

EFFECT OF HATCHING DATE ON SEVERAL TRAITS IN POULTRY

By

ONSI IBRAHIM MELEK
(B.Sc. Agric., Alexandria University), 1960

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Approved by : M. A. Elhany
: G. Kamal
: S. A. Helmy
Committee in Charge

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I. INTRODUCTION

Undoubtedly, poultry industry may play a serious role by contributing to the supply of animal protein sources in the United Arab Republic. From a practical standpoint, local as well as foreign breeds of chickens could be essential for establishing a good foundation stock. This may make the study and the investigation of both local and foreign breeds of great importance to poultry breeders in this country. Dokki 4 is a new promising local breed, (El-Itziby and Sayed, 1966). Its meat quality is considered to be more desirable by the Egyptian consumer as compared with that of the Fayoumi fowl. The White Plymouth Rocks, on the other hand, represent one of the most desirable foreign breeds which have been adapted to the Egyptian circumstances. It is hypothesized that studying the influence of date of hatch on some of the economic traits of the fowl may be of great importance to poultrymen in this country.

For comparative study, breed differences with respect to certain traits such as : body weight, age at sexual maturity, egg production and egg fertility and hatchability had to be given certain considerations.

Therefore, it was mainly aimed to study the effect of hatching date on some productive and reproductive traits of

the Dokki 4 fowl as a local breed, compared with White Plymouth Rock the dual purpose introduced one. The undertaken traits were :-

- 1- Body weight at eight weeks of age; the end of the brooding period.
- 2- Body weight at twelve weeks of age.
- 3- Age at sexual maturity.
- 4- Egg production during the first 90 days after sexual maturity.
- 5- Average weight of the first 10 eggs.
- 6- Fertility.
- 7- Hatchability.

Such a study may add useful information to poultry breeders on one hand, and may be of some importance for establishing a sound poultry industry in this country especially during the process of decision-making.

II. REVIEW OF LITERATURE

A. Affect of Hatching Date :

Generally speaking, date of hatch may influence, to some extent, some of the productive and reproductive traits of the bird, such as; body weight, age at sexual maturity, egg production, egg weight and both fertility and hatchability of chicken eggs.

1- Body Weight :

A number of studies agreed that early-hatched chicks in the season, which started their growing stage during mild season, attained faster growth and heavier body weight as compared to the late-hatched ones, which started that stage during hot season (Heywang, 1947; Bauman, 1952; Kamar, 1954; Ragab and Kotby, 1958; Mostafa et al., 1963 and Al-Rawi, 1969).

Kempster (1941), showed that the winter-hatched chicks were superior in relative growth rate to autumn hatched ones during the second growing period (from 8 weeks of age to the beginning of production). During the first stage (up to 8 weeks of age), the autumn-hatched chicks were superior to the winter hatched ones.

Amer et al. (1965), observed that January hatched Fayoumi and Leghorn chicks were lighter than those which were hatched in February, March, April and May. On the other hand, the North Holland Blue chicks hatched in January were the heaviest as compared with those which were hatched later in the season.

Ghany et al. (1965), reported that January hatched chicks showed higher body weights than either May or August hatched groups at both 8 and 12 weeks of age.

Recently, Abou-El-Senoun (1968), found that the late-hatched chicks were superior to the earlier hatched ones in body weight up to 8 weeks of age, but the early-hatched ones took the superiority afterwards.

Although date of hatch has a great effect on body weight and growth rate, the influence of varying environmental conditions should not be overlooked.

Several researches were undertaken to study the effect of the environmental temperature on the growth of the chicks. A number of reports stated that the high environmental temperature caused a remarkable depressing effect on the growth and the body weights of the growing chicks (Kheireldin and

Shaffner, 1954; Perry Joiner and Huston, 1957; Milligan and Winn, 1964; Huston, 1965; Prince et al., 1965 and Ragab et al., 1967).

On the other hand, Prince et al. (1961), showed that subjecting chicks from 4 to 8 weeks of age to high environmental temperature resulted in a slight and not significant increase in weight gains as compared with those grown under normal environmental temperature.

However, Walter et al. (1965), concluded that subjecting 11 or 21 weeks old White Leghorn pullets to ambient temperature of 38°F. or 99°F. did not affect the body weights of the treated pullets.

The effect of different daylengths and lighting treatments on the growth and the body weights of the chicks had been studied by several investigators. Some of them found that the increased daylength during the growing period caused an increase in growth rate and body weight of the chicks, and that the light restriction during this stage resulted in decreased growth rate and body weight (Tomhave, 1954; Morris and Fox, 1960; Bowman et al., 1964; Skoglund and Walbeck, 1964; Beane et al., 1965 and Parker and Mc Cluskey, 1965).

