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The standards, regulations and legislation required for organic ruminant keeping in the European Union

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Summary

Multinational formal regulations like 2092/91/EEC or 1804/99/EC are compromises because they have to take into consideration the different conditions of the partner countries. Many of the compromises need further emphasis and more specific descriptions for ruminants:

- Extended converting periods,
- Whole farm converting and no ability of converting just farm branches,
- Cross check of allowed farm inputs,
- Improved declarations of drugs, feeds, disinfections,
- Improved animal keeping in breeding, rearing, weaning, feeding,
- Adapted stocking rates for environmental issues: pollution and nature protection,
- Integration of trade (wholesaler, retailer) into the certification and
- Improved disease prevention strategies.

The organic farming regulations are process claims. Therefore, there are clear process qualities but this is no warranty for product qualities. It is even prohibited to claim that organic food is healthier than conventionally produced food. For organic milk and meat – the major ruminant products – product qualities have to be defined. Food safety standards like HACCP (Hazard Analysis and Critical Control Points, WHO-standards) have to be implemented into the organic regulations. Finally the nature conservation intended by organic farming is not clearly described in the regulations. Ruminants are important in the maintenance of landscape and endangered biotopes. All of these aspects require further research to design policy frameworks to develop the regulations of organic animal husbandry.

Keywords: organic ruminant keeping, organic standards, European regulation 1804/99/EC

Introduction

Organic agriculture is considered an environmentally sound and socially acceptable land use system with “natural food” production (FAO, 2000). It is based on independently certified and controlled specific standards of production which are described by the International Federation of Organic Agricultural Movement (IFOAM, 1999) and taken from international bodies like the Codex Alimentarius Commission (FAO/WHO, 1999).

Cattle, sheep and goats are important livestock on organic farms (Graf & Willer, 2000). In the historical context of organic farming these ruminants were mainly considered as “manure-producers”. With the increasing demand for organic livestock products in the past decades - especially since the BSE-crises in Europe in the nineties - the production of milk and meat became the main focus of organic ruminant keeping.

The basic standards and principles of organic farming of IFOAM (latest version from 1999) were the platform for many state regulation negotiations on organic animal husbandry. They define the minimum requirements for certification as an organic farming product domestically and for foods imported from other countries.

The EU-regulation 1804/99/EC is one of the most precise legislative regulations on organic animal husbandry worldwide and will be used as the basis for the following statements. Despite the fact that organic ruminant production is clearly defined in 1804/99/EC, there is a need to improve the standards, the regulations and legislation to fulfil needs of livestock keepers as well as consumer and public expectations. This paper will focus on the requirements for improving organic ruminant production in the EU in the context of this EU-regulation.

The basic principles and standards of organic ruminant keeping

Adapted and sustainable farming systems are the backbone of organic farming. The 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 on the private 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 respectively under 1257/99/EC of the AGENDA 2000.

EU-regulation 1804/99/EC for organic livestock keeping

Comparable to organic crop production, organic animal husbandry needed to be defined, regulated, certified and monitored on state level. The EU filled this missing link with the regulation 1804/99/EC, which was negotiated over a period of 6 years (Haccius, 1999). The regulation became valid on August 24, 2000 and became part of the regulation 2092/91/EEC.

Formal multinational 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 favoured to less favoured production conditions as well as from large scale to small scale farming

systems. The compromises in such regulations need to be discussed and developed after 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 equally considered. While cattle are well described, sheep and goats received only scant attention.

The handling 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 (Article 1 (2); AGÖL 1999). This can lead to inter(agri)cultural misunderstandings and disagreements between different national standards (e.g. important for intra-EC-trade). Some major aspects of 1804/99/EC for organic ruminant keeping are discussed below:

Farmland-related animal husbandry

Livestock plays an important role on organic farms (Annex I B 1.1.), e.g. in nutrient cycling (Annex I B 1.3.). Landless animal husbandry is not organic and thus prohibited (Annex I B 1.2.). The limited livestock density does not exceed 170 kg nitrogen per hectare an year (Annex I B 7.1.) and is measured in livestock units (LU; Annex I B 7.2. and Annex VII). In a Europe-wide context, the use of livestock units (Table 1) 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 (e.g. AGÖL in Germany allows only 1.4 livestock units per ha and year, which are equal to 112 kg of N and 98 kg of P₂O₅). Therefore, the certification procedure has to prove a proper livestock - farmland-ratio in the context of Annex I B 1.4., I B 7.6., 7.7. as well as Annex I B 8.2.4. where environmental contamination has to be minimised.

