



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

Ferry Leenstra, Veronika Maurer, Monique Bestman, Frans van Sambeek, Zivile Kepalaite Amsler, Thea van Niekerk, Fabien Galea and Berry Reuvekamp

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 life 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:

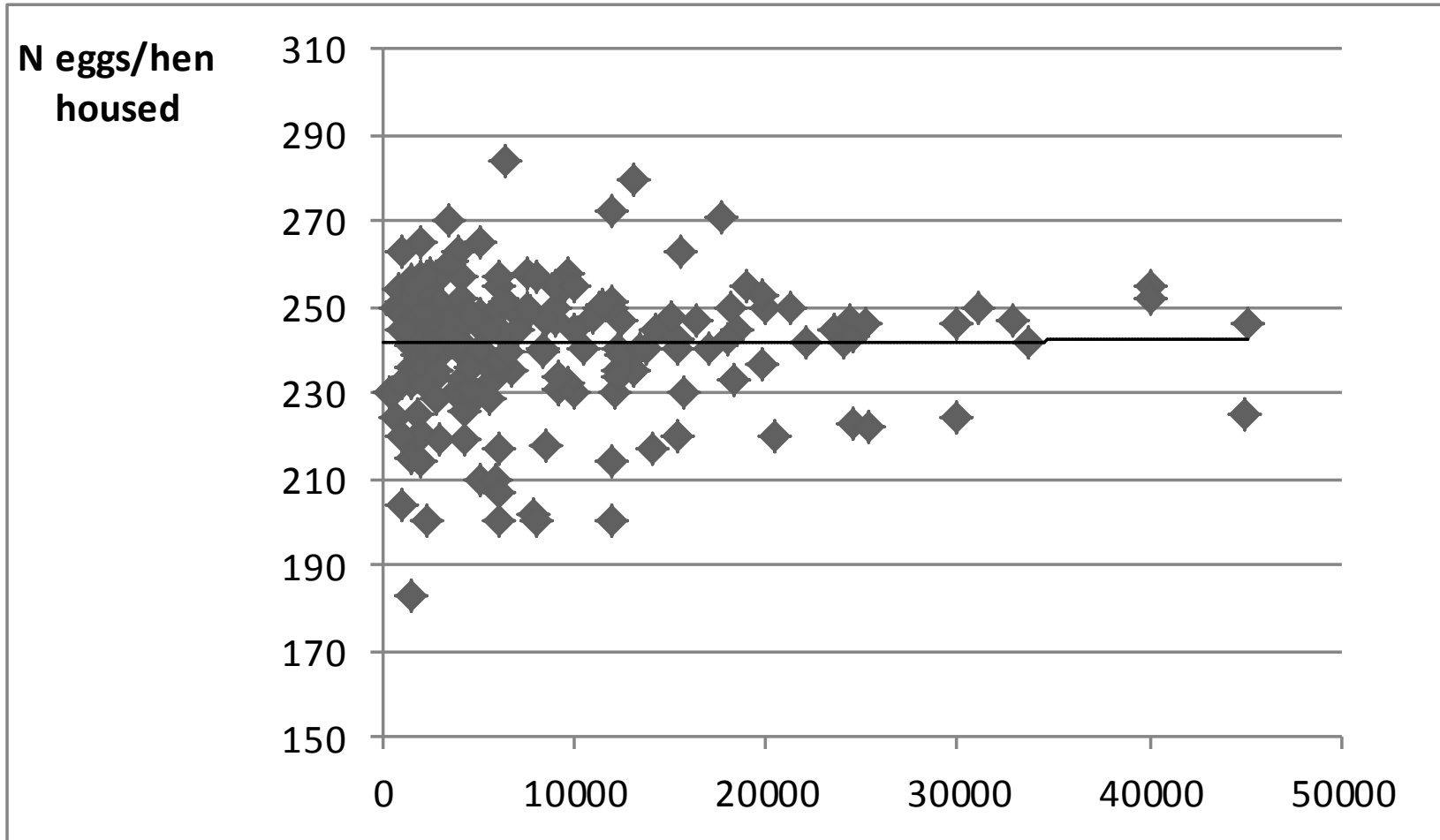
free range and organic: a higher body weight might provide a more robust performance;

meat and bone meal (animal products) required?

