



LowInputBreeds








Development of integrated livestock breeding and management strategies to improve animal health, product quality and performance in European organic and 'low input' milk, meat and egg production


## Organic and free range egg production systems: effects of genotype and management

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## Low input systems for laying hens






**Commercial production of eggs**

- › Organic
- › Free range

**Hens receive complete diet (more or less ad libitum), but have outside access**

**In general conventional, commercial genotypes**

**Real low input is back yard farming**

## Goals



- › Develop a participatory system to test and optimize genotypes specific for free range and organic systems
- › Optimize management for free range and organic farms with special emphasis on diets and feather pecking
- › Analyze how the productive live of laying hens can be extended (consequences for health)
- › Analyze/optimize egg quality characteristics

### Overview of

- › Where we stand now
- › Some results



**Develop a participatory system to test and optimize genotypes specific for free range and organic systems**



**Interviews with farmers in France, Switzerland and The Netherlands (2009/2010)**

**> 20 different genotypes present**

**White hens perform quite well, silver hens some incidents with high mortality**

**Discussions with groups of farmers:**

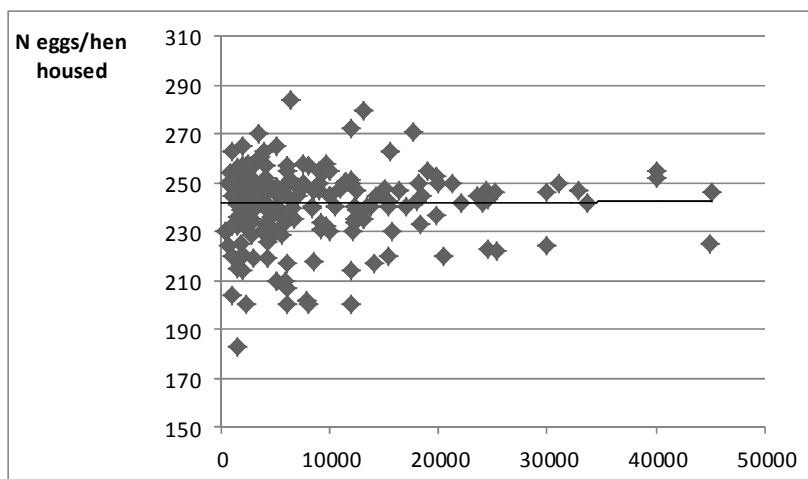
**free range and organic: a higher body weight might provide a more robust performance;**

**meat and bone meal (animal products) required?**

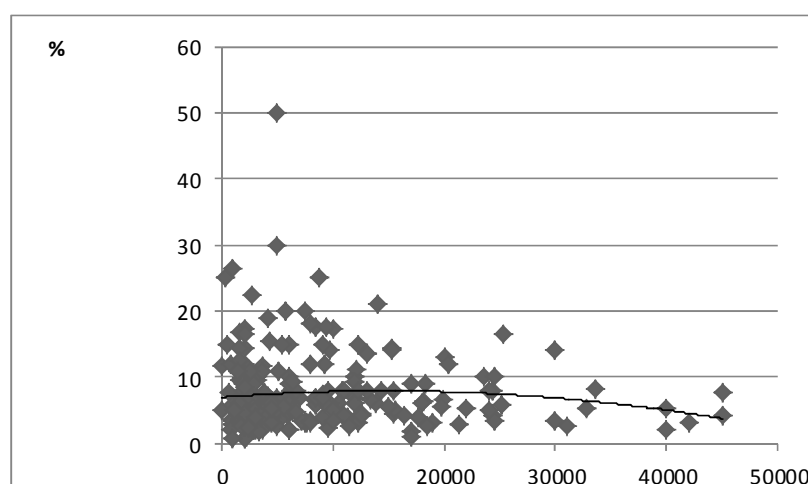
**Two alternative genotypes (heavier) tested on a small scale: no real improvement**



## Flock size and egg production (60 wk) per hen housed



## Flock size and mortality at 60 weeks



**Develop a participatory system to test and optimize genotypes specific for free range and organic systems**



- › **>50% farms have a data management program**
- › **Also on-line packages available (independent, feed company, hatchery)**
- › **Publication of bench mark performance for different systems already quite common**
- › **With sufficient cooperation and willingness to share data: genotype comparisons are possible and might serve as a substitute for Random Sample Testing**

**It becomes clear that for research on free ranging hens large groups (> 300) are required to get results that are significant for field situations. Lab-scale experiments are difficult to translate to field situations. On-farm/field data required.**



7

**Optimize management issues for free range and organic farms with special emphasis on diets and feather pecking**



**Plan at start LIB:**

**experimental setting: genotype x diet interaction**

- › **Genotype: new vs currently common? (or ...)**
- › **Diet: with and without animal proteins**

**But: meat and bone meal no feasible option for the time being, new vs 'old' genotype in experimental setting no option**

- › **Short list of alternative protein sources from EU-origin**
  - › **Insects**
  - › **Grain legumes (peas, lupines, etc. and their concentrates)**
  - › **Oil seeds**
  - › **Leaf proteins**
  - › **Aquatic proteins**
- › **Try to have on farm experiments**



8

## Example of benchmark performance (NL)



Age at slaughter	Organic	Free Range	Barn	Cage
2009	77	72	75	88
2010	76	74	78	83
2011	76	76	77	84
2012	76	80	82	90

Mortality	Organic	Free Range	Barn	Cage
2009	15.4	11.9	11.2	9.0
2010	20.9	13.3	11.1	8.3
2011	12.8	11.6	8.8	10.1
2012	9.0	11.9	9.8	10.7



Source: Legmanager Agrovision  
and Izak Vermeij.

