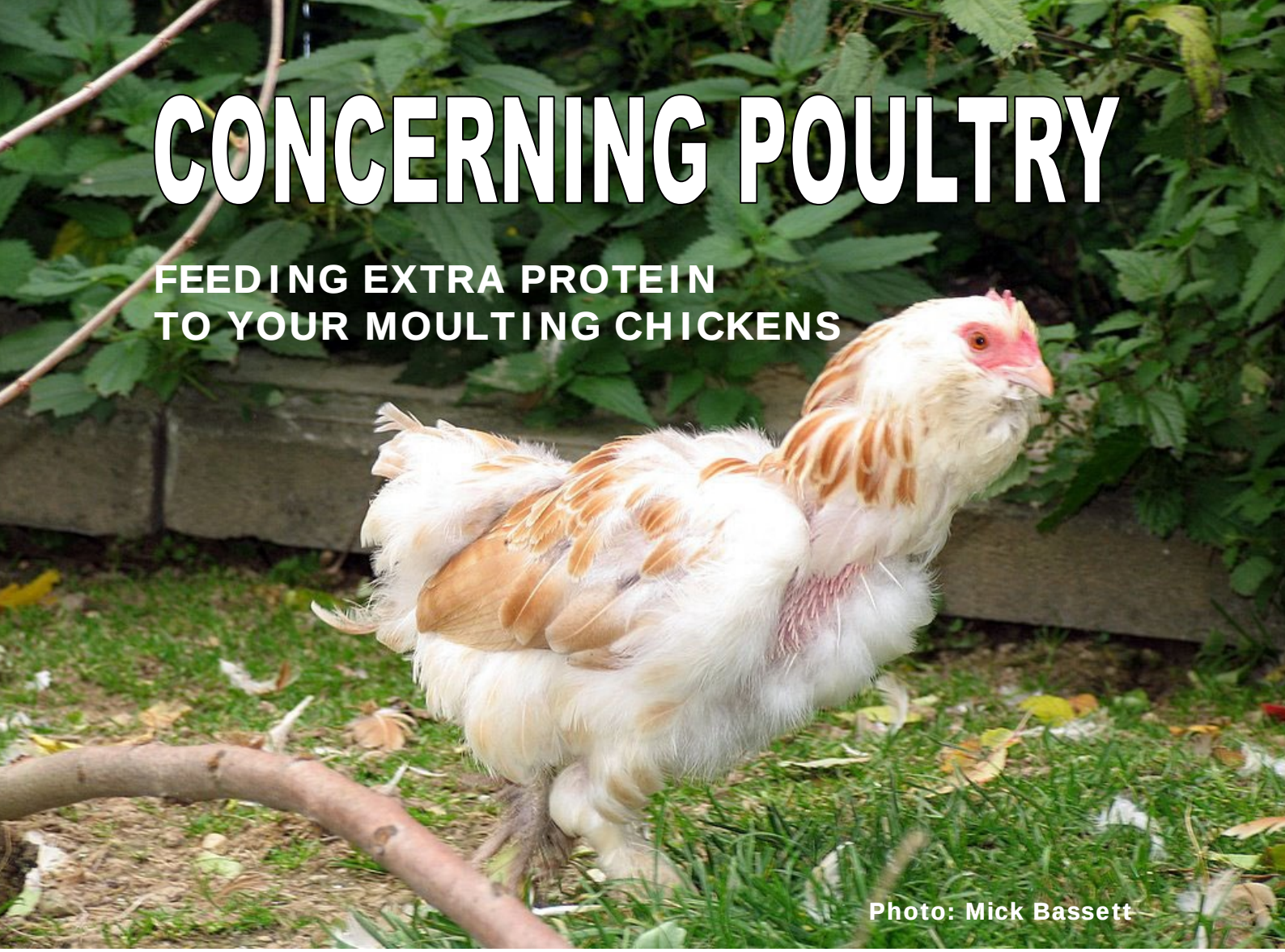


FEEDING EXTRA PROTEIN TO YOUR MOULTING CHICKENS

By: Elly Vogelaar (NL)

