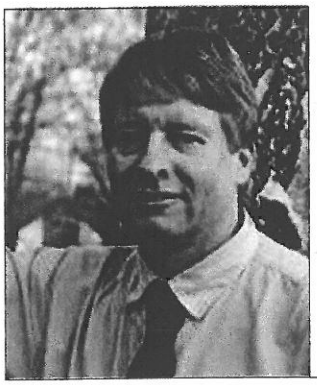
Organic Sheep and Goat Farming



THÜNEN

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Introduction

Only few know how difficult organic sheep and goat farming is from animal welfare, ecological and economic perspective. Newcomers particularly overestimate the production and marketing potential of the products, and underestimate the associated skills and demands in organic small ruminant husbandry (e.g., health, feeding, housing).

It usually takes years to learn how to operate an organic sheep and goat farm and make it profitable. In addition to that, good animal handling skills, and marketing ability, qualified professional and veterinary advice is crucial for successful, sustainable development. Many veterinarians do not know enough about organic sheep and goat farming. This paper will give some key information.

Organic sheep and goat farming is based on established and monitored production and processing guidelines. In 2008, EU-directive 834/2007/EU became the second legally binding minimum standards of organic animal husbandry (first was 1804/1999/EC, valid from August 2000). This regulations became relevant for sheep and goats on organic farms as well. The standards describes exactly the production processes to be adhered to, before advertising organic or eco-production. Higher standards than those demanded by the EU-organic-regulation are laid down by the agricultural associations of organic farming. Usually the standards are not very different.

Guidelines alone, however, do not make an environmentally friendly, economic, organic sheep and goat keeping centring on animal welfare. A high degree of knowledge as well as practical skill are necessary to keep live stock in accordance with animal welfare and in an environmentally friendly way, and at the same time to earn sufficient income. Here, the regulations offer little help. However, the experience made by organic sheep and goat farmers having practiced for a longer duration of time, show that, in time, these difficulties can be mastered.

Sheep and goat husbandry

Goats

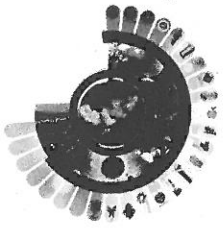
Goats are ruminants. They have horizontal slit-shaped pupils and consume, on average, 2 kg of dry matter per 50 kg of body weight per day.

In some climates goats, like humans, are able to breed at any time of the year. In northern climates and among the Swiss breeds, the breeding season commences as the day length shortens, and ends in early spring. Does of any breed come into heat every 21 days for 2 to 48 hours. A doe in heat typically flags her tail often, stays near the buck if one is present, becomes more vocal, and may also show a decrease in appetite and milk production for the duration of the heat.

Bucks (intact males) of Swiss and northern breeds come into rut in the fall as with the doe's heat cycles. Rut is characterized by a decrease in appetite, obsessive interest in the does, a strong heat. In addition to live breeding, artificial insemination has gained popularity among goat breeders, as it allows for rapid improvement because of breeder access to a wide variety of bloodlines.

Gestation length is approximately 150 days. Twins are the usual result, with single and triplet births also common. Less frequent are litters of quadruplet, quintuplet, and even sextuplet kids. Birthing, known as kidding, generally occurs uneventfully with few complications. The mother often eats the placenta, which, with its oxytocin, gives her much needed nutrients, helps staunch her bleeding, and is believed by some to reduce the lure of the birth scent to predators.

Freshening (coming into milk production) occurs at kidding. Milk production varies with the breed, age, quality, and diet of the doe; dairy goats generally produce between 660 to 1,000 L of milk per 305 day lactation. On average, a good quality dairy doe will give at least 2 to 3 L of milk per day while she is in milk, although a first time milker may produce less. Meat, fiber, and pet breeds are not usually milked and simply produce enough for the kids until weaning.



Goats are reputed to be willing to eat almost anything. The digestive systems of a goat allow nearly any organic substance to be broken down and used as nutrients.

Contrary to this reputation, they are quite fastidious in their habits, preferring to browse on the tips of woody shrubs and trees, as well as the occasional broad leaved plant. It can fairly be said that goats will eat almost anything in the botanical world. Their plant diet is extremely varied and includes some species which are toxic or detrimental to cattle and sheep. This makes them valuable for controlling noxious weeds and clearing brush and undergrowth. They will seldom eat soiled food or water unless facing starvation. This is one of the reasons why goat rearing is most often free ranging since stall-fed goat rearing involves extensive upkeep and is seldom commercially viable.

The taste of goat meat is similar to that of lamb meat. However, some feel that it has a similar taste to veal or venison, depending on the age and condition of the goat. It can be prepared in a variety of ways including stewed, baked, grilled, barbecued, minced, canned, or made into sausage. Nutritionally, it is healthier than mutton as it is lower in fat and cholesterol, and comparable to chicken. It also has more minerals than chicken, and is lower in total and saturated fats than other meats.

