

Preliminary study of *in vitro* effectiveness of novel acaricides to field population of poultry red mite (*Dermanyssus gallinae*)

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Dermanyssus gallinae (De Geer, 1778) commonly known as poultry red mite (prm) is a temporary haematophagous parasite of birds. Currently, prm constitute a major problem in poultry industry worldwide. Heavy infestation influences hen health, causes distress, poor feed conversion and, consequently, reduced egg production and increased bird mortality.

The study aimed to evaluate the effectiveness of acaricidal formulations: Milben Ex (s. a. biphenrin, amitraz), Bio PK (s. a. different hydrocarbons), Dergall (heptamethyltrisiloxane modified with an alkylene oxide) and Mite Max (cellulose polymer) against various developmental forms of poultry red mite (*Dermanyssus gallinae*) under laboratory conditions.

Mixed stages of mites were collected from a commercial battery cage farm of laying hens by means of a trap system (Sokół *et al.*, 2008). The own method for testing the effectiveness of acaricidal formulations in laboratory conditions was developed for the study. It based on the use of Petri plate with a diameter of 7 cm, which largely reproduces the smooth surfaces of the commercial cage hen house equipment. The formulations were tested at the followed solutions: working solution (WS) recommended by the manufacturer (group 1); 50% of WS (group 2); and 200% of WS (group 3), and as a control group (C) water with no formulation, each in 5 replications. Mites were observed and counted at room temperature after 0.5; 1; 2; 3; 6; 9; 12; 24 hours from the start of the experiment using a stereoscopic magnifying glass (50×). Mites were considered dead when did not move. The mortality rate was presented as the ratio of dead mites and total number of mites (dead and live) 24 h after application, expressed as a percentage (average of 5 replicates). Significance of differences (for $p < 0.05$) was analyzed using Kruskal-Wallis ANOVA test and median test.

At the concentration recommended by the manufacturer (group 1), the highest effectiveness after 24 hours from application (hereinafter referred to as the maximum of effectiveness) was shown by followed formulations: Bio Pk (100%), Dergall (98.8%), Mite Max (84.2%), and Milben Ex (6.6%). Mite Max showed the fastest acaricidal action – 100% efficacy as early as 1 hour after use. Dergall, which initially caused immobilization of mites (90% after 1 hour, 50% after 2 hours), showed maximum of effectiveness after 3 hours from application. Bio PK showed maximum of effectiveness after 6 hours. In group 3 (at the increased dose) the preparations had much faster action: Dergall – showed maximum of effectiveness after 1h, Mite Max and Bio PK after 2 hours.