


## Effect of Bird Mite on Reproduction in Gloster Canaries and Treatment

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### Abstract

Dermanyssus Gallinae pose a serious danger to birds. The biggest problem for the breeder in cage birds is the breeding time. Stressed male birds have low libido as well as low semen yield. Although there are many options to be applied in the treatment, frequent repetition of the application affects the birds negatively. Carbamate insecticides used in the production season can pass into the eggs. Mite infestation was detected in 15 canaries with constant itching and restlessness during the breeding season. 2 weeks after the application of Selamectin, a serious decrease was observed in the complaints. It is predicted that the use of selamectin will be effective against the problem of Dermanyssus gallinae that can be seen in cage birds.

**Keywords:** Bird mite, gloster canaries, reproduction, treatment

## 1. Introduction

Bird mite, a *Dermanyssus gallinae*, is most well-known for being a menace to the laying bird business. It has a negative impact on production, hen health, and welfare all over the world, both directly and through its function as a disease vector (George et al., 2015). They are found in clusters in cracked and recessed environments (Entrekin and Oliver, 1982). Using a mix of temperature cues, chemical cues, vibrational responses, and responses to carbon dioxide and carbon monoxide, *D. gallinae* locate their hosts from these refugia (Kilpinen and Mullens, 2004). The fact that bird mites can carry and spread zoonotic illnesses with both bacterial and viral origins further accentuates their potential medicinal significance. In addition, there are studies reporting that related diseases transmitted by bird mites can be transmitted from birds to mammals, including humans (Orton et al., 2000; George et al., 2015). Although examples of diseases spread to humans through bird mite vectors are rare in the literature, it has been suggested that spirochetes, rickettsia, salmonella, bartonella, pasteurella, sporozoa, hemogregarin, flagella, and filariae are transmitted (Litwin, 1961; Mehlhorn, 2016). It has been reported that clinical symptoms associated with this infestation include weakening, itching, dermatitis, insomnia, self-pecking, cannibalism, decrease in egg number, anemia and death (Circella et al., 2011). Besides, it has been reported that one of the biggest obstacles to reproduction in songbirds is the loss of offspring due to parasitic infestations (Moller et al., 1990). Avermectin group drugs disrupt the neuromuscular transmission of nematodes and arthropods by binding to gamma-amino-butyric acid (GABA) receptors in the nervous system and activating glutamate chloride ion channels in muscle synapses (Bishop et al., 2000). Selamectin, a new generation macrocyclic lactone from the avermectin group, is an aniparasitic drug (DiGeronimo, 2016). Selamectin was

used in the treatment of *Dermanyssus gallinae* in canaries and was found to be quite successful in a study comparing different preparations. However, the dose rate used per patient in canaries was not mentioned in the study (Sarasola et al., 2002). In a study, selamectin applied topically at a dose of 20 mg/kg reached its maximum level in 3 days (Hahn et al., 2013). The half-life of selamectin administered in the study was 5-8 days and its plasma concentration was 16.1 ng/ml. It was also determined that effective plasma concentrations were achieved for 19 days. As a result, it has been seen that Selamectin can be used as a lethal parasitic drug in bird species (Todisco et al., 2008; Hahn et al., 2013). The aim of this study is to provide information about the causative agent of the disease and to report the effects of Selamectin treatment on reproduction in canaries.

## 2. Materials and Methods

### 2.1 Animals

A total of 15 canaries (10 females and 5 males) were used in the study. The canaries had itching and restlessness at night due to *D. gallinae* infestation reluctance to mate in male canaries. These complaints had been seen for approximately 20 days.

### 2.2. Semen and Eggs Analyses

Semen was collected from male canaries by massage method (Gee et al., 2004). Sperm examination was evaluated subjectively macroscopically and microscopically. Motility examination was performed microscopically. The motility of canary semen was examined under a light microscope and evaluated subjectively and presented as %. Liquid consistency and poor semen quality were observed in semen collected for artificial insemination from male canaries during the breeding season. In female canaries, it was determined that the first eggs could not complete their development due to empty or early departure from the nest.

### 2.3. Clinical Examination and Diagnosis

When the material taken from under the nest material was shaken on white paper during an inspection, the mites were observed with the naked eye, although it

was not dense. In addition, samples taken from canaries were examined under a light microscope at x20 magnification and adult *D. gallinae* mites were detected (Figure 1).

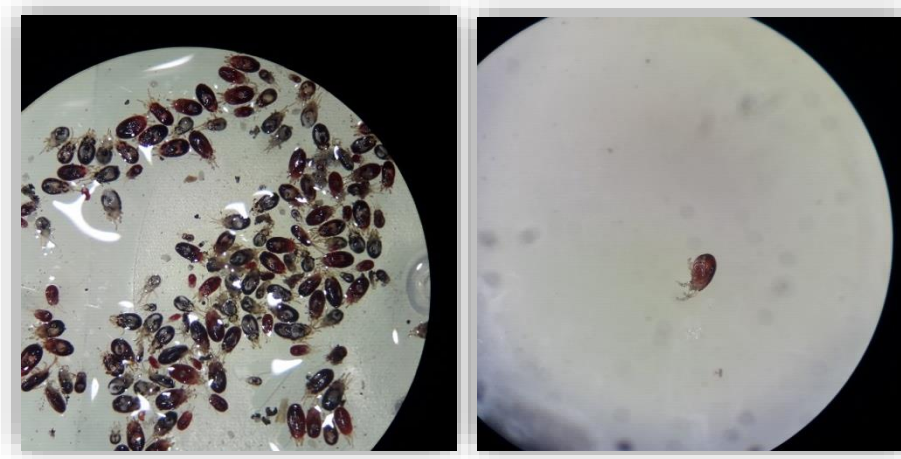


Figure 1. *D. gallinae* mites seen at x20 magnification under the stereo microscope

### 2.4. Treatment

12% drip solution (Stronghold®, Zoetis pharmaceuticals) containing 1 ml/120 mg Selamectin was used in the treatment. 1 drop of solution was applied through the gap between the wing and neck with the help of a 0 size fine brush. During

the application, the skin was exposed by parting the feathers on the area (Figure 2). To increase the effectiveness of the solution, the featherless area of the neck-wing junction where subcutaneous vascularization is intense was preferred.

