

Minimizing negative effects of Poultry Red Mite (*Dermanyssus gallinae*) in layer farms using an automated mite monitoring device

August 28 2013, M.F. Mul (MSc.)



LIVESTOCK RESEARCH
WAGENINGEN UR

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Help me!
The vampires
are killing
me!



JAMIE CO

Abstract



- Poultry Red Mite (*Dermanyssus gallinae*) = ectoparasite
- World wide problem
- Control difficult
- Monitoring for timely and effective treatment
- Current monitoring is time consuming
- Our solution: Automated monitoring device
- Monitoring device:
 - 1) model +
 - 2) automated mite counter
- Preliminary results :
 - 1) first step of model is finalized
 - 2) sensor 100% detection, attractive, no clustering of mites



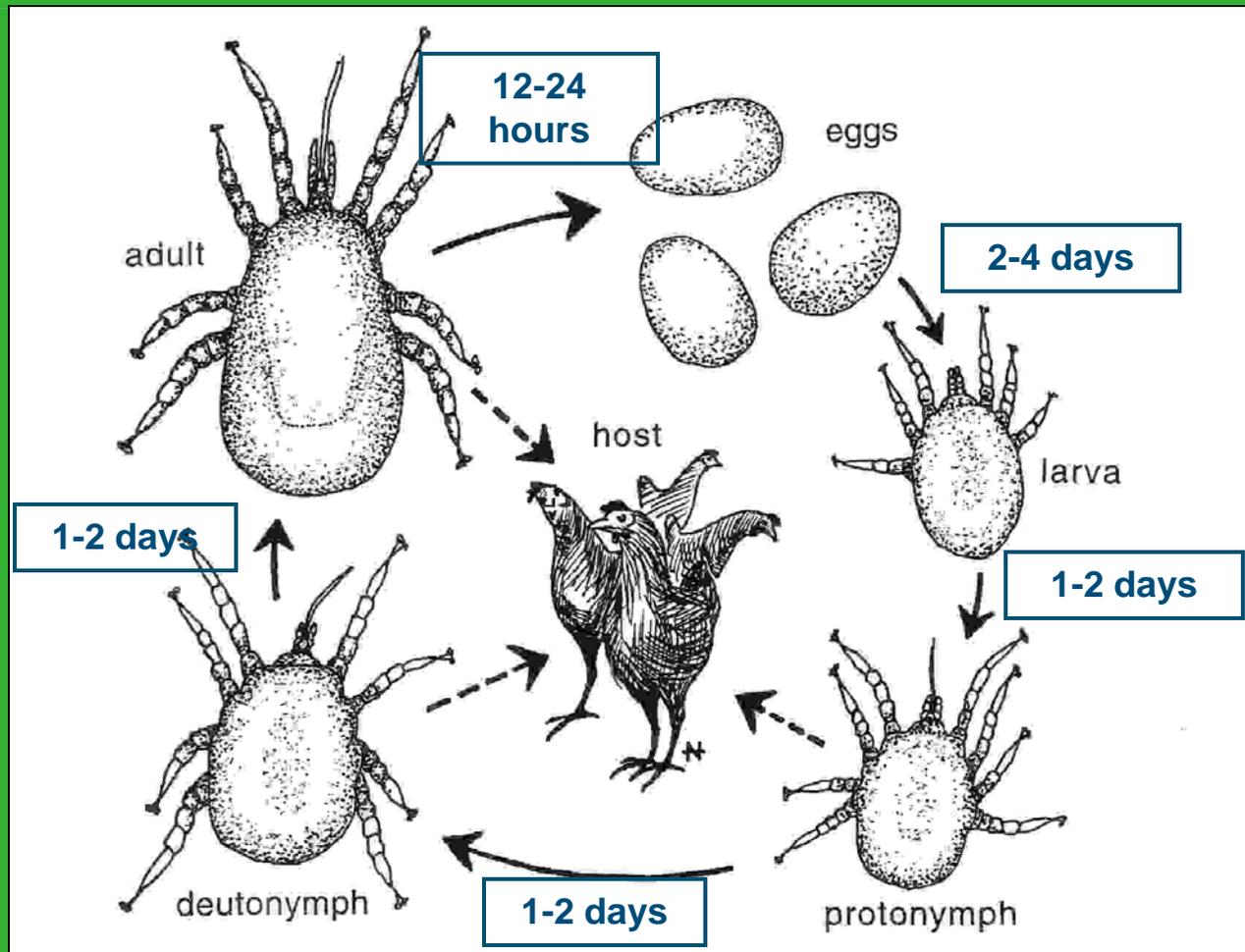
Background: Poultry Red Mite



- Most common ectoparasite in poultry
- All over the world
- 0.6 – 0.8 mm long, grey-red in colour.
- Lives in cracks and crevices in vicinity of hens
- Feeds on blood of poultry, birds, mouse, humans
- Stays on hen only for blood meal (30 – 60 minutes)
- Nocturnal



Lifecycle (5,5 – 17 days)



V. Maurer, FiBL, Switzerland



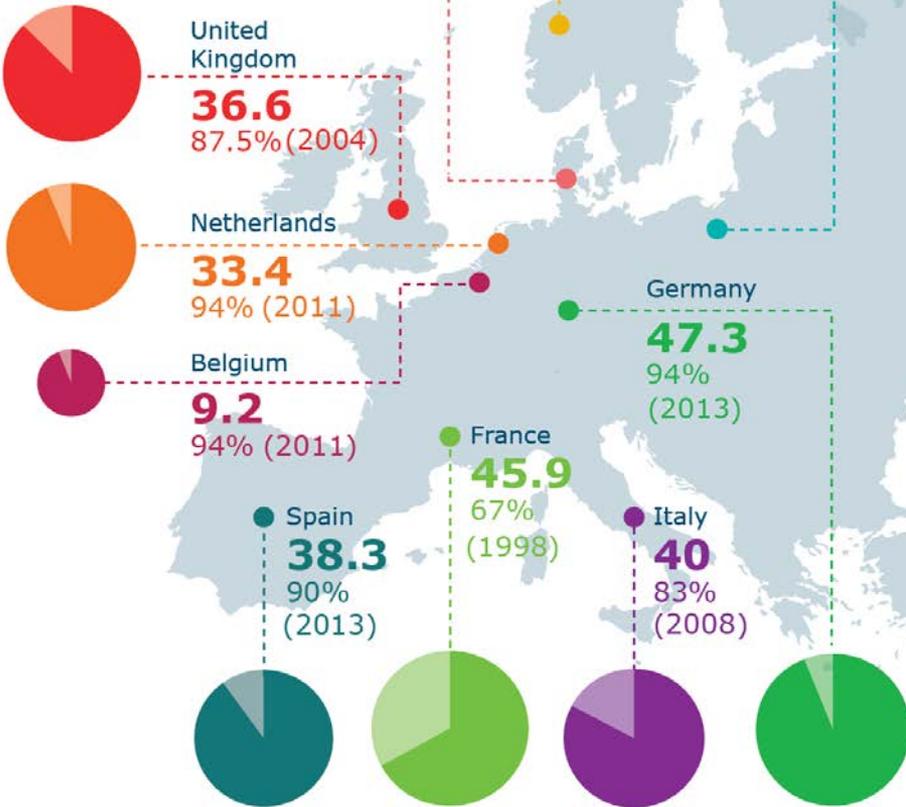
INFESTATION OF POULTRY RED MITE IN EUROPE



Number of laying hens per country in millions (2012) and poultry red mite prevalence in percentages.



Estimated costs in Europe € 130 million/annum !



