

12. Organic Poultry Production

Since the mid-1980s, the advance of organic farming has completely changed the structure of the Danish poultry sector. For many years, the trend in poultry farming was towards increasingly fewer, but larger and larger egg and broiler production units. Within just a few years, organically produced eggs have achieved a market share of 15-20 per cent.

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Photo: Simme Eriksen

The veranda in front of the henhouse gives the hens additional indoor floor space.

Organic poultry production

Organic eggs are produced on a considerable number of relatively "small" organic farms, with typically 2000-8000 laying hens. In comparison, conventional battery hen units often have more than 100,000 hens.

The Altofte Farm

The Altofte Farm in northern Jutland is run by Anita and Leif. The mixed farm has about 230 ha, 160 dairy cows and 11,000-12,000 laying hens. They have owned the farm since 1981 and converted to organic farming in 1995.

They started keeping hens in 1999. Anita tells us why: "It all began like it often does, with an empty barn and a visit to a neighbour who had organic hens. We fixed up our empty barn, with deep litter over the entire floor surface, feed lines, perches, nest boxes, etc., and then we were ready to start." The old buildings can house about 6000 hens. After a careful start with only 3000 hens, they have had a "full house" since.

Anita is the one who usually takes care of the hens. After a trial period, they decided to expand. Regarding the new henhouse, Anita tells us: "We went for a truly organic and slightly untraditional solution with simple ventilation and a veranda along the entire front of the house. The ventilation system works great, but we decided to install shades in addition, which help to improve temperature control. Due to the veranda, our hens have access to a much bigger indoor area than required by the regulations. In our case, they have about 1/3 more space than required." The new henhouse is designed for 6000 hens – equivalent to two flocks, and thus, Anita and Leif more or less have the same number of hens in both systems. An obvious question is thus which of the systems works best? "The new one", Anita exclaims, and

Similarly, there has been a steady increase in the production of organic broiler chickens, even though this production so far only accounts for less than one per cent of the total Danish broiler production. A main reason for this is that the Danish egg-laying industry only produces enough to cover domestic consumption, whereas Danish broilers are a significant export product, with an annual export of about 75 million broiler chickens.



Photo:
Simme
Eriksen

adds: "the really big difference is the design. The new henhouse is specifically designed for laying hens, and for rational operation. The old buildings were originally built as a cow barn and hayloft, which creates lots of bother for both hens and humans. For example, there are just too many nooks and corners in the old barn, and in wintertime we have to use a wheelbarrow to bring in all of the bulk fodder. That's why this is the last year we'll be having hens in the old buildings."

Four flocks of about 3000 hens each require a lot of space for hen runs. Anita comments on these: "We have chosen to plant six rows of shelter belts in the middle of the runs. Even though the trees aren't that tall yet, the hens obviously really like having them there. The hens also benefit the shelter belts, since their constant scavenging for food helps to keep the space between the trees clean."

Housing facilities

Housing facilities for organic hens can be roughly divided into three groups. The first two of these are still the most common, and include converted barns and haylofts, which typically had been used for pig or cattle production.

Many of the converted barns use deep litter on the entire area. Nest boxes and perches are placed wherever it is convenient. Typically, perches are placed along the walls and nest boxes in the middle of the room. Feed is either placed in suspended troughs, which requires hard manual labour, or in feed lines, whose height can be adjusted in step with the increasing height of the deep litter layer. This is a rather inexpensive solution for a start, but it does have a few disadvantages. For example, having so much bedding available can easily tempt the hens to lay eggs on the floor instead of in the boxes. The percentage of floor eggs is often too high in such houses.

The other variation of converted old barns is a design with manure pits covered by slats. The pits are typically placed on both sides of the nesting boxes, in the middle of the henhouse. They can also be placed underneath the perches, or, as in some cases, the perches can be fastened directly to the manure pits. When using manure pits, it is important to calculate how many square metres are used for bedding and the slats, respectively, since the organic regulations not only consider the number of hens per square metre, but also distinguish between what the floor space is used for. The advantage of using manure pits is that most of the droppings are kept away from the bedding, thus reducing the occurrence of dirty eggs.

The last "group" of housing is not so much a group, but rather a collection of different types of new, specially designed henhouses. Most of these have manure pits on both sides of the nesting boxes. In general, new henhouses are built with capacities of 3000 or 6000 hens, depending on whether one has the space and interest for having one or two hen flocks.

Free-range area

If you ask the hens themselves, they would surely

prefer hen runs with trees. Preferably, lots of trees and bushes and other undergrowth to hide in. Our domestic chickens have descended from the Balkavia Hen, an Indian jungle fowl. They are especially aware of flying enemies, and thus try to avoid wide, open spaces. The expansive, open areas often used as hen pastures may fulfil the legal requirements, but do not necessarily satisfy the chickens.

