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# Trends in poultry production

*The further development of alternative housing systems for laying hens is dependant on the form of production as defined in a new marketing standard. Desirable would be the reduction of the present five declaration possibilities to three (battery cage, alternative and free-range).*

*In poultry meat production, the changes in structure and integration continues. Technical innovations towards reducing paid labour and the control of labour peaks remain, therefore, exactly as much in the centre of attention as do new developments for ensuring product quality.*

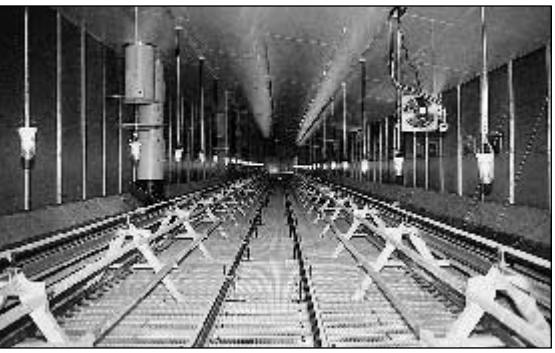

*Fig. 1: On-floor housing with A-frames and plastic gratings*

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**Keywords**

Furnished cages, aviaries, alternative housing systems, poultry meat production

The development of layer housing design and technology is currently greatly influenced by the new EU guidelines for the establishment of minimum standards for the protection of laying hens (in brief: Hen Housing Order/HHVO) of June 15, 1999. In this EU Standard are defined concrete requirements for alternative production forms with, from January 1, 2012, a so-called furnished cage replacing conventional batteries. For broiler and turkey production, concrete EU requirements or national regulations on production criteria are not in place. In the meantime, however, fundamental values have been established on a voluntary basis over all federal states in Germany which are more concerned with the protection of the animals' welfare and with environmental protection and remain to be translated into technical terms. The economically difficult surrounding conditions, especially in broiler production, demand technology improvements for further labour rationalisation and computer-supported management help. In total, the structural conditions in poultry production are influenced by the increasing public discussion over 'safe food', and assurances as to source and quality. Technical innovation towards the identification, measuring and inspection of eggs and poultry meat are therefore necessary.

### Furnished cages for layers

In its new HHVO the EU requires an increase in the minimum space per layer in cages to 550 $cm^2$ and that the cages should be fitted with a claw abrasive strip as from January 1, 2003. From January 1, 2012 furnished cages should take over entirely from conventional battery cages. The minimum requirements for furnished cages are defined as follows:

- Cage floor area of at least 750 $cm^2$/bird including 660 $cm^2$ of usable area;
- Equipment to include nest, scratching area with litter and 15 cm perch;
- 12 cm of unlimited trough usage;
- Fitting of claw sanders in all cages.

The poultry equipment manufacturers face the demanding challenge of having to develop a new production system which comprises the demands of bird welfare protection and at the same time, however, takes account of the aspects work and product quality, function security, automation and economical viability. Whilst the integration of perches in a somewhat higher cage should present no problems, and family nests with automatic expelling systems have already been developed for alternative poultry production and can be fitted into cages in an adjusted form, one can only view with apprehension the development of scratching areas with litter within a cage system. The search for a suitable litter substrate that promises comfort for the bird, meets hygiene demands, and can be automatically delivered to each cage is proving extraordinarily difficult. The discussion, too, over the optimum size of group in the new cages is still open. Backing the choice of larger bird groups per cage are the cost per bird place and the better exploitation of nest and scratching areas, as well as the possibility of appropriately modifying existing large-area cages used at the moment, e.g., for broiler breeder flocks. According to Swedish experience, groups of ten to 12 birds per cage have the advantage of easy-viewing for the manager and a stability of bird social structure as well as the least danger from aggressive pecking with cannibalism losses where birds have their bills unclipped. The question of when and which furnished cage will establish itself depends, therefore, on experience in practical conditions (currently different models of furnished cages are being tested in seven German commercial enterprises), from the evaluation by the veterinary council of the EU in 2005, and from consumer acceptance.

### Alternative production systems for layers

The technical further-development of on-floor and aviary systems for layers is also characterised through the new EU guidelines. Thus, the HHVO requires a maximum stocking rate of nine birds/$m^2$ usable area, at least 15 cm perch space and 1 $m^2$ nest space for a maximum of 120 layers from January 1, 2002 for newbuilt systems and from January 1, 2007 for reconditioned older accommodation. In aviaries the demand is for a maximum of four levels one over the other with a minimum distance between each of 45 cm whereby the manure in such an etage system must not be able to fall onto the level below. The aviary system trends therefore move in the direction of littering the entire floor of the building and raising the first etage in order to thus increase the movement

area and therefore the stocking rate. Because of the strong development of dust in aviary systems, different litter substrates will have to be tested in the future and the housing atmosphere improved through the application of filters, air washers and moisturising plants.