INFESTATION OF POULTRY RED MITE LEADS TO:

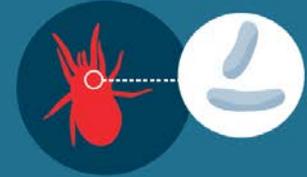
Stress/Pecking Agitation



Additional mortality



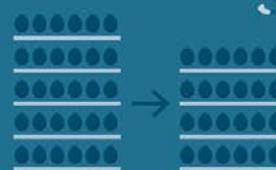
Spread of poultry pathogens of bacterial and viral origin



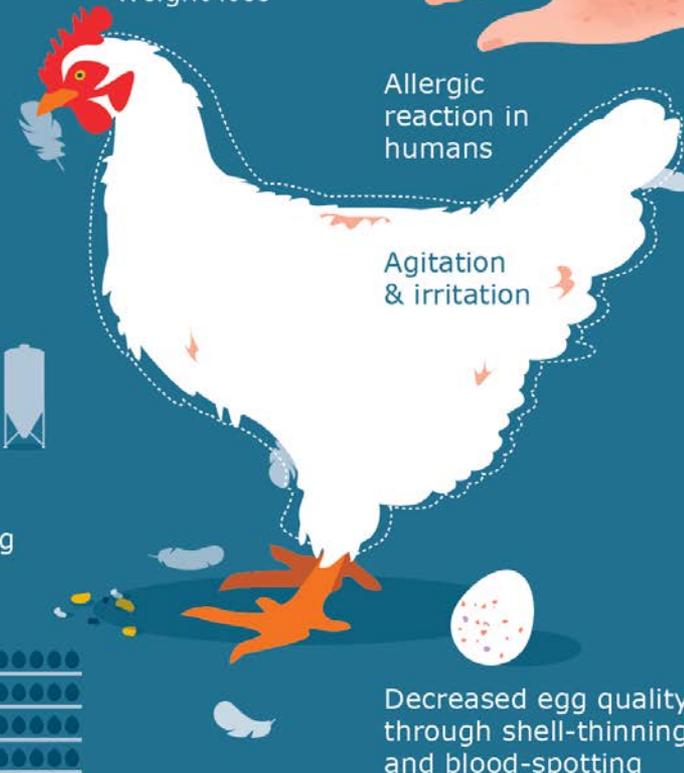
Higher feed conversion



Decreased egg production



Weight loss



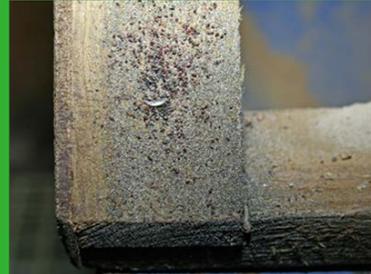
Allergic reaction in humans

Agitation & irritation

Decreased egg quality through shell-thinning and blood-spotting

Control of PRM

- Difficult due to
 - Development of resistance against Acaricides
 - Ban on Acaricides
 - Hiding in cracks and crevices



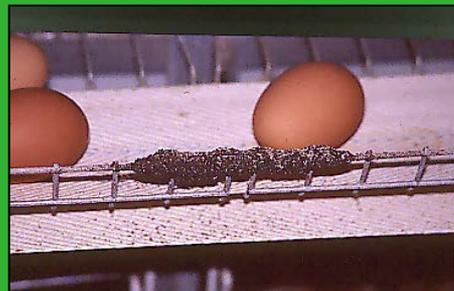
Problem

Farmers notice a PRM infestation when:

- Mites are seen on belt and feeders
- Clumps of mites are seen
- Blood spots are detected on eggs
- Employees are bitten



