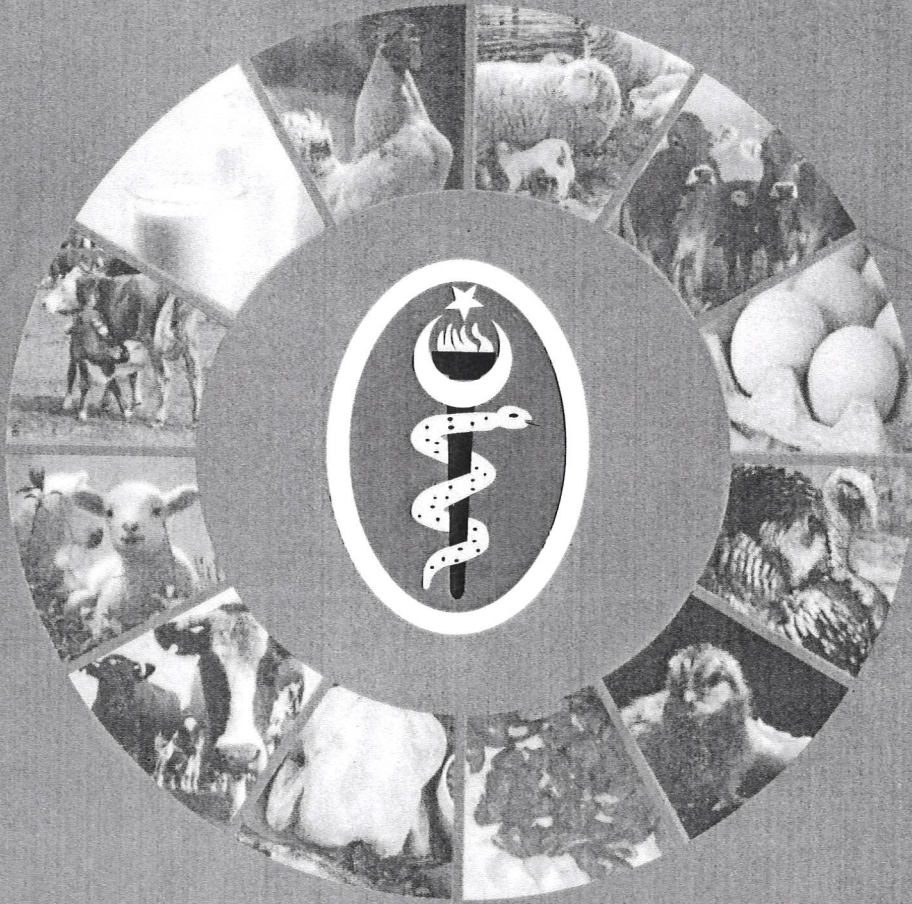


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**Organic animal husbandry in the European Union:
standards, regulations and practice with special
consideration of ruminants**

Gerold Rahmann

Organic animal husbandry in the European Union: standards, regulations and practice with special consideration of ruminants

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Abstract

In comparison to conventional and intensive farming, the guidelines mentioned above guarantee high quality processing in terms of environmental, animal husbandry, and socio-economic issues. Hence, organic farming is unequivocally regarded as being more sustainable. Standard works, however, supply only marginal guidelines regarding the management of product quality in organic meat production (Tauscher et al. 2003).

Framework conditions for organic animal husbandry measurably exceed the standards of conventional husbandry. Thus, certain methods of keeping the animals, certain food stuffs and additives, as well as means of production and breeding possible in conventional agriculture are deliberately rejected. On the other hand, husbandry conditions promoting animal welfare and health are needed and poorer performance by the animals as well as a higher degree of labour intensiveness are being accepted. The aim is not to make short-term profits, but to achieve long-term animal welfare and organic husbandry.

1 Introduction

In our society, high quality food is plentifully available. There is a general expectation that food must be good as well as cheap. Many people, however, are not aware of how it is produced. This also applies to food produced from animals. Many people think that the animals which provide our food live on idyllic farms with green pastureland. Even toddlers are pleased with this image, for example, in children's books, films, and toys. That this image seldom corresponds to reality is not mentioned, and it is not something many people are interested in. Only isolated

occurrences in the food industry raise public awareness and often turn into scandals with partly exaggerated reactions which only rarely have a long-lasting effect. The BSE-crisis is only one example. Yet, all consumers share in responsibility for the conditions to be found in animal husbandry.

Thus, it seems to be an irresolvable dilemma that people demand ever-improved but cheaper food, when at the same time they have mounting expectations with regard to an environmentally friendly production, taking into account animal welfare and saving resources. Organic farming – and thus organic animal husbandry – could present a way out of the dilemma. Organic animal husbandry is seen as an environmentally friendly, animal-welfare orientated, near-natural way of producing high-quality food with a minimized pesticide content. It is, therefore, a socially acceptable method of animal husbandry. Within the last decades, the importance of organic farming has increased steadily.

Organic animal husbandry is based on established and monitored production and processing guidelines. In 1999, EU-directive 1804/99EU on the legally binding minimum standards of organic animal husbandry was passed and has been in force since 24th August 2000. It describes exactly the production processes to be adhered to in order to claim organic or ecological production, for example with organic labelling. Higher standards than those required by the EU-regulation, are laid down by the agricultural associations of organic farming.

Using civil law as a basis, the organic associations have established regulations by which exceed the minimum standards of EU-directive 2092/91. Important examples of the higher standards set by the organic animal husbandry associations are:

- Entire farm conversion to organic production
- Minimum levels of fodder to be produced on site
- More stringent regulations for feeding, food stuffs and additives
- A lower density of stock kept in stables and on pastures
- Stricter regulation of animal welfare
- Lists of prohibited veterinary drugs
- Regulation on transport and slaughtering more in line with animal welfare
- More specific regulation on processing
- More detailed monitoring of how well guidelines are observed

2 Why Organic Animal Husbandry?

In order to be able to assess and understand the standards and guidelines of organic animal husbandry, some fundamental knowledge is required on the developments in organic animal

husbandry, as well as on the function of animals within the organism of a farm. These form the basis for the guidelines laid down for organic animal husbandry. The keeping of domesticated animals has undergone considerable changes during the last two centuries. Unfavourable local conditions were compensated for by technology and transporting means of production and products worldwide. Animal husbandry became more independent of local natural conditions. Production became more and more oriented to market opportunities instead of self-sufficiency. Enormous biological, mechanical, and organizational and technical progress, has led in very short time to huge performance increases in animal husbandry. The consequences of the ever-more intensive methods of animal husbandry have been considerable environmental problems, overproduction, serious concerns for animal health and welfare. The external costs in the form of environmental damage caused annually by conventional farming in Germany, was 1,996 billion € in 1996. Pretty et al. (2002) established a cost for environmental damage of 115€ per hectare of agriculturally used land, or 268 € per hectare of land used as fields (in comparison: Great Britain 338 € or 370 € respectively; USA 80 € or 110 €). Usually, these costs (environmental protection, purification of drinking water, etc.) are paid for by the taxpayer or consumer. A large part of these costs can be avoided by conversion to organic farming (Rahmann 2004; see Table 1).

Table 1: Differences between conventional and organic animal husbandry

	Conventional	Organic (2092/91/EEC)
Breeds, origin	High performing special breeds and cross-breeds depending on the targeted products	Only animals reared on organic farms, diversity of breeds, sometimes rare breeds of working animals
Housing (buildings and free runs)	Animal protection laws (requirements for keeping animals according to species)	Special requirements for keeping animals oriented towards animal welfare (occupation-density, size of buildings, tethering inside the stable forbidden, etc.)
Feeding	According to current food stuffs legislation (permitted food additives such as enzymes, synthetic amino acids, etc.)	Food stuffs produced as much as possible on site, feeding according to animal welfare (among other things, minimum requirements of roughage) only specifically permitted additives, no synthetic amino acids, no genetically modified organisms
Management and treatment	Managed breeding, sometimes with the aid of hormones, stable-wide prophylaxis and preventative use of drugs, legally required waiting periods according to drug prescription laws	No preventative use of drugs (exception: legally required inoculations), only two allopathic treatments per year, double the withholding period after use of drugs. Restricted interference with the animals' integrity (removal of horns, shortening of beaks, shortening of teeth, docking of tails, etc.)

Source: Tauscher et al. 2003

3 The Role of Animal Husbandry in Organic Farming

The correlations between animal husbandry and plant cultivation are only part of the complex agricultural organism. In addition, there are other correlations with the conditions arising from the natural and social context, with the structures of a farm, and with the needs and resources of the people managing the farm. Only when all parts are balanced, is the organism of the farm in a healthy state. Any farmer keeping animals makes an effort – often intuitively – to balance the keeping of his animals with this wholeness.

