

Effects of the Chicken Body Louse, *Menacanthus stramineus* (Nitz.) (Mallophaga : Menoponidae), on Production of the Saudi Arabian Baladi Hens.

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ABSTRACT :

The effects of *Menacanthus stramineus* (Nitz.) on the Saudi Arabian Baladi hen productions were carried out at the Animal Farm of the College of Agriculture, King Saud University, Riyadh, Saudi Arabia, from mid December 1986 to late May 1987. The egg production of infested hens was significantly less than non-infested hens. Louse infestation had no significant effect on body weight of hens, fertility, and hatchability of eggs. The degree and severity of louse infestation were recorded.

Key words : Insecta, Mallophaga, Chicken, Eggs, Saudi Arabia.

INTRODUCTION

Chewing lice (Mallophaga) are considered to be the most important ectoparasites of poultry. More species of chewing lice may be found on domestic chickens than any other known fowl (Emerson, 1956). Seven species of chewing lice were collected on domestic chickens in the central region of Saudi Arabia (Aldryhim, 1991).

The data on economic losses caused by lice are conflicting, with reports of no losses (DeVaney, 1956 & Warren et al. 1948) and other reports (DeVaney, 1976; Edgars & King, 1950; and Gless & Runn, 1959) of an economic effect from louse infestation.

The chicken body louse, M. Stramineus, is the most common species of louse found in modern poultry production facilities (DeVaney, 1986). The entire life cycle occurs on the host and the life cycle requires 2-3 weeks (Axtell & Arends, 1990).

Hoffman (1960) considered lice population on chickens to be light when the average numbers of lice at six body locations was less than three, medium when it averaged three to seven, and heavy when the numbers exceeded seven.

Poultry production in Saudi Arabia is becoming of increasing importance, and little previous attention has been directed towards the study of the effect of external parasites on chickens production; therefore, the objective of this study was to determine the actual extent of damage incurred by infestation of M. stramineus on Saudi Arabian Baladi hens.

MATERIALS AND METHODS

This study was conducted in the Animal Farm at the College of Agriculture, King Saud University, Riyadh, from December 19, 1986 to May 6, 1987. Four poultry houses were used in this study. Each house measured 5.2 x 3.1 x 3 metres (LWH), with one concrete wall, and three mesh walls, with a 40

centimetre base. Houses were separated by a four metre path.

160 Saudi Arabian Baladi hens were selected from the farm flock. The hens were approximately ten months in age and were infected by chicken body louse M. stramineus. The hens were divided randomly into four groups and each group was placed into one of the houses. 20 roosters were randomly selected from farm flock and five roosters were randomly added to each house.

Birds of two groups were treated with Gamatox^R to eliminate louse infestation, and were subsequently regard as louse-free hens (LFH). The birds of the other two groups were not treated, and they were referred to as louse-infested hens (LIH).

Egg production records were kept for 24 weeks after treatment. Daily egg production was recorded and percentage of egg production was calculated. At the end of each seven-day period, the percentage of egg production were totalled, and the average was taken.

At biweekly intervals, ten hens were randomly selected from each house, to record body weight, percent infested hens, and louse severity. Louse severity was estimated using the Hoffman (1960) method; however, substituting the designations of zero, one, two, three, for louse free, lightly infested, medium infested, and heavily infested hens, respectively.

To determine the effect of the louse infestation on the fertility and hatchability (% hatch of fertile eggs) of eggs, the eggs produced in the fourth week and thirteenth week were placed in an incubator. Eggs which were produced in same day, from same treatment, were considered as a replicate. Percent of fertility (% F) and hatchability (% H) were calculated.

Data were analyzed using General Linear Model (GLM) at level of $P > 0.05$ and correlation coefficient with a program from the Statistical Analysis System (SAS 1982).

RESULTS AND DISCUSSION

The percentage of louse infested hens was high and steady throughout this study (Fig. 1), with a mean average of 80.2 ± 0.4 . However, louse severity was negatively correlated with time ($r = -0.96$), with a mean average of 1.3 ± 0.5 . The decline of louse severity, with time, was probably due to the louse population decrease resultant from rising temperature in late spring and summer. With high louse severity in winter, lice were found at all parts of the body, except the head and neck. However at low louse density, most lice were found confined around the vent, probably because of high humidity at that microenvironment.

