

LOHMANN SCHOOL 2015

“The Poultry Mite”

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Technical Service Department

BREEDING FOR SUCCESS ... TOGETHER



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House Dust Mite



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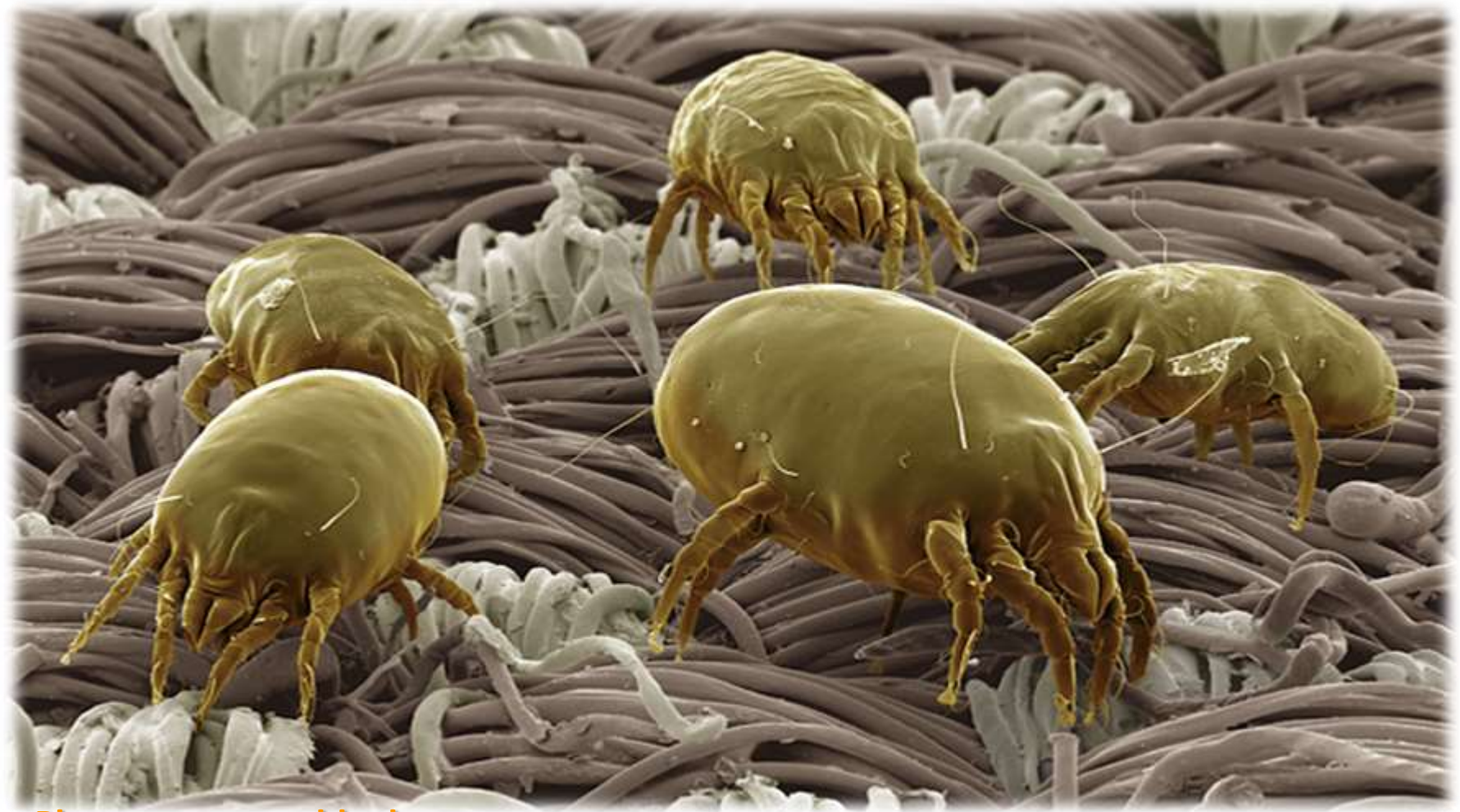


Photo: www.world.edu

Tropical Mite

(*Archegozetes longisetosus*)



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Strongest Animal in the World!

A pull force equal to 1200 times of its own weight!

This would be like a 75 kg human lifting an 90 Tons tank!

Photos: www.uni-tuebingen.de

Ectoparasites



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Arachnida

Ticks



Mites



Insecta




















Bugs, Lice & Fleas



Flies &



Mosquitoes

COUNTRY	RED FOWL MITE	NORTHERN FOWL MITE
BRASIL		
CANADA / USA		
FRANCE		
GERMANY		
INDIA		
IRAN		
ISRAEL		
JAPAN		
KOREA		
NEPAL		
NORWAY		
PORTUGAL		
SWEDEN		
THAILAND		
TURKEY		

Northern Fowl Mite VS Red Fowl Mite



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Differences	Northern Mite	Red Mite
Appearance	In the plumage	At birds and in the house
	Mainly Under moderate weather conditions	Mainly Under Hot weather conditions
Life Cycle	Permanently on host	As well as on the host and in the barn
Survival without a host	3 – 4 Weeks	Up to a year
Treatment	Just at birds	As well as at birds and house



Photos: www.thepoultrysite.com

Northern Fowl Mite (Ornithonyssus sylviarum)



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Photo: www.itp.lucidcentral.org

Photo: Dennis Kunkel, Visuals Unlimited Inc.

