HOW TO OPTIMISE FEEDING HYBRID LAYERS IN THE FREE RANGE FAMILY POULTRY SYSTEM

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Summary

This document discusses the feeding of hybrid layers in the "traditional" family poultry system. The author claims that he went through a necessary process of "detachment" in order to reach a proposal for adaptive research with layers kept in the aforementioned system. These layers should be fed with a small portion of protein rich food, apart from the maize fed by the family.

Key words: Family poultry, hybrid layers, free range, mind set

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1. Introduction

In this document the author wants to communicate a process of getting "detached" from the current knowledge. This is a necessary thought process in order to develop ideas as to what to investigate with the aim of optimising the feeding of hybrid layers in the family poultry system. In connection with that, the following will be discussed:

- The system itself
- The feeding in this system
- Proposals for research

2. The system

The system referred to is the so-called "traditional system", but with the incorporation of hybrid layers. The author is of the opinion that it is possible to improve the traditional system with hybrid layers, maintaining the free range practice and almost all the other conditions of the family poultry system (de Vries, 2002). The only change the families (normally the women) have made is to increase the level of maize given as supplementary feeding.
The big advantage of this system, compared with the confined system of layers, is that the families do not depend on concentrate supply, while the layers are able to maintain a reasonable production level.
This combination of improved breeds (hybrids) and the free range "traditional system" has only been publicised a few times: Huchzermeyer (in Smith, 1990) already experimented with this system in 1976, and the *Bangladesh Smallholder Livestock Development Project* is applying this same system.

In the meanwhile, the introduction of hybrid layers through private initiatives or rural development programmes is in process in many countries. These layers are introduced to the family system, and although the extension agents promote confinement, the families sooner or later revert to the free range system. It is regrettable that the extension agents promote the confinement of the layers, because that idea is based on their wrong mind set. (de Vries, 2002)

This wrong mind set is persistent. For example, in 2002, a programme was initiated in Muy Muy, Nicaragua. Rhode Island Red layers were introduced to 20 families, on condition that a pen was constructed and that the layers should be kept in confinement and fed with concentrate. The families, however, do not maintain the system. After one year no one keeps the layers inside during day time, and almost 90 % have stopped giving concentrate.
This is because the free range system has the advantage of producing eggs on a reasonable level while supplementing with only local grains, normally maize. This results normally in a reasonable production of about 50 %.

Now, the challenge is to identify and test research topics that fit into this free range system and which are not based on the supply of concentrates. This is discussed in the rest of the document.

3. About the feeding in the system

In this system, feeding is based on the administration of maize and all that is found when ranging in the back yard. Little is known about this. How much maize is given and what does the chicken eat when ranging?
In the literature a few approaches have been described to estimate what layers eat in this system. For example, Roberts e.o (1992) has designed a formula to estimate what a chicken eats in the back yard, and Huque (1999), analysed the content of the crops.

The author has worked with the above described system for a long time, and has developed an opinion about how to best feed in this system after going through a process of various stages of "detachment". These stages are presented below.

a) Giving concentrate, but less than required (Mozambique). **Stage 1. Smaller quantity of concentrate.**
b) Compare reduced quantities of concentrates with quantities of maize (Zambia) **Stage 2. Supplement with maize, forget about concentrate.**
c) Analyse the behaviour of chickens and the owners in Nicaragua. **Stage 3. Realise that the families already give quite a significant quantity of maize.**
d) Measure the food intake of pastured poultry in the Netherlands when they are offered wheat and a complementary concentrate. **Stage 4. Apparently the layers do not need that quantity of protein when they are kept in that system.**
e) Supplement hybrids with soy bean in Nicaragua. **Stage 5. To supplement with a small quantity of soy beans.**

a. Giving concentrate, but a reduced quantity.

During the first experiments with this system (in Mozambique) the objective was to reduce the quantity of concentrate with the aim of lowering the costs. Concentrate was available, but in small quantities. The objective was to produce eggs with less concentrate, making use of the free range back yard system. The families were given the guidelines of supplying 50 grams of concentrate per layer per day. The production reached 216 eggs per layer per year, and one egg was produced per 100 grams of concentrate.

It is possible that the production was that high because the number of layers was low, and the families might have supplied maize also.

b. Compare different supplements.