9

## Example of benchmark performance (NL)



Production %	Organic	Free Range	Barn	Cage
2009	78.8	86.8	87.5	88.4
2010	84.4	88.4	88.6	89.3
2011	86.8	87.6	89.1	89.9
2012	87.7	88.4	88.7	89.6

N eggs/hen started	Organic	Free Range	Barn	Cage
2009	303	296	324	398
2010	302	323	346	377
2011	331	331	341	381
2012	322	342	368	416



Source: Legmanager Agrovision  
and Izak Vermeij.

10

Optimize management issues for free range and organic farms with special emphasis on diets and feather pecking



### Farm visits (20/system/country)

- › More insight in management factors, dietary factors (supplements, roughage) included
- › Feather score, keel bone, foot pads
- › What determines slaughter age
- › Egg quality characteristics
- › Try new genotype?

### Basic data and best practices



Analyse how the productive live of laying hens can be extended (consequences for health)



- › Information from farmers on how slaughter age is decided
- › Trend in all systems towards longer production periods, very limited number of moulted flocks
- › Shell quality crucial
- › Health issues (actual health status, immune status ↔ options to revaccinate)
- › Food safety issues (Salmonella)
- › Currently 1 flock in The Netherlands and 7 in Switzerland under investigation



### Analyze/optimize egg quality characteristics



- › From farm visits - data from egg traders (link to on farm storage conditions, frequency of collection, 2<sup>nd</sup> grade eggs, etc.)
- › Comparison of fatty acid content of eggs from farms with real green outdoor run vs farms with standard outdoor run



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13

### Farm visits, current situation



	NL organic	NL free range	CH organic	CH free range
N flocks	46	25	44	36
Brown 5 brands	23	18	17	14
White 2 brands	0	6	11	16
Silver 2 brands	19	1	0	0
Mixed	4	0	16	6
Farm size	12000	27550	1823	3504
Min-max	200-18500	11300-51000	500-2000	1000-8000

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14



## Farm visits



### › The Netherlands

40 farms 1<sup>st</sup> flock visited; 28 farms 2<sup>nd</sup> flock visited

14 2<sup>nd</sup> flock same genotype as first flock

5 2<sup>nd</sup> flock partly same genotype (2 genotypes on farm)

9 2<sup>nd</sup> flock different genotype as 1<sup>st</sup> flock

### › Switzerland

37 farms (47 independent houses) 1<sup>st</sup> flock visited

35 farms (38 independent houses) 2<sup>nd</sup> flock visited

all 2<sup>nd</sup> flock same genotype as 1<sup>st</sup> flock



15

## Results of farm visits (CH and NL)

Feather condition (44-62 wk of age)

1=bad, 4 = good; average of 50 hens



	NL organic	NL free range	CH organic	CH free range
N flocks	46	25	44	36
Neck	3.3	2.5	3.8	3.3
Belly	3.0	2.9	3.6	3.5
Back	2.6	2.9	3.3	3.4
Tail	2.7	2.5	3.4	3.2
Wings	3.2	3.0	3.6	3.5
Total	14.9	13.8	17.7	16.9
%	74.5%	69%	88.5%	84.5%

Example  $2.6 = 10 \times 1 + 10 \times 2 + 20 \times 3 + 10 \times 4$

$3.8 = 10 \times 3 + 40 \times 4$

Organic: lower density, smaller flocks than free range

CH: lower density and smaller flocks than NL

CH no beak treatment, NL free range treated beaks





## Results of farm visits (CH and NL)

Keel bone, foot pads and wounds (44-62 wk of age)

1=bad, 4 = good; average of 50 hens



	NL organic	NL free range	CH organic	CH free range
N flocks	46	25	44	36
Keel bone	3.1	2.9	3.7	3.5
Foot pads	3.5	2.5	3.8	3.3
Comb wounds	3.2	3.5	3.4	3.4
Belly wounds	3.8	3.9	3.9	3.9

**Example**  $2.6 = 10 \times 1 + 10 \times 2 + 20 \times 3 + 10 \times 4$

$3.4 = 5 \times 1 + 10 \times 2 + 10 \times 3 + 25 \times 4$

$3.8 = 10 \times 3 + 40 \times 4$

**Organic:** lower density and smaller flocks than free range

**CH:** lower density and smaller flocks than NL

**CH** no beak treatment at all, NL free range treated beaks

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17



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## Results of farm visits (CH and NL)



- › NL free range hens scored worse for plumage than organic. NL lower scores than CH
- › Good plumage condition with intact beaks in commercial flocks is possible, but large variation among flocks
- › Many hens with broken but healed keel bone (rearing system, trained to jump and land safely?)
- › Foot pad lesions quite common
- › Full analysis (effects of farm, genotype, management factors) when data set is complete



19



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20