Northern Fowl Mite (*Ornithonyssus sylviarum*)



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Photo: Brad Mullens, UC Riverside

Northern Fowl Mite (*Ornithonyssus sylviarum*)



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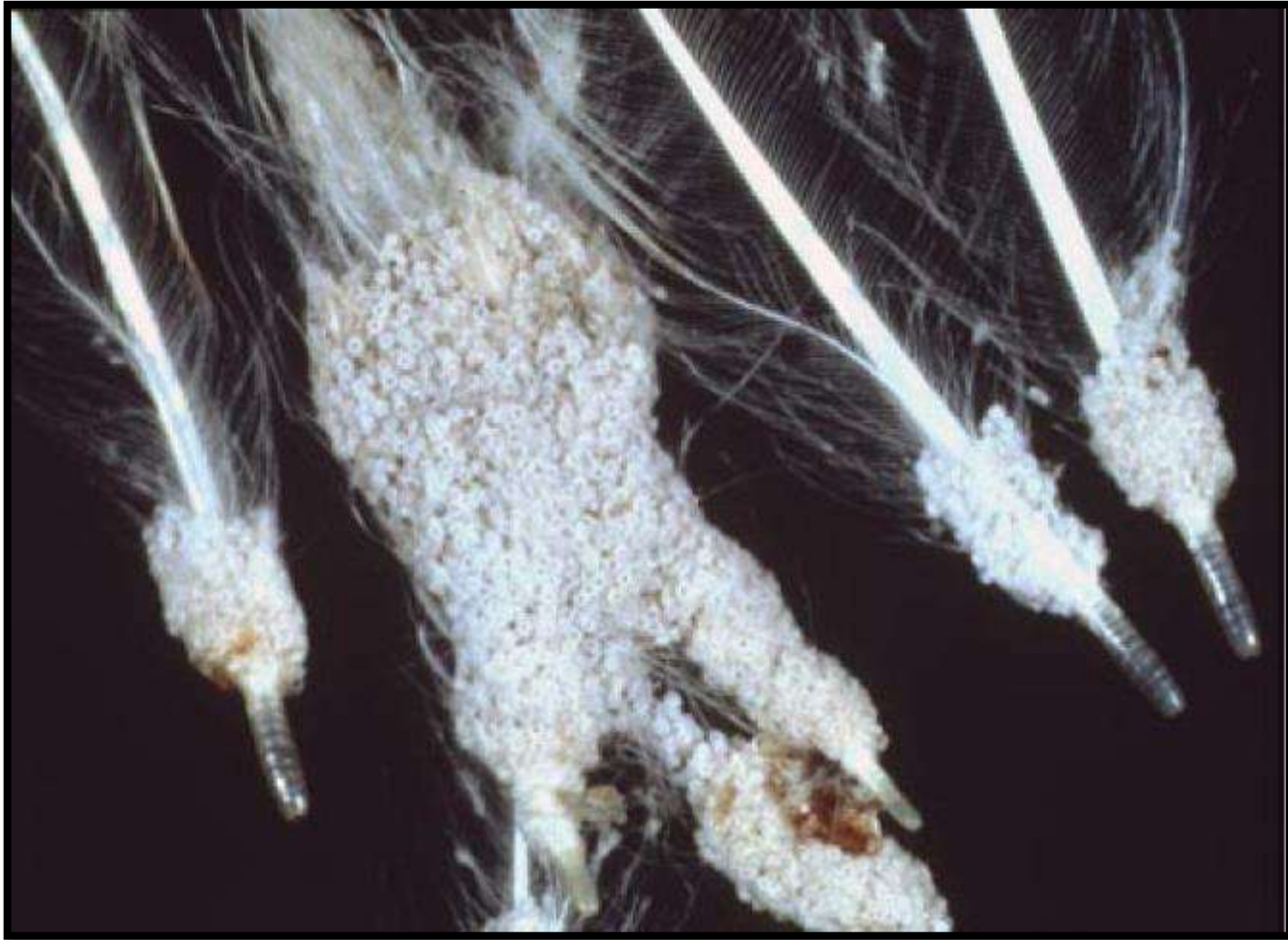


Photo: Nancy Hinkle, University of Georgia

Northern Fowl Mite (*Ornithonyssus sylviarum*)



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The mites as well as feces and eggs of mites can be seen in the bottom of the plumage (feather quill)



Photo: www.sva.se

Northern Fowl Mite (*Ornithonyssus sylviarum*)



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Blackened feathers in the vent area



Photos: www.entomology.cornell.edu

Treatment:



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- **Birds can be sprayed, dusted or dipped, depending on the size of the flock.**
- **The vent area, tail and under wings must be treated properly as favorite areas for parasites.**
- **Spraying or dusting must be applied directly to the vent region with sufficient pressure to penetrate the feathers.**
- **The treatment in non-cage systems is very difficult, as you can not reach the vent area properly, in this case dipping is recommended.**
- **Keep all wild birds away of your poultry farm as they can be a source and host of parasites.**

Red Fowl Mite (*Dermanyssus gallinae*)



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Photos: www.norfolkbrahmas.wordpress.com

Photo: www.knowledgescotland.org

Red Fowl Mite (*Dermanyssus gallinae*)