The regulations for organic chicken rearing have become more stringent in recent years. Earlier, it was sufficient for the hens to just have access to "a field", whereas now many different requirements must be met. First, a free-range area must usually only be used every other year. In between, a crop shall be grown that can utilise the nitrogen from the hens' droppings. However, exemptions from this rule are possible, e.g., when the hens are kept in fruit or berry orchards. One requirement is that the hens keep the area under the trees and bushes clean.

So far, however, not many hen pastures actually are placed within fruit or berry orchards. One reason is that very few poultry farmers also grow fruit or berries, another is that keeping chickens on the same area year after year can give parasite problems, especially worms. To avoid this, the hens could be kept in the orchard only every other year, but fruit trees make efficient soil tillage difficult.

Currently, there are numerous studies on the design of free-range areas for hens. For example, one project in southern Jutland is studying ways to optimise the use of such areas, including such factors as shelter belts, trees and co-grazing by other livestock.

Hen feeding

In certain aspects, feeding hens is much more complicated than feeding our other livestock species. While ruminants are able to degrade their feed and synthesise proteins to suit most of their needs, pigs and especially poultry have to be fed the right type of protein. The amino acid composition in chicken feed must be adapted to the needs of the hens, since their ability to "remodel" one amino acid to another is greatly limited. Laying hens have specifically high requirements for the amino acid Methionin. This is one of the essential amino acids, which cannot be synthesised by hens, and therefore must be provided in the feed.

In addition to amino acids, there must be a sufficient amount of fatty acids in the feed. Fatty acids are important for egg laying and thus vital for achieving high egg yields. Oats is an excellent source of fatty acids, but unfortunately, the crop is not used as extensively as hen feed as it would deserve.

It is not permitted to give feedstuffs containing GMOs and synthetic amino acids to organic layer hens. This implies that pure Methionin cannot be added to the feed. Feed mixtures for laying hens must therefore be highly optimised, in order to limit the intake of surplus amino acids (protein). Surplus protein may increase the hens' water requirement (in order to flush out unused protein) and also places an extra strain on the animals' metabolism.

Cereal as hen feed

Hens readily eat barley, which also has a high energy content. Barley could easily constitute 20-25 % of the hens' feed. In Denmark, it is recommended to feed a maximum of 10 % barley to hens. Feed with a higher percentage of barley results in moist, sticky and nearly fatty droppings, increasing the risk of dirty eggs and moist, sticky bedding. Other countries, e.g., Sweden, do not consider this aspect to be so important, and often recommend the before-mentioned 20-25 % barley contents.

Wheat is the most concentrated cereal crop, and is

willingly eaten by poultry. Actually so willingly, that giving hens free access to wheat can create problems. They risk getting fat instead of laying eggs! Wheat represents the main cereal ingredient in more or less all chicken feed mixtures available in Denmark. Wheat is also popular among those farmers that mix their own feed, since it helps to ensure a large daily feed intake. Being such a concentrated feed, whole wheat can also be used to "dilute" the protein feed given to broilers. In the last phase of their growth, broilers still need lots of energy, but not so much protein.

Oats are also willingly eaten by chickens, have a positive effect on digestion and should definitely be used more! However, oats contain less energy than both barley and wheat, and are therefore often looked upon as a somewhat "bulky" grain. Oats do have the benefit of containing a fair amount of fat, with a favourable fatty acid composition. A Danish experiment in the early 1970s also showed that oats had a positive effect on the hens' plumage. At the time, this effect did not receive much attention, but it ought to nowadays, since there is so much focus on the welfare of organic poultry.

Rye and triticale should only be fed to hens in very limited amounts, since both reduce the hens' appetites. Especially rye also gives diarrhoea and poor feed utilisation.

| Cereal species | Maize | Wheat | Barley | Oats |
|-----------------------------------|-------|-------|--------|------|
| Number of hens | 120 | 120 | 120 | 120 |
| Hen mortality (%) | 7 | 8 | 5 | 6 |
| Egg yield(eggs per 280 days) | 219 | 216 | 224 | 216 |
| Egg yield(g/egg) | 56.4 | 55.5 | 56.0 | 56.9 |
| Feed consumption (g/day) | 124 | 127 | 136 | 138 |
| Feed consumption (kg feed/kg egg) | 2.82 | 2.98 | 3.04 | 3.16 |

Effect of different cereals on egg laying and feed utilisation

An interesting observation was that the hens which were fed maize and wheat developed a poor plumage, whereas the "oat hens" had a fully-developed plumage. There was some feather pecking among the hens that were fed barley.

Maize contains lots of energy, fatty acids, and is theoretically a good feed for laying hens and broilers. Unfortunately, feed maize must be imported, and the economic and ecological benefits of the crop are thus rather questionable.

Protein feed

Protein feed for hens is one of the challenges currently being studied. It is no problem to compose a feed mixture for laying hens, which meets the requirements of the organic regulations. However, this often means importing foreign protein feedstuffs. This makes the mixtures expensive, but also increases the focus on the current attempts at finding crops and varieties which can give high protein yields with optimal protein quality under Danish growing conditions.