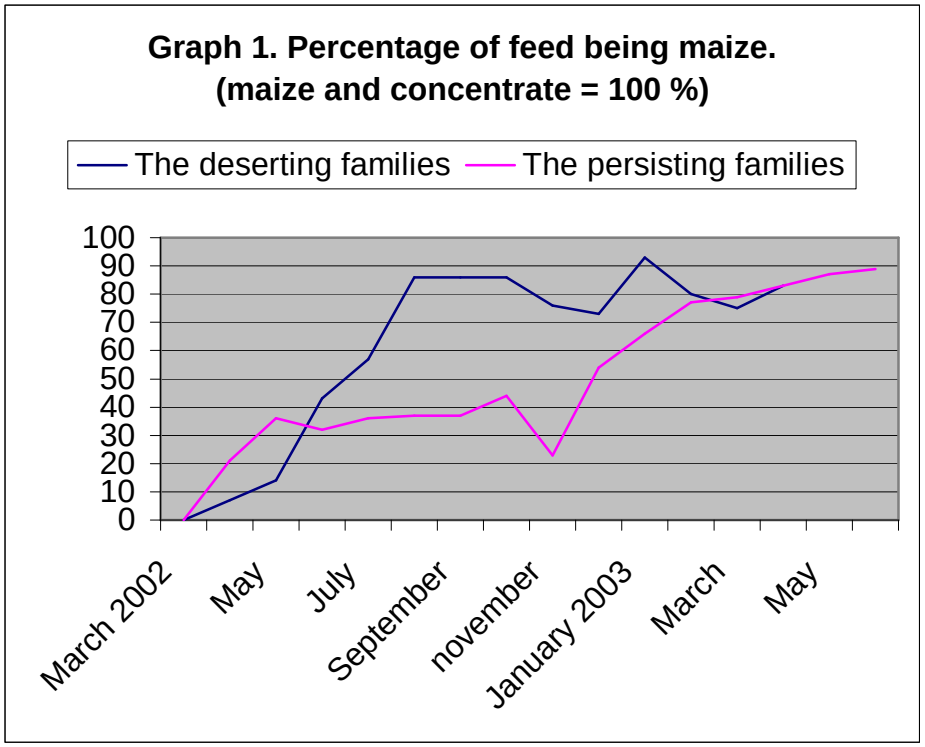
The experiences in Mozambique were the reason for starting an experiment in Zambia with different types of supplement.
Three groups of families were supplied with the following feeds:
50 grams of: -concentrate with 25 % of protein; - with 16 % of protein, and one group with maize.
Productions per layer per year are found in the following table.

Table 1. Production of hybrid layers on free range, with different supplements.

	Maize group	**Group with 16 % protein in conc.**	**Group with 25 % protein in conc.**
Annual production per layer.	156	188	176

During this time it was realised that the focus should not be on giving concentrates to hybrid layers in this system. For sure, giving concentrates (given in smaller quantities) might result in higher production levels. But it is difficult for the families to secure concentrate at all times, and as the system is multifactorial, it was probably better to focus on the supply of local grains.

The conduct of the families from the project in Nicaragua, mentioned above, also demonstrates that this is the right focus. The next figure demonstrates that feeding the layers changed from supplying concentrates to supplying maize.



After one year half of the participants had stopped keeping hybrids. These were called the deserting families.

c *The quantity of maize.*

It was noticed that, in Zambia, where the families gave only 50 grams of maize per day, the egg production was quite irregular. There were times when the layers stopped laying for a period of 4 – 6 weeks, after which production started again. Were these signals of lack of feed ?
What is true, is that women in Nicaragua gave, in November 1995, 92 grams of maize to local hens. This quantity might be related to the season (October - November is harvest season), because in July 2003 it was found that 7 families (some were the same as in 1995) gave on average only 52 grams of maize to hybrid layers on free range in the yard.
Also in 1995, in Muy Muy, Nicaragua, data was collected from one family, keeping hybrid layers on free range. The layers had access to a feeding bar with different feeds ad lib. It was registered that the layers consumed 87 grams of maize. Apart from the maize, the layers ate rice bran (18 grams per day), meat and bone meal (14 grams per day), and lime stone. If the layers have relatively free access to maize, they apparently need more than 50 grams.

d The percentage of protein

Is it possible that with this amount of maize the layers on free range are able to reach an intake with an overall protein level of 16 %. Can it be possible that they eat so much protein when scratching ?
This has been estimated with a formula calculating the garbage in the back yard, or by analysing the manure.
The author has tried to approach this issue by closely monitoring the behaviour of the chickens. And yes, it is true that the chickens eat lots of insects, resulting in an increase in protein level in the crops (11% compared with only 9% from maize alone). But this level is far below the required level. Is this a sign that in the free range system with maize supplement, an extra protein supplement is needed ? And if so, what level is required ?
Is it true that a level of 16 % is required ?
Henuk (2002) published that in a choice feeding system the animals are able to select according to their needs, which means that in general the overall percentage of protein could go down to 13 %.
Also, the calculated protein content of the already mentioned choice feeding experiment in Nicaragua was 13 %.
What is more, in a pastured poultry system in the Netherlands, the calculated protein content of the overall ration reached values between 13 – 14 % of protein. In that system the layers had access to wheat and a complementary concentrate. In the next table the registered consumption during three periods is shown.

Table 2. Daily consumption of hybrid layers in a pastured poultry system in the Netherlands,

		Daily consumption			
Period	***% of protein in the concentrate***	**Conc. (%)**	**wheat (%) (Prot 11%)**	**Total, grams**	**Protein, %**
April 2002	*19,1*	30	70	123	**13,4**
October 2002	*19,1*	35	65	93	**13,8**
June 2003	*18,7*	46	54	122	**14,5**

It is considered that there is probably no need to reach a level of 16 % protein in the choice feeding diet when layers are on free range.