Table 1. 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 below 1 year	5
• Ewes and mother goats	13.3

Converting of farm branches and livestock

It is possible to convert just one branch of the farm towards organic production, e.g. only the crop production, but not the animal husbandry, or dairy cattle but not pig keeping (Annex I B 1.5.). 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 (Annex I B 1.6.). A clear separation is needed to avoid contamination (e.g. prohibited disinfectants or feedstuffs/feed materials which are not in 1804/99/EC Annex II) and mixing of inputs (e.g. feeds and dung).

Comparable to crop production (Annex I A), the conversion period for pastures for ruminants is 24 months (Annex I B 2.1.1). The conversion period starts with seeding of annual crops and for 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" (Article 1, paragraph 5, definition 24). After 24 months, grassland has withstood the converting period and is considered an organic feedstuff.

Table 2. 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 ruminants and horses	24 months (like crop production 2092/91/EEC I A)
• Beef cattle	12 months; minimum of ¾ of the animals life
• Milk (cows; sheep and goats)	6 months (3 months till 24 August 2003)
• Small ruminants	6 months

Milk can be sold under the label "organic" 15 months after the start of converting: 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 (Annex I B 4.8.; till August 24, 2005) is purchased (see below). After three months with this feed, milk can be declared "organic" (Table 2). 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 (Annex I B 2.3.). 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 (see above).

The conversion period for livestock seems to be very long, but in some cases it is too short. For example, if after 12 months (¾ of the animal's lifespan) the land on which cattle are kept conforms with the regulations, beef can be sold as "organic" (Annex I B 2.2.1.). That means that a 20 months old bull can be reared under conventional conditions for 5 months and fattened 15 months under organic regulations. This animal can still be infected with BSE if meat-and-bone-meal (MBM) or animal fat was contained in the powdered milk for calves, which are considered as a transmitting factor of the disease (MAFF, 2000). The conversion from conventional to organic does not eliminate the risk of BSE, because the incubation period is longer than the conversion periods. Tests are made at 24 month (e.g. in Germany) or at 30 month old animals (EU-regulation) respectively but most of beef cattle are slaughtered before they reached this age.

A similar problem can occur with milk, which can be labelled as "organic milk" after six months (three months until August 24, 2005) according to the regulations. But zoonotic pathogens like antibiotic resistant coli bacteria, *Staphylococcus aureus* or chemical toxins

(disinfectants, heavy metals from feed and preventative veterinary treatments apart from double withholding periods; Annex I B 5.7.) can be still prevalent in the udder and affect the milk quality, and even human health, negatively.

To avoid such problems (and the negative image of organic products) animal products should originate only from animals which are born and reared under the regulations. For example, during the BSE-crises in Germany early this year, some private organic farming associations in Germany declared that beef can only use the labels of BIOLAND® and DEMETER® when the cattle are born, kept and fed under their organic farming regulations (which are even more restrictive than 1804/99/EC) - that means without conversion periods and conventional feedstuff - to avoid a case of BSE on such organic farms.

The regulations of purchasing livestock only from organic farms (Annex I B 3.2.) is directed at avoiding any possible contamination originating from conventional farming. Three exceptions: the conversion period of the production unit (Annex I B 3.3.); the herd establishment (Annex I B 3.4.); restocking after epidemics (e.g. Foot and Mouth Disease epidemic in the UK in 2001) and natural calamities (e.g. earthquake) (Annex I B 3.6.), are only valid until the end of 2003. If young stock is purchased from conventional farms (Annex I B 3.4.), the maximum age at time of purchase is six months for calves and 45 days for lambs and kids (just after weaning).