In the Northern Hemisphere, at this time of the year, many chickens are moulting. Some grow their feathers back in as quickly as 3-4 weeks, others take 12-16 weeks to grow them back. Since their feathers are made out of beta-keratin - a protein in the keratin family - it is often thought helpful to increase the protein in their feed up to 20 percent. (Normally this is 14 to 17%). While moulting, the chicken puts all its protein resources into feather-making. No wonder, egg-laying will slow down or - more likely - stop completely. Feathers are more easily grown when laying ceases, because of the bird's difficulty in assimilating sufficient protein for both egg and feather production.
So, nature always finds a way and we should not really have to interfere. Still the hens often are listless, and the moulting rooster as well. While in this condition, he is nearly always infertile, with his reproductive physiology undergoing a resting phase. You may notice he will no longer call his hens for a treat, but eat it himself, and right so!

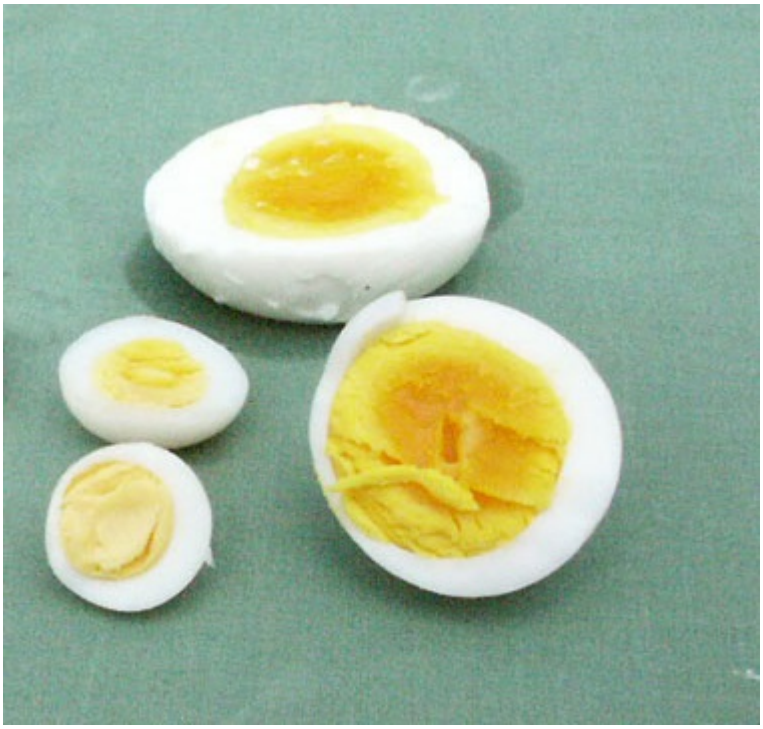
Adding some extra protein into their diet at this time does make sense. There are many protein-rich feeds and 'treats' for chickens. Just search the internet and you will find plenty! To name a few: Legumes like split peas and lentils;

seeds, like sesame, sunflower seeds and pumpkin seeds; grains like triticale, kamut and quinoa (called 'superfoods', not even that protein-rich, although quite expensive); mealworms; cooked eggs; catfood; fish meal or even fresh fish. Most of these protein-rich treats will we eagerly eaten by your chickens, although they sometimes have to 'learn' it is actually edible.
The main issue could be the following: how much extra protein can we feed our chickens without overfeeding them? Keep in mind, the major ingredients in poultry feed provide the protein and energy sources required to maintain health, grow, and produce eggs.
Another thing is, are these extra 'treats' all as good as we think? Let's walk through the list and let me tell you what I found.

First, let's see which are the basic proteins in chicken feed
In the past, animal products such as meat, bone, blood and poultry by-products have were used successfully in poultry diets. They are all high in protein and other nutrients; however, we can no longer use these products due to the threat posed by the Mad-Cow disease. (Fish is an exception, under certain conditions).
Today the major protein source (>45% crude protein) in chicken feed is **soybean**. It is an excellent feed ingredient for poultry and also contains high levels of linoleic acid, an essential nutrient that is required in animal diets. Since there is now interest in finding alternatives, this is sometimes replenished with **canola** (in Europe known as double-zero rapeseed), having a protein content of 36-39%.
Canola is a relatively new poultry feed ingredient and shows some promise, however it is not without problems too. It is related to mustard and cabbage and as such includes compounds that can cause problems when fed to poultry. When fed more than about 10% in the diet, it causes eggs produced by many brown egg layers to smell and taste fishy! So if you think your eggs smell fishy, check the ingredients on the feed bag label!