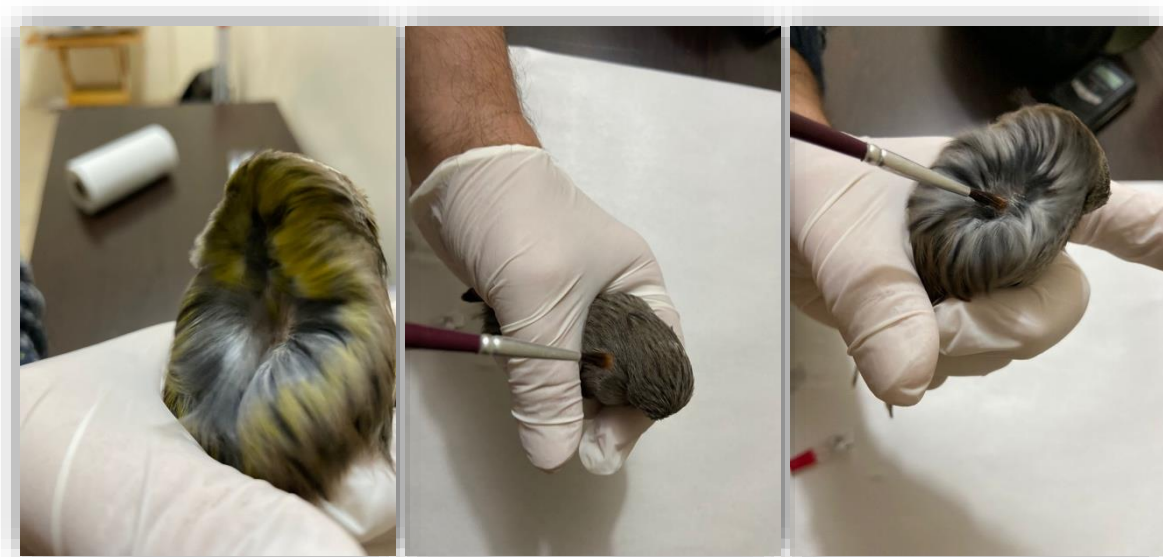


Figure 2. Revealing the featherless region between the neck and wing

### 2.5. Artificial Insemination

The cloacal method was used for insemination (Gee et al., 2004). Female canaries were inseminated with a pipette from which we drew the sperm.

### 3. Results

Selamectin treatment was continued twice with an interval of 15 days. No mites

were detected in the nested control after the treatment. Although the breeding season was over after the treatment, three offspring could be obtained from a couple by artificial insemination. (Figure 3). Baby canaries have completed their development healthy (Figure 4). In addition, no mites were found in the control of the nest after the chicks left the nest.



**Figure 3.** Produced canary chick



**Figure 4.** 18-day-old canary chicks

#### 4. Discussion

Found in many parts of the world, the ectoparasitic mite *Dermanyssus gallinae* is a particular problem in domestic birds (Sparangano et al., 2014). Although *D. gallinae* infestation is seen in many bird species, studies reporting that it infects other species has led to host expansion and increased zoonotic importance (Roy and Chauve, 2007). Although *D. gallinae* infestations cause clinical itching, cannibalism, decrease in egg number, dermatitis, weakening, and anemia in birds, it has been reported that it causes death in progressive cases (Davidova et al., 2021). Studies show that skin lesions similar to those in birds are also seen in humans (Rosen et al., 2002). More than 35 compounds have been mentioned for the control of *D. gallinae* in birds (organophosphates, organochlorines, pyrethroids, carbamates amitraz, and endectocycles). Although some of these are theoretically efficient, they are insufficient in practice (Todisco et al., 2008). Selamectin is an important antiparasitic drug for use in veterinary medicine. Its long duration of action and broad therapeutic activity facilitate its use against a wide variety of internal and external parasites. In addition, it is preferred in domestic and wild bird species as it is suitable for widespread and safe use (DiGeronimo, 2016). Selamectin can also be used successfully in canary species, and it has been reported in various publications that the appropriate dose should be investigated (Todisco et al., 2008; DiGeronimo, 2016). The dose amount applied in this study was found to be effective and usable in the treatment of canaries.

#### 5. Conclusions

During the breeding period in canaries, fatigue, reluctance to move, and decrease in libido are observed due to *D. gallinae* infestation. This situation can cause a serious decrease in the egg fertilization rate in the reproduction season. It is very important to combat this very challenging and unwanted infestation for

the producer. In order to obtain effective results in the fight against *D. gallinae* infestation, there is a need for active substances with a long half-life and acaricide properties that can remain in the blood at an effective rate for a long time. In this study, Selamectin treatment was applied to canaries for *D. gallinae* infestation. As a result of the study, it was revealed that a 12% drop solution containing 1 ml/120 mg of selamectin can be used for successful treatment in canaries. In addition, despite the end of the breeding season after the treatment, 3 hatchlings could be obtained from a couple.

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