

TITLE:

Evaluation of DERGALL for the control of the red poultry mite
(*Dermanyssus gallinae*) in deep litter housing system

PROJECT Code:

2015-05-Dergall

SPONSOR:

ICB Pharma

TESTING FACILITY:

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STUDY COMPLETION DATE:

15 June 2015

Project Title: Evaluation of DERGALL for the Control of the red poultry mite (*Dermanyssus gallinae*) in deep litter housing.

OBJECTIVES

To conduct field trial to evaluate DERGALL for the control of the red poultry mite (*Dermanyssus gallinae*). To report the results in a report form suitable for direct presentation to research, regulatory and marketing personnel.

STUDY OUTLINE

The specific objectives of this study were:

- a. To determine the immobilization effect of Dergall on red poultry mite when mixed at the recommended rate of 30ml and 60 ml of Dergall per 1 liter of water in deep litter housing system.
- b. To compare the efficacy of Dergall with untreated control.
- c. To determine if Dergall provides prolonged efficacy protecting hens from re-infestation by the red poultry mite.

Introduction: This study was designed and implemented to demonstrate the efficacy of Dergall against red poultry mite in deep litter housing system.

Study Initiation Date: 6 May 2015

Experimental Start Date: 6 May 2015

Study Completion Date: 15 June 2015

Experimental design

There were two trials at commercial layer houses on the same farm naturally infested with red poultry mite with deep litter housing system included in the study.

Each treatment area was evaluated for red poultry mite population using the protocol outlined in 'Evaluation Procedures'. After the initial monitoring procedure, all housing elements that are typical hiding places, where mites aggregate were sprayed thoroughly e. g. surfaces directly surrounding the birds, nest structures (incl. wooden threshold elements), feeding and drinking bowls, cracks and crevices of hall walls, belt conveyor of eggs, etc.

The control treatment with water only has been applied using the same procedure in separate layer house on the same farm.

24 hours and 5 days after treatment (5 DAT), the treated area was evaluated by monitoring for red poultry mite population. The same procedure took place 10 days after treatment (10 DAT) and 30 days following the first treatment.

Initial treatment and subsequent treatments occurred on 6 May 2015, 11 May 2015 and 16 May 2015 respectively.

Test Substance: Dergall - poison-free formulation providing physical action through immobilization.

Control Substance: Water

Test Insects/Arthropods:

Test species: red poultry mite (*Dermanyssus gallinae*)

Location of Trials

Plzen, Czech Republic

Housing method:

Deep litter housing

Treatments:

Treatment has been conducted about 60 minutes after switching the lights off, when the birds became calm. Headlamp was used as a source of light during application.

Dergall prepared at the concentration of 0.6% (60 ml per 1 liter of water) and applied at the rate of 50ml/m² with mechanical compression sprayer at normal pressure from a distance of approximately 50 cm to nest structures (incl. wooden threshold elements), feeding and drinking bowls, cracks and crevices of hall walls, belt conveyor of eggs, etc.

Dergall prepared at the concentration of 0.3% (30 ml per 1 liter of water) and applied at the rate of 50ml/m² with mechanical compression sprayer at normal pressure from a distance of approximately 80 cm to the floor of the house. Treatment has been conducted in a presence of the birds.

The subsequent application has been applied twice with same procedure 5 and 10 days following initial application.

Control treatment has been applied using water only at the rate of 50ml/m² in the same time intervals.

'Evaluation Procedures'

Mite Sampling and Laboratory Examination

The presence of the *Dermanyssus gallinae* from clusters of organic origin was assessed under light. Parasites in the poultry houses were determined prior and post-treatment by inspection of their likely hiding and breeding place and samples randomly taken from each of ten points from throughout both of the testing sites. Using a small surgical spoon, mites were collected by scrapings from the nest structures (incl. wooden threshold elements), feeding and drinking bowls, doors, hinges, crevices of hall walls, belt conveyor of eggs etc., and put into plastic containers.