Organic animal husbandry is no exception in that the production of food and animal raw-materials is of prime importance. Additionally, working animals perform non-material services and services of use within a concern (Table 2). In this context the multi-functionality of animal husbandry (agriculture) is sometimes mentioned.

Table 2: Products and services provided by working animals

Food	Raw-materials	Non material services	On-farm services
- meat	- feathers	- therapy	- manure
- milk	- wool	- recreation	- consumption of rest products
- eggs	- furs	- landscape preservation	- pollination of plants
- blood	- hair	- transport	- pest control
- honey	- bone	- hunting	- guarding
	- thread (silk)	- human protection	
	- medicines	- sports	
		- status	
		- research	

Animal husbandry plays a central role in organic farming. Most of the organic farms practice animal husbandry. In bio-dynamic farming, the keeping of cattle is obligatory. In addition to the production of food, animal raw-materials, and non material services (services delivered by animals), the services obtained through animal husbandry are of particular value within a concern, and are of great importance for organic farming. Animal husbandry makes use of the plants produced by green manure cultures on fields, makes use of leftovers, and produces not only food and raw-material from these substances, but also „muck“, the farm fertilizer extremely valuable in organic farming. Therefore, it is an integral part of the cycle of organic management, and as such has been laid down in the EU-regulation.

4 The basic principles and standards of organic ruminant keeping

Adapted and sustainable farming systems are the backbone of organic farming. A holistic approach considers soil, plants, livestock and humans in mutual relations in the farming cycle.

Since the early 1920s, the standards for organic agricultural farming have been generated in a long process over many decades at the individual level. The basic principles and standards of organic animal husbandry of the IFOAM cover:

- conversion periods,
- adapted stock densities,
- farm fodder production,
- high standards in animal welfare,
- the general prohibition of GMOs and derivatives in the whole production chain,
- no synthetic disinfection strategies in stables and equipment,
- no allopathic disease prevention,
- no antibiotics and hormones in animal feed and
- an independent certification of the production, packaging and processing.

The private standards of organic farming are used for formal and legislative regulations on organic farming in several countries. Since the 1990s, several countries have defined formal regulations for organic farming. The EU regulation on organic crop production (without organic animal husbandry) was announced in 1991 (2092/91/EEC) and financially supported under the agri-environmental programme 2078/92/EEC and under 1257/99/EC of the AGENDA 2000. Comparable to organic crop production, organic animal husbandry needed to be defined, regulated, certified and monitored at the state level. The EU filled this missing link with the regulation 1804/99/EC, which was negotiated over a period of six years. The regulation became valid on August 24, 2000 and became part of the regulation 2092/91/EEC. Formal multi-national regulations like 1804/99/EC are compromises, because they have to be considered in light of the different conditions of the partner countries: from arctic to tropical, from humid to arid, from private to communal land-use systems, from favourable to less favourable production conditions, as well as from large-scale to small-scale farming systems. The compromises in such regulations need to be discussed and developed according to implementation.

Most of the regulations in 1804/99/EC (written in eight annexes) are valid for all livestock on organic farms, without specification of the species. Cattle, sheep and goats are not considered equally. While cattle are well described, sheep and goats received only scant attention. The treatment of the most important livestock species is described in a very detailed manner in the Annexes of 1804/99/EC. Not all regulations are useful for all farm conditions and systems throughout the EU, and some important aspects are overlooked. In such cases, higher private and common standards of organic farming or regulations for specific animal species (aquaculture,

rabbits, deer, etc.) on the national level are valid, as long as they do not contradict the regulations in 1804/99/EC. This can lead to inter(agri)cultural misunderstandings and disagreements between different national standards (e.g., important for intra-EC-trade). Some key aspects of 1804/99/EC for organic ruminant keeping are discussed below:

4.1 Farmland-related animal husbandry

Livestock plays an important role on organic farms, e.g., in nutrient cycling. Landless animal husbandry is not organic and thus prohibited. The limited livestock density does not exceed 170 kg nitrogen per hectare per year and is measured in livestock units (LU). In a Europe-wide context, the use of livestock units (Table 3) is difficult and ignores the different sizes, and therefore, weights, of different breeds as well as the different environmental conditions. A Galloway steer is not comparable with a Charolais steer; rocky, swallow and steep pastures can not be compared with fertile and deep soils. Apart from agri-environmental programmes (1257/99/EC), which are not liable for organic farming, lower and adopted stock densities - as suggested in 1804/99/EC Annex I B 7.3. and 7.5. - are not actually defined. Only some private organic farming associations have lower regulations. Therefore, the certification procedure has to prove a proper livestock-farmland-ratio where environmental contamination has to be minimised.

Table 3: Maximum numbers of ruminants per hectare and year (≤ 170 kg N/ha/y)
(Source: extracted from 1804/99/EC, Annex I B 7. and Annex VII)

• Dairy cows and male cattle above 2 years	2
• Female cattle above 2 years (not lactating)	2.5
• Male and female cattle between 1 and 2 years	3.3
• Fattening calves and other cattle under 1 year	5
• Ewes and mother goats	13.3

4.2 Conversion of farm branches and livestock

It is possible to convert just one branch of the farm to organic production, e.g., only the crop production, but not animal husbandry, or dairy cattle keeping but not pig keeping. If there is a clear spatial separation (farm land, feed and dung storage as well as stables), the same animal species can be kept organically and conventionally by one farmer. A clear separation is needed to avoid contamination (e.g., prohibited disinfectants or feedstuffs/feed materials which are not in the 1804/99/EC Annex II) and mixing of inputs (e.g., feeds and dung).

Comparable to crop production, the conversion period for pastures for ruminants is 24 months. The conversion period starts with seeding of annual crops and planting of permanent plants (pastures, shrubs, trees) after the last conventional utilisation (grazing, moving). After 12 months without prohibited treatments, grass and shrubs are viewed as "in-conversion feedstuffs/feed

materials". After 24 months, grassland has withstood the converting period and is considered an organic feedstuff.

Table 4: Conversion periods for ruminant pastures and their products
(Source: 1804/99/EC Annex I B 2.1.1. and 2.2.1.)

Animal species and use	Conversion period
• Pastures for herbivores (ruminants, horses)	24 months (like crop production 2092/91/EEC)
• Beef cattle	12 months; minimum of $\frac{3}{4}$ of the animals life
• Milk (cows, sheep and goats)	6 months
• Small ruminants	6 months

Milk can be sold under the label "organic" 15 months after the start of conversion: after 12 months 60% own feed "in-conversion" is available and 30% DM (dry matter) of annual needs of organic feedstuffs/feed materials and 10% conventional feeds is purchased. After six months with this feed, milk can be declared "organic" (Table 4). Besides the feeding rules, all other relevant regulations for organic farming have to be followed (animal handling, etc.).

If the whole production unit (livestock, pastures and feeding crops) is converted simultaneously, and the livestock is mainly fed own feedstuffs, there is no extra converting period for livestock. This means milk and meat can be labelled as "organic" despite the fact that livestock are not fed organic feed, but only "in-conversion feedstuffs/feed materials," and probably 10% conventional feeds. This is only an advantage if organic feeds can not be purchased.

The regulations of purchasing livestock from organic farms only is directed at avoiding any possibility of contamination originating from conventional farming. Three exceptions: the conversion period of the production unit; the herd establishment; restocking after epidemics (e.g., Foot and Mouth Disease epidemic in the U.K. in 2001) and natural calamities (e.g. earthquake). If young stock is purchased from conventional farms, the maximum age at time of purchase is six months for calves and 45 days for lambs and kids (just after weaning and used for breeding purposes).

The fourth exception allows that 10% of the female breeding stock of cattle and 20% of female breeding stock of small ruminants can be purchased every year from conventional farms if they are not available from organic farms (pregnancy is possible before first delivery). Male breeding stock from conventional farms can be used if the regulations are followed (it has not been clearly defined if this holds true without a conversion period). The acceptance of the certifying body is required.

4.3 Feeding of organic livestock

The definition of farmland-related animal husbandry with kg nitrogen per hectare and year does not set the origin of the feedstuff. The statement that livestock has to be fed 'predominantly' with self-produced feedstuff is not specific enough. Organic feeds can be purchased from other organic farms and 10% dry matter (DM) of conventional feeds (positive lists) or a maximum of 25% DM per day (exception for mobile herds), respectively, are even allowed for ruminants until September 2005. A maximum of 30% DM of "in-conversion feedstuff" (after 12 months of conversion; see above) can be fed to organic livestock even when products are to be sold under the organic label. If the feed is produced on the own farm, a maximum of 60% DM is allowed. Recently, processed and mixed feeds were not considered in 1804/99/EC Annex II (positive lists) of the regulation. Single components are the basis for certification as long as there are no declaration and certification standards described for mixed feeds. The problem is the insufficient declaration of components used in mixed animal feeds.