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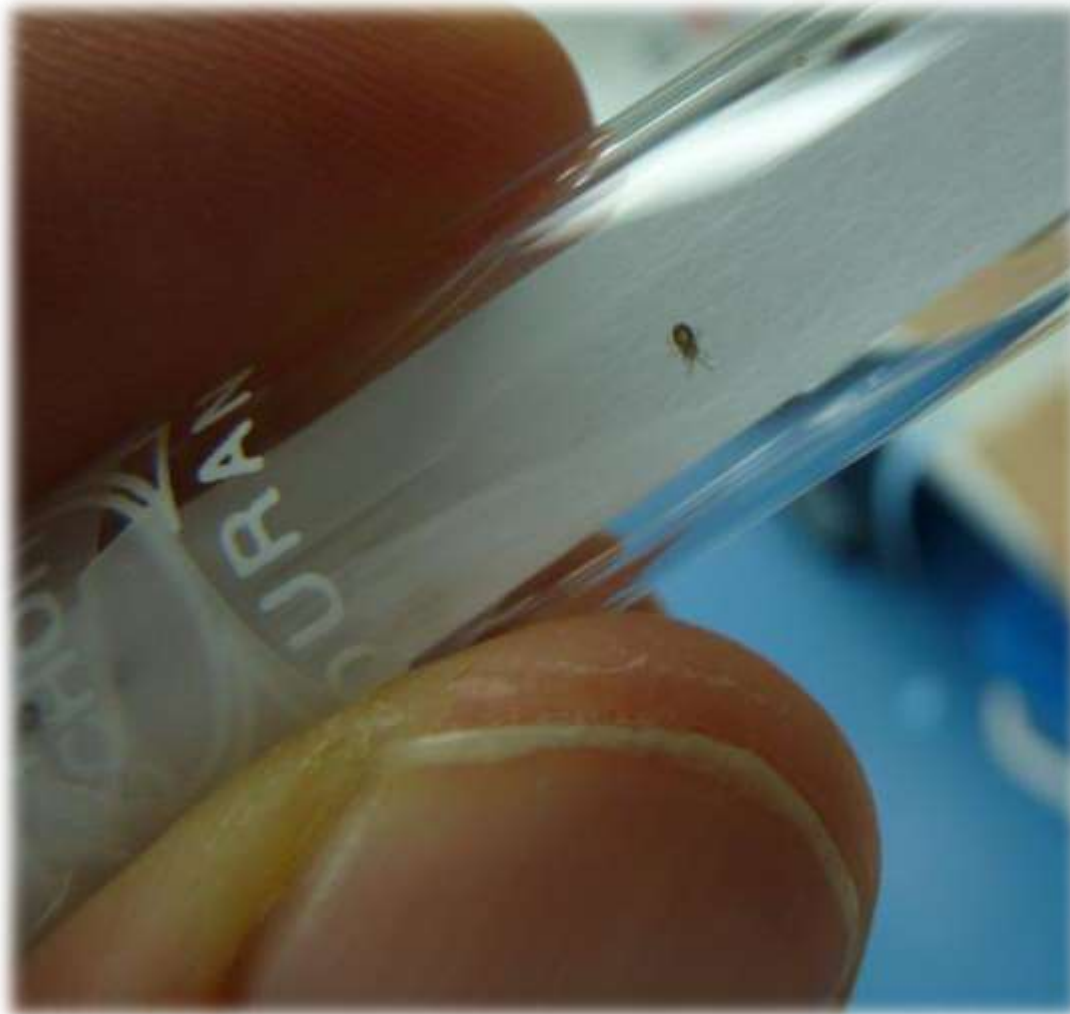
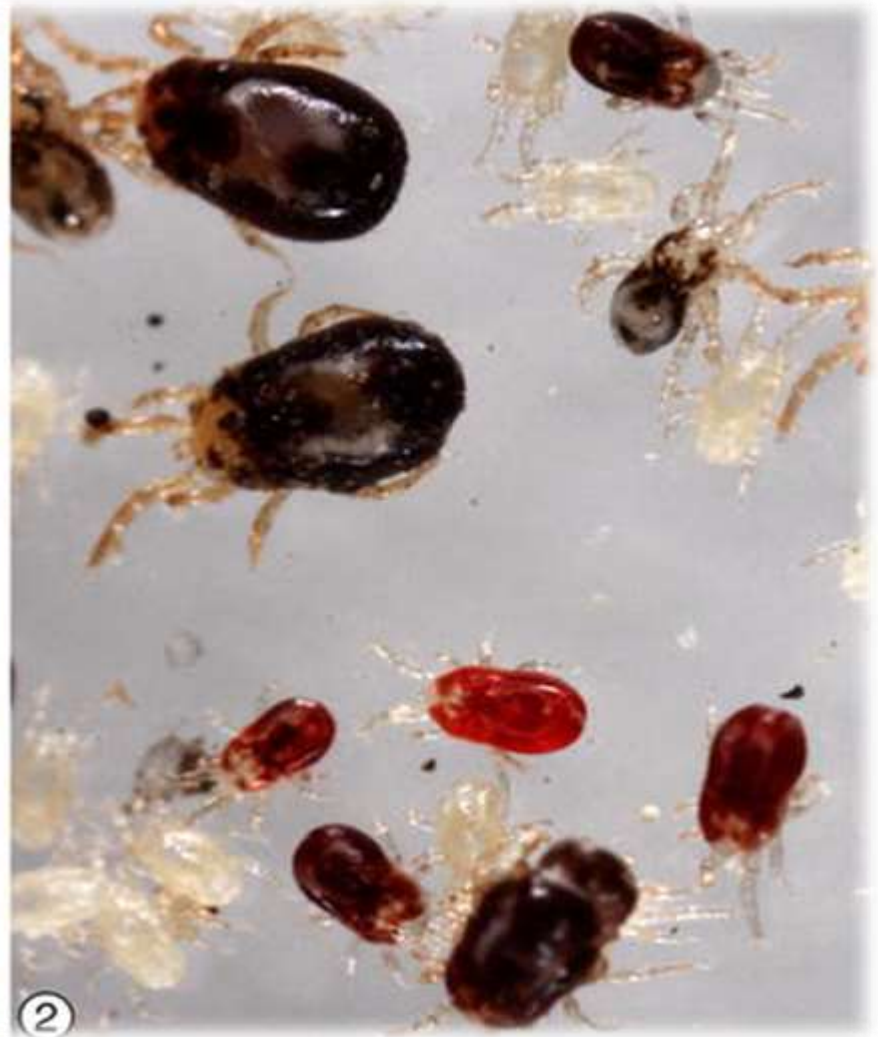


Photo: Farhad Mozafar

Red Mite (*Dermanyssus gallinae*)



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The poultry red mite (*Dermanyssus gallinae*, De Geer 1778)
is the most economically deleterious parasite
of laying hens in Europe (Chauve, 1998).