Samples (10 g) of scraped litter were collected. Mites were taken out from the litter and investigated after 2 hours. The numbers of found alive mites were recalculated to one gram of scraped organic material to facilitate the comparison of effect of the tested preparation in the experimental and control objects.

Efficacy

Efficacy assessments post-treatment was conducted at 1, 5, 10 and 30 days. Mites has been assessed as active or immobilized at each assessment. 'Immobilized' refers to a state of no movement at all, and 'Active' is used to describe mites with full movement.

Bird's condition

The condition of hens has been monitored and assessed at each assessment time for possible negative/positive reactions. Health condition, feeding improvement, growth and egg production were also assessed.

Analysis of data

Table 2 shows the mite score assigned each monitoring points within each treatment both pre- and post-treatment.

Results & Discussion

In this trial the positive effect on the health condition of the birds was clearly noticeable. The infestation level in the test population can be described as severe. Prior to the treatment there were 5-10 dead birds observed daily. Fourteen days after the initial treatment there were no lethal cases observed in the hens' population. Therefore, this effect was directly connected to the significant reduction of the level of infestation with red poultry mite.

Additionally, a noticeable improvement in health condition of birds, feeding, growth and egg production (ca. 7%) was observed.

As shown in Table 1 and 2, Dergall resulted in lowered mite scores in post-treatment counts at 24-hour, 5 (re-treatment), 10 (re-treatment) and 30 days. This has been proven with the subsequent treatment 5 and 10 days later, where the "just-hatched" juvenile parasitic stages were treated. Major reduction level of the population of red poultry mite leads to very low level of the population recovery. No efficacy was observed in the control population.

Conclusions

Dergall demonstrated a high level of efficacy, 24-hour, 5 days, 10- and 30-day post-application when prepared at the concentrations of 0.6% (60 ml per 1 liter of water) and 0.3% (30 ml per 1 liter of water) and applied at the rate of 50ml/m². There were no observable negative impacts to the equipment, facilities, chickens, or applicators noted during this study. Average 14 days following the treatment a noticeable improvement in health condition of birds, feeding, growth and egg production was observed. Delayed improvement effect was related to the severe infestation in the hens' population.

Table 1. *Dermanyssus gallinae* population assessment.

Treatment	Pretreatment Average	24 Hour Average	5 DAT Average	10 DAT Average	30 DAT Average
Dergall	0	66	81	91.5	80.4
Control	0	0	0	0	0

Table 2. Efficacy (percentage of mortality) against red poultry mite (*Dermanyssus gallinae*) in battery cage housing system.

Percentage by weight	Monitoring point no.	Initial treatment	24 hours After treatment	5 DAT Subsequent treatment	10 DAT	30 DAT
0.3/0.6	1	0	70	80	90	90
0.3/0.6	2	0	70	80	95	100
0.3/0.6	3	0	60	80	90	90
0.3/0.6	4	0	50	90	95	80
0.3/0.6	5	0	70	80	90	90
0.3/0.6	6	0	70	80	90	95
0.3/0.6	7	0	60	80	80	80
0.3/0.6	8	0	60	70	90	90
0.3/0.6	9	0	70	80	95	90
0.3/0.6	10	0	80	90	100	80

Figure 1. Pretreatment



Figure 2. Pretreatment



Figure 3. Pretreatment



Figure 4. Pretreatment



Figure 5. Treatment



Figure 6. Nozzle used to apply treatment.



Figure 7. Material collected from monitoring point (nest).



ADMINISTRATIVE DETAILS

Samples and Materials

Appropriate samples of the experimental product has been supplied by ICB Pharma. A Material Safety Data Sheet or equivalent information on the toxicology and handling requirements of all candidate compounds have been supplied to test provider by ICB Pharma along with the samples of the compounds.

Reporting

This final report contains full experimental details, results and photographs (if relevant) of the trials. It makes a scientific conclusions based on the data obtained that may be used as recommendations for future work or marketing possibilities.

-----END OF REPORT-----