The fourth exception (Annex I B 3.8.) allows that every year 10% of the female breeding stock of cattle and 20% of female breeding stock of small ruminants can be purchased from conventional farms if they are not available from organic farms (before first delivery; pregnancy is possible). Male breeding stock from conventional farms can be used if the regulations are followed (if this holds true without a conversion period is not clearly defined). The acceptance of the certifying body is required. The commission will approve these regulations and probably eliminate them after 2003 (Annex I B 3.11.).

Feeding of ruminants

The definition of farmland-related animal husbandry with kg nitrogen per hectare and year does not fix the origin of the feedstuff (see above). 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 (Annex I B 7.4. on a contract basis) and even 10% dry matter (DM) of conventional feeds (positive lists) or a maximum of 25% DM per day (exception for mobile herds), respectively, are allowed for ruminants until September 2005 (Annex I B 4.2.).

A maximum of 30% DM of "in-conversion feedstuff" (after 12 months of conversion; see above) can be fed to organic livestock respectively 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 (Annex I B 4.4.).

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 (Article 1 (1) a-c) 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 miling systems. Nevertheless, it was agreed that animal welfare is more important than economic considerations. In 1804/99/EC Annex I B 4.5., 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 feed to kids but not to lambs (the fat content is too low). In practice, 1804/99/EC Annex I B 4.5. is interpreted 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 (1804/99/EC Annex II) - are available and have to 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 to keep 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 (definition conform to 220/90/EEC and 1804/99/EC Article 4 No 12 and 13 as well as Article 5). This includes feed for livestock (conforming to definition of animal feeds in 471/82/EEC) and is already valid since September 24, 1999; 1804/99/EC Annex I B 4.18.). 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:

- Particularly in the processing, the origin of permissible conventional ingredients (5%) are not obvious. Contamination with GMOs are possible when 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 and this by oxidation of sorbitol and this by 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 when 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 the animal nutrition (1804/99/EC Annex I B 4.12. and Annex II D 1.5. and 3.1.). Listed in Annex II D 1.2. are permissible minerals, vitamins and pro-vitamins for animal feed. 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 seems not 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 of conventional livestock keeping strategies) or whether organic farming should try to adapt livestock to the local conditions of the farm.

Ruminant 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).

Animal health and veterinary treatments

The principle of animal health is preventing and not curing/treating (Annex I B 5.1.). Robust, adapted and disease tolerant livestock ensure fit and healthy animals (Annex I B 3.1.). 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 3.2. (lack of organic farms). Thirdly, very often adapted local breeds (wether 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 the emphasis on animal welfare and not on maximising production. Under these conditions it is assumed that animal health can be maintained by prevention (Annex I B 5.2.). 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 (Annex I B 5.5.). 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 (Annex I B 5.3.). This has to be proven and carried out by a veterinarian. Natural methods of disease treatment

are to be preferred as long as they help the animal (Annex I B 5.4.). 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 have to be noted in a herd book and be presented to the certification body (Annex I B 5.6.). The withholding period is twice as long (minimum of 48 hours) as requested for the applied drugs (Annex I B 5.7.). 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) (Annex I B 5.8.). There is still no positive list of chemical allopathic drugs. There is an urgent need to create positive lists in the regulations for livestock keeping.

Husbandry management practices, transport and slaughtering

The breeding of ruminants should be done by natural mating (Annex I B 6.1.1.). 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 (Annex I B 3.11.).

Under conventional conditions tested bulls or rather semen, 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 test 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 (Annex I B 6.1.2.). This is even valid for purchased livestock from conventionally managed farms. Only under special circumstances may these treatments be performed, regulated by the certification authorities (e.g. hygienic, animal welfare or bio-security aspects). Castration of male stock is allowed to keep traditional animal husbandry practices (Annex I B 6.1.3.). 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 (Annex I B 6.1.8.). Ruminants have to be kept in groups to meet their social needs (for calves Annex I B 8.3.7. and 629/91/EEC). It is not defined how social needs can be fulfilled via farm conditions. Igloo-boxes for the keeping of individual calves is understood to conform with the regulations because the calves can have sight contact to other calves (e.g. AGÖL). From an ethological point of view this can not fulfil the behavioural needs (e.g. social needs) of the calves (Rist, 1987).