A long discussion in the design of the regulation was the feeding of young stock. On many organic farms, calves, lambs and kids receive only colostrum milk and subsequently powdered milk. The young stock does not suckle or receive natural milk because the organic milk is very valuable (especially milk from small ruminants; Rahmann 2001) and therefore expensive as young stock feeds. Sour milk from powdered milk is easy to handle and prevents calf diarrhoea. Suckling is difficult to manage in dairy cow milking systems. Nevertheless, it was agreed that animal welfare is more important than economic considerations. The feeding of young stock is defined: calves have to be fed for three months, and lambs and kids 45 days, with "natural milk, preferably maternal milk". But, it was not defined what "on the basis of natural milk" means. It is not established that "natural milk" must originate from the same species, only the physiological needs have to be fulfilled. That could be interpreted, that cow milk can be fed to kids but not to lambs (the fat content is too low). In practice, 1804/99/EC is interpreted to mean that even skimmed powdered milk can be used. Powdered organic milk is rarely available on the market. Only powdered conventional milk - without ingredients like animal fat or antibiotics which are prohibited under the regulations of organic farming - is available and must be used. Other feeds (milk substitutes: e.g., 50% skimmed powdered milk with 50% plant proteins) are not even excluded. This practical interpretation ignores the importance of maternal milk in keeping young stock healthy and fit. In the agreed periods of three months for calves and 45 days for lambs and kids, respectively, "natural milk" should be from the same species and even the same herd to immunise young stock against the pathogens which are prevalent on the farm.

In organic farming it is not permissible to use anything produced using GMOs (genetically modified organisms) or derivatives. This includes feed for livestock (conforming to definition of

animal feeds in 471/82/EEC) and has already been valid since September 24, 1999. It is now, and will become even more difficult in the future, to control the general prohibition of GMOs or derivatives and warrant GMO-free products:

- The origin of permissible conventional ingredients (5%) is not obvious, particularly in the processing phase. Contamination with GMOs is possible if ingredients come from countries where no separation of GM and non-GM crops is practised (e. g., maize and soy beans in USA).
- Derivatives of GMOs are problematic: for example Vitamin C is synthesized from cetogulon acid through oxidation of sorbose. This occurs through the oxidation of sorbitol through the reduction of glucose. This glucose could originate from maize starch, which could be produced as a GMO. Such Vitamin C is not considered a derivative of a GMO because all genetic information is destroyed during the whole procedure (Schmidt, 1999).
- Permissible conventional animal feeds (10% for ruminants and 20% for monogastric animals) could be contaminated by GMOs even if there is GMO-free warranty.
- GMOs can infiltrate animal products via veterinary treatments of the animals (white-genetic engineering). Particularly vaccines are produced using GMOs.
- Pollen transport by insects (e. g., bees) and alluvial drifts from other plots with GMO-cultivations.

Conventionally produced supplements and fermentation-supports for silage-making are allowed as long as they do not contribute to animal nutrition. Permissible minerals, vitamins and pro-vitamins for animal feed are listed in Annex II. Artificially produced vitamins may not be used for ruminants, but are allowed for monogastric animals. Only vitamins derived from raw materials occurring naturally in feedstuffs are allowed for herbivores (70/524/EEC).

A supplementary feeding of Vitamin D and artificially produced Vitamin A and E are prohibited for ruminants. Normally ruminants do not need extra vitamins in their diet if they are adapted to the local environment conditions. High yielding dairy cows do not seem to be suitable for organic farms. In the winter period there can be a deficiency of Vitamin A, D and E because the natural conditions (sunlight) and the feed stuff (low quantities of roughage in winter) are not available to fulfil the needs of high yielding livestock (e.g., lactating cows). Vitamin A and E are components of roughage, but not Vitamin D. Therefore the question is whether organic ruminant keeping should allow complementary and synthetic feed additives (copying conventional livestock keeping strategies) or whether organic farming should try to adapt livestock to the local conditions of the farm.

4.4 Animal husbandry

Animal welfare plays an important role in organic farming. There are detailed descriptions of animal keeping in the regulation 1804/99/EC, particularly for cattle, pigs and fowl, but less for sheep, goats, horses and other livestock. The regulations are very detailed for bee-keeping due to the history of private organic standards for this enterprise. Apart from animal welfare, high animal husbandry standards are the major factors for good animal health and high production yields. Organic animal husbandry standards are defined in Annex I B 5.: Health Management, Annex I B 6.: Livestock Management including Transport and Slaughtering and Annex I B 8.: Housing and Stocking Rates (indoor and outdoor keeping).

4.4.1 *Animal health and veterinary treatments*

The guiding principle of animal health is to prevent disease rather than to cure or treat it. Robust, adapted and disease-tolerant livestock ensure fit and healthy animals. Local breeds are considered to fulfil these targets. These are breeds typical of a specific region and adapted to the local environmental conditions and keeping patterns. Although the use of local breeds in organic farming makes sense, there are several problems. First, if a farm does convert to organic farming, the existing breeds on the farm will be converted. These are often high yielding breeds. Secondly, it is difficult to obtain organic livestock in the local surroundings as required under Annex I B (lack of organic farms). Thirdly, very often adapted local breeds (whether organic nor conventional) do not exist or have low production yields (often endangered breeds).

To support animal health, feeding is required to meet the physiological needs of the animals with an emphasis on animal welfare and not on maximising production. Under these conditions it is assumed that animal health can be maintained by prevention. The prevention shall aim to enhance the immunity of the body. Preventive treatments with “chemically-synthesised allopathic veterinary medicinal products” or antibiotics as well as oestrus synchronisation, or antibacterial feeding additives (growth promoters) are strictly forbidden. Vaccinations are allowed even when the vaccine is produced with the use of GMOs (“white genetic engineering”). Treatment of parasites and vaccinations are not considered as “chemically-synthesised allopathic veterinary medicinal products”. De-worming can be done after a veterinarian has recommended that a heavy infection requires treatment. With such an recommendation the whole flock of small ruminants can be de-wormed. Particularly in small ruminant keeping, endo-parasites are endemic and a regular treatment is common (every six weeks is not seldom). There is a need to design management strategies to avoid such immense use of chemical allopathic drugs:

If an animal is sick, an immediate veterinary treatment is necessary. This has to be checked and carried out by a veterinarian. Natural methods of disease treatment are to be preferred as long

as they help the animal. If these natural treatments do not help, chemical-synthesised allopathic treatments are allowed (even antibiotics). The treated animals have to be marked: large animals on individual level, small stock on group level. All health-related data has to be noted in a herd book and be presented to the certification body. The withholding period is twice as long (minimum of 48 hours) as requested for the applied drugs. If a large animal or a group of small stock, respectively, has been treated more than three times with chemical allopathic drugs, the products can not be sold under the "organic" label. Only one chemical allopathic treatment is allowed for livestock for which the production period is less than one year (lamb, kid meat). There is still no positive list of chemical allopathic drugs. There is a urgent need to create positive lists in the regulations for livestock keeping.

4.4.2 Husbandry management practices, transport and slaughtering

The breeding of ruminants should be done by natural mating. Artificial insemination is allowed, but not embryo transfer, oestrus synchronisation, etc. Male breeding stock has to be kept on the farm, requiring extra farm resources (space, labour and feeds). In natural mating, the breeding progress is reduced and diseases can be transmitted by intercourse (IBR, Brucellosis, etc.). An on-farm health control of these transmittable diseases is necessary. It is permissible to use conventionally kept male breeding stock.

Under conventional conditions, bulls or rather semen tested, do not always fulfil the expectations of organic breeding: lactation curve and milk composition, live yields, meat quality parameters, double purpose, roughage dominated feeding or fitness under the regulations, etc.. There is an obvious need to improve organic breeding systems with tested male stock. This means male breeding stock has to be tested under the conditions of organic farming to check and examine their breeding value for organic farms. A close collaboration between organic farmers and breeding associations is necessary.

Animal cruelty of any kind is prohibited. The systematic shortening of sheep tails, dehorning and other such husbandry practices are not allowed. This is even valid for livestock purchased from conventionally managed farms. These treatments may only be performed under special circumstances, regulated by the certification authorities (e.g., hygiene, animal welfare or bio-security aspects). Castration of male stock is allowed to maintain traditional animal husbandry practices. The castration should be done at a very young age, or under anaesthesia by a veterinarian. The purpose of castration is under discussion: in Denmark and the UK it is common practise to castrate bulls, in Germany and France it is not. The opposite practice prevails in pig keeping in these countries. But breeding management is difficult in mixed flocks of male and female animals (sheep and goats in Mediterranean areas, suckling cow keeping in northern Europe) without

castration.

