilers lost about four percent of their live weight as blood.

Newell and Shaffner (1950) found a positive correlation between relative blood loss and the appearance of the dressed carcass. As the relative blood loss increased,the appearance of the dressed carcass became better. The amount of blood lost was closely associated with total blood volume than with body weight,and the females tended to lose a higher insignificant percentage of blood than males.

The effect of seasonal variation on the amount of blood lost by Fayoumi, Rhode Island Red and Leghorn chicks had been studied by Abdou (1964). He found that the winter hatched chicks had the highest blood weight.

Glazener, and Jull (1964) studied the relationship between the body weight and feathering. They found that the better feathered chicks at 8 weeks were the heaviest at 10 weeks of age. They also observed that the females tended to feather better than males.

Sheridan, and McDonald(1963), however, found no significant relationship between feathering and body weight.

On the other hand, Abdou (1964) reported that the winter-hatched chicks showed the highest feather weight. Card and Nesheim (1967) stated that the average weight of feather loss was about 5 % of the live weight. The same auhors also observed that feathering was higher in females than in males.

Hathaway, et al. (1953) studied the meat yield for three pure breeds of broiler chicks, Dark Cornish, White plymouth Rock and New Hampshire and three other