The transport of livestock is not clearly defined (Annex I B 6.2.), but a stress-reduced loading, transporting and unloading of livestock without the use of allopathic tranquilliser,

electrical shockers or similar tools is aimed. 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.

Housing and stocking rates for ruminants

The tethering of livestock is prohibited (Annex I B 6.1.4.). This was a crucial aspect of disputes between the different countries. Especially the small-scale organic farms in north-west Europe 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 ; Krutzinna et al., 1996). In Annex I B 6.1.5., a tethering is allowed as long as the stables were built before August 24, 1999 (Annex I B 8.5.1.) and the tethered animals can move freely on a regular basis (twice a week; Annex I B 6.1.6.) and if the animals get 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 done by the certification body (from ethological point of view the necessary group sizes are three cows or calves; Takeda et al. 1998). The certification body can also authorise the limited and reasonable tethering of single animals (e.g. sick animals).

Table 3. 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 (Annex I B 8.3.1.). 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

when 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 principle of ruminant keeping (Annex I B 8.1.2.). Only with permanent summer pasture grazing an outdoor run is not necessary (Annex I B 8.3.2.), 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 (Annex I B 8.3.4.). Such exceptions in animal welfare are difficult to communicate to consumers, who expect organic animal husbandry without exceptions (Rahmann et al., 2001).

A minimum surface area for indoor housing and outdoor exercise areas is defined (Annex I B 8.2.3. and Annex VIII; Table 3). 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; Hörning, 1997). Cheaper stable buildings have to be designed and permitted 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 (Bertsch, 1999). A maximum of 50% of the stable surface can be slatted or of gridded construction, the rest has to be a flat and non-slippery surface (Annex I B 8.3.5.). All indoor and outdoor net spaces for the animals are considered for this regulation. This means that the stable surface can be slatted or of 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 strewned-in with organic materials (defined in Annex II, part A; e.g. straw or wood chips; peat is difficult by environmental issues). There has to be enough space for fodder intake and resting (one place per animal) and the stable construction has to avoid harm to the animal by other animals or the stable equipment and cruelty to the animals while at the same time ensuring animal welfare (social contacts, playing, etc.). For disinfection and cleaning of stables and equipment, only the means and remedies in Annex II, part E are allowed (Annex I B 8.2.5.). The disinfection of permanently accessible outdoor runs is difficult and can lead to environmental contamination (water, air).

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 (Annex I B 1.7.). 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.

Converseley, organic livestock can graze on pastures which are not under the certification of organic farming (Annex I B 1.8.). This is possible on communal grazing areas where flocks of organic and non-organic livestock are mixed. In that case, the grazing areas may not be contaminated with prohibited treatments (those not in the positive lists of Annex II) in the last three years, the non-organic livestock is 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

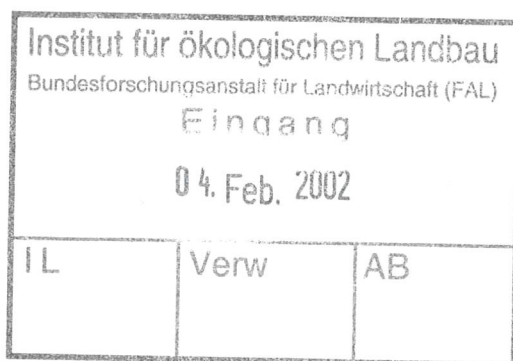
organic and non-organic livestock on communal pastures. The approval and certification of the organic farm has to be done during the period of grazing communal pastures. The monitoring of such systems is very difficult, particularly with small ruminants (identification of individual animals, mixing of stock). A collaboration on a written contract basis between the organic and conventional farms is possible. 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 when they do not graze together. This should not be ignored by organic livestock keepers because prevention and treatments of such diseases are difficult, time-consuming and costly.