A feeding system which leads to anaemic conditions (e.g., to produce white coloured veal) is prohibited and considered as animal cruelty. Ruminants have to be kept in groups to meet their social needs. How social needs can be fulfilled via farm conditions has not been defined. Igloo-boxes for the keeping of individual calves are understood to be in conformance with the regulations because the calves can have sight contact to other calves. From an ethological point of view this can not fulfil the behavioural needs (e. g., social needs) of the calves.

The transport of livestock is not clearly defined, but a stress-reduced loading, transporting and unloading of livestock without the use of allopathic tranquillisers, electrical shockers or similar tools is targeted. These regulations can create difficulties for organic livestock transports: e.g., in Germany the transport should not last longer than four hours. The animals have to be slaughtered in abattoirs which fulfil the regulations of organic farming and are certified (certification B). Those abattoirs are rare and not equally spread over the country. Sometimes the driving distance is more than four hours. It is also not clear what happens in the case of problems like traffic jams, break down of transport vehicles, the experience of the transport company in handling animals, where no specific certification B is needed.

4.4.3 Housing and stocking rates for ruminants

The tethering of livestock is prohibited. This was a crucial aspect of disputes between the different countries. The small-scale organic farms in northwest Europe particularly complained about this regulation because tethering of cattle in winter periods is usual. A modification for free moving livestock in buildings was not considered possible and newly constructed free moving stables are costly and can result in a change of the whole farming organisation (e.g., milking, feeding, removal of manure). Tethering is allowed as long as the stables were built before August 24, 1999 and the tethered animals can move freely on a regular basis (twice a week), and if the animals are provided with a soft laying surface (agreement with the certification body). It is difficult to monitor such a regular free movement of tethered livestock. The exceptions for tethering will end on December 31, 2010, but not for small farms. A clear definition of "small farm" or small herds is not given and has to be made by the certification body (from ethological point of view the necessary group sizes are three cows or calves). The certification body can also authorise the limited and reasonable tethering of single animals (e.g., sick animals).

Table 5: Minimum space for organic ruminant keeping
(Source: 1804/99/EC Annex VIII 1.)

Animal species, purpose	Live weight (LW)	Minimum space (for animal):	
		Indoor (stable) (m ² / animal)	Outdoor runs ¹ (m ² / animal)
Breeding cattle (Male and Female)	≤ 100 kg	1.5	1.1
	≤ 200 kg	2.5	1.9
	≤ 350 kg	4.0	3
	> 350 kg	5; min. one m ² per 100 kg LW	3.7; min. 0.75 m ² per 100 kg LW
Dairy cows (lactating)		6	4.5
Breeding bulls (> 2 years)		10	30
Sheep and goats		1.5 per ewe / goat	2.5 per ewe / goat
		0.35 lamb / kid	0.5 per lamb / kid

¹ Does not comprise grazing area

It is not obligatory but recommended that ruminants should graze on pastures (“free-range”) and not be fed in stables as long as the animal, weather and pasture conditions are suitable. Many stables do not have direct access to pastures. Therefore the animals have to be brought to the pastures. This is time-intensive and sometimes not possible if the milking equipment is in the stable and the pastures too far away. If grazing is not possible, a permanently accessible open-air run is obligatory. Free moving stables with permanent access to open-air runs are the basic principle of ruminant keeping. Only with permanent summer pasture grazing is an outdoor run not necessary, as long as the animals are not tethered. Final fattening of lambs and beef cattle in stables is possible if this period is less than one fifth of the animal’s life, and a maximum of three months of the fattening animal’s life. Such exceptions in animal welfare are difficult to communicate to consumers, who expect organic animal husbandry without exceptions.

A minimum surface area for indoor housing and outdoor exercise areas is defined (Table 5). Because the space for conventional ruminant keeping is lower, the building cost per animal is higher in organic farming. This increases the production costs per animal. Because the production yield is reduced under the regulations of organic farming (about 30 to 40% less than comparable conventionally-kept ruminants), the fixed production costs (buildings) per kg milk or meat are much higher than in conventional farming (more than 50% higher fix costs are possible). Cheaper stable buildings have to be designed and permitted in order to keep these fixed costs low.

New stables for ruminants do not separate indoor and outdoor areas. Sheltered space alternates with non-sheltered space without walls in between. It can happen that the sheltered space is smaller than required in the regulation but better for animal welfare. The sum of indoor and outdoor net space has to be considered to conform with the regulations. A maximum of 50% of the stable surface can be of slatted or gridded construction, the rest has to be a flat and non-slippery

surface. All net indoor and outdoor spaces for the animals are considered for this regulation. This means that the stable surface can be of slatted or gridded construction and the outdoor run without. This is not useful from an animal welfare point of view, because the space is not equally used by the animals. The boxes have to be strewed-in with organic materials (e.g., straw or wood chips; peat is difficult in terms of environmental issues). There has to be enough space for fodder intake and resting (one place per animal) and the stable construction has to prevent harm to the animal by other animals or stable equipment, and cruelty to the animals, while at the same time ensuring animal welfare (social contact, playing, etc.). Only the means and remedies in Annex II, part E are allowed for the disinfection and cleaning of stables and equipment. The disinfection of permanently accessible outdoor runs is difficult and can lead to environmental contamination (water, air).

4.5 Mixing of organic and conventional animal husbandry

Conventionally kept livestock from extensive grazing systems (950/97/EC) can graze on organic pastures as long as no organic livestock is present. For this grazing period, non-organic livestock must follow the rules of organic livestock keeping. This grazing has to be accepted and approved by the certification body.

Conversely, organic livestock can graze on pastures which are not certified for organic farming. This is possible on communal grazing areas where flocks of organic and non-organic livestock are mixed. In this case, the grazing areas may not be contaminated with prohibited treatments in the last three years, the non-organic livestock is to be kept in extensive farming systems (Annex 950/97/EC), and the products of the organic livestock are not sold under an organic label. The label "organic" is allowed only if the certification body can prove the separation of organic and non-organic livestock on communal pastures. The approval and certification of the organic farm has to be made during the period of grazing communal pastures. The monitoring of such systems is very difficult, particularly with small ruminants (identification of individual animals, mixing of stock). Collaboration between the organic and conventional farms is possible on an written contractual basis. The fulfilment will be inspected.

Nevertheless there are significant difficulties in mixed grazing with organic and non-organic livestock on the same pastures. For example, environmentally transmitted diseases like foot-rot or anthelmintic-resistant endo-parasites can be transmitted between the flocks even if they do not graze together. This should not be ignored by organic livestock keepers because the prevention and treatment of such diseases is difficult, time-consuming and costly.

5 Summary

The development of meat and milk production under the premises of organic farming is still in its infancy, and is much less developed than the organic cultivation of plants. In civil law, and since 1992, in legally binding guidelines (2092/91/EEC), processing quality is given priority over quantity. In comparison to the legal requirements currently in effect, high standards of animal welfare and environmental protection are being introduced through the framework conditions of organic animal husbandry. Even though many consumers of organic products expect not only high quality processing but also high quality products, product quality is not defined explicitly either by EU-requirements or by the organic-producer-associations, except in regard to contamination with undesired substances.

While organic production of milk, beef and lamb is quite unproblematic, there are at present, relatively difficult conditions in the organic production of eggs and poultry products. The problem with eggs and poultry production on the one hand rests in the comparatively high price advantage of intensively produced eggs and poultry, and on the other hand in the lack of an independent organic quality profile.

In order to obtain the higher prices at market which are necessary to cover the higher costs involved, organic meat and milk production needs to develop quality standards not just for production practices, but also for the products. Here, carcass- and meat quality in beef, lamb, eggs and poultry products must be improved. These can only be achieved through optimised coordination of feeding, breeding, techniques of husbandry, and, especially, management.

On July 19, 1999, EU-directive 1804/99/EU for the organic keeping of animals was passed and came into force on the August 24, 2000. It was integrated into EU-directive 2092/91/EEC which since then covers cultivation of plants and animal husbandry. The contents of this directive present a compromise between the different agricultural associations of the EU member states. Thus, it defines the minimum standard for organic farming, including organic animal husbandry, across the entire EU.

Guidelines alone, however, do not create an environmentally-friendly, economic, organic animal husbandry centering on animal welfare. A high degree of knowledge as well as practical skill are necessary to keep livestock in accordance with animal welfare and in an environmentally friendly way, and at the same time to earn sufficient income. Here, the guidelines offer little help. When converting from conventional to organic farming, it can take years before the farm regains its balance. Thus, the first years of organic farming are beset with many problems concerning conversion and adaptation: animal illnesses, lower yields and performances, pressure caused by weeds and pests, quality problems, and as a consequence, economic difficulties. However, the experiences of organic farmers who have practiced over a longer period of time, show that, with

time, these difficulties can be mastered. For these reasons, organic animal husbandry is a permanent challenge (Rahmann 2004).