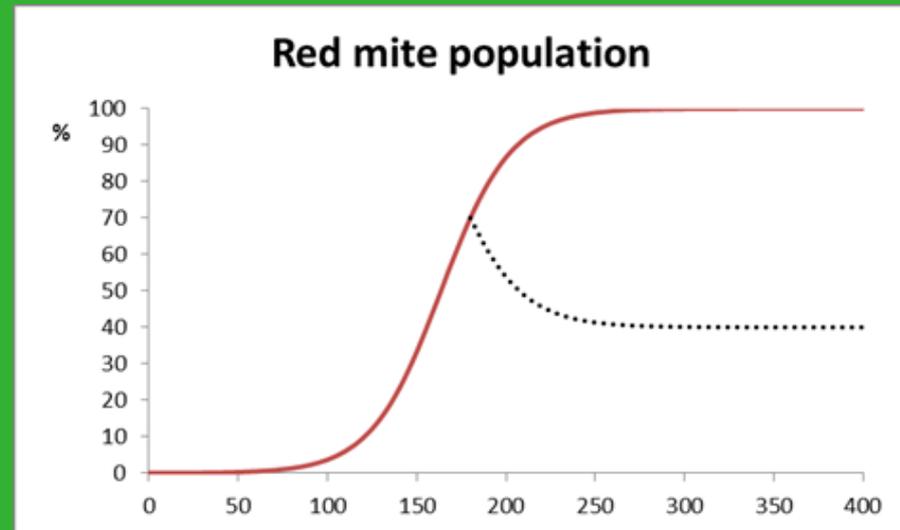
THIS IS TOO LATE: INFESTATION IS HEAVY AND WIDESPREAD!!!!



Pictures: internet



Why treatment in time/ on time?



- Efficacy treatment
- Treatment costs (estimated €0.14/hen/laying round)
- Loss of production (estimated €0.29/ hen/ laying round)



Monitoring

- Monitoring to:
 - Detect a PRM infestation early
 - Point out best moment for applying control measures
 - Carry out local measures for contesting PRM
 - Determine the effectiveness of control measures

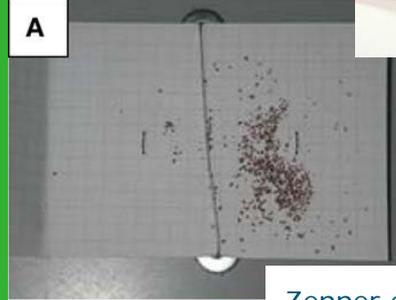
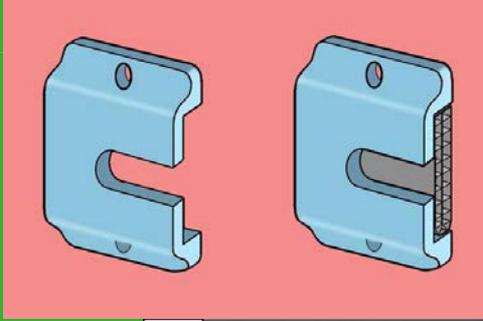


Monitoring methods



Present monitoring devices:

- Labour intensive
- Not distinctive enough



Abstract-background-problem-solution-results-summary-future work



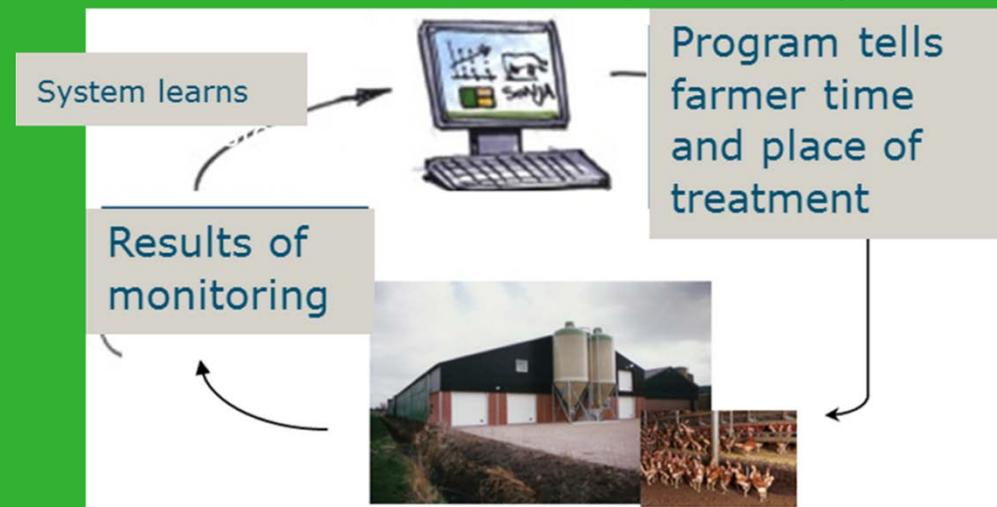
Van Emous, WUR



Monitoring in the future: automated mite monitor

- PRM mite monitoring tool=
 - Automatic mite counter
 - Dynamic adaptive model for each poultry facility

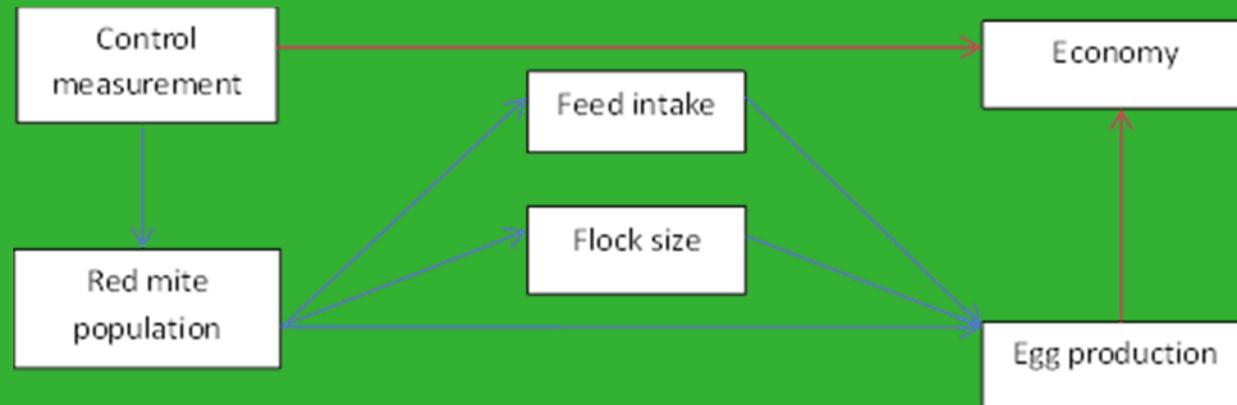
- Gives an indication of presence, spread and developing trend
- Help the farmer to identify the moment and place of application control method



Automated Mite Monitor : model

- A Dynamic adaptive model fits itself for
 - each housing facility
 - Management
 - Age of hen
 - Temperatures

- Model: first step



Automated mite monitor: automated counter

1. Sensor and processor counting mites
2. Attractive enough for mites to walk into
3. Prevent clutching of mites
4. Robust

- Ad 1) sensor detecting 100% nymphs-adults
- Ad 2) results laboratory test \neq results field test:

Further development in field: current recovery probably enough to detect differences

- Ad 3) sucking with 7.5 m/s







Conclusion



- Poultry Red Mite (*Dermanyssus gallinae*) = World wide problem
- Monitoring necessary for timely and effective treatment
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Future research



- Finalize the development mite counter in poultry farm including robustness check
- Determine the relation counted number of mite – actual number of mites in small laying hen cages
- Develop models with available data (field trials, monitoring data from farms and laboratory tests) :
 - Development of PRM in layer house including effect of control measurements.
 - Development of production performance incl. damaging effects of PRM
- Twin the counter and the model and test in small laying hen cages



Thank you for
your attention.
We need your
help!



JAMIE