Rapeseed and rapeseed cakes are both rather suitable as hen feed, however, mostly as feed to hen strains laying white-shelled eggs. Many of the strains that lay brown-shelled lack an enzyme which helps to breakdown one of the characteristic flavour com-

pounds in rapeseed. In hens lacking this enzyme, the eggs will often have a fishy taste, and rapeseed products should only be used in very small quantities. Hens laying white-shelled eggs tolerate "normal" amounts of rape products in their feed.

Peas only have one drawback: their low content of Methionin. Otherwise, the pea varieties grown in Denmark are suitable as feed for laying hens and broilers.

Grass meal made from grass, lucerne or clover is often used in small quantities. Partially because it is an excellent source of protein, but also because it contributes to a good yolk colour.

Of foreign protein crops we would like to mention sunflower cakes and soy cakes, both of which are common ingredients in feed mixtures. Both are high in protein and have a suitable amino acid composition. Especially sunflower cakes have a high content of Methionin.

Broilers on the Bøvling Farm



Photo: Karen Munk-Nielsen

On the Bøvling Farm, not far from Skanderborg in eastern Jutland, Carsten Vejborg and Ingrid Kristensen were among the first to start producing organic broilers at a large scale. Carsten tells us a bit about the background: "After the production and sales of basic organic foods such as milk, eggs, vegetables and flour had stabilised, an increasing demand arose for organic meat products. I had been working with organic farming for many years, and was especially interested in poultry. Producing broilers was therefore a rather obvious choice."

Carsten started his first batch of broilers in 1998, and there have been broilers on the fields every summer since. In 2001, Carsten produced about 8000 broilers, of which half were sold to a slaughterhouse, the other half in the farm's own shop. Carsten continues: "The farm shop enables us to have close contact with our customers. This makes it easy to explain why good quality costs a bit more. We plan on producing "only" about 6000 broilers in 2002, but hope to sell all of these in our own shop."

Carsten keeps the chicks indoors for about three weeks, before putting them out on a freerange area, with small huts that house 170-180 chicks each. The chickens alternate every other year between regular pastures and a fruit orchard. There's no doubt regarding what both the chickens and Carsten prefer: "It's so obvious that the chicks feel much safer between the trees. It's too bad the establishment of large fruit orchards is so costly, but concerning the animals' welfare, future broilers should definitely have access to shade and protection under trees.

Carsten and Ingrid have had some visits from predators. The first year, a fox killed 474 chicks

in one night. That night, they learned the hard way that they needed a proper enclosure with houses that can be closed for the night. After having straightened things out a bit, they still have foxes in the area, but they no longer cause any serious harm. The biggest problem now are birds of prey. Regular guests include the northern goshawk and the common buzzard, but also the more seldom red kite. They do not hunt the birds of prey, but try to minimise losses by planting vegetation in the enclosures and establishing beds of Jerusalem artichokes.

Water – an important nutrient

Hens have a relatively high daily water requirement, since eggs mainly consist of water. Furthermore, their digestion system and physiology depends on rather large amounts of water in connection with the discharge of faeces. Chickens do not excrete urine and solid faeces separately. The two fractions are mixed before being excreted via the cloaca. Poultry excretions are often referred to as droppings.

Access to a smooth water surface makes it much easier for hens to drink. There are many suitable types of watering systems on the market. Certain functional requirements need to be met. Above all, the drinker must be easy to clean. Optimally, such cleaning should be part of daily routines, but regular checks can also help to detect when it is time for cleaning. Make sure to check if there is a fatty layer on the water. If so, this is usually a sign of coli bacteria. The drinkers should be cleaned with warm water and a soft brush. Chemical detergents are usually not needed, as long as the drinking system is cleaned regularly.

Unfortunately, nipple drinkers are often used in many henhouses, but these usually give too little water too slowly. The hens are not able to drink enough water, and their kidneys will have problems excreting excess protein.

Roughage as poultry feed

Nearly all roughage can also be fed to poultry. Grass growing in the free-range areas and on pastures is often the only roughage fed in summer. In winter, the main roughage is whole-crop silage. The hens eat it willingly, and it is easy to store as wrapped silage. Otherwise, all kinds of roughage can be used, perhaps except for very wet silage, which tends to spoil the bedding.

Root crops used to be a common poultry fodder, especially in the first half of the 1900s. Roots crops are excellent when it come to keeping the hens busy.

Broilers

In recent years, there has been a significant increase in organic broiler production. Nearly all broiler producers use movable broiler huts on grass-clover leys. Organic broiler production is mainly a summer activity, since the heating of the huts in winter is too expensive.

So far, this production is quite new, and in this book, we only present practical experience from a single farm, see page 165. Due to the increasing demand for organic poultry meat in Denmark, it is expected that the production volume will increase significantly within the next three to five years.