An analysis of eggs production for the entire 24 weeks after treatment indicated that the differences in egg production between infested and uninfested hen was significant in favor of LFH (Table 1). DeVaney (1978) found that egg production of White Leghorn hens infested with the northern fowl mite,

Ornitonyssus sylviam, was significantly lower than egg production of control hens.

Egg production was effected by louse severity. The analysis of egg production for the first 13 weeks (when louse severity was high) indicated that the differences in egg production between LFH and LIH was significant ($p < 0.01$), however, when louse severity was light, in the last 11 weeks of the experiment, there was no difference in egg production between LFH and LIH. This was probably due to low louse severity which had little apparent effect on egg production. Stockdale (1960) reported that chickens can stand the effects of a certain level of louse infestation, without detrimental effect.

Analysis of the data indicated that there were no differences in weight of the hens due to the louse infestation throughout the 24 week investigation (Table 1). The fact of no weight difference between LIH and LFH was probably due to equal quality and quantity of food, and because the LFH experienced greater egg production. However, DeVaney (1976) reported that louse infestation result in decreased hen weight.

The fertility and hatchability of both the LFH and LIH eggs was not different in the fourth week of egg production. However, eggs of the 13th week revealed a 7.4% difference in fertility in favor of LFH (Table 2). DeVaney (1978) found that fertility and hatchability of eggs were not affected by mite infestation.

Table 1. Comparison of egg production (%) and body weight (g) between louse-free (LFH) and louse-infested hens (LIH)¹.

| Period (weeks) | Louse severity | Egg production (%) (mean ± SD) | | Body weight (g) (mean ± SD) | |
|----------------|----------------|-----------------------------------|--------------|--------------------------------|-----------|
| | | LFH | LIH | LFH | LIH |
| 1 - 24 | 1.3 | 43.5 ± 2.3 * | 35.2 ± 2.6 * | 1269 ± 2.5 | 1234 ± 17 |
| 1 - 13 | 1.6 | 47.1 ± 1.3 * | 30.6 ± 2.2 * | 1255 ± 3.6 | 1227 ± 14 |
| 14 - 24 | 0.9 | 39.6 ± 3.6 | 40.1 ± 3.3 | 1289 ± 2.2 | 1244 ± 12 |

¹ * Indicates significant difference between LFH and LIH at the same period as determined by GLM $P < 0.05$.

Table 2. Comparison of fertility and hatchability of eggs from louse-free hens (LFH) and louse-infested hens (LIH).

| Week | Hens Status | Mean no. eggs per rep. | | Fertility % (mean±SD) | Hatchability % (mean±SD) |
|------|-------------|----------------------------|-------|--------------------------|-----------------------------|
| | | Set | Hatch | | |
| 4 | LFH | 29.1 (204) ¹ | 18.2 | 93.1 ± 1.7 | 67.2 ± 1.9 |
| | LIH | 20.3 (142) | 13.1 | 94.1 ± 2.1 | 68.6 ± 1.2 |
| 13 | LFH | 50.3 (352) | 41.4 | 88.5 ± 1.5* ² | 93.0 ± 1.9 |
| | LIH | 38.0 (266) | 28.8 | 81.1 ± 1.3* | 93.5 ± 1.1 |

¹ (n) = Total number of eggs

²* Indicates significant difference between LFH and LIH as determined by GLM (P < 0.05).

In summary this study demonstrated that infested hens by M. stramineus produced less eggs than louse free infested hens. Percent of egg production of infested hen was negative correlated with louse severity. Body weight of hens and fertility and hatchability of eggs were not significantly reduced due to the louse infestation.

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تأثير قمل جسم الدجاج القارض على إنتاجية الدجاج العلوي السعودي

إجريت هذه الدراسة بمزرعة الدجاج التابعة لكلية الزراعة بجامعة الملك سعود بالرياض خلال الفترة من ديسمبر ١٩٨٦ وحتى آخر مايو ١٩٨٧ . وقد وجد أن الإنتاجية من البيض للدجاج المصاب بالقمل كان أقل معنوياً من الدجاج غير المصاب بالقمل . ولم يوجد أي تأثير معنوي على وزن الدجاج ومدى الخصوبة ونسبة الفقس بين الدجاج المصاب وغير المصاب بالقمل .