Red Mite (*Dermanyssus gallinae*)



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- A Night Active Bloodsucker from spider family which affects mostly Poultry
- Known as the most harmful Ectoparasite of laying hens
- Distributed worldwide (High infestations in Italy, Poland, UK, Netherlands, Japan, Morocco) (Sparagano et al., 2009)
- Losses due to Red Mite infestation:
about **130.000.000 € yearly just in EU!** Ca. 0.50 € per Hen (van Emous, 2005)
- Females: About 1.1 mm
(can suck about 200 µg Blood each time)
- Males: About 0.7 mm (just suck blood occasionally)
- Under favorable conditions
(20-35 °C & 70-80 % relative Humidity)
life cycle can be completed within 5 - 14 days
(Egg to adult)

Consequences of Infestation:

- **Restlessness & Stress in the flock (Esp. during night and in the nest)**
- **Skin Irritation, Dermatitis, reduced Feather Quality**
- **Feather Pecking, Cannibalism**
- **Weight Loss, Anemia (pale wattles and Combs)**
- **Carry over of poultry diseases (Salmonella, ND, Pasteurella, Fowl Pox, Leucosis etc.)**
- **Drop in Egg Production up to 20%**
- **Increase in Second-Graded Eggs (e.g. blood spots on eggs)**
- **Mortality in extreme cases especially Pullets**
- **In male birds, reduce of seminal fluid volume**
- **Stress and health problem for the staff (Dermatitis, Allergy reactions)**



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Increase in second-Graded Eggs!

So called blood spots!
No salable Eggs!
No Hatching Eggs!









Consequences of Infestation



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	Infestation Degree			
Parameter	Without	Moderate	Considerable	High
Feed Consumption/Bird/Day (g)	108	108	109	110 (+2)
Egg Weight (g)	62.0	61.8	61.5	61.0 (-1)
Final Weight/Bird (g)	1800	1775	1750	1700 (-100)
Grade B Eggs (%)	6	8	11	20 (+14%)
Reject Eggs (%)	7	7	8	12 (+12%)
Egg Numbers	345	345	343	335 (-10)

Dipl.-Ing. R. A. Van Emous, Dpl.-Ing. Th. C.G. M., Fiks- Van Niekrek , Dipl.-Ing.M. Mul
Wagenigen University

What does mite infestation cost?

Parameter	Infestation degree			
	without	moderate	considerable	high
Feed Consumption, g/Bird/Day	108	108	109	110
Egg weight, g	62,0	61,8	61,5	61,0
Final body weight, g	1800	1775	1750	1700
2. Grade eggs, %	6	8	11	20
Number of eggs, HH	345	345	343	335
Difference per HH and year, €		-0.27	-0.57	-2.50

Consequences of red mite infestation

Source: Dipl.-Ing. R. A. Van Emous, Dipl. -Ing. Th. C. G. m. Fiks-Van Niekerk, Dipl. -Ing. M. Mul
University of Wageningen (supplemented by own calculation Dr. Michael Lüke, Komilbek Kasimov; LTZ)

Challenge of red mite treatment



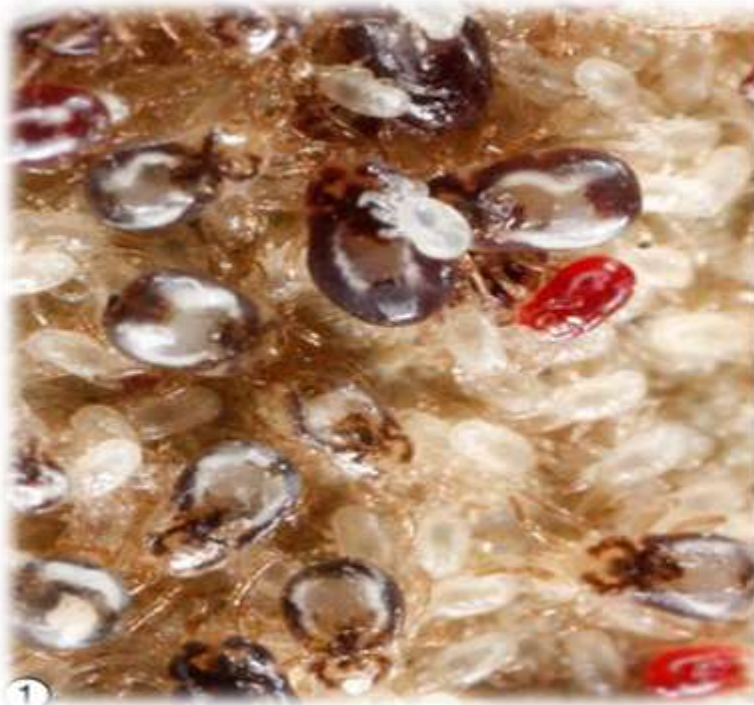
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- Turnover of approximately 60- 70 weeks of production allows Red Mite to create large Population (depending on infestation intensity 25 - 50 000 red mites per bird)
- Mites hide themselves in house, under perches and egg belts, in nests etc., reaching a treatment is almost impossible (depending on farming construction)
- After birds removal poultry houses also infested at least 5-6 months
- Red Mite can survive for long time (up to a year) even without taking a single blood meal
- Mites can be transmitted between houses and farms by egg belts, egg trays and staff etc.
- Red mite can develop resistance against chemical products in a short time
- Changes in legislation make the treatment harder
- Red mite infestation is normally higher in free-range and organic farming than in conventional cages (More hiding possibilities, easier avoidance of control methods)



Methods of controlling Red Mite

- Application of chemical Products
- Alternative Solutions



Application of chemical Products

A successful chemical application depends on:

- Proper active ingredient product
- The dosage, Temperature, Water Hardness & pH etc.
- Mite stage: Egg, Nymph, Adult
- Mite Strains
- Time of Application (3-4 Hours after darkness period starts is recommended)
- House Construction, Housing Systems, Hiding Possibilities etc.

**Just don't do a Treatment but rather
APPLY THE TREATMENT PROPERLY &
FOLLOW THE MANUFACTURER'S INSTRUCTIONS!**










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Insecticides / Acaricides in EU



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Organo Phosphates	Carbomates	Pyrethroid	Spinosin
Diazinon 	Carbaryl 	Cypermethrin	Spinosad
Dichlorvos 	Propoxur 	Permethrin	
Phoxim*	Bevdicarb	Cyhalothrin 	
Chlorpyrifos 	Methomyl 	Deltamethrin	

* The only acaricide which is licensed to be used during production period in EU!



