

Health and Welfare in Organic Poultry Production

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This review paper deals with the major health and welfare aspects of organic poultry production. The differences between organic and conventional egg and poultry meat production are discussed, with the main emphasis on housing and management requirements, feed composition and the use of veterinary prophylactic and therapeutic drugs. The effects of the legislation and statutes for organic farming on the health and welfare of the birds are also discussed, especially in relation to the biosecurity problems associated with free-range systems, the occurrence of behavioural disturbances in loose housed flocks and the use of veterinary drugs and vaccinations in general. The results from a questionnaire sent out to all Swedish organic egg producers, where questions about the farmer's perception of the birds' health status were included, are presented at the end of the paper. It is concluded that most of the health and welfare problems seen in conventional poultry systems for loose housed or free ranging birds can also be found on organic poultry farms. It is also concluded that there is a need for information about biosecurity, disease detection and disease prevention on organic poultry farms.

Laying hens; broilers; organic farming; ecological farming; legislation; housing; management; biosecurity; behaviour; animal welfare; disease; questionnaire.

Introduction

Whereas early organic farming was mainly focused on crop production, organic animal production has become an increasingly important sector during the last decade. In general, the statutes for organic animal husbandry are based on the same principles as organic plant production, i.e. sustainable resource utilisation without adding synthetic substances such as chemical fertilisers and herbicides. However, there is also the quite separate issue of animal welfare, as the rules state that animals should be raised under conditions, which allow them to perform a wide range of social behaviours, etc.

In spite of the growing popularity of organic animal husbandry, which is partly a result of environmental awareness among farmers and partly related to increasing consumer demand for organic products, there are only a limited number

of scientific publications related to animal health and welfare in such systems. Looking specifically at poultry, the number of publications is even smaller. Because of this, it is difficult to get a reasonable overview of the current situation in different countries and to synthesise current knowledge in a review paper like this. Instead, I will try to summarise the important differences between conventional and organic poultry husbandry and some of their – positive or negative – health and welfare effects. Most of this discussion will be based on Swedish experiences. I will also summarise the results from a questionnaire, which was recently sent out to all organic egg producers in Sweden.

By far the biggest association certifying organic products in Sweden is called KRAV, and they base most of their regulations on the

IFOAM (International Federation of Organic Agricultural Movements) standards. References to statutes for organic animal husbandry in the text below will generally be references to the latest version of the KRAV rules (*Anon.* 2000).

Differences in relation to conventional egg and poultry production

Loose housing – outdoor range

Freedom of movement is an important part of organic animal husbandry. The laying hens are kept loose housed on litter and often also slatted floor or tiers. According to the current statutes, stocking density may not exceed 6 hens/m² floor area (including slatted floor, tiers and nest box space). In practice, the housing systems applied for larger flocks (>1000 birds) of laying hens do not differ much from that used for conventionally kept loose-housed hens, except for a slightly lower stocking density. The main difference is that the organic hens are given access to an outdoor area (at least 4 m² per bird) during the warm season. This outdoor area should be mainly covered with grass or other types of vegetation, which means that it is difficult to use a permanent pasture area. For smaller flocks the solution is often some type of mobile hen house, which can be moved to a new pasture at regular intervals (*Ciczuk & Sjelin* 1996, *Bassler et al.* 1999). For bigger farms, block grazing can be applied, i.e. dividing the pasture into smaller stripes or sectors and alternating between these (*Charpentier & Odelros* 1997, *Odelros & Charpentier* 1999). To encourage the hens to utilise the entire outdoor area it is important to provide bushes or other types of shelter, which will make the hens feel less exposed to birds of prey (*Odén* 1996, *von Wachelfelt* 1999). Loose housing on littered floor and outdoor grazing is required also for other types of organic poultry. In addition to this, turkeys should have access to perches, and

ducks and geese should have access to water ponds during the warm season.

Antibiotics, anticoccidials

It is not allowed to routinely use any type of antibiotics or chemotherapeutics in organic farming. This means that anticoccidials (also known as coccidiostatics), i.e. drugs used to prevent outbreaks of the parasitic disease coccidiosis (*Eimeria spp.*), can not be used routinely like in conventional poultry husbandry (*Berg* 1999). Instead, vaccination of pullets is possible. Currently, the rules for organic animal husbandry do allow routine vaccination, when 'there is an obvious need and other methods of treatment can be regarded as less acceptable'. Vaccines consisting of or manufactured by the use of genetically modified organism may not be used in organic farming according to the Swedish KRAV rules. This means that KRAV has applied a stricter rule in this matter compared to what is stated in the EU legislation, which allows GMO-based vaccines when there is no other useful alternative available.