Above: Soy beans. Photo: Agricultural Research Service of the United States Department of Agriculture.
Right: Rapeseed. Photo: Tcherome.

Which protein-rich treats can you provide?



Cooked eggs. High protein source (90%) and they are cheap. Just cook the eggs and chop them. Do not feed your chickens raw eggs or they might develop a taste for eating their own eggs! Raw eggs contain less protein, around 50%.

Left: Cooked chicken and quail eggs. Photo: Dirk de Jong.

Fish. This is derived from herring, menhaden, and pollack, caught specifically for the production of fish-made foods. (There is another type of fish meal specifically for human consumption). It is an excellent source of protein, energy, minerals and vitamins. Good quality fishmeal (can be ordered online) is a brown powder which will average between 60% and 70% protein. The odor of fishmeal, as would be expected, is that of fish. Some warn for off-flavors in the eggs or meat produced, so don't overdo it, although it will not be a problem when your chickens are not laying. If you can get inexpensively fresh fish, like sardines or your own catch, that will be appreciated by your chickens. Feed them raw, just slit them open.

Right: Fresh blue whiting. Photo: Luis Miguel Bugallo Sánchez. Wikipedia Commons CC BY-SA.

Dried shrimps and amphipods.
Closer to chicken's nature than fish and eagerly eaten.
Research found that the Cd (cadmium) level found in the meal from amphipod was 6 times higher than EU's upper limit, so don't overdo this either.

Right: Dried amphipods. Photo: Aviculture Europe.

Insects. Such as (dried) crickets, grasshoppers are ultra-high in protein content. Also mealworms; alive 30%, dried 45 to 50%. Dried and ground black soldier fly larvae have been positively tested as a component of a complete chick diet (as a substitute for soy meal).

When feeding mealworms it is best (safest) to choose the freeze-dried ones. If you prefer to feed live ones, we advise to buy them from a reliable shop, or you can raise your own.

Left: Larvae of the black soldier fly.
Photo: Dennis Kress.

To explain the use of the word 'safe': The darkling beetle *Alphitobius diaperinus* – called the lesser mealworm or sometimes wrongly called buffalo worm - are often found in the litter of poultry facilities and migrate easily from the one to the other poultry house. The larvae feed on manure, sick or dead chickens, cracked eggs and bird feathers. Both adult beetles and larvae act as reservoirs for many poultry pathogens and parasites, for instance the viruses causing leukosis, Marek's disease, Gumboro, turkey corona virus, Newcastle disease and avian influenza viruses. These beetles can also be carriers of the causative agents of avian influenza, salmonella, fowl pox, coccidiosis, botulism, and Newcastle Disease. They also act as vectors of caecal worms and avian tapeworms…. (The real buffalo worm is the larva of the *Alphitobius laevigatus*.)

Interesting to add is that the insect meal commercially available in Europe is made out of insects that have been fed only with vegetables, not manure or carcasses.
Currently, insects are not permitted to be grown on animal based media and manure. A lot of questions are still unanswered regarding the use of insects in the feed of production animals. Insects can be used in food for pets.

Right: Moulting hen.
Photo: Aviculture Europe.

Worms/snails/slugs. High protein. Some chickens eat them and some don't. There is always a small risk that they are infested with eggs of the tape worm. All tapeworms of poultry have indirect life cycles with intermediate hosts such as earthworms and beetles.

Legume grains. Often grown specifically for animal feeds. This group includes the (dry) beans, peas, and lentils. Lentils have the second-highest level of protein (26%) of any legume, after soybeans. However, compounds including, tannins, oligosaccharides, and enzyme inhibitors that are found at high levels in most of these grains severely affect growth in poultry.

Since soy is processed with heat, these compounds are virtually eliminated as a problem. So with some processing, beans and peas may become a usable ingredient.

However, some of these inhibitors are heat-resistant, so more work is needed. When you want to feed your chickens whole soybeans, they must be roasted to de-activate the trypsin-inhibitors they contain. Trypsin is an enzyme involved in the breakdown of many different proteins, including as part of digestion. As a result, inhibitors that interfere with its activity can have an anti-nutritional effect. So, don't feed raw legumes, but dried ones, or sprouted ones. (See also 'cereal grains').