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23 January 2002

Dear Gerold

ORGANIC MEAT AND MILK PRODUCTION FROM RUMINANTS

Your paper has now been evaluated by an independent referee. We would be grateful if you could now revise it in view of his/her comments, which are relatively minor. When revising the paper, please also take into account the Instructions to Authors supplied by Wageningen Pers. These instructions accompany this letter. As we have been asked to supply camera-ready copies to the publishers, it is your responsibility to ensure that you comply with these instructions. Please ensure that your formatting, Tables, References etc comply with these. We hope that the enclosed instructions are clear, but if you have any problems with them or with the comments made by the referees, please do not hesitate to contact me at my email address (i.kyriazakis@ed.sac.ac.uk).

The deadline for returning the revised paper to me is 25 February 2002. When returning your paper we would appreciate both a hard copy and a clearly labelled diskette version, that will be forwarded to publishers. We hope to forward all the material to the publishers by 8 March 2002, so it would be very important that you meet the above deadline.

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The standards, regulations and legislation required for organic ruminant keeping in the European Union

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Summary

Multinational formal regulations like 2092/91/EEC or 1804/99/EC are compromises because they have to take into consideration the different conditions of the partner countries. Many of the compromises need further emphasis and more specific descriptions for ruminants:

- Extended converting periods,
- Whole farm converting and no ability of converting just farm branches,
- Cross check of allowed farm inputs,
- Improved declarations of drugs, feeds, disinfections,
- Improved animal keeping in breeding, rearing, weaning, feeding,
- Adapted stocking rates for environmental issues: pollution and nature protection,
- Integration of trade (wholesaler, retailer) into the certification and
- Improved disease prevention strategies.

The organic farming regulations are process claims. Therefore, there are clear process qualities but this is no warranty for product qualities. It is even prohibited to claim that organic food is healthier than conventionally produced food. For organic milk and meat – the major ruminant products – product qualities have to be defined. Food safety standards like HACCP (Hazard Analysis and Critical Control Points, WHO-standards) have to be implemented into the organic regulations. Finally the nature conservation intended by organic farming is not clearly described in the regulations. Ruminants are important in the maintenance of landscape and endangered biotopes. All of these aspects require further research to design policy frameworks to develop the regulations of organic animal husbandry.

Keywords: organic ruminant keeping, organic standards, European regulation 1804/99/EC

Introduction

Organic agriculture is considered an environmentally sound and socially acceptable land use system with "natural food" production (FAO, 2000). It is based on independently certified and controlled specific standards of production which are described by the International Federation of Organic Agricultural Movement (IFOAM, 1999) and taken from international bodies like the Codex Alimentarius Commission (FAO/WHO, 1999).

Cattle, sheep and goats are important livestock on organic farms (Graf & Willer, 2000). In the historical context of organic farming these ruminants were mainly considered as "manure-producers". With the increasing demand for organic livestock products in the past decades - especially since the BSE-crises in Europe in the nineties - the production of milk and meat became the main focus of organic ruminant keeping.

The basic standards and principles of organic farming of IFOAM (latest version from 1999) were the platform for many state regulation negotiations on organic animal husbandry. They define the minimum requirements for certification as an organic farming product domestically and for foods imported from other countries.

The EU-regulation 1804/99/EC is one of the most precise legislative regulations on organic animal husbandry worldwide and will be used as the basis for the following statements. Despite the fact that organic ruminant production is clearly defined in 1804/99/EC, there is a need to improve the standards, the regulations and legislation to fulfil needs of livestock keepers as well as consumer and public expectations. This paper will focus on the requirements for improving organic ruminant production in the EU in the context of this EU-regulation.

The basic principles and standards of organic ruminant keeping

Adapted and sustainable farming systems are the backbone of organic farming. The 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 on the private 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 respectively under 1257/99/EC of the AGENDA 2000.

EU-regulation 1804/99/EC for organic livestock keeping

Comparable to organic crop production, organic animal husbandry needed to be defined, regulated, certified and monitored on state level. The EU filled this missing link with the regulation 1804/99/EC, which was negotiated over a period of 6 years (Haccius, 1999). The regulation became valid on August 24, 2000 and became part of the regulation 2092/91/EEC.