4. Conclusions and proposals

It can be concluded that the author has gone through a process of "detachment" from the currently accepted "best-practice" knowledge. First, the concept of confinement was abandoned, then the idea of giving full quantity of concentrates, after that the need for concentrates, and after that the idea that the ration should reach a level of 16 % protein.

However, the layers still have to eat, and for that they need an energy and a protein source. What has been documented about that, until now, is shown in the following table:

Table 3 Summarised data on the feeding of chickens in the free range system

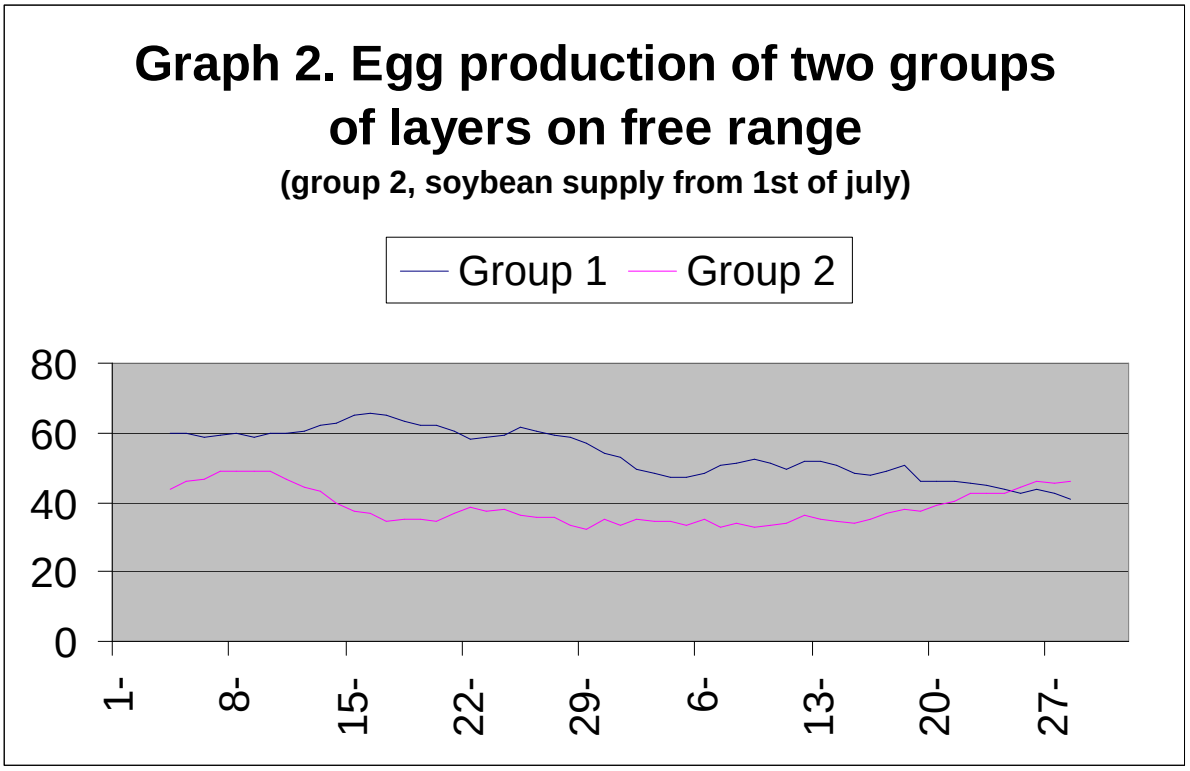
Parameter	Value	Source
Quantity of maize	75 grams	(1976)170 eggs, hybrids, Huchzermeyer, Zimbabwe
	92 grams	104 eggs, local hens, de Vries, Nicaragua (Nov)
	50 grams	144 eggs, hybrids, Zambia, de Vries
	52 grams	Jun 2003, Nicaragua, hybrids. De Vries (prod 47 %, 2 months)
	87 grams	choice feeding, hybrids (1995)Muy Muy, Nicaragua.
Percentage of protein in the crops	11 %	Roberts
	11%	De Vries
	7 – 9 %	Huque
Percentage of protein, choice feeding, ad lib consumption	13 %	De Vries, hybrids on free range, Nicaragua
	13 %	Henuk, 2002 hybrids
	13-14 %	De Vries, this document

These data point to the following statement:

> *Hybrids on free range in the family poultry system need to be supplied with 70 – 90 grams of maize and a protein source to reach a level of 13 % protein in the overall diet.*

If this is true, why not start an experiment where hybrids are supplemented with a small quantity of soy beans ? That is what was done in Muy Muy, Nicaragua. **(Stage 5)**

Of 7 families with hybrid layers on free range, 4 received 20 grams of soy bean per layer per day. They were instructed to supply the soy beans cooked. Production was registered, and the results are shown in the graph shown below.



The age and origin of the hens, the type of back yard, the quantity of maize supplied etc., were not uniform parameters for each of the families. Therefore, the result could not be significant from this data collection. But the objective of this example is to stimulate other researchers to start similar experiments with:

- **Hybrid hens on free range (7 – 10)**, of the same age, with 14 families.
- Two groups, one with 70 grams of maize and 20 grams of a protein supplement.
- The other group with only maize, ad lib
- Register the production.

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