


# Population-level impact of native arthropod predators on the poultry red mite *Dermanyssus gallinae*

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## Abstract

Stimulating the regulation of pests by their natural enemies is a way to improve the sustainability of agriculture and respect for the environment. However, the presence of natural enemies does not guarantee the existence of a pest control service. To what extent are predatory mites commonly found in henhouses actually able to regulate a major egg industry pest mite, *Dermanyssus gallinae*? To answer this question, we have experimentally recreated portions of a poultry house ecosystem allowing the development of the pest over several generations in the presence of a chick and detritivorous mites (Astigmata) that are ubiquitous and abundant in layer farms. In these conditions, we compared the growth of *D. gallinae* populations in the presence and absence of native predatory arthropods. No effect of native predators on the growth of the *D. gallinae* population could be detected despite high initial predator-to-prey ratios and satisfactory growth of predator populations. Prey switching to the alternative prey Astigmata likely dilutes the effect of predation on the target prey. Further exploration is needed to see whether action could be taken to enhance the effect of top-down regulation.

## Highlights

Native predators did not affect *Dermanyssus gallinae* populations in mesocosms.

Prey switching may reduce control efficiency of *D. gallinae*.

Population dynamics of *D. gallinae* may explain control failure in the field.

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