Left: Legume grains.
Below: Cereal grains, left to right, wheat, rye, triticale.
Photos: Agricultural Research Service of the United States Department of Agriculture.

Cereal Grains. Typically low in protein, between 7% and 12%, and generally high in fiber. The energy level (starch) varies from very low (oats) to quite high (corn). Some cereal grains such as wheat and barley contain compounds that are not well digested by poultry and may need supplemental enzymes added to the feed to aid digestion if fed in levels above 10 or 20% in the diet.
Comparison of Crude Protein of field peas to other grains:

Field Peas	24.5
Corn	9.5
Barley	13.2
Oats	13.1

Groats are the grain seeds without the hull. The most common are buckwheat groats (in Europe), oat and rice groats. Groats have a relatively low crude fiber content and contain a higher percentage of protein than the original grain.

Sprouts. During the sprouting, the grains and legumes get a completely renewed chemical composition. This process is due to the enzyme diastase, which is formed during the germination and converts starch into sugar, increasing the amount of vitamins, minerals, proteins, and nucleic acids. These provide an easy digestion.
It is easy to grow them yourself at home; see this article which we published earlier: http://www.aviculture-europe.nl/nummers/06E01A09.pdf

Right: Sprouting grains.
Photo: Otto Boswinkel.

Superfoods/super-grains. For instance: **kamut.** Protein 12 to 18 %. An ancient wheat variety. Praised (for human consumption) as supergrains/superfood. Expensive, not known if it is extra beneficial for poultry as well. Same holds for **spelt** (17% protein) and other super-grains.

Sunflower seeds. Research has shown that whole sunflower seeds can be included at up to 30% of layer diets with no adverse affects on hen performance. Hens fed diets containing sunflower seeds, however, give eggs with a significantly reduced colour score (i.e., they look pale) and a significant rise in yolk cholesterol content.

Left: Sunflowers.
Photo: Aviculture Europe.

Pumpkin seeds (pepita). 30% protein. The seeds contain a botanical de-wormer, cucurbitacin. When used as de-wormer it is best to hull and grind the seeds.

Below: Pumpkin seeds.
Photo: Aviculture Europe.

Greens. Even greens contain protein! In this time of the year they are probably not growing in your own garden, but you can buy them in the store or market. Best are dense, dark greens like kale, collards, chard, spinach and broccoli.

Left: Kale.
Photo: Otto Boswinkel.

Don't forget: Commercial feed, purchased from a reliable dealer, has all the nutrients chickens need to grow and thrive. Even a little more of a good thing will upset a balanced diet. Still some supplementation is fine, but these foods should be limited as 'treats' and not given *ad libitum (*available for the birds constantly); the total supplementation of treats like scratch (cracked corn, oats, or other grains) greens and table scraps should be no more than can be eaten in about 20 minutes.

Right: Give them a chance to get used to the 'new' food.

Moulting chickens will probably eat less, which will only decrease their protein intake. Still it is best to try and get them to eat more of the 'normal' feed – for instance by adding a bit of lukewarm water to the meal, stir and make fine crumbles. This might be better than supplying all sorts of extras.
Note: Do not continue to feed a layer diet to chickens not in egg production as it is too high in calcium; switch to grower feed. Sometimes a special feed mix for the moulting period is offered for sale. Check with your feed supplier.

There's another aspect when it comes to feeding extra-protein: for starters, every mammal/ bird can only absorb a given quantity of protein with each meal. Anything beyond that is stored in the body as fat. In the case of chickens, this is particularly dangerous, since it affects their immune system in a negative way. Then, when offered a higher dose of protein, the body (chicken-body, in this case) 'jumpstarts' its metabolism AS A WHOLE, including laying eggs; so practically, when you want to help your hens with moulting, you're 'forcing' them to start laying eggs simultaneously.
In the case of growing chicks (especially between 3 and 7 - 8 months of age) the extra-protein might lead to feather-related faults (the plumage grows too fast, feathers become twisted, markings are not right and so on).

