7. Arthropod pests in poultry production

7.1 Alternative control methods against chicken mite

In the first year of the EU-funded project, CHIMICO, work has focused on the isolation of semiochemicals with behaviour-modifying effects on the chicken mites as well as identifation of fungal pathogens with the potential for application in poultry houses.

The first biologically active extracts which are attractive to chicken mites have been produced. Several different types of bioassays have been tested for their suitability for chicken mites, and a modified system is now available which has shown promising results. An air entrainment system was tested in pilot tests and an olfactometer set-up was constructed. Both systems are now ready for implementation. Scanning electron microscopy (SEM) was used for studies of the sensilla on foreleg tarsi and on the palps of chicken mites. Mapping of the sensilla most likely to function as sensory sensilla has provided crucial information for subsequent work on electrophysiology. Preliminary chemical analysis of solvent washings of blood-fed and unfed mites was conducted using high resolution gas chromatography (GC) and coupled gas chromatography-mass spectrometry (GC-MS). Crude samples were separated into volatile and non-volatile fractions by vacuum distillation, and GC revealed promising differences in the volatile profiles of blood-fed and unfed samples.

A survey for naturally occurring fungal pathogens in chicken mites from Denmark and Spain was initiated. Live mites were incubated in arenas for ten days, and dead mites were examined for fungus after incubation in moist chambers. So far, the survey has not provided any findings of fungus-infected mites from the field samples. A bioassay was developed to study the effect of fungal isolates from other sources, on blood-fed chicken mites. All tested isolates proved virulent to chicken mites when applied as dry spores at high inoculum levels. Five isolates (*Beauveria bassiana* and *Metarhizium anisopliae*) were selected for further studies on fungus persistence in the poultry environment and on fungus epidemiology in mite populations. Studies were initiated which will investigate the effect of various physical factors present in poultry houses, on fungal pathogens and chicken mites.

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7.2 A test for resistance in four Norwegian populations of chicken mites

Chicken mites, *Dermanyssus gallinae*, collected from four Norwegian populations were tested for resistance against three acaricides: carbaryl, malathion and permethrin. The results were compared to the results from a test on the laboratory culture of *D. gallinae* at the DPIL. The results showed that all four Norwegian populations were resistant to permethrin. A concentration of 4 x LC_{99} had hardly any effect at all on three of the four populations, in the last population the mortality almost reached 100% at this concentration. There was no resistance against the two other active ingredients, only a slightly reduced sensitivity against malathion. However, both compounds should be sufficiently effective to control *D. gallinae*. Due to the low number of mite populations tested it has not been possible to make any general conclusions on the resistance in Norwegian mite populations.

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