Some goats are bred for milk which can be drunk fresh, although pasteurization is recommended to reduce naturally occuring S. aureus and E. coli. Goat milk is commonly processed into cheese, and small commercial operations offer goat butter and ice cream. If the strong-smelling buck is not separated from the does, his scent will affect the milk. Goats' milk contains less lactose, so is less likely to trigger lactose intolerance. The milk is naturally homogenized since it lacks the protein agglutinin. The curd is much smaller. The milk also has a more similar makeup (percentage of fats, etc.) to human milk than cows milk. For these reasons, goats' milk may be recommended for infants and people who have difficulty digesting cows' milk.

Some goats are bred for the fiber from their coats. Most goats have softer insulating hairs nearer the skin, and longer guard hairs on the surface. The desirable fiber for the textile industry is the former, and it goes by several names (mohair, fleece, goat wool, cashmere, etc., explained below). The coarse guard hairs are worthless as they cannot be spun or dyed. The proportion and texture varies between breeds, and has been a target of selective breeding for millennia.

Sheep

Sheep are not very different from goats. They are kept in flocks — in pens, in a barn or on pasture. Sheep are active grazers where such feed is available at ground or low levels. They are usually given feed twice a day from troughs or they are allowed to graze in a pasture. Sheep need fresh water from troughs or ponds, except that in some countries, such as New Zealand, there is enough moisture in the grass to satisfy them much of the time. Upon being weaned from ewe's milk, they eat hay, grains and grasses. The lambs are weaned due to increasing competition between the lamb and ewe for food. Sheep are most comfortable when the temperature is moderate.

Sheep breeders look for such traits in their flocks as high wool quality, consistent muscle development, quick conception rate (for females), multiple births and quick physical development.

Sheep may be kept in a fenced-in field or paddock. The farmer must ensure that the fences are maintained in order to prevent the sheep from wandering onto roads or neighbours' property. Alternatively, they may be "hefted" (trained to stay in a certain area without the need for fences). The hardy Herdwick breed is particularly known for its affinity for being hefted. A shepherd and a sheep dog may be employed for protection of the flock. On large farms, dogs or riders on horseback or motorcycles may herd sheep.

Marking of sheep for identification purposes is often done by means of sheep tags - a type of ear tag. In some areas sheep are still identified through the use of notches cut in

the ear known as ear marking, using either specially designed tools (ear marking pliers) or other cutting implements.

Ewes are pregnant for just under five months before they lamb, and may have anywhere from one to three lambs per birth. Some ewes can have seven or eight lambs. Twin and single lambs are most common, triplets less common. A ewe may lamb once or twice a year. Lambs are weaned at three months. Sheep are full grown at one year weighing between 70 and 125 kilograms. Sheep can live to eleven or twelve years of age. As ewes sometimes fail to bond with newborn lambs, especially after delivering twins or triplets, it is important to minimize disturbances during this period.

Often, to more closely manage the births, vaccinate lambs, and protect them from predators shepherds will have the ewes give birth in "lambing sheds"; essentially a barn (sometimes a temporary structure erected in the pasture) with individual pens for each ewe and her offspring.

3 Development of the EU-Standards for organic sheep and goat farming

1991 the EU-regulation 2092/91/EEC was one of the first international standards for organic farming with the formal status of a law, valid for all EU countries as well as for imported goods.

It covered only crop production. The EU filled this missing of animal husbandry with the regulation 1804/99/EC in 2000, which became part of the regulation 2092/91/EEC. In 2007, a new EU organic regulation was released (834/2007) and is valid since 2008 till today.

Today, the EU standards cover all farm livestock, bees and aquaculture, algues and sea grass. Nevertheless, the EU is already discussing a new, the third, regulation.

Most of the animal related regulations and annexes in 834/2007 are valid for all livestock on organic farms, without specification of the species. The organic farming regulations are process claims.

Therefore, there are clear process qualities but this is no warranty for product qualities (Tab. 1).

Tab. 1. Differences between conventional and organic animal husbandry (examples)

	Conventional	Organic (834/2007)
Breeds, origin	Highly performing special breeds and cross-breeds according to product aimed for	Only animals reared on organic farms, diversity of breeds, sometimes rare breeds, natural breeding
Keeping (buildings and free runs)	Animal protection laws (requirements for keeping of animals according to species)	Special requirements for keeping of animals orientated towards animal welfare (stock density, space, grazing, tiding, 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 rations according to animal welfare (e.g., minimum use/parts of roughage) only specifically permitted additives, no synthetic amino acids, no genetically modified organisms
Management and treatment	Managed breeding, if necessary stable-wide prophylaxis, legally required waiting periods according to drug prescription law	No prophylaxis (exception: legally required vaccinations), only three allopathical treatments per year for long live animals (>1 year) respectively 1 treatment for livestock, which is not used more than one year;
double the waiting period after use of drugs, minimium 48 hours.		
Restricted interfering with the animals´ integrity (no polling, beak triming, tail clipping, etc.)		
Transport	Animal transport regulation	Animal transport regulation with short transport ways

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 an year and is measured in livestock units.