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Betreff: Re: [Fwd: Re: 1st Int. Congress on organic animal production and food safety]

Von: Gerold Rahmann <gerold.rahmann@fal.de>

Datum: Tue, 16 Mar 2004 15:37:08 +0100

An: serifeincoglu@yahoo.com

Dear Serife Incoglu,

thank you for the possibility that my wife can attend the conference and the reservation at the hotel. I have booked a flight for her in the same plane as you have done for me and Ms. Kerstin Barth.

Attached you will find my full paper incl. an abstract. I hope it fits into your expectation. Otherwise do not hesitate to contact me again.

Yours Gerold Rahmann

serifeincoglu@yahoo.com schrieb:

Dear Prof. RAHMANN,

We are going to make double room reservation for you. We are very pleased for the attendance of your wife to the congress. This is not important detail related with the partner rate, don't mind about this.

I am looking forward to hear from you.

Yours sincerely

Dr. Serife INCOGLU

--- Gerold Rahmann <gerold.rahmann@fal.de> wrote:

Dear Dr. Serife Incoglu,
thanks for reservation. I would like to come with my wife - KlaudiaRahmann - to the conference. She would like to attend the conference as agronom as well. Is there a special partner rate for her participation? Can you make a reservation for us in a double room. I will cover all the cost for her.
Yours Gerold Rahmann

----- Ursprüngliche Nachricht -----

Betreff: Re: 1st Int. Congress on organic animal production and foodsafety

Datum: Thu, 11 Mar 2004 04:42:24 -0800 (PST)

Von: <serifeincoglu@yahoo.com>

An: Kerstin Barth <kerstin.barth@fal.de>

Dear Dr. Barth,

We have already make flighth reservation for you and Prof. Dr. Rahmann as follow

BARTH KERSTIN & RAHMANN GEROLD

TK1666 27 APR HAMBURG>ISTANBUL 17:30 > 21:40
TK344 27 APR IST > IZM 23:45 > 00:45+1
TK307 01 MAY IZM>IST 06:00 > 07:00
TK166 01 MAY IST>HAM 10:25 > 12:50

We are going to make payment for the tickets in April.

And then I will inform you to pick up your tickets from closest agency. But If you want any change at your flight schedule, please inform me. I am looking forward to hear from you.

Yours sincerely
Dr. Serife INCOGLU

--- Kerstin Barth <kerstin.barth@fal.de> wrote:

Dear Dr. Incoglu,

we know that you are very busy to organize the conference, but on behalf of Professor Rahmann and myself I like to know if we should book our flight and send you the receipt afterwards. Please let me know till March 16th how we should do

it.

With kind regards
Kerstin Barth

--

Dr. agr. Kerstin Barth
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Organic animal husbandry in the European Union: standards, regulations and practice with special consideration of ruminants

Gerold Rahmann

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Abstract

In comparison to conventional and intensive farming, the guidelines mentioned above guarantee high quality processing in terms of environmental, animal husbandry, and socio-economic issues. Hence, organic farming is unequivocally regarded as being more sustainable. Standard works, however, supply only marginal guidelines regarding the management of product quality in organic meat production (Tauscher et al. 2003).

Framework conditions for organic animal husbandry measurably exceed the standards of conventional husbandry. Thus, certain methods of keeping the animals, certain food stuffs and additives, as well as means of production and breeding possible in conventional agriculture are deliberately rejected. On the other hand, husbandry conditions promoting animal welfare and health are needed and poorer performance by the animals as well as a higher degree of labour intensiveness are being accepted. The aim is not to make short-term profits, but to achieve long-term animal welfare and organic husbandry.

1 Introduction

In our society, high quality food is plentifully available. There is a general expectation that food must be good as well as cheap. Many people, however, are not aware of how it is produced. This also applies to food produced from animals. Many people think that the animals which provide our food live on idyllic farms with green pastureland. Even toddlers are plied with this image, for example, in children's books, films, and toys. That this image seldom corresponds to reality is not mentioned, and it is not something many people are interested in. Only isolated occurrences in the food industry raise public awareness and often turn into scandals with partly exaggerated reactions which only rarely have a long-lasting effect. The BSE-crisis is only one example. Yet, all consumers share in responsibility for the conditions to be found in animal husbandry.

Thus, it seems to be an irresolvable dilemma that people demand ever-improved but cheaper food, when at the same time they have mounting expectations with regard to an environmentally friendly production, taking into account animal welfare and saving resources. Organic farming – and thus organic animal husbandry – could present a way out of the dilemma. Organic animal husbandry is seen as an environmentally friendly, animal-welfare orientated, near-natural way of producing high-quality food with a minimized pesticide content. It is, therefore, a socially acceptable method of animal husbandry. Within the last decades, the importance of organic farming has increased steadily.

Organic animal husbandry is based on established and monitored production and processing guidelines. In 1999, EU-directive 1804/99EU on the legally binding minimum standards of organic animal husbandry was passed and has been in force since 24th August 2000. It describes exactly the production processes to be adhered to in order to claim organic or ecological production, for example with organic labelling. Higher standards than those required by the EU-regulation, are laid down by the agricultural associations of organic farming.

Using civil law as a basis, the organic associations have established regulations by which exceed

the minimum standards of EU-directive 2092/91. Important examples of the higher standards set by the organic animal husbandry associations are:

- Entire farm conversion to organic production
- Minimum levels of fodder to be produced on site
- More stringent regulations for feeding, food stuffs and additives
- A lower density of stock kept in stables and on pastures
- Stricter regulation of animal welfare
- Lists of prohibited veterinary drugs
- Regulation on transport and slaughtering more in line with animal welfare
- More specific regulation on processing
- More detailed monitoring of how well guidelines are observed

2 Why Organic Animal Husbandry?

In order to be able to assess and understand the standards and guidelines of organic animal husbandry, some fundamental knowledge is required on the developments in organic animal husbandry, as well as on the function of animals within the organism of a farm. These form the basis for the guidelines laid down for organic animal husbandry. The keeping of domesticated animals has undergone considerable changes during the last two centuries. Unfavourable local conditions were compensated for by technology and transporting means of production and products worldwide. Animal husbandry became more independent of local natural conditions. Production became more and more oriented to market opportunities instead of self-sufficiency. Enormous biological, mechanical, and organizational and technical progress, has led in very short time to huge performance increases in animal husbandry. The consequences of the ever-more intensive methods of animal husbandry have been considerable environmental problems, overproduction, serious concerns for animal health and welfare. The external costs in the form of environmental damage caused annually by conventional farming in Germany, was 1,996 billion € in 1996. Pretty et al. (2002) established a cost for environmental damage of 115€ per hectare of agriculturally used land, or 268 € per hectare of land used as fields (in comparison: Great Britain 338 € or 370 € respectively; USA 80 € or 110 €). Usually, these costs (environmental protection, purification of drinking water, etc.) are paid for by the taxpayer or consumer. A large part of these costs can be avoided by conversion to organic farming (Rahmann 2004; see Table 1).

Table 1: Differences between conventional and organic animal husbandry

	Conventional	Organic (2092/91/EEC)
Breeds, origin	High performing special breeds and cross-breeds depending on the targeted products	Only animals reared on organic farms, diversity of breeds, sometimes rare breeds of working animals
Housing (buildings and free runs)	Animal protection laws (requirements for keeping animals according to species)	Special requirements for keeping animals oriented towards animal welfare (occupation-density, size of buildings, tethering inside the stable forbidden, etc.)
Feeding	According to current food stuffs legislation (permitted food additives such as enzymes, synthetic amino acids, etc.)	Food stuffs produced as much as possible on site, feeding according to animal welfare (among other things, minimum requirements of roughage) only specifically permitted additives, no synthetic amino acids, no genetically modified organisms
Management and	Managed breeding, sometimes	No preventative use of drugs (exception:

	Conventional	Organic (2092/91/EEC)
treatment	with the aid of hormones, stable-wide prophylaxis and preventative use of drugs, legally required waiting periods according to drug prescription laws	legally required inoculations), only two allopathic treatments per year, double the withholding period after use of drugs. Restricted interference with the animals' integrity (removal of horns, shortening of beaks, shortening of teeth, docking of tails, etc.)

Source: Tauscher et al. 2003

3 The Role of Animal Husbandry in Organic Farming

The correlations between animal husbandry and plant cultivation are only part of the complex agricultural organism. In addition, there are other correlations with the conditions arising from the natural and social context, with the structures of a farm, and with the needs and resources of the people managing the farm. Only when all parts are balanced, is the organism of the farm in a healthy state. Any farmer keeping animals makes an effort – often intuitively – to balance the keeping of his animals with this wholeness.