Left: A moulting Wyandotte bantam. Note the pin feathers.
Photo: Monique de Vrijer.

A few more tips to end with: During moult, reduce stress as much as possible, avoid bringing new birds into the flock, and be careful how you handle a chicken at this stage, as the new 'pin feathers' pushing through are quite tender.

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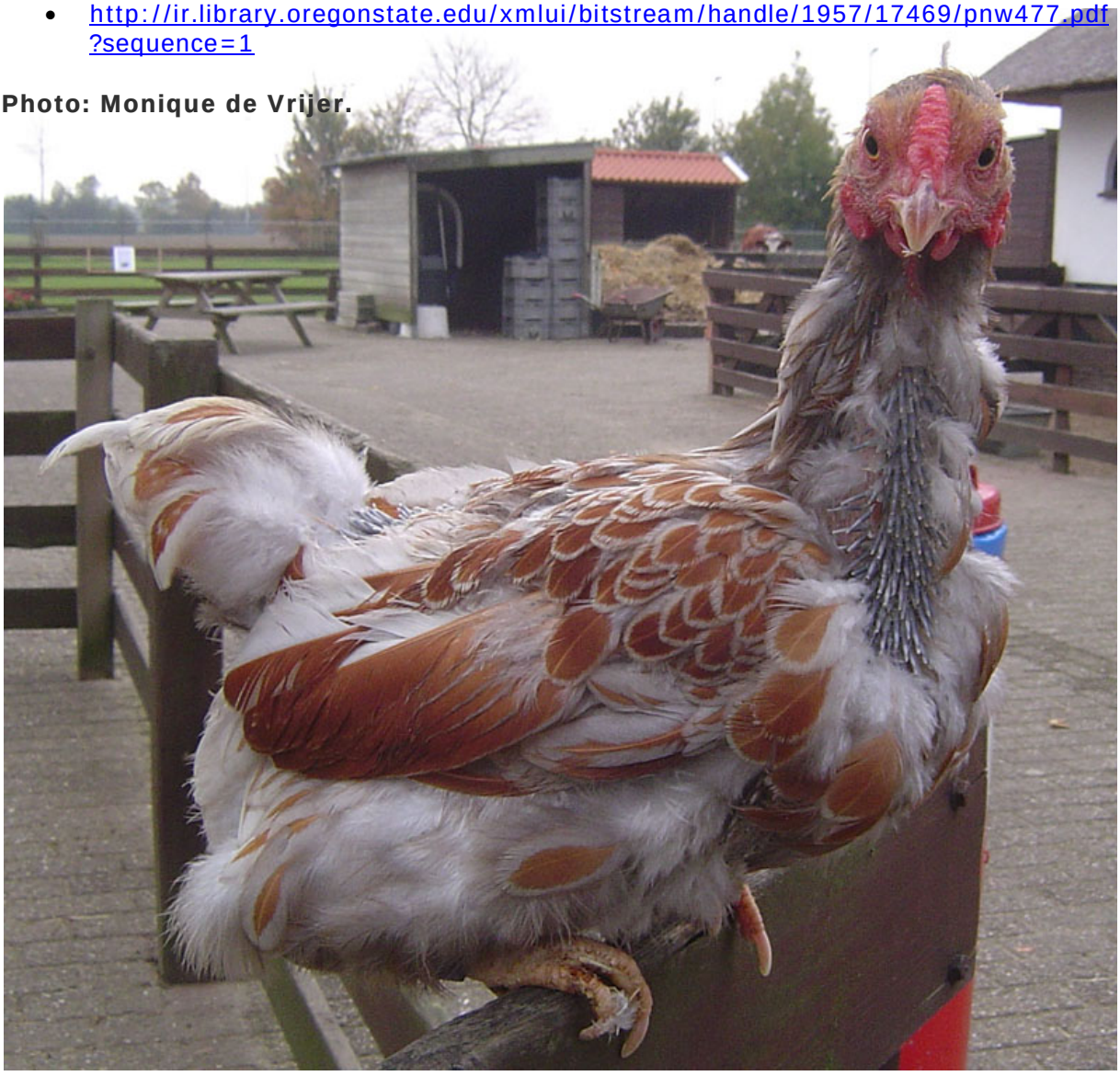
Photo: Monique de Vrijer.



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