Insecticides / Acaricides

Resistance Development reported in European Countries:*

Organo Phosphates	Carbomates	Pyrethroid
In many European Countries	Germany	UK
	Italy	Sweden
		France
		Germany
		Italy

*Fiddes et al.,2005; Thind & Ford, 2007; Nordenfors et al., 2001; Beugnet et al., 1997;
Liebish 2001; Marangi et al., 2009; Camarda et al.,2010

Application of chemical Products

- Just few effective Products are registered and permitted! (especially in Europe)
- Developing Resistance to the very few chemicals available!
- Resistance can be accelerated when a wrong dosage is applied!
(selecting the survivors)
- In the case of unsuccessful application
→ Stimulating the Mites to lay more eggs!
- Reaching all the mites during a treatment is almost impossible
- The later contact with the most of the chemicals is not effective! (Drying time)
- Most of the Products are not effective against Mite eggs!
- Residue problem for Egg and Meat!
- Most of the Products are ecologically damaging!
- The new effective Products are expensive!



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Acaricide products used to try controlling the poultry red mite have shown some limitations, either because mites became more and more resistant ¹ or because some products are withdrawn from national market because of negative impacts on the environment as a side-effect. The costs for prevention and control are globally impressive² and therefore control strategies are needed!

Dr. Olivier Sparango; Control of poultry mites (Dermanyssus) ; Springer

¹ Marangi, Cafiero et al., and Roy, Chauve et al.

² Sparango et al.

Alternative Treatments



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Treatment with drinking & feeding additives

(based on e.g. Neem oil, Garlic, Sulfur, essential oils, etc.)



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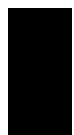
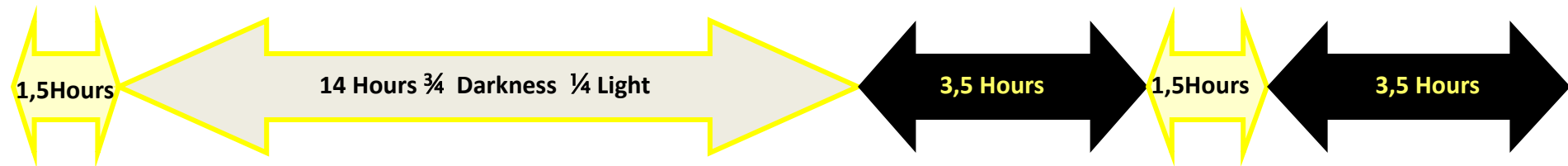
Intermittent Lighting Program to reduce Red Fowl Mites for Commercial Flocks (after 30 weeks of age)



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24 Hours Day

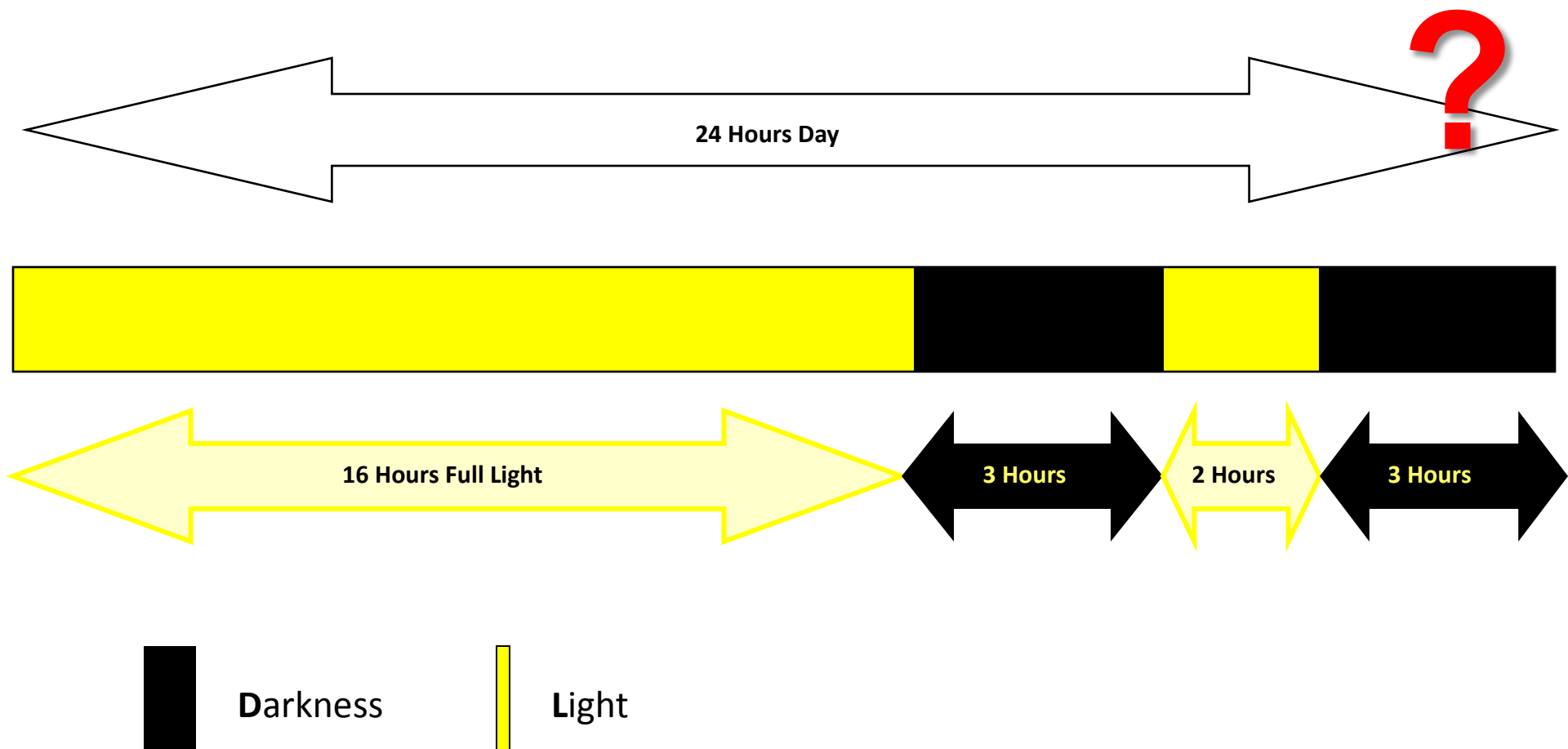


Darkness



Light

Intermittent Lighting Program to reduce Red Fowl Mites for Parent stock



Temperature Treatments

Red Mites are sensitive

to high Temperatures (above 45 °C)

& low temperatures (below -20 °C, Below 8-9°C the eggs don't hatch but still alive!)