Organic animal husbandry is no exception in that the production of food and animal raw-materials is of prime importance. Additionally, working animals perform non-material services and services of use within a concern (Table 2). In this context the multi-functionality of animal husbandry (agriculture) is sometimes mentioned.

Table 2: Products and services provided by working animals

Food	Raw-materials	Non material services	On-farm services
- meat	- feathers	- therapy	- manure
- milk	- wool	- recreation	- consumption of rest products
- eggs	- furs	- landscape preservation	- pollination of plants
- blood	- hair	- transport	- pest control
- honey	- bone	- hunting	- guarding
	- thread (silk)	- human protection	
	- medicines	- sports	
		- status	
		- research	

Animal husbandry plays a central role in organic farming. Most of the organic farms practice animal husbandry. In bio-dynamic farming, the keeping of cattle is obligatory. In addition to the production of food, animal raw-materials, and non material services (services delivered by animals), the services obtained through animal husbandry are of particular value within a concern, and are of great importance for organic farming. Animal husbandry makes use of the plants produced by green manure cultures on fields, makes use of leftovers, and produces not only food and raw-material from these substances, but also „muck“, the farm fertilizer extremely valuable in organic farming. Therefore, it is an integral part of the cycle of organic management, and as such has been laid down in the EU-regulation.

4 The basic principles and standards of organic ruminant keeping

Adapted and sustainable farming systems are the backbone of organic farming. A holistic approach considers soil, plants, livestock and humans in mutual relations in the farming cycle. Since the early 1920s, the standards for organic agricultural farming have been generated in a long process over

many decades at the individual level. The basic principles and standards of organic animal husbandry of the IFOAM cover:

- conversion periods,
- adapted stock densities,
- farm fodder production,
- high standards in animal welfare,
- the general prohibition of GMOs and derivatives in the whole production chain,
- no synthetic disinfection strategies in stables and equipment,
- no allopathic disease prevention,
- no antibiotics and hormones in animal feed and
- an independent certification of the production, packaging and processing.

The private standards of organic farming are used for formal and legislative regulations on organic farming in several countries. Since the 1990s, several countries have defined formal regulations for organic farming. The EU regulation on organic crop production (without organic animal husbandry) was announced in 1991 (2092/91/EEC) and financially supported under the agri-environmental programme 2078/92/EEC and under 1257/99/EC of the AGENDA 2000. Comparable to organic crop production, organic animal husbandry needed to be defined, regulated, certified and monitored at the state level. The EU filled this missing link with the regulation 1804/99/EC, which was negotiated over a period of six years. The regulation became valid on August 24, 2000 and became part of the regulation 2092/91/EEC. Formal multi-national regulations like 1804/99/EC are compromises, because they have to be considered in light of the different conditions of the partner countries: from arctic to tropical, from humid to arid, from private to communal land-use systems, from favourable to less favourable production conditions, as well as from large-scale to small-scale farming systems. The compromises in such regulations need to be discussed and developed according to implementation.

Most of the regulations in 1804/99/EC (written in eight annexes) are valid for all livestock on organic farms, without specification of the species. Cattle, sheep and goats are not considered equally. While cattle are well described, sheep and goats received only scant attention. The treatment of the most important livestock species is described in a very detailed manner in the Annexes of 1804/99/EC. Not all regulations are useful for all farm conditions and systems throughout the EU, and some important aspects are overlooked. In such cases, higher private and common standards of organic farming or regulations for specific animal species (aquaculture, rabbits, deer, etc.) on the national level are valid, as long as they do not contradict the regulations in 1804/99/EC. This can lead to inter(agri)cultural misunderstandings and disagreements between different national standards (e.g., important for intra-EC-trade). Some key aspects of 1804/99/EC for organic ruminant keeping are discussed below:

4.1 Farmland-related animal husbandry

Livestock plays an important role on organic farms, e.g., in nutrient cycling. Landless animal husbandry is not organic and thus prohibited. The limited livestock density does not exceed 170 kg nitrogen per hectare per year and is measured in livestock units (LU). In a Europe-wide context, the use of livestock units (Table 3) is difficult and ignores the different sizes, and therefore, weights, of different breeds as well as the different environmental conditions. A Galloway steer is not comparable with a Charolais steer; rocky, swallow and steep pastures can not be compared with fertile and deep soils. Apart from agri-environmental programmes (1257/99/EC), which are not liable for organic farming, lower and adopted stock densities - as suggested in 1804/99/EC Annex I B 7.3. and 7.5. - are not actually defined. Only some private organic farming associations have lower regulations. Therefore, the certification procedure has to prove a proper livestock-farmland-

ratio where environmental contamination has to be minimised.

**Table 3: Maximum numbers of ruminants per hectare and year (≤ 170 kg N/ha/y)
(Source: extracted from 1804/99/EC, Annex I B 7. and Annex VII)**

• Dairy cows and male cattle above 2 years	2
• Female cattle above 2 years (not lactating)	2.5
• Male and female cattle between 1 and 2 years	3.3
• Fattening calves and other cattle under 1 year	5
• Ewes and mother goats	13.3

4.2 Conversion of farm branches and livestock

It is possible to convert just one branch of the farm to organic production, e.g., only the crop production, but not animal husbandry, or dairy cattle keeping but not pig keeping. If there is a clear spatial separation (farm land, feed and dung storage as well as stables), the same animal species can be kept organically and conventionally by one farmer. A clear separation is needed to avoid contamination (e.g., prohibited disinfectants or feedstuffs/feed materials which are not in the 1804/99/EC Annex II) and mixing of inputs (e.g., feeds and dung).

Comparable to crop production, the conversion period for pastures for ruminants is 24 months. The conversion period starts with seeding of annual crops and planting of permanent plants (pastures, shrubs, trees) after the last conventional utilisation (grazing, moving). After 12 months without prohibited treatments, grass and shrubs are viewed as “in-conversion feedstuffs/feed materials”. After 24 months, grassland has withstood the converting period and is considered an organic feedstuff.

**Table 4: Conversion periods for ruminant pastures and their products
(Source: 1804/99/EC Annex I B 2.1.1. and 2.2.1.)**

Animal species and use	Conversion period
• Pastures for herbivores (ruminants, horses)	24 months (like crop production 2092/91/EEC)
• Beef cattle	12 months; minimum of $\frac{3}{4}$ of the animals life
• Milk (cows, sheep and goats)	6 months
• Small ruminants	6 months

Milk can be sold under the label “organic” 15 months after the start of conversion: after 12 months 60% own feed “in-conversion” is available and 30% DM (dry matter) of annual needs of organic feedstuffs/feed materials and 10% conventional feeds is purchased. After six months with this feed, milk can be declared “organic” (Table 4). Besides the feeding rules, all other relevant regulations for organic farming have to be followed (animal handling, etc.).

If the whole production unit (livestock, pastures and feeding crops) is converted simultaneously, and the livestock is mainly fed own feedstuffs, there is no extra converting period for livestock. This means milk and meat can be labelled as “organic” despite the fact that livestock are not fed organic feed, but only “in-conversion feedstuffs/feed materials,” and probably 10% conventional feeds. This is only an advantage if organic feeds can not be purchased.

The regulations of purchasing livestock from organic farms only is directed at avoiding any possibility of contamination originating from conventional farming. Three exceptions: the conversion period of the production unit; the herd establishment; restocking after epidemics (e.g.,

Foot and Mouth Disease epidemic in the U.K. in 2001) and natural calamities (e.g. earthquake). If young stock is purchased from conventional farms, the maximum age at time of purchase is six months for calves and 45 days for lambs and kids (just after weaning and used for breeding purposes).

The fourth exception allows that 10% of the female breeding stock of cattle and 20% of female breeding stock of small ruminants can be purchased every year from conventional farms if they are not available from organic farms (pregnancy is possible before first delivery). Male breeding stock from conventional farms can be used if the regulations are followed (it has not been clearly defined if this holds true without a conversion period). The acceptance of the certifying body is required.

4.3 Feeding of organic livestock

The definition of farmland-related animal husbandry with kg nitrogen per hectare and year does not set the origin of the feedstuff. The statement that livestock has to be fed 'predominantly' with self-produced feedstuff is not specific enough. Organic feeds can be purchased from other organic farms and 10% dry matter (DM) of conventional feeds (positive lists) or a maximum of 25% DM per day (exception for mobile herds), respectively, are even allowed for ruminants until September 2005. A maximum of 30% DM of "in-conversion feedstuff" (after 12 months of conversion; see above) can be fed to organic livestock even when products are to be sold under the organic label. If the feed is produced on the own farm, a maximum of 60% DM is allowed. Recently, processed and mixed feeds were not considered in 1804/99/EC Annex II (positive lists) of the regulation. Single components are the basis for certification as long as there are no declaration and certification standards described for mixed feeds. The problem is the insufficient declaration of components used in mixed animal feeds.