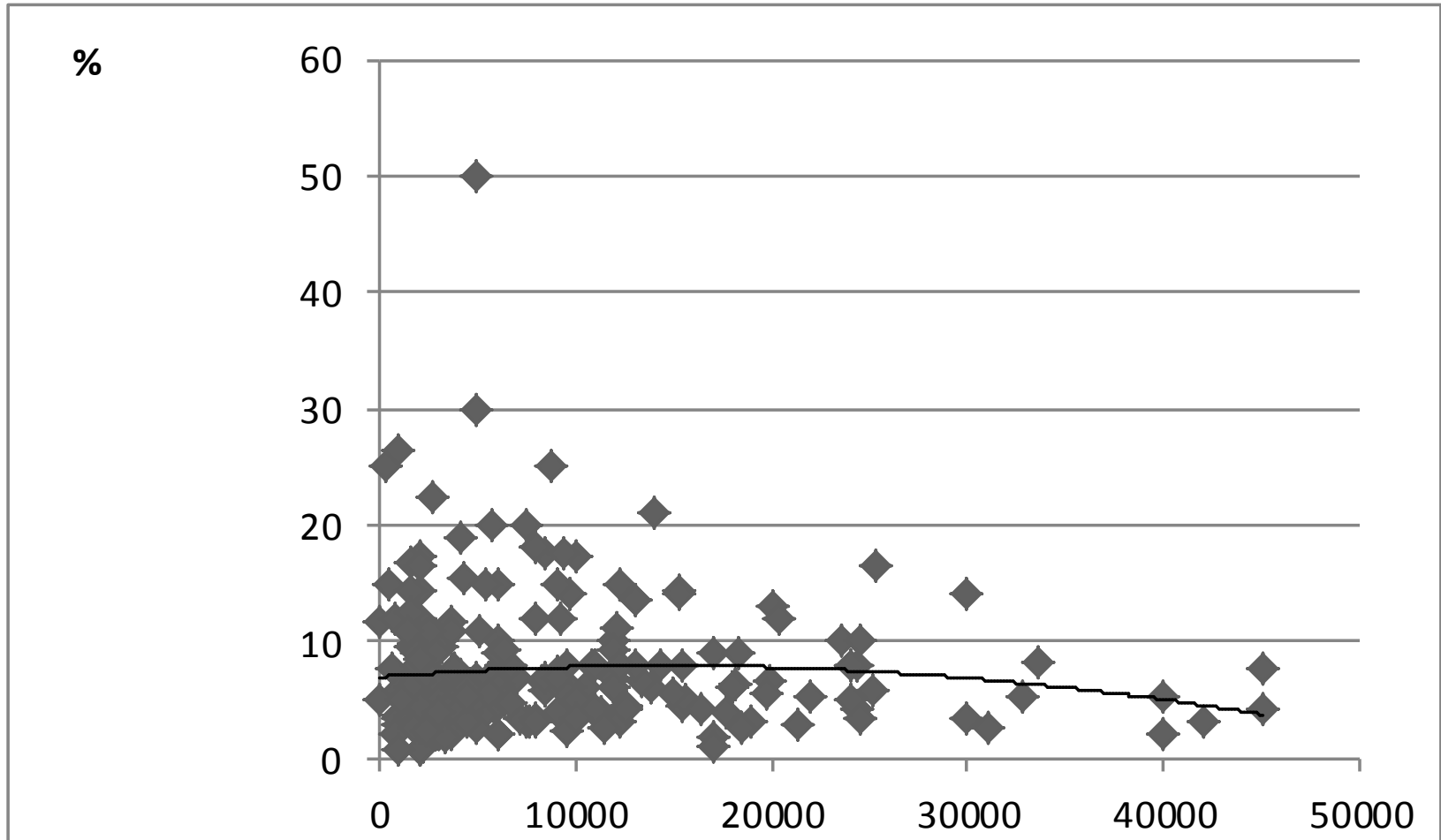
Two alternative genotypes (heavier) tested on a small scale: no real improvement



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.

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**

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.

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.

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 life 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 \leftrightarrow 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, 2nd grade eggs, etc.)
- › Comparison of fatty acid content of eggs from farms with real green outdoor run vs farms with standard outdoor run



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 |

Farm visits



› The Netherlands

40 farms 1st flock visited; 28 farms 2nd flock visited

14 2nd flock same genotype as first flock

5 2nd flock partly same genotype (2 genotypes on farm)

9 2nd flock different genotype as 1st flock

› Switzerland

37 farms (47 independent houses) 1st flock visited

35 farms (38 independent houses) 2nd flock visited

all 2nd flock same genotype as 1st flock

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



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**



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