Low Temperatures

Treatment with Liquid Nitrogen (experimental, too expensive)

Treatment with Dry Ice (experimental)

High Temperatures

Using flamethrowers, blowtorches or hot air blowers in service period
or Heating up the house from 45 °C to 60 °C for some hours

HIGH TEMPERATURE TREATMENT



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Photo: www.vaneckbv.nl

HIGH TEMPERATURE TREATMENT



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Photo: www.vaneckbv.nl

HIGH TEMPERATURE TREATMENT



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**The fusibility of plastic parts of the equipment must be considered !
The treatment should be performed by experts with great caution!**

Predator Mites (natural enemies)

- Another member of Spider family
- Natural enemy of fowl mite
- Is able to combat and eat about 5 fowl mites each day
- Environmentally friendly as a biological treatment
- Suitable for organic systems
- It is not easy to manage the treatment
- The predators are sensitive to other treatments
- Just keeps the infestation level low
- The Treatment should be still developed

Predator Mites (natural enemies)



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<http://avianvaccinexperts.de/index.php/hypoaspis-mites>



<http://www.refona.nl/refona/media/foto/dutchyenbloedmijt.gif>

Inert (Silicate) Dusts



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Silicate Dusts

- A physical treatment through Sillicum dioxide
- Entering the respiratory system and causing suffocation
- Blocking the joints between mite's chitin shell and causes immobilization of mites
- Most applied alternative control method in Europe
- Different products available as powder & liquid
- The efficiency of different products vary widely
- Choosing the proper product, mixture, particle size, pressure and appropriate application are **CRUCIAL** for a successful application!



Silicate Dusts

Problems:

- **stress and health problems for birds and staff!**
- **Dust residue on eggs (specially powder products)**
- **The method generally should be still developed!**
- **The efficiency of different products under different environmental situations should be studied more!**
- **The impact of inert dust on birds and human should be studied more!**



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Photo: Farhad Mozafar/LTZ

Inert (Silicate) Dusts



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Photos: Farhad Mozafar/LTZ

Inert (Silicate) Dusts



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Photo: D. Ifländer/Baumeister Frischei

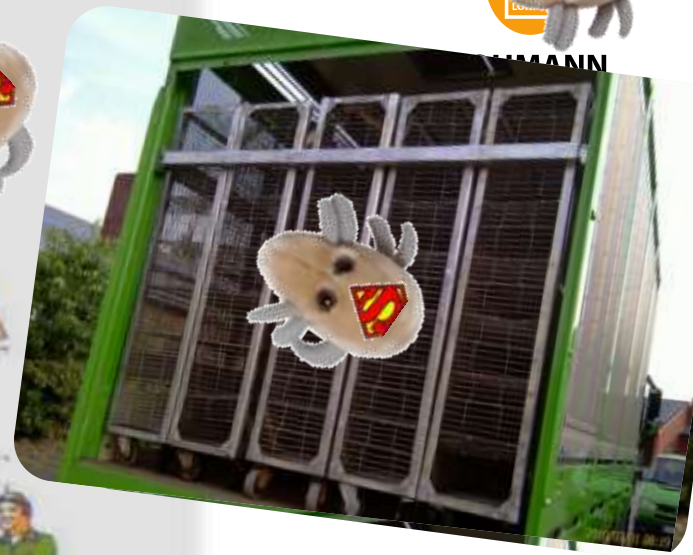
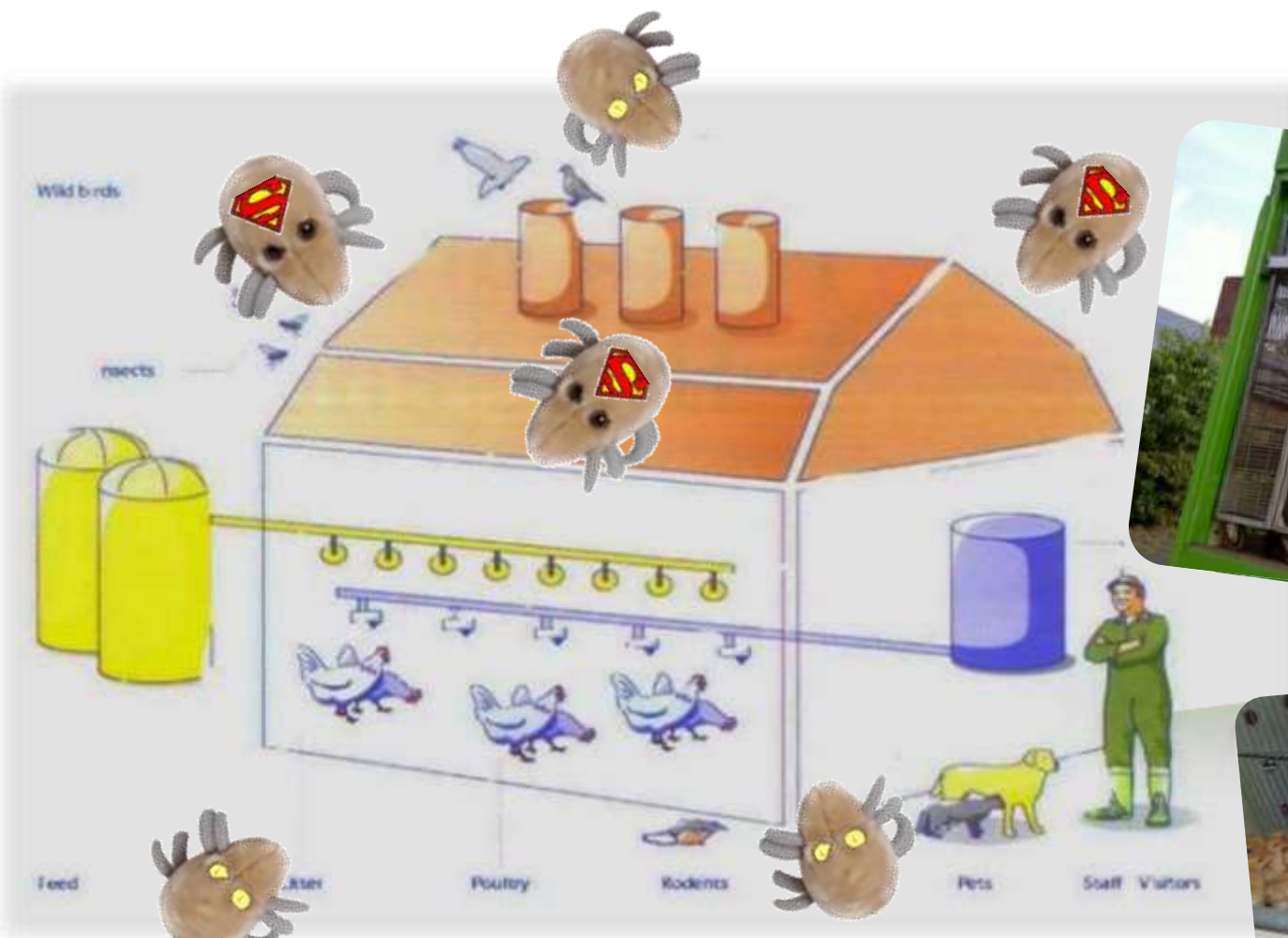
Inert (Silicate) Dusts