Feed composition

According to the statutes, a certain proportion of the feed given to poultry on organic farms should be produced on the home farm. Until recently, a temporary stipulation has allowed Swedish organic farmers to use some synthetic amino acids. Since August 2000, this is, however, no longer the case.

Trials with free choice of feedstuff have been carried out lately and have revealed large differences between individual hens in terms of amount of feed eaten and type of feed chosen (*Burel et al.* 1999)

Slaughter age

In August 2000 a number of EU statutes regarding organic animal husbandry were included in the Swedish KRAV rules. One of

these relates to the minimum age at slaughter, and states that poultry breeds which are not of a specifically slow-growing type, must be, for example, at least 81 days (broilers) or 140 days (turkeys and geese) at time of slaughter.

Medical treatment in case of disease

The rules for organic farming clearly state that animals showing signs of disease or injury should immediately be seen to and be given appropriate care (Anon. 2000, Sainsbury 2000). If necessary treatments are not carried out, the entire farm may lose organic labelling rights.

If antibiotics or chemotherapeutics are used in organic flocks, the withdrawal time for meat is double the official conventional withdrawal time (EU and KRAV rules) and at least 6 months (KRAV only). In practice, this means that any broilers or turkeys treated with antibiotics will not be allowed for KRAV labelling, as they will be slaughtered before the end of the withdrawal period. For eggs, the withdrawal time for organic flocks is double the statutory time.

Health and welfare aspects

It is stated that organic animal husbandry should be based on good animal housing, management and feeding, which will promote animal health and keep the level of disease low (Anon. 2000). This is based on the idea of 'Positive Animal Welfare' (PAW). The term PAW means satisfying the birds' needs in a way that provides for their behavioural requirements, not just negatively avoiding cruelty (Sainsbury 2000). However, some problems are likely to arise more or less regardless of management systems and others may be even more common in organic farming than on conventional farms.

Behavioural disturbances

Organic poultry kept in loose housing systems may, like conventionally managed poultry kept

under similar conditions, be affected by a number of behavioural disturbances. The most common problems in organic laying hens are feather pecking and cannibalism (Kjaer 1996, Sandøe 1996). It is known from research based on conventional egg production that these problems can be triggered by a number of different factors such as breed, feed composition, rearing environment, external parasites and other management factors (Gunnarsson 2000). Most likely, the same factors can lead to outbreaks of feather pecking or cannibalism in organic hens. For example, results from a recent Danish study showed that cannibalism was much more common in a certain commercially available brown hybrid than in the other, non-commercial, breeds studied under organic conditions (Sørensen & Kjaer 1999). However, it should be remembered that due to intense breeding efforts the commercial hybrids are continuously changing, both in terms of production capacity and temperament, and that it is therefore difficult to give any lasting advice regarding the choice of hybrid.

Cannibalism and severe feather pecking can certainly lead to deteriorated welfare for the birds. The high incidence of these problems in Danish organic layer flocks have led the Danish Animal Ethics Council (Det Dyreetiske Råd) to conclude that the current situation is not acceptable (Sandøe 1996). In severe cases, cannibalism can also lead to substantial mortality in organic flocks. Beak trimming to prevent cannibalism or feather pecking is not allowed according to the Swedish animal welfare legislation, and should anyhow not be accepted as a routine procedure in organic flocks anywhere (Sandøe 1996).

Loose housing of hens will, on the other hand, lead to improvements regarding other aspects of animal health, such as improved bone strength in loose-housed laying hens compared to caged birds (Appleby 1993).

Predators

Naturally, birds kept outdoors are more exposed to predators than birds kept indoors. Ground predators like foxes can effectively be kept away from the flock by an electric fence. It is more difficult to avoid birds of prey, but by providing natural shelter, like bushes, or artificial shelter roofs the situation can be improved (Bassler *et al.* 1999).