A long discussion in the design of the regulation was the feeding of young stock. On many organic farms, calves, lambs and kids receive only colostrum milk and subsequently powdered milk. The young stock does not suckle or receive natural milk because the organic milk is very valuable (especially milk from small ruminants; Rahmann 2001) and therefore expensive as young stock feeds. Sour milk from powdered milk is easy to handle and prevents calf diarrhoea. Suckling is difficult to manage in dairy cow milking systems. Nevertheless, it was agreed that animal welfare is more important than economic considerations. The feeding of young stock is defined: calves have to be fed for three months, and lambs and kids 45 days, with "natural milk, preferably maternal milk". But, it was not defined what "on the basis of natural milk" means. It is not established that "natural milk" must originate from the same species, only the physiological needs have to be fulfilled. That could be interpreted, that cow milk can be fed to kids but not to lambs (the fat content is too low). In practice, 1804/99/EC is interpreted to mean that even skimmed powdered milk can be used. Powdered organic milk is rarely available on the market. Only powdered conventional milk - without ingredients like animal fat or antibiotics which are prohibited under the regulations of organic farming - is available and must be used. Other feeds (milk substitutes: e.g., 50% skimmed powdered milk with 50% plant proteins) are not even excluded. This practical interpretation ignores the importance of maternal milk in keeping young stock healthy and fit. In the agreed periods of three months for calves and 45 days for lambs and kids, respectively, "natural milk" should be from the same species and even the same herd to immunise young stock against the pathogens which are prevalent on the farm.

In organic farming it is not permissible to use anything produced using GMOs (genetically modified organisms) or derivatives. This includes feed for livestock (conforming to definition of animal feeds in 471/82/EEC) and has already been valid since September 24, 1999. It is now, and will become even more difficult in the future, to control the general prohibition of GMOs or derivatives and warrant GMO-free products:

- The origin of permissible conventional ingredients (5%) is not obvious, particularly in the processing phase. Contamination with GMOs is possible if ingredients come from countries where no separation of GM and non-GM crops is practised (e. g., maize and soy beans in USA).
- Derivatives of GMOs are problematic: for example Vitamin C is synthesized from cetogulon acid through oxidation of sorbose. This occurs through the oxidation of sorbitol through the reduction of glucose. This glucose could originate from maize starch, which could be produced as a GMO. Such Vitamin C is not considered a derivative of a GMO because all genetic information is destroyed during the whole procedure (Schmidt, 1999).
- Permissible conventional animal feeds (10% for ruminants and 20% for monogastric animals) could be contaminated by GMOs even if there is GMO-free warranty.
- GMOs can infiltrate animal products via veterinary treatments of the animals (white-genetic engineering). Particularly vaccines are produced using GMOs.
- Pollen transport by insects (e. g., bees) and alluvial drifts from other plots with GMO-cultivations.

Conventionally produced supplements and fermentation-supports for silage-making are allowed as long as they do not contribute to animal nutrition. Permissible minerals, vitamins and pro-vitamins for animal feed are listed in Annex II. Artificially produced vitamins may not be used for ruminants, but are allowed for monogastric animals. Only vitamins derived from raw materials occurring naturally in feedstuffs are allowed for herbivores (70/524/EEC).

A supplementary feeding of Vitamin D and artificially produced Vitamin A and E are prohibited for ruminants. Normally ruminants do not need extra vitamins in their diet if they are adapted to the local environment conditions. High yielding dairy cows do not seem to be suitable for organic farms. In the winter period there can be a deficiency of Vitamin A, D and E because the natural conditions (sunlight) and the feed stuff (low quantities of roughage in winter) are not available to fulfil the needs of high yielding livestock (e.g., lactating cows). Vitamin A and E are components of roughage, but not Vitamin D. Therefore the question is whether organic ruminant keeping should allow complementary and synthetic feed additives (copying conventional livestock keeping strategies) or whether organic farming should try to adapt livestock to the local conditions of the farm.

4.4 Animal husbandry

Animal welfare plays an important role in organic farming. There are detailed descriptions of animal keeping in the regulation 1804/99/EC, particularly for cattle, pigs and fowl, but less for sheep, goats, horses and other livestock. The regulations are very detailed for bee-keeping due to the history of private organic standards for this enterprise. Apart from animal welfare, high animal husbandry standards are the major factors for good animal health and high production yields. Organic animal husbandry standards are defined in Annex I B 5.: Health Management, Annex I B 6.: Livestock Management including Transport and Slaughtering and Annex I B 8.: Housing and Stocking Rates (indoor and outdoor keeping).

4.4.1 Animal health and veterinary treatments

The guiding principle of animal health is to prevent disease rather than to cure or treat it. Robust, adapted and disease-tolerant livestock ensure fit and healthy animals. Local breeds are considered to fulfil these targets. These are breeds typical of a specific region and adapted to the local environmental conditions and keeping patterns. Although the use of local breeds in organic farming makes sense, there are several problems. First, if a farm does convert to organic farming, the existing breeds on the farm will be converted. These are often high yielding breeds. Secondly, it is

difficult to obtain organic livestock in the local surroundings as required under Annex I B (lack of organic farms). Thirdly, very often adapted local breeds (whether organic nor conventional) do not exist or have low production yields (often endangered breeds).

To support animal health, feeding is required to meet the physiological needs of the animals with an emphasis on animal welfare and not on maximising production. Under these conditions it is assumed that animal health can be maintained by prevention. The prevention shall aim to enhance the immunity of the body. Preventive treatments with “chemically-synthesised allopathic veterinary medicinal products” or antibiotics as well as oestrus synchronisation, or antibacterial feeding additives (growth promoters) are strictly forbidden. Vaccinations are allowed even when the vaccine is produced with the use of GMOs (“white genetic engineering”). Treatment of parasites and vaccinations are not considered as “chemically-synthesised allopathic veterinary medicinal products”. De-worming can be done after a veterinarian has recommended that a heavy infection requires treatment. With such a recommendation the whole flock of small ruminants can be de-wormed. Particularly in small ruminant keeping, endo-parasites are endemic and a regular treatment is common (every six weeks is not seldom). There is a need to design management strategies to avoid such immense use of chemical allopathic drugs.

If an animal is sick, an immediate veterinary treatment is necessary. This has to be checked and carried out by a veterinarian. Natural methods of disease treatment are to be preferred as long as they help the animal. If these natural treatments do not help, chemical-synthesised allopathic treatments are allowed (even antibiotics). The treated animals have to be marked: large animals on individual level, small stock on group level. All health-related data has to be noted in a herd book and be presented to the certification body. The withholding period is twice as long (minimum of 48 hours) as requested for the applied drugs. If a large animal or a group of small stock, respectively, has been treated more than three times with chemical allopathic drugs, the products can not be sold under the “organic” label. Only one chemical allopathic treatment is allowed for livestock for which the production period is less than one year (lamb, kid meat). There is still no positive list of chemical allopathic drugs. There is a urgent need to create positive lists in the regulations for livestock keeping.

4.4.2 Husbandry management practices, transport and slaughtering

The breeding of ruminants should be done by natural mating. Artificial insemination is allowed, but not embryo transfer, oestrus synchronisation, etc. Male breeding stock has to be kept on the farm, requiring extra farm resources (space, labour and feeds). In natural mating, the breeding progress is reduced and diseases can be transmitted by intercourse (IBR, Brucellosis, etc.). An on-farm health control of these transmittable diseases is necessary. It is permissible to use conventionally kept male breeding stock.

Under conventional conditions, bulls or rather semen tested, do not always fulfil the expectations of organic breeding: lactation curve and milk composition, live yields, meat quality parameters, double purpose, roughage dominated feeding or fitness under the regulations, etc.. There is an obvious need to improve organic breeding systems with tested male stock. This means male breeding stock has to be tested under the conditions of organic farming to check and examine their breeding value for organic farms. A close collaboration between organic farmers and breeding associations is necessary.

Animal cruelty of any kind is prohibited. The systematic shortening of sheep tails, dehorning and other such husbandry practices are not allowed. This is even valid for livestock purchased from conventionally managed farms. These treatments may only be performed under special circumstances, regulated by the certification authorities (e.g., hygiene, animal welfare or bio-

security aspects). Castration of male stock is allowed to maintain traditional animal husbandry practices. The castration should be done at a very young age, or under anaesthesia by a veterinarian. The purpose of castration is under discussion: in Denmark and the UK it is common practise to castrate bulls, in Germany and France it is not. The opposite practice prevails in pig keeping in these countries. But breeding management is difficult in mixed flocks of male and female animals (sheep and goats in Mediterranean areas, suckling cow keeping in northern Europe) without castration.