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Photo: D. Ifländer/Baumeister Frischei



Hygiene & disinfection!



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Hygiene & disinfection!



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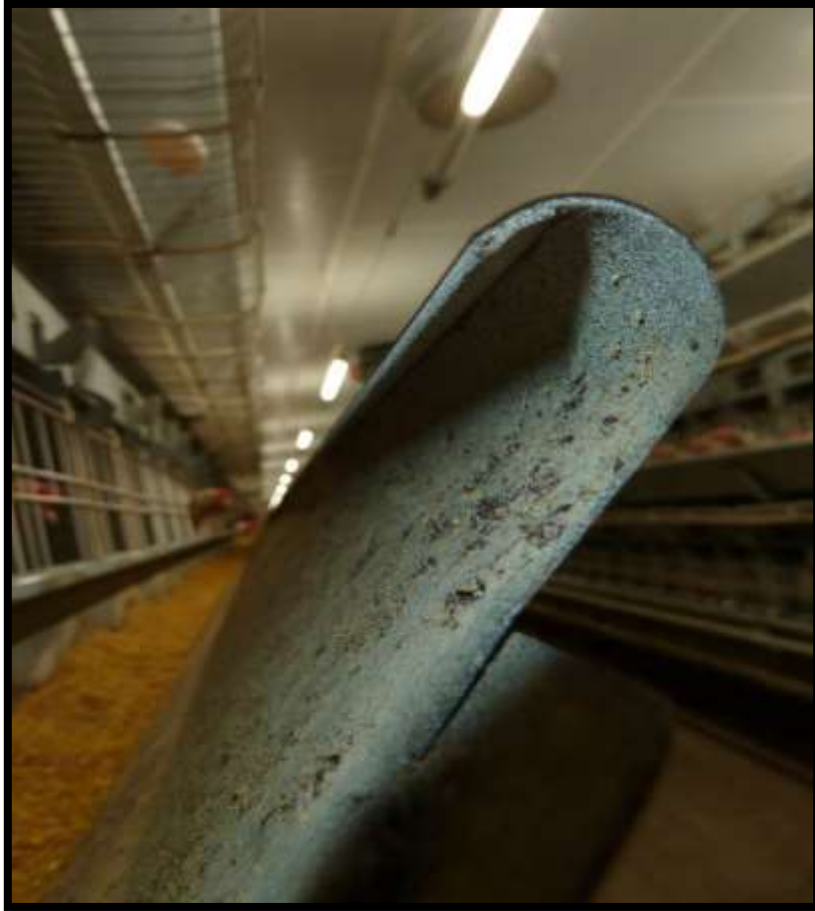


Photo: Agravis Raiffeisen AG

Red Mite Monitoring



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Already too late!



Already too late!



Already too late!



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World Poultry Volume 30. No. 1/ 2014

Already too late!

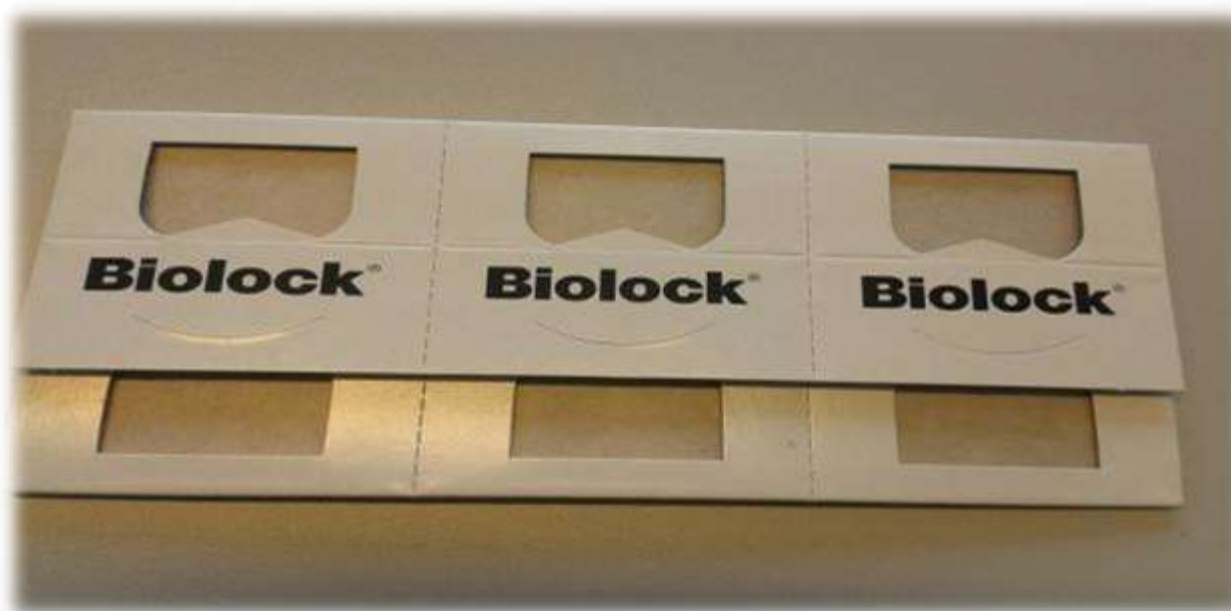
Already too late!