13,3 sheep and/or goats are the maximum number per ha and year.

Conversion

It is possible to convert just one branch of the farm towards organic production, e.g. only the sheep and goat farming, but not the crop production, or extensive sheep keeping for lamb production and landscape management but not dairy goat 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 listed) 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 for permanent plants (pastures, shrubs, trees) after the last conventional utilisation (grazing, moving).

After 12 months without prohibited treatments, grass and shrubs are considered as "in-conversion feedstuffs/feed materials". After 24 months, grassland has withstood the converting period and is considered an organic feedstuff (Tab. 2).

Tab. 2: Conversion periods for ruminant pastures and their products

Animal species and use	Conversion period
Pastures for herbivores	24 months (like crop production)
Milk (cows, sheep and goats)	6 months
Small ruminants	6 months

To avoid problems (and the negative image of organic products) animal products should originate only from animals which are born and reared under the regulations. The regulations allows purchasing livestock only from organic farms. If young stock has to be purchased from conventional farms, the maximum age at time of purchase is 45 days for lambs and kids (just after weaning).

An exception allows, that every year 20% of female breeding stock of small ruminants can be purchased from conventional farms if they are not available from organic farms and before first delivery (pregnancy is possible). Male breeding stock borrowed from conventional farms can be used if the regulations are followed. The acceptance of the certifying body is required.

Feeding

The definition of farmland-related animal husbandry with kg nitrogen per hectare and year does not fix the origin of the feedstuff (see above). Sheep and goats have to be ded with 100% organic feedstuff. The statement that livestock has to be fed 'predominantly' with self-produced feedstuff is not specific enough. 50% of organic feeds for ruminants can be purchased from other organic farms.

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

Purchased minerals, vitamins and pro-vitamins for animal feed are possible, as long as they are labeled for organic purposes.

Animal health and veterinary treatments.

Animal welfare plays an important role in organic farming. There are detailed descriptions of animal keeping in the regulation. Apart from animal welfare, high animal husbandry standards are the major factors for good animal health and high production yields.

The principle of animal health is preventing and not curing/treating.

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 (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 the 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 (no allowed under NOP). 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 done on some farms). This is not a good farming practice. There is a need to design management strategies to avoid such immense use of chemical allopathic drugs without leave animals suffer when treatment is needed.

If an animal is sick, an immediate veterinary treatment is necessary. 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. 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. 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.

Husbandry management practices, transport and slaughtering

The breeding of small 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 tested bucks or rather semen, do not always fulfil the expectations of organic breeding: lactation curve and milk composition, growth, meat quality parameters, double purpose, roughage dominated feeding or fitness under the regulations etc..

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 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 practice. The castration should be done at a very young age (<1 month), or under anaesthesia and painless by a veterinarian. Breeding management is difficult in mixed flocks of male and female animals (sheep and goats in Mediterranean areas) without castration.

A feeding system which leads to anaemic conditions is prohibited and considered as animal cruelty. Ruminants have to be kept in groups to meet their social needs. It is not defined how social needs can be fulfilled via farm conditions.

The transport of livestock is not clearly defined, 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.

Housing and stocking rates

The tethering of livestock is prohibited. This was a crucial aspect of disputes between the different countries. For example in Austria and other regions the tethering of dairy goats in winter periods in-door as well as sheep in summer periods on pasture is often practiced.

Tab. 3: Minimum space for organic sheep and goat keeping

Indoor (stable) (m2 / animal)	Outdoor runs1 (m2 / animal)
1.5 per ewe / goat 0.35 lamb / kid	2.5 per ewe / goat 0.5 per lamb / kid

1 Does not include grazing area

It is obligatory 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. 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. Only with permanent summer pasture grazing an outdoor run is 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.

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 slattered or of gridded construction, the rest has to be a flat and non-slippery surface. All in-door and out-door 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. In sheep and goat keeping slatted or gridded flours are used in arctic regions where straw is scarce.

The boxes have to be strewed-in with organic materials. 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 are allowed, as long as they are listed.

Mixing of organic and conventional stock

Conventionally kept livestock from extensive grazing systems 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.

Converseley, organic livestock can graze on pastures which are not under the certification of organic farming.

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 in the last three years, the non-organic livestock is kept in extensive farming systems 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).

Collaboration on an 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 drug-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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