Biosecurity

Free-range systems, where the animals are allowed to go outside on pasture, will increase the exposure to a number of potentially harmful microbes like *Salmonella* and *Campylobacter*. If feeding pans are placed outdoors they may attract rodents and small birds, which may carry *Salmonella* bacteria (Bassler *et al.* 1999, Odelros & Charpentier 1999). If the feed is kept indoors this risk is substantially lower, but must still be considered as greater than in systems where the birds are kept strictly indoors (Berg 1999). This, in combination with the difficulties associated with sanitation procedures outdoors on grass-covered areas after an eventual outbreak of salmonellosis, is the reason why organic farms are not allowed to participate in all parts of the official Swedish *Salmonella* control programme (Ekstrand 1996, Charpentier & Odelros 1997, Berg 1999). However, sampling for *Salmonella* is routinely carried out on all commercial egg farms. The major retail chains also demand extended *Salmonella* testing, in addition to the official control programme, in organic egg farms. To date, no *Salmonella* outbreak has been detected in Swedish commercial flocks of organic laying hens (Jansson, pers. comm), and no human cases of salmonellosis have knowingly been linked to consumption of organic eggs.

Another infection that can be expected to be more common in free-ranging birds is erysipelas, caused by the bacterium *Ery-*

sipelothrix rhusiopathiae, which is ubiquitous in nature. The disease is more commonly seen in turkeys but can also be found in hens. It can lead to chronic polyarthritis but also to rapid increases in mortality as a result of septicaemia in severe cases (Charlton 1996).

Campylobacter infections, which are not a problem for the birds but for the poultry meat consumers, are extremely difficult to avoid when broilers are kept outdoors (Berg 1999).

There are also a number of intestinal helminths, which may affect free-ranging and organic birds (Kjær 1996). For example, Danish researchers have found *Ascaridia galli*, *Heterakis gallinarum* and *Capillaria obsignata* in more than 50% of the organic/free range laying hens examined (Permin *et al.* 1999). However, the significance of these infections in terms of bird health has not been assessed (Thamsborg *et al.* 1999). The most efficient way of reducing the parasitic load is to change pasture grounds often (Charpentier & Odelros 1997, Bassler *et al.* 1999). For free-ranging broilers, new pasture areas can be provided for each batch of animals, as a part of the all-in-all-out system (Thamsborg *et al.* 1999). Currently, any grazing area has to be kept without birds for a period of at least two months in-between batches. In Sweden, several organic farmers keep their birds indoors during the winter season.

Coccidiosis

The small protozoan parasite causing intestinal coccidiosis in poultry can be found almost everywhere birds are kept (Berg 1999). The disease mainly affects young birds, however older flocks may experience outbreaks in association with other stressful events. Today, a reasonably safe and effective vaccine is used for almost all pullets reared for organic egg production (and also for many conventional flocks). As will be discussed below, the pullets are not reared according to organic standards, but when the pul-

let rearer is informed that the birds will later be used for organic egg production vaccination will be applied instead of using traditional anticoccidial drugs during the growing period. For broilers, which have to be given an efficient vaccine very early in life because of the short and rapid growing period, the vaccination issue can not yet be regarded as solved, although research is undertaken (*Waldenstedt* 1999). In any case, good hygiene and dry litter will be necessary to avoid problems (*Karlsson* 1996, *Odelros & Charpentier* 1999). It should also be remembered that the rules state that 'the vaccination policy may be subject to change in the future', which means that the current generous policy may be restricted later.

Nutritional balance

The protein balance in organic poultry feed is a potential problem (*Elwinger* 1996). A number of Swedish organic egg producers have expressed great concern about the recent complete ban of synthetic amino acids in layer feed (*Odelros* 2000). The main worry is that the conventionally available layer hybrids have nutritional requirements that may be difficult to meet unless extra amino acids can be included in the diet (*Berg* 1999, *Odelros* 2000). If so, the resulting imbalances or deficiencies may possibly result in health problems and behavioural disturbances, such as feather pecking or cannibalism (*Elwinger & Wahlström* 2000a, 2000b, *Odelros* 2000).