A feeding system which leads to anaemic conditions (e.g., to produce white coloured veal) is prohibited and considered as animal cruelty. Ruminants have to be kept in groups to meet their social needs. How social needs can be fulfilled via farm conditions has not been defined. Igloo-boxes for the keeping of individual calves are understood to be in conformance with the regulations because the calves can have sight contact to other calves. From an ethological point of view this can not fulfil the behavioural needs (e. g., social needs) of the calves.

The transport of livestock is not clearly defined, but a stress-reduced loading, transporting and unloading of livestock without the use of allopathic tranquillisers, electrical shockers or similar tools is targeted. These regulations can create difficulties for organic livestock transports: e.g., in Germany the transport should not last longer than four hours. The animals have to be slaughtered in abattoirs which fulfil the regulations of organic farming and are certified (certification B). Those abattoirs are rare and not equally spread over the country. Sometimes the driving distance is more than four hours. It is also not clear what happens in the case of problems like traffic jams, break down of transport vehicles, the experience of the transport company in handling animals, where no specific certification B is needed.

4.4.3 Housing and stocking rates for ruminants

The tethering of livestock is prohibited. This was a crucial aspect of disputes between the different countries. The small-scale organic farms in northwest Europe particularly complained about this regulation because tethering of cattle in winter periods is usual. A modification for free moving livestock in buildings was not considered possible and newly constructed free moving stables are costly and can result in a change of the whole farming organisation (e.g., milking, feeding, removal of manure). Tethering is allowed as long as the stables were built before August 24, 1999 and the tethered animals can move freely on a regular basis (twice a week), and if the animals are provided with a soft laying surface (agreement with the certification body). It is difficult to monitor such a regular free movement of tethered livestock. The exceptions for tethering will end on December 31, 2010, but not for small farms. A clear definition of “small farm” or small herds is not given and has to be made by the certification body (from ethological point of view the necessary group sizes are three cows or calves). The certification body can also authorise the limited and reasonable tethering of single animals (e.g., sick animals).

Table 5: Minimum space for organic ruminant keeping
(Source: 1804/99/EC Annex VIII 1.)

Animal species, purpose	Live weight (LW)	Minimum space (for animal):	
		Indoor (stable) (m ² / animal)	Outdoor runs ¹ (m ² / animal)
Breeding cattle (Male and Female)	≤ 100 kg	1.5	1.1
	≤ 200 kg	2.5	1.9
	≤ 350 kg	4.0	3

	> 350 kg	5; min. one m ² per 100 kg LW	3.7; min. 0.75 m ² per 100 kg LW
Dairy cows (lactating)		6	4.5
Breeding bulls (> 2 years)		10	30
Sheep and goats		1.5 per ewe / goat 0.35 lamb / kid	2.5 per ewe / goat 0.5 per lamb / kid

¹ Does not comprise grazing area

It is not obligatory but recommended that ruminants should graze on pastures (“free-range”) and not be fed in stables as long as the animal, weather and pasture conditions are suitable. Many stables do not have direct access to pastures. Therefore the animals have to be brought to the pastures. This is time-intensive and sometimes not possible if the milking equipment is in the stable and the pastures too far away. If grazing is not possible, a permanently accessible open-air run is obligatory. Free moving stables with permanent access to open-air runs are the basic principle of ruminant keeping. Only with permanent summer pasture grazing is an outdoor run not necessary, as long as the animals are not tethered. Final fattening of lambs and beef cattle in stables is possible if this period is less than one fifth of the animal’s life, and a maximum of three months of the fattening animal’s life. Such exceptions in animal welfare are difficult to communicate to consumers, who expect organic animal husbandry without exceptions.

A minimum surface area for indoor housing and outdoor exercise areas is defined (Table 5). Because the space for conventional ruminant keeping is lower, the building cost per animal is higher in organic farming. This increases the production costs per animal. Because the production yield is reduced under the regulations of organic farming (about 30 to 40% less than comparable conventionally-kept ruminants), the fixed production costs (buildings) per kg milk or meat are much higher than in conventional farming (more than 50% higher fix costs are possible). Cheaper stable buildings have to be designed and permitted in order to keep these fixed costs low.

New stables for ruminants do not separate indoor and outdoor areas. Sheltered space alternates with non-sheltered space without walls in between. It can happen that the sheltered space is smaller than required in the regulation but better for animal welfare. The sum of indoor and outdoor net space has to be considered to conform with the regulations. A maximum of 50% of the stable surface can be of slatted or gridded construction, the rest has to be a flat and non-slippery surface. All net indoor and outdoor spaces for the animals are considered for this regulation. This means that the stable surface can be of slatted or gridded construction and the outdoor run without. This is not useful from an animal welfare point of view, because the space is not equally used by the animals. The boxes have to be strewed-in with organic materials (e.g., straw or wood chips; peat is difficult in terms of environmental issues). There has to be enough space for fodder intake and resting (one place per animal) and the stable construction has to prevent harm to the animal by other animals or stable equipment, and cruelty to the animals, while at the same time ensuring animal welfare (social contact, playing, etc.). Only the means and remedies in Annex II, part E are allowed for the disinfection and cleaning of stables and equipment. The disinfection of permanently accessible outdoor runs is difficult and can lead to environmental contamination (water, air).

4.5 Mixing of organic and conventional animal husbandry

Conventionally kept livestock from extensive grazing systems (950/97/EC) can graze on organic pastures as long as no organic livestock is present. For this grazing period, non-organic livestock must follow the rules of organic livestock keeping. This grazing has to be accepted and approved by the certification body.

Conversely, organic livestock can graze on pastures which are not certified for organic farming.

This is possible on communal grazing areas where flocks of organic and non-organic livestock are mixed. In this case, the grazing areas may not be contaminated with prohibited treatments in the last three years, the non-organic livestock is to be kept in extensive farming systems (Annex 950/97/EC), and the products of the organic livestock are not sold under an organic label. The label "organic" is allowed only if the certification body can prove the separation of organic and non-organic livestock on communal pastures. The approval and certification of the organic farm has to be made during the period of grazing communal pastures. The monitoring of such systems is very difficult, particularly with small ruminants (identification of individual animals, mixing of stock). Collaboration between the organic and conventional farms is possible on an written contractual basis. The fulfilment will be inspected.

Nevertheless there are significant difficulties in mixed grazing with organic and non-organic livestock on the same pastures. For example, environmentally transmitted diseases like foot-rot or anthelmintic-resistant endo-parasites can be transmitted between the flocks even if they do not graze together. This should not be ignored by organic livestock keepers because the prevention and treatment of such diseases is difficult, time-consuming and costly.

5 Summary

The development of meat and milk production under the premises of organic farming is still in its infancy, and is much less developed than the organic cultivation of plants. In civil law, and since 1992, in legally binding guidelines (2092/91/EEC), processing quality is given priority over quantity. In comparison to the legal requirements currently in effect, high standards of animal welfare and environmental protection are being introduced through the framework conditions of organic animal husbandry. Even though many consumers of organic products expect not only high quality processing but also high quality products, product quality is not defined explicitly either by EU-requirements or by the organic-producer-associations, except in regard to contamination with undesired substances.

While organic production of milk, beef and lamb is quite unproblematic, there are at present, relatively difficult conditions in the organic production of eggs and poultry products. The problem with eggs and poultry production on the one hand rests in the comparatively high price advantage of intensively produced eggs and poultry, and on the other hand in the lack of an independent organic quality profile.

In order to obtain the higher prices at market which are necessary to cover the higher costs involved, organic meat and milk production needs to develop quality standards not just for production practices, but also for the products. Here, carcass- and meat quality in beef, lamb, eggs and poultry products must be improved. These can only be achieved through optimised coordination of feeding, breeding, techniques of husbandry, and, especially, management.

On July 19, 1999, EU-directive 1804/99/EU for the organic keeping of animals was passed and came into force on the August 24, 2000. It was integrated into EU-directive 2092/91/EEC which since then covers cultivation of plants and animal husbandry. The contents of this directive present a compromise between the different agricultural associations of the EU member states. Thus, it defines the minimum standard for organic farming, including organic animal husbandry, across the entire EU.

Guidelines alone, however, do not create an environmentally-friendly, economic, organic animal husbandry centering on animal welfare. A high degree of knowledge as well as practical skill are necessary to keep livestock in accordance with animal welfare and in an environmentally friendly way, and at the same time to earn sufficient income. Here, the guidelines offer little help. When

converting from conventional to organic farming, it can take years before the farm regains its balance. Thus, the first years of organic farming are beset with many problems concerning conversion and adaptation: animal illnesses, lower yields and performances, pressure caused by weeds and pests, quality problems, and as a consequence, economic difficulties. However, the experiences of organic farmers who have practiced over a longer period of time, show that, with time, these difficulties can be mastered. For these reasons, organic animal husbandry is a permanent challenge (Rahmann 2004).

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