Formal multinational 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 favoured to less favoured production conditions as well as from large scale to small scale farming

systems. The compromises in such regulations need to be discussed and developed after 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 equally considered. While cattle are well described, sheep and goats received only scant attention.

The handling 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 (Article 1 (2); AGÖL 1999). This can lead to inter(agri)cultural misunderstandings and disagreements between different national standards (e.g. important for intra-EC-trade). Some major aspects of 1804/99/EC for organic ruminant keeping are discussed below:

Farmland-related animal husbandry

Livestock plays an important role on organic farms (Annex I B 1.1.), e.g. in nutrient cycling (Annex I B 1.3.). Landless animal husbandry is not organic and thus prohibited (Annex I B 1.2.). The limited livestock density does not exceed 170 kg nitrogen per hectare an year (Annex I B 7.1.) and is measured in livestock units (LU; Annex I B 7.2. and Annex VII). In a Europe-wide context, the use of livestock units (Table 1) 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 (e.g. AGÖL in Germany allows only 1.4 livestock units per ha and year, which are equal to 112 kg of N and 98 kg of P₂O₅). Therefore, the certification procedure has to prove a proper livestock - farmland-ratio in the context of Annex I B 1.4., I B 7.6., 7.7. as well as Annex I B 8.2.4. where environmental contamination has to be minimised.

Table 1. 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 below 1 year	5
• Ewes and mother goats	13.3

Converting of farm branches and livestock

It is possible to convert just one branch of the farm towards organic production, e.g. only the crop production, but not the animal husbandry, or dairy cattle but not pig keeping (Annex I B 1.5.). 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 (Annex I B 1.6.). A clear separation is needed to avoid contamination (e.g. prohibited disinfectants or feedstuffs/feed materials which are not in 1804/99/EC Annex II) and mixing of inputs (e.g. feeds and dung).

Comparable to crop production (Annex I A), the conversion period for pastures for ruminants is 24 months (Annex I B 2.1.1). The conversion period starts with seeding of annual crops and for 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" (Article 1, paragraph 5, definition 24). After 24 months, grassland has withstood the converting period and is considered an organic feedstuff.

Table 2. 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 ruminants and horses	24 months (like crop production 2092/91/EEC I A)
• Beef cattle	12 months; minimum of ¾ of the animals life
• Milk (cows, sheep and goats)	6 months (3 months till 24 August 2003)
• Small ruminants	6 months

Milk can be sold under the label "organic" 15 months after the start of converting: 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 (Annex I B 4.8.; till August 24, 2005) is purchased (see below). After three months with this feed, milk can be declared "organic" (Table 2). 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 (Annex I B 2.3.). 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 (see above).

The conversion period for livestock seems to be very long, but in some cases it is too short. For example, if after 12 months (¾ of the animal's lifespan) the land on which cattle are kept conforms with the regulations, beef can be sold as "organic" (Annex I B 2.2.1.). That means that a 20 months old bull can be reared under conventional conditions for 5 months and fattened 15 months under organic regulations. This animal can still be infected with BSE if meat-and-bone-meal (MBM) or animal fat was contained in the powdered milk for calves, which are considered as a transmitting factor of the disease (MAFF, 2000). The conversion from conventional to organic does not eliminate the risk of BSE, because the incubation period is longer than the conversion periods. Tests are made at 24 month (e.g. in Germany) or at 30 month old animals (EU-regulation) respectively but most of beef cattle are slaughtered before they reached this age.

A similar problem can occur with milk, which can be labelled as "organic milk" after six months (three months until August 24, 2005) according to the regulations. But zoonotic pathogens like antibiotic resistant coli bacteria, *Staphylococcus aureus* or chemical toxins

(disinfectants, heavy metals from feed and preventative veterinary treatments apart from double withholding periods; Annex I B 5.7.) can be still prevalent in the udder and affect the milk quality, and even human health, negatively.

To avoid such problems (and the negative image of organic products) animal products should originate only from animals which are born and reared under the regulations. For example, during the BSE-crises in Germany early this year, some private organic farming associations in Germany declared that beef can only use the labels of BIOLAND® and DEMETER® when the cattle are born, kept and fed under their organic farming regulations (which are even more restrictive than 1804/99/EC) - that means without conversion periods and conventional feedstuff - to avoid a case of BSE on such organic farms.