Slaughter age

The consequences of the new rules for minimum age at slaughter for meat type poultry are as yet unknown. They have led to increasing general interest in 'alternative' breeds, such as the 'Label Rouge' currently used in France and other countries, such as Denmark (*Nielsen et al.* 1999, *von Wachenfelt & Odelros* 1999). For biosecurity reasons, live animal imports to

Sweden are limited, and currently restricted to grandparent stock. It is doubtful if the demand for slow-growing broiler and turkey breeds for organic production in Sweden will be large enough to support a set-up of grand parent flocks within the country. The alternative, i.e. increased import of eggs or live birds aimed for slaughter, may on the other hand increase the risk of introducing contagious viral or bacterial diseases not currently present in the country. This may cause serious outbreaks affecting animal health and welfare in both organic and conventional flocks.

Rearing the conventional broiler hybrids for as long as 81 days or more will make it necessary to develop completely new feeding strategies to avoid, for example, leg weakness, and it is still uncertain what other health and welfare effects such a long growing period will have.

Veterinary drugs, alternative therapeutic methods

The use of antibiotics and chemotherapeutics is generally low even in conventional Swedish egg and poultry meat production. The use of growth promoting antibiotics has been banned in all types of animal production since 1986. For other species, the prolonged withdrawal periods in organic farming have led to discussions about possible under-treatment of diseased organically kept animals, leading to unnecessary suffering. In poultry, this has not been an issue. The use of alternative treatments, such as herbal medicines or homeopathic drugs, has so far been very limited (*Odelros*, pers. comm.)

The questionnaire – health and welfare in Swedish organic poultry production

In order to gather information about current practices, a questionnaire with questions related to housing, production levels and the health of the birds were sent out to all Swedish organic egg producers during spring 2000. This

was initiated by the poultry advisor Åsa Odelros and funded by the Swedish National Board of Agriculture. Of a total of 115 producers, 56 (49%) had returned the questionnaire by the end of July 2000. The design of the questionnaire was open, allowing and encouraging the farmers to formulate their own answers and give comments, instead of using a 'multiple choice' design. This means that it is sometimes rather difficult to quantify the different answers, but on the other hand much extra information can be found.

Of the farmers answering the questionnaire, all were egg producers, however eight also kept other types of poultry, such as geese, ducks and quail in smaller scale (not necessarily for organic production). Currently, no broilers for the general market are grown organically in Sweden, although some trials have been carried out during the last few years.

The number of laying hens per farm varied from 12 to 10000 (with a mean of 1670 and a median of 895). Comparing these figures with data obtained from other sources, it can be concluded that larger farms are slightly over-represented among those returning the questionnaire. The total number of organically kept laying hens in Sweden is approximately 140 000, which roughly corresponds to 2.5% of the total population. In general, flocks of less than 50 hens can be considered as 'back yard' flocks, kept on farms concentrating on other types of organic production for commercial purposes. Flock size varied from 12 to 1700, where the 'standard' commercial organic flock size is probably around 500-1000 hens. Historically, brown hybrids have been dominating the scene, but during the last few years the white hybrids have become increasingly popular because of their temperament (see below) and currently about 75% of the flocks are white. International conventional hybrids, like the white Hyline and LSL or the brown Dekalb Gold, ISA

or LB, are frequently used. Only some smaller flocks consist of hens of traditional country type or purebred hens of show type. Most of the organic egg producers have been running for less than five years, although some of them do have experience from earlier conventional egg production.

Twenty-three farms (41%) reported the presence of some kind of hygiene barrier for changing boots and/or clothes before entering the hen house, to improve biosecurity. Larger farms (>1000 hens) were more likely to have hygiene barriers (52%) than smaller farms (31%). The importance of proper hygiene and biosecurity routines is stressed in Swedish literature aimed at organic poultry producers (*Charpentier & Odelros 1997*), but it still seems to be rather difficult to convince the producers about this.

The organic egg producers buy their pullets at 16 weeks of age from conventional pullet rearers, as organically grown pullets are hard to find in Sweden. After a 6-week transition period, the eggs can be sold with organic labelling. The farmers rarely ask for or receive details about the rearing experiences of their birds. Considering current knowledge about the importance of rearing methods for the later health and well-being of laying hens (*Gunnarsson 2000*) it is surprising that this does not attract more attention. For example, very few of the producers have reported in the questionnaire that their hens have been vaccinated. It is, however, very likely that the hens had been vaccinated as chickens/pullets according to the standard scheme (Marek's disease, avian encephalitis, infectious bronchitis), as they have not been reared separately from conventional pullets.

The need for medication to treat disease seems to be very limited. Three farmers reported having used some kind of anti-parasitic treatment over the years, and one reported the use of homeopathic drugs for preventive purposes, although it was unclear against what.

