MSD ANIMAL HEALTH

TECHNICAL SERVICES BULLETIN

Poultry Welfare: Adverse Effects of Poultry Red Mite and Improvements After Using Exzolt®

INTRODUCTION

Every poultry producer who has looked at flocks infested with poultry red mites (PRM) has thought to themselves, "I wouldn't like to have those things on me!" But does infestation with PRM (*Dermanyssus gallinae*) actually have a negative impact on poultry welfare?

A study by Kowalski and Sokół (2009) measuring corticosterone, adrenaline, noradrenaline, albumin and α-, β- and γ- globulins under controlled conditions concluded that heavy infestation with PRM resulted in increased stimulation of the hypothalamic-pituitary-adrenal cortex axis (somatic stress) and high activity of the sympatho-adrenomedullar system (psychogenic stress) and wondered about the effect of chronic stress on the ability of the flock to mount an immune response. This indicates that PRM can be a significant stressor to poultry flocks.

A study of production and welfare parameters was conducted in a commercial flock with heavy PRM infestation. Birds were sampled and observed for evidence of stress before treatment with Exzolt®. After treatment, a significant reduction in PRM was accompanied by significant improvements in the stress indicators.

KEY POINTS

- Treatment with Exzolt® almost eliminated the PRM infestation and significantly improved welfare parameters.
- Before treatment, corticosterone levels were 4.0 ng/ml, and significantly decreased to 1.7 ng/ml after treatment, while the heterophil:lymphocyte ratio was reduced from 0.6 before treatment to 0.1 after treatment (both indicators of reduced stress).
- Hemoglobin (Hb) levels were 7.0 g/dl and improved to 7.8 g / dl at Week 6, while mean corpuscular Hb rose from 32.9 to 36.9 pg.
- After treatment, severe feather pecking decreased during the day ($p < 0.01$). During the night, the percentage of active hens decreased from 34% before to 11% after treatment ($p<0.01$).
- Production responded, rising from 85.2% before treatment to 91.6% after treatment, while daily mortality decreased from 0.012% to 0.007% after treatment.

STUDY SUMMARY

The 13-week-long study was conducted in a commercial layer facility with enriched cages that housed 12,700, 29-week-old hens infested with PRM. The flock was observed and red mites were monitored weekly for 13 weeks. Mite counts in the traps prior to treatment ranged from 1500 to 2200 per trap. After seven weeks, the flock was treated with Exzolt® (fluralaner) solution – two treatments separated by seven days.

One week before treatment (baseline), blood stress biomarkers (corticosterone, adrenaline, ovotransferrin) and haematological parameters (heterophil: lymphocyte ratio – another stress indicator[2]), hemoglobin and mean corpuscular hemoglobin were measured from a sample of 50 hens.

Behavioural parameters were assessed weekly through scan (activity) and individual bird sampling (other behaviours). Egg production and hen mortality were measured daily throughout the study.

At Week 1 (immediately after the second treatment) and Week 6, the same 50 hens were sampled for the blood stress biomarkers and haematological parameters. Results are summarized in Table 1.

From Week 3 onward, the mite counts in traps averaged <2 mites /trap, indicating excellent efficacy of the Exzolt® treatment, and showing a valid correlation of the welfare parameters with the infestation.

After treatment, severe feather pecking decreased during the day ($p < 0.01$). During the night, the percentage of active hens decreased from 34% before to 11% after treatment ($p<0.01$).

Table 1. Welfare and production parameters before and after Exzolt® treatment

PARAMETER[a]	BASELINE (WEEK -1)	WEEK 1 POST-EXZOLT®	WEEK 6 POST-EXZOLT®
Mite Infestation Level	1500 – 2200 per trap	10 per trap	< 2 mites/trap
Blood Corticosterone	4.0 ng/ml	2.7 ng/mlc	1.7 ng/ml[b]
Heterophil: lymphocyte ratio	0.6	0.3b	0.1[b]
Hemoglobin (Hb)	7.0 g/dl	8.0 g/dl[b]	7.8 g/dl[b]
Mean corpuscular Hb	32.9 pg	33.9 pg	36.9 pg[b]
Average Daily Mortality	0.012%	NA	0.007 %[c]
Egg production	85.2%	NA	91.6%[b]

Changes vs baseline: [a] No changes in the following parameters: adrenaline, ovotransferrin
Other superscripts indicate siginificant difference from baseline [b] $p < 0.01$; [c] $p < 0.05$

DISCUSSION AND CONCLUSIONS

Infestation with poultry red mites not only causes economic losses , it also has an adverse effect on animal well-being. The reduction of the PRM infestation of this flock was accompanied by a significant reduction in feather pecking and night time activity as well as a significant reduction in stress parameters such as blood corticosterone levels and heterophil:lymphocyte ratio, both of which continued to drop through the 6-week measurement period after treatment.

In addition to stress indicators, the PRM infestation caused measurable reduction in hemoglobin levels, with significant increases in hemoglobin and mean corpuscular hemoglobin observed after the flock was treated with Exzolt®.

The flock responded to the reduction of stress and improvement in blood parameters with improved egg production and reduced mortality.

REFERENCES

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