The regulations of purchasing livestock only from organic farms (Annex I B 3.2.) is directed at avoiding any possible contamination originating from conventional farming. Three exceptions: the conversion period of the production unit (Annex I B 3.3.); the herd establishment (Annex I B 3.4.); restocking after epidemics (e.g. Foot and Mouth Disease epidemic in the UK in 2001) and natural calamities (e.g. earthquake) (Annex I B 3.6.), are only valid until the end of 2003. If young stock is purchased from conventional farms (Annex I B 3.4.), the maximum age at time of purchase is six months for calves and 45 days for lambs and kids (just after weaning).

The fourth exception (Annex I B 3.8.) allows that every year 10% of the female breeding stock of cattle and 20% of female breeding stock of small ruminants can be purchased from conventional farms if they are not available from organic farms (before first delivery; pregnancy is possible). Male breeding stock from conventional farms can be used if the regulations are followed (if this holds true without a conversion period is not clearly defined). The acceptance of the certifying body is required. The commission will approve these regulations and probably eliminate them after 2003 (Annex I B 3.11.).

Feeding of ruminants

The definition of farmland-related animal husbandry with kg nitrogen per hectare and year does not fix the origin of the feedstuff (see above). 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 (Annex I B 7.4. on a contract basis) and even 10% dry matter (DM) of conventional feeds (positive lists) or a maximum of 25% DM per day (exception for mobile herds), respectively, are allowed for ruminants until September 2005 (Annex I B 4.2.).

A maximum of 30% DM of "in-conversion feedstuff" (after 12 months of conversion; see above) can be fed to organic livestock respectively 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 (Annex I B 4.4.).

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 (Article 1 (1) a-c) 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 miling systems. Nevertheless, it was agreed that animal welfare is more important than economic considerations. In 1804/99/EC Annex I B 4.5., 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 feed to kids but not to lambs (the fat content is too low). In practice, 1804/99/EC Annex I B 4.5. is interpreted 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 (1804/99/EC Annex II) - are available and have to 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 to keep 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 (definition conform to 220/90/EEC and 1804/99/EC Article 4 No 12 and 13 as well as Article 5). This includes feed for livestock (conforming to definition of animal feeds in 471/82/EEC) and is already valid since September 24, 1999; 1804/99/EC Annex I B 4.18.). 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:

- Particularly in the processing, the origin of permissible conventional ingredients (5%) are not obvious. Contamination with GMOs are possible when 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 and this by oxidation of sorbitol and this by 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 when 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 the animal nutrition (1804/99/EC Annex I B 4.12. and Annex II D 1.5. and 3.1.). Listed in Annex II D 1.2. are permissible minerals, vitamins and pro-vitamins for animal feed. 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 seems not 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 of conventional livestock keeping strategies) or whether organic farming should try to adapt livestock to the local conditions of the farm.

Ruminant 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).

Animal health and veterinary treatments

The principle of animal health is preventing and not curing/treating (Annex I B 5.1.). Robust, adapted and disease tolerant livestock ensure fit and healthy animals (Annex I B 3.1.). 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 3.2. (lack of organic farms). Thirdly, very often adapted local breeds (wether 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 the emphasis on animal welfare and not on maximising production. Under these conditions it is assumed that animal health can be maintained by prevention (Annex I B 5.2.). 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 (Annex I B 5.5.). 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". Deworming 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 dewormed. 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 (Annex I B 5.3.). This has to be proven and carried out by a veterinarian. Natural methods of disease treatment

are to be preferred as long as they help the animal (Annex I B 5.4.). 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 have to be noted in a herd book and be presented to the certification body (Annex I B 5.6.). The withholding period is twice as long (minimum of 48 hours) as requested for the applied drugs (Annex I B 5.7.). 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) (Annex I B 5.8.). 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.

Husbandry management practices, transport and slaughtering

The breeding of ruminants should be done by natural mating (Annex I B 6.1.1.). 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 (Annex I B 3.11.).