The reported mortality in layer flocks from start of production to slaughter varied from approximately 1 to 60%, with a mean value of 9% and a median value of 6%. These figures are difficult to interpret, as some flocks are still alive, and some back yard flocks are not run on an all-in-all-out basis, but instead kept together for generations until some hens are very old. Also, the number of farmers not reporting mortality figures was substantial. Several farmers commented that high mortality has mainly been a problem in brown flocks, as a consequence of cannibalism. As a comparison, *Sørensen & Kjaer* (1999) reported a mortality of approximately 20%, mainly related to cannibalism, in a commercial brown hybrid under organic conditions.

A total of 26 farmers (46%) mentioned the occurrence of cannibalism, mainly during start of lay. In most cases the farmers reported that the cannibalism only affected a limited number of hens and that this did not result in any permanent injuries. In some cases, however, the cannibalism resulted in increased mortality. Several of the farmers having experienced severe outbreaks of cannibalism reported a change of hybrid from brown to white for the next batch, and seem to be satisfied with this.

Also, a rather high proportion (25 farmers, 45%) mentioned the occurrence of feather pecking, mainly in brown hens. In the comments, one farmer considered this a 'necessary evil'; another one saw it as a stress symptom, and yet another one blamed it on the presence of cockerels in the flock.

The foot health of the layers was generally described as good. Eight farmers mentioned foot problems, mainly bumble foot, but this only affected a small number of hens in the flocks.

It is difficult to estimate the incidence of coccidiosis among the organic hens. Only three farmers reported that they might have had hens suffering from coccidiosis in their flocks. No

samples were taken to confirm the diagnosis and mortality was low.

Problems with external parasites seem to be rather wide spread. Fifteen farmers (27%) reported the presence of red hen mites (*Dermanyssus gallinae*), mainly in the summer. Three farmers with back yard flocks mentioned other types of external parasites, such as lice (*Knemidocoptes gallinae* and *Menopon biseratum*) and leg parasites (*Knemidocoptes mutans*). This is not surprising in flocks where all-in-all-out procedures are not practised. No farmer reported problems with intestinal helminths.

Under the heading 'accidents', 14 farmers reported single occasions where hens have been caught in the housing system and where this led to injuries or deaths. This indicates that there is still room for improvements in the design of the housing systems, to avoid future accidents. One farmer mentioned losses due to fox attacks, and another one mentioned losses caused by birds of prey. If this is representative, predators play only a minor role in decimating the flocks.

Conclusions

From this discussion of different health and welfare aspects on organic poultry production, a few major conclusions can be drawn:

- Most of the health and welfare problems seen in conventional poultry systems for loose housed or free ranging birds can also be found on organic poultry farms.
- The organic poultry farmers are often enthusiastic, but sometimes lack basic poultry knowledge.
- There is a need for information about biosecurity, disease detection and disease prevention on organic poultry farms.

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Sammanfattning

Hälsa och välfärd i ekologiska fjäderfäbesättningar

I denna översiktsartikel behandlas hälso- och djurskyddsfrågor inom ekologisk fjäderfäupfödning. Skillnaderna mellan ekologisk och konventionell ägg- och matfågelproduktion diskuteras, med betoning på inhysning och skötsel, fodersammansättning samt användandet av veterinärmedicinska preparat i förebyggande och botande syfte. Effekterna av lagstiftning och regelverk för ekologisk djurhållning på hälsa och välfärd hos fåglarna diskuteras också, särskilt med avseende på smittskyddsproblem relaterade till utomhusvistelse, förekomsten av beteendestörningar i frigående flockar samt användandet av mediciner och vaccinationer i allmänhet. Resultaten från en enkät utsänd till alla svenska ekologiska äggproducenter, där frågor om djurägarens uppfattning om fåglarnas hälsostatus ingick, presenteras i slutet av artikeln. Slutligen konstateras att huvuddelen av de hälso- och djurskyddsproblem som kan ses i konventionella inhysningssystem för frigående höns också kan återfinnas inom ekologisk fjäderfäupfödning. Det konstateras också att det finns ett behov av information om smittskydds- och hygienätkande, fjäderfäsjukdomar samt förebyggande djurhälsovård inom ekologisk fjäderfäproduktion.