

Evaluation of the poultry red mite (*Dermanyssus gallinae*, *Acarina:Dermanyssidae*) susceptibility to some acaricides in a field population from Italy.

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Dermanyssus gallinae (i.e. “red poultry mite”) are of concern for the industry due to their negative impact on animal health, welfare, and production. Control of red mites has primarily relied on the use of acaricides and relatively few, at least in Italy, are approved for the purpose. Carbamate, organophosphorus, amidine and pyrethroid-based acaricides are the most widely used worldwide, but these acaricides have become less effective over time and with repeated usage. Red mite field populations from seven naturally infested Italian caged laying poultry farms were investigated for their susceptibility to some formulations available on the market, such as amitraz, carbaryl and permethrin. A minimum of 3,000 mites of all stages were collected and were tested with five different acaricide concentrations (5%, 10%, 20%, 50%, 100%) plus an untreated control (0%). Amitraz showed an efficacy of 100% for each concentration in seven farms investigated with the exception of one farm in which the efficacy was significantly lower for the 5% and 10% concentrations ($p < 0.05$). Carbaryl did not achieve a good mean efficacy at any concentration in six farms, while it reached a good efficacy (95%) only in one although at the highest concentration (100%). The efficacy of permethrin was good (from 95 to 100%) in one farm but only at the highest concentrations (50 and 100%, respectively) while the efficacy reached 95% and 93% at the concentration of 100% in two farms, respectively. The differences among the farms were statistically significant only starting at the highest concentration (up to 20%) of both carbaryl and permethrin. In conclusion, field red mite populations were found to be tolerant even with the highest concentrations with carbaryl and permethrin for 86% and 42% of the investigated farms, respectively ($p < 0.05$). Furthermore, 86% of the investigated farms showed a red mite population susceptible to amitraz at any concentration. Out of the seven field populations tested with amitraz, one population was becoming tolerant while another was the most tolerant to carbaryl and permethrin at any concentration. The results showed that red mites collected from Italian farms also have an increasing potential for acaricide resistance.

Keywords: *Dermanyssus gallinae*, carbaryl, permethrin, amitraz, susceptibility