Another solution is housing on a complete floor grid system with littered scratching area within a roofed 'henrun' linked to the building. With equipment elements, value is put on durability, constructional quality, and ease of cleaning. For perches, the earlier wooden beams have been replaced with metal pipes and plastic rods produced with a view to bird welfare requirements. Space-saving solutions available for on-floor systems include frames built over the manure pit and perches over the drinker or feeder lines. For more undisturbed laying, family nests have established themselves over individual nest systems. Nowadays, a wide pallet of nest variants with automatic expelling systems and egg collection belts are available. In such nests the litter is replaced by plastic grass or rubber-finger flooring which offers no problems with hygiene and labour-saving egg collection. The actual breakthrough for aviary systems which represent a more cost-efficient production than on-floor systems, depends on under which terms the produced eggs can be marketed. At the moment the eggs produced in aviary systems can only be marketed as a free-range where an outdoor run for the hens is included in the system.

### Aviaries for chick rearing and broiler parent production

Aviary rearing will gain in importance in future chicken rearing. This system allows high stocking rates (36 birds/$m^2$), is cost-efficient, and gives the young birds optimum freedom of movement and natural comfort. It also allows a flexible transition for the birds to other laying systems which is not the case where cage or on-floor systems are used. Up until now, there has been a deficit in aviary rearing places. This will change quickly, however, provided equipment manufacturers offer variants which will encourage long-term adoption of the system. Worthy of welcome are detail improvements such as, e.g., automatic folding landing areas, perches designed on an animal welfare basis, or bird-catching aids for vaccinations. Broiler parents are mainly kept in on-floor systems, brood egg production partly takes place, also, in large area cages. Aviary systems designed for layers are only conditionally suitable for heavier broiler parent flocks. This market niche is now being filled by aviary systems specially designed for broiler parents. This system takes account of the limited flight capabilities of broiler parents by introducing a reduced distance between the movement areas and the roofed landing platforms. The family nests are integrated in the aviary block, important for the improvement of nest acceptance when feeding is restricted. Aviary housing also allows stocking rates for broiler parents up to three times that possible with on-floor systems.

### Poultry meat production

With open housing and conventionally-built broiler or turkey houses, two well-developed housing systems are already available for intensive feeding enterprises. In German states which have completed voluntary agreements, there is a recognisable future for new-built daylight housing whereby the daylight area must cover at least 3% of the building floor area. New in Germany is the creation of a premium line of labelled broiler meats from birds produced with an outside scratching area and access to outdoors. As far as the housing equipment elements are concerned there is, above all, a need for optimising feeding and drinking equipment as well as ventilation, catching and loading technology and slaughter technology. Thus nowadays feeding bowls have been evolved in such a way that no introduction of feeding plates or egg stools are required for chickens in their first days. Fully automatic pans with compressed air cylinders allowing simultaneous access to feed for all birds, an important help in achieving uniformity of flock members where feeding is rationed. Through adjusting available feed to consumption levels, waste can be reduced. Finally, universal feeding systems with a single feed line but interchangeable bowls means the system can be used with different types or ages of poultry.

Innovations in the drinking water supply aim at a combination of the advantages of nipple drinkers and automatic drinkers. This gives a higher flow of water but less waste. Additionally, the form of the drinking bowl is designed with stronger awareness of the anatomy of the birds and the different drinking behaviour of land and water fowl. Automatic weighing systems, an important support for management over years in many feeding enterprises, are now available in variants without cables. In ventilation management the trend in conventionally-built housing moves towards combined ventilation. The planning target in open housing is also an air exchange rate of at least 4.5 $m^3$ per kg liveweight in summer. This means that support fans cannot be done without in naturally ventilated housing. An additional cooling effect can be achieved through air humidifiers whereby the development of difficult-to-manage high-pressure misting systems moves towards water-sparing so-called pad-coolers where the total intake air is sucked in through moistened plastic material in a tunnel ventilation system. The catching and loading of broilers, up until now a peak labour operation only capable of being handled with outside help in an all-in all-out system, can nowadays be completely automated in a method which takes account of bird welfare. Used here are poultry catching machines usually shared between many enterprises. Whereas this system has already started to be applied in practice in the USA and Britain, it remains difficult to convince the public about it in Germany.

Advances are also being shown in slaughter technology hygiene. A system from the Netherlands makes possible, for instance, simultaneous venting and vacuum withdrawal of the innards. This single operation substantially reduces the risk of faecal contamination of the carcase.

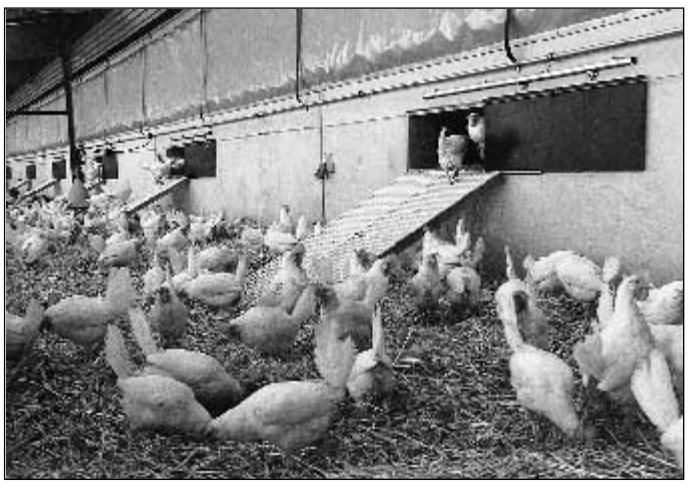

*Fig. 2: Scratching area in layer accommodation with dust baths*