

## **Selection and characterization of 'low input' farm groups in 3 macro-climatic regions in Europe for inclusion in a "farmer participatory" performance recording network (FP-PRN) and performance recording of currently used layer genotypes**

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### **Introduction**

In poultry, breeding is carried out by a very limited number of international operating breeding companies. For laying hens two companies dominate the market. Laying hens are in general 4-way crosses. Since 1960 the majority of commercial layers are bred and housed in cages. Non-cage housing started to appear again from 1980 onwards and increases slowly in importance, at first in Europe, but recently also in North America. It is questionable if birds bred to perform in cages are also suited for free range housing. In this project we examine the performance of current genotypes in free range systems (organic and conventional), and if and how an improved genotype for free range housing can be developed.

### **Methods**

In WP 4 we work with (networks of) farmers. As first step we carried out an inventory among laying hen farmers in Switzerland, The Netherlands and France that keep free range or organic hens. We have data of 325 flocks on 275 farms. Questions asked were on general information about the farm, on housing system and management procedures, among which recording of data, and genotypes and performance. As a second step we organised workshops with farmers to discuss their ideas on breeding goals ('the ideal hen') for free range systems. Secondary purpose of these workshops was to form a network of farmers, that might be interested in experimenting with different genotypes and give feed back to the breeding company on performance of the flock in a standardized way.

### **Results**

#### *Inventory*

Table 1 gives the average farm size, egg production and mortality for the two systems and 3 countries. Farm size considerably differs between the two systems and the three countries. Egg production in organic systems is lower and mortality higher in organic systems compared to free range. The difference is most pronounced in The Netherlands and almost non-existent in France. Farmers in France indicated that both organic and free range hens had treated beaks, in Switzerland none of the birds had treated beaks. In The Netherlands free range birds have treated beaks, organic birds not.

Table 1: Farm size, number of eggs/hen housed and mortality until 60 wk of age per country and system

	Switzerland		France		Netherlands	
	Free range	Organic	Free range	Organic	Free range	Organic
Number of farms	35	91	32	11	48	57
Farm size	3.093	1.635	7.577	4.682	17.625	8.077
Egg production (N)	244.1	241.9	247.0	245.4	244.9	231.0
Mortality (%)	5.9	6.6	4.9	4.7	6.6	12.0

In Switzerland and The Netherlands brown, white and silver hens were kept. In France only brown hens. In total there were 30 different genotypes: 10 'brands' of brown hens (1 - 51 flocks/brand), 3 brands of white hens (4-28 flocks/brand), and 4 brands of silver hens (3-15 flocks/brand). There is a clear difference between countries with regard to genotypes. In Switzerland one brown genotype is favoured, in The Netherlands another one and in France a third one. In Switzerland there were quite a number of white flocks (CH 35, NL 7), while the silvers were much more kept in The Netherlands (CH 5, NL 32). In Switzerland there were 3 flocks with original genotypes. In Switzerland there were 73 mixed flocks (brown and white, brown and silver, white and silver).

Table 2 gives an overview of egg production and mortality by housing system and group of genotypes. The white and mixed flocks are mainly from Switzerland, the silvers from The Netherlands, while in the group of brown birds all three countries are present.

In free range the Brown+White mixed flocks produced significantly worse than all other groups. In organic systems the Silver hens were not significantly different from the Brown ones, but produced less than all other groups. In general differences in production can be attributed to the differences in mortality. The White hens perform quite well in free range and organic systems. These results are confounded with country: the white hens were predominantly present in Switzerland and the silvers in The Netherlands. Yet, the general picture is lower production per hen housed and higher mortality in organic systems compared to free range systems and lower production per hen housed and higher

mortality among the Silvers. The differences in production per hen housed can be explained by the differences in mortality.

The farmers were also asked to give a score for feather condition. The results corresponded with data on production and mortality: White hens had, compared to the other types, a rather good feather cover, while among Silver hens a rather high percentage of birds with a bad feather cover. The Brown ones were in between.

The differences between performance of organic and free range hens might be influenced by beak treatment: in organic flocks no beak treatment is allowed, in free range flocks beaks can be touched or even trimmed. Another reason might be the differences in diet. Diets for organic hens have to contain organic raw materials, for free range flocks all available sources can be used.

Table 2: Number of flocks, eggs/hen housed (N) and mortality (%) until 60 wk of age

	White	Brown	Silver	Brown+Silver	Brown+White	White+Silver
Flocks	32	120	31	5	28	4
Free range (N eggs/hh)	248.7	246.2	237.8	248.0	200.0	NP
Organic (N eggs/hh)	243.5	239.1	227.2	254.3	240.8	243
Free range (%)	5.2	5.8	9.8	5.6	1.0	NP
Organic (%)	3.5	8	13.4	9.6	7.1	10.4

Table 3 indicates if farmers consider for the next flock the same or another genotype. We asked the farmers for reasons to change. It appears that free range farmers stick more to the same genotype than organic farmers. These decisions on genotype are in Switzerland and France often dependent on the egg trader and/or the hatchery, while in The Netherlands this is less the case. This explains the rather high rate of change in Switzerland.

Table 3: Next flock same or different genotype?

	Same	Different	Don't know
Free range	103	25	12
Organic	66	97	8
Switzerland	69	77	0
France	32	6	0
The Netherlands	68	29	20

### Workshops

In Switzerland and The Netherlands workshops with farmers were organised to discuss the results of the inventory and the most important characteristics for free ranging hens. In both countries longevity and adaptability scored high. Other important characteristics deal with behaviour: curious, but calm, good nesting behaviour and not prone to trooping/smothering.

Productivity and a good feed conversion also ranked high, but farmers indicated that the ideal hen has a good eating capacity and probably should be a bit heavier than current genotypes. The farmers indicated that in free range systems often stress factors of different origins are present. Hens then tend to eat less and do not have sufficient reserves to draw on. Adaptability and fast recovery after a dip in production were considered more important than a high peak production.

### How to continue

Besides a more thorough analysis of the data set (especially for interactions), farm visits are planned to get more insight in possible causes of differences between genotypes and systems, specifically for feather cover, and health (mortality) related issues. During the farm visits data on and samples for egg quality will also be collected.

It will be discussed which criteria farmers use to decide on when to finish a flock or plan to moult them. It will be examined which farmers are interested in experimenting with a new genotype, most likely a heavier type of bird.

In an experimental set up we plan to test two different genotypes (the new one and one prone to feather damage) on a pure vegetarian diet and on a diet containing meat and bone meal. Quantity and quality of protein is a critical factor in poultry diets, especially with current high prices of raw materials. This is more pronounced in organic than in conventional diets.