Under conventional conditions tested bulls or rather semen, 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 test 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 (Annex I B 6.1.2.). This is even valid for purchased livestock from conventionally managed farms. Only under special circumstances may these treatments be performed, regulated by the certification authorities (e.g. hygiene, animal welfare or bio-security aspects). Castration of male stock is allowed to keep traditional animal husbandry practices (Annex I B 6.1.3.). 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 (Annex I B 6.1.8.). Ruminants have to be kept in groups to meet their social needs (for calves Annex I B 8.3.7. and 629/91/EEC). It is not defined how social needs can be fulfilled via farm conditions. Igloo-boxes for the keeping of individual calves is understood to conform with the regulations because the calves can have sight contact to other calves (e.g. AGÖL). From an ethological point of view this can not fulfil the behavioural needs (e. g. social needs) of the calves (Rist, 1987).

The transport of livestock is not clearly defined (Annex I B 6.2.), but a stress-reduced loading, transporting and unloading of livestock without the use of allopathic tranquilliser,

electrical shockers or similar tools is aimed. 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.

Housing and stocking rates for ruminants

The tethering of livestock is prohibited (Annex I B 6.1.4.). This was a crucial aspect of disputes between the different countries. Especially the small-scale organic farms in north-west Europe 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 ; Krutzinna et al., 1996). In Annex I B 6.1.5., a tethering is allowed as long as the stables were built before August 24, 1999 (Annex I B 8.5.1.) and the tethered animals can move freely on a regular basis (twice a week; Annex I B 6.1.6.) and if the animals get 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 done by the certification body (from ethological point of view the necessary group sizes are three cows or calves; Takeda et al. 1998). The certification body can also authorise the limited and reasonable tethering of single animals (e.g. sick animals).

Table 3. Minimum space for organic ruminant keeping (Source: 1804/99/EC Annex VIII I).

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 (Annex I B 8.3.1.). 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

when 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 principle of ruminant keeping (Annex I B 8.1.2.). Only with permanent summer pasture grazing an outdoor run is not necessary (Annex I B 8.3.2.), 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 (Annex I B 8.3.4.). Such exceptions in animal welfare are difficult to communicate to consumers, who expect organic animal husbandry without exceptions (Rahmann et al., 2001).

A minimum surface area for indoor housing and outdoor exercise areas is defined (Annex I B 8.2.3. and Annex VIII; Table 3). 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; Hörning, 1997). Cheaper stable buildings have to be designed and permitted 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 (Bertsch, 1999). A maximum of 50% of the stable surface can be slatted or of gridded construction, the rest has to be a flat and non-slippery surface (Annex I B 8.3.5.). All indoor and outdoor net spaces for the animals are considered for this regulation. This means that the stable surface can be slatted or of 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 strewn-in with organic materials (defined in Annex II, part A; e.g. straw or wood chips; peat is difficult by environmental issues). There has to be enough space for fodder intake and resting (one place per animal) and the stable construction has to avoid harm to the animal by other animals or the stable equipment and cruelty to the animals while at the same time ensuring animal welfare (social contacts, playing, etc.). For disinfection and cleaning of stables and equipment, only the means and remedies in Annex II, part E are allowed (Annex I B 8.2.5.). The disinfection of permanently accessible outdoor runs is difficult and can lead to environmental contamination (water, air).

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 (Annex I B 1.7.). 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.

Converseley, organic livestock can graze on pastures which are not under the certification of organic farming (Annex I B 1.8.). This is possible on communal grazing areas where flocks of organic and non-organic livestock are mixed. In that case, the grazing areas may not be contaminated with prohibited treatments (those not in the positive lists of Annex II) in the last three years, the non-organic livestock is 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 done 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). A collaboration on a written contract basis between the organic and conventional farms is possible. 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 when they do not graze together. This should not be ignored by organic livestock keepers because prevention and treatments of such diseases are difficult, time-consuming and costly.

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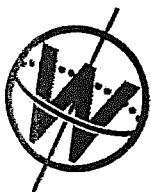
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