Red Mite Monitoring



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Photos: LOHMANN GB



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Conclusion



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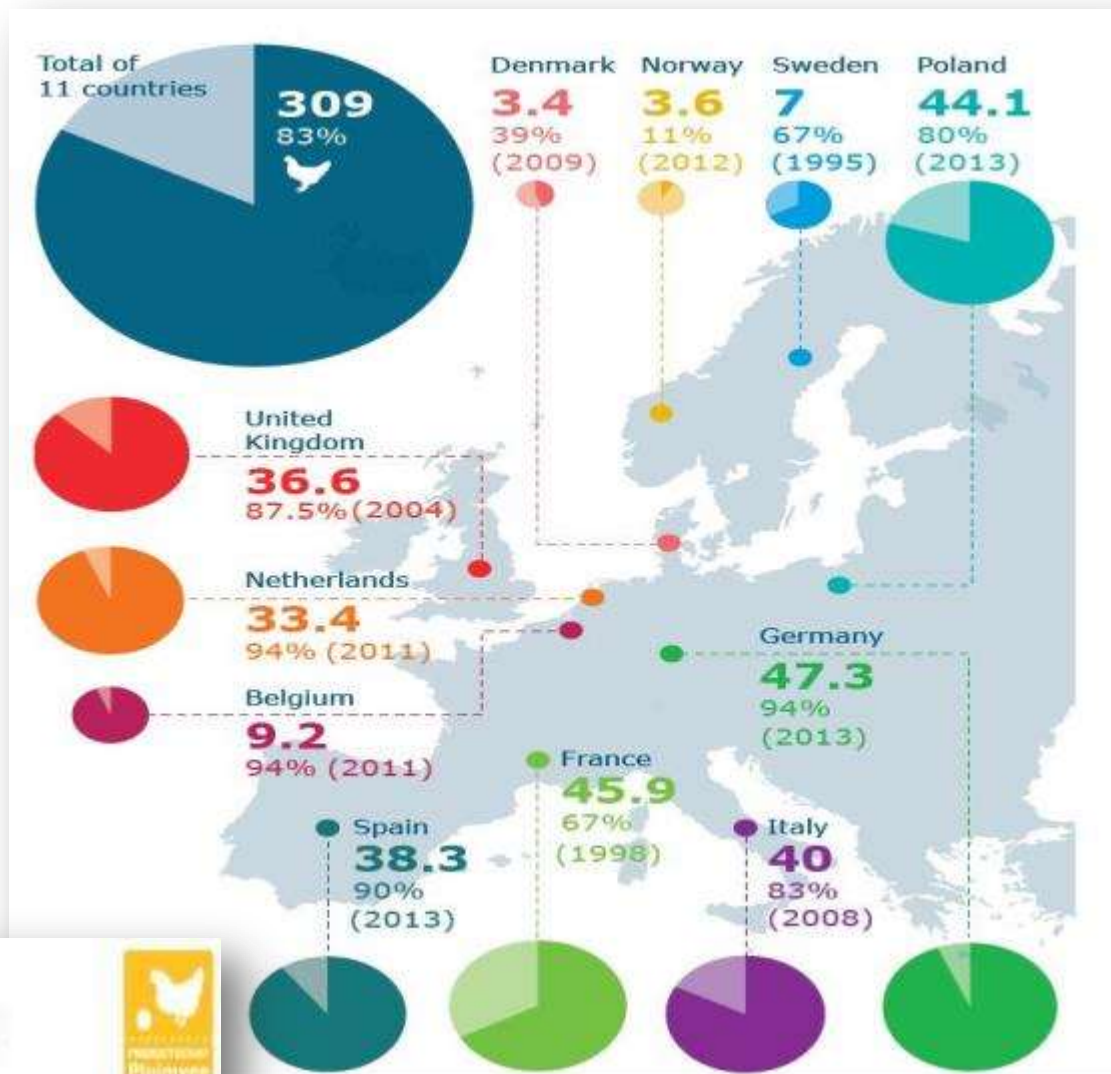
- There's almost no single treatment with 100% success against red mite infestation!
- Try to find an effective individual concept for your farm to control red mite infestation!
- More useful experiments and new treatments against fowl mite should be done!
- Many simple and basic tools can be very effective in controlling the red mite infestation!

“CONTROLLING OF RED MITE REMAINS STILL AS A BIG CHALLENGE IN KEEPING OF LAYING HENS!!!”

Number of laying hens per country in Millions (2012) and percentages of farms with Poultry Red Mite



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LIVESTOCK RESEARCH
WAGENINGEN UR





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**Since Salmonella vaccination is
now widespread within the
poultry industry, it seems the
new economic, welfare and
epidemiological problem is now
*the poultry red mite!***

Dr. Olivier Sparango; Control of poultry mites
(Dermanyssus) ; Springer

*THANK YOU
FOR YOUR
ATTENTION!*

Video: Farhad Mozafar/LTZ