On the other hand, different results indicated that the exposure of chicks to long daylengths reduced the growth rate of the exposed chicks, and that the light restriction is more favourable for greater body growth of the growing chicks (Clegg and Sanford, 1951; Novikov et al., 1956 and Siegel et al., 1963). It was also observed that the adult males gained more weight on very short daylengths than on long daylengths (Lamoureux, 1943b and Parker and Mc Cluskey, 1964).

However, other group of workers concluded that different lighting treatments did not significantly affect either body weight or growth rate of the growing chicks (Richard and Heywang, 1961; Shutze et al., 1961 and Noles and Smith, 1964).

2- Age at Sexual Maturity :

There is a considerable individual variation in the age at which pullets sexually mature. However, the time required for the bird to reach maturity, and consequently the date when it lays its first egg, vary according to the season of hatch (Romanoff and Romanoff, 1949).

Numerous investigators stated that the spring hatched pullets, matured sexually at older ages as compared with either those which were hatched early in the season; during fall and winter months, or during the unnatural season; at early summer and summer months (Jeffrey and Platt, 1941; Byerly and Knox, 1946; Greenwood and Blyth, 1946; Romanoff and Romanoff, 1949 and Hafez and Kassar, 1955).

They added that within the spring hatched chicks, for every two days by which the hatching date retarded after March 21, there was a corresponding prolongation of the age at first egg by about one day. Most of these studies showed that the autumn, winter and summer hatched chicks were favoured by long day of sunlight during the active growing stage, and that the age at sexual maturity was associated with daylength at maturity.

Blow et al. (1955), found that June hatched chicks were the latest in sexual maturity as compared with those which were hatched on March, October or December, while December hatched ones were the earliest maturing group.

Sennan et al. (1965), reported that January hatched pullets came into lay at the earliest age as compared with

February, June, August or October hatched ones, and that those hatched in October were the latest group in reaching sexual maturity.

Several workers reported that increasing daylength to which the chicks were subjected during the growing period, specially during the rearing period resulted in marked decrease of age at sexual maturity. They added that the decreased photoperiod during this stage resulted in a noticeable retardation in the age at which pullets laid their first egg (Clyton and Robertson, 1960; Morris and Fox, 1960; Lauber et al., 1963; Mc Cluskey and Parker, 1963; Bowman et al., 1964; Harrison et al., 1965, Proudfoot and Gowe, 1967; Harrison et al., 1969, Bornstein and Lev , 1969a and Kicka et al., 1969).

Callenbach et al. (1944), found that the age at sexual maturity of June hatched chicks was not advanced by using 24 hours of light per day, moreover, they reported that subjecting the growing chicks to constant 24 hours per day, appeared to inhibit the expression of sexual maturity of a considerable number of the treated pullets.

Seigel et al. (1963), found no significant latine in the age at first egg between pullets which received

either 6 or 14 hours of daylight during the growing period.

On the other hand, other investigators observed that subjecting October hatched chicks to constant daylength of 16 hours during the growing period retarded their age at first egg, as compared with those which were grown under normal daylength (Tomhave, 1954 and Richard and Huiwang, 1961).

With respect to the effect of the environmental temperature on the age at sexual maturity, Walter et al. (1965), stated that no effect could be observed by subjecting either 11 or 20 weeks old White Leghorn pullets to ambient temperatures of 38°F. or 99°F. for a period of 5½ hours daily on their subsequent age at sexual maturity.

On the other hand, Kicks et al. (1969), found that the mid-day shutting-in or cool feeding treatments for the 4-months pullets seemed to help in accelerating sexual maturity than where no mid-day darkness or no cool feeding were applied.

3- Egg Production :

Several workers concluded that, the spring hatched pullets; (normal hatching season), were superior to either fall, winter or summer hatched ones with respect to the rate of egg production (Jeffrey and Platt, 1941; Romanoff and Romanoff, 1949; Tomhave, 1954; Blow et al., 1955 and Kinder and Funk, 1959 and 1960).

They added that within the spring hatches, February and March hatched pullets scored the highest rate of lay, followed by those of April and May hatches, while June hatched ones averaged the lowest level of production.

El-Hossari (1966), observed a little effect of hatching date on egg production of Fayoumi hens up to 12 or 17 months of age and also on the production during either 50 days or 250 days after sexual maturity.

With respect to the effect of some environmental conditions related to the time of hatch, a number of investigators reported that restriction of daylength to which the chicks were subjected during the growing period, resulted in higher average egg production, as compared with those reared under longer daylengths (Morris and Fox, 1960 and King, 1961).