

Approaches to fattening dairy calves

Alternatives to conventional fattening of calves
from dairy farms





In Europe, most calves born onto organic farms that are not used as replacements end up on conventional finishing farms. The routine use of antibiotics on finishing farms, feeding regimes based on milk replacer and housing on fully slatted floors are all practices that clash with the tenets of organic farming.

Although the economic viability of fattening dairy calves tends to be a challenge, innovative organic producers have developed alternative fattening systems for calves, bulls and bullocks from dairy farming, either on the calves' home farm or in cooperative endeavours. This technical guide presents the systems and shows what to look out for when fattening calves. This is the English translation of the edition for Germany and the EU.

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Calling conventional fattening into question

Since the intensification of agriculture in the middle of the last century, the majority of calves born on dairy farms are intensively fattened on specialised, conventionally managed finishing farms and slaughtered either as calves aged 7 to 8 months or as young bulls. In calf fattening, controversial “milk fattening” still predominates. It is estimated that more than 90 % of calves from organic farms that are not used as replacements end up in conventional units after a short number of weeks. From an organic agriculture and organic market perspective this is an unsatisfactory situation. But due to the high use of antibiotics in this system, the conventional sector also faces a challenge in itself, given that there are calls from both the political sphere and society at large to reduce antibiotic use and improve animal welfare in farming.

High level of antibiotics use

In the conventional system, both male calves and females from dairy herds not intended as replacements are usually released to the livestock trade at around 14 days of age and a live weight of at least 45 kg and transferred to conventional finishing farms. When the calves are brought onto the finishing holding they are routinely treated with antibiotics (mostly via feed).

The high level of antibiotics use increases the risk of selection of resistant pathogens, which can enter the human diet via meat. At the same time, large quantities of antibiotics enter the environment with the animals' excretions. This practice contributes to the fact that antibiotics are increasingly no longer effective against serious diseases in both humans and animals.

In addition to antibiotics, fattening calves are also routinely treated for parasites in the conventional system. The frequent use of these substances similarly promotes resistances in these pathogens and poses a problem for the environment.

However, even in more ethologically sound husbandry systems it is often not realistic to completely forego the use of antibiotics. But antibiotics should only be used in justified emergencies and not as routine medication.

Calf fattening in organic farming

From an organic farming perspective, organic calves should not be fattened in a system that requires the use of antibiotics,
... because organic farming aims at keeping animals in good natural health,
... because the use of antibiotics in livestock husbandry must be reduced in order to minimise the development of resistant or even multi-resistant pathogens and to maintain the effectiveness of antibiotics for humans and animals,
... so that the organic animals can be fattened and finished on organic farms and marketed as organic meat.



Conventional calf fattening brings together calves from different farms in large groups at a critical time of their immune status. This practice brings with it great health risks for the animals.

The problem of moving farms

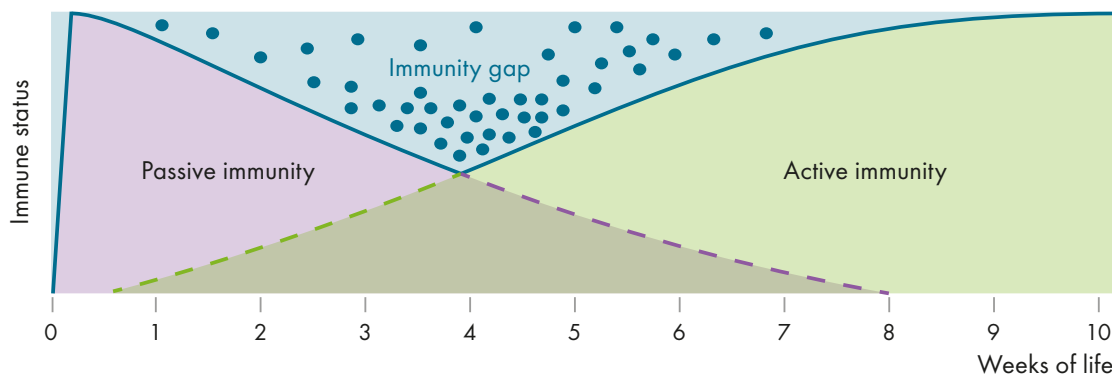
In the conventional system, the calves are sold to the livestock trade after about two weeks on the home farm. The trader then sells the calves to calf fatteners at home or abroad (often to the Netherlands). At this point, the calves still have a poorly developed active immune system (see diagram below).

The passive immunity they received from their mothers via the colostrum has already greatly diminished at this point. In this sensitive phase of their development, calves in the conventional system are moved to a new environment and brought

together with other calves from multiple farms. The different provenances mean that each calf brings along different pathogens and a correspondingly different immune status.

The routine administration of antibiotics after moving farms prevents pathogens from spreading rapidly and leading to severe gastrointestinal and respiratory diseases among calves that are stressed and susceptible to illness due to transport, a new environment and regrouping. If pathogens spread on the finishing farms, the calves have to be treated again.

Figure 1: Immunity of calves as a function of age



The decreasing passive immunity provided by the dam's colostrum and the animals' own only slowly increasing immune response together give rise to an "immunity gap" between the second and sixth week of the calves' lives. During this period, the animals are particularly susceptible to disease.

Impractical requirements for animals for slaughter

Carcasses are assessed in accordance with the Beef Labelling Act implementing the EU Regulation on the labelling of beef and beef products. Grading is based on carcass category, conformation and fat cover classes.

In the EU and UK, young cattle up to the age of 8 months (240 days) are assigned to carcass category V (veal) (Regulation EC No. 566/2008). Quality meat programmes may impose additional requirements such as certain weight ranges or defined husbandry conditions.

The timing of slaughter is critical for the market performance of both conventional and organic calves. The full price is paid for grade R2 / R3 at a slaughter weight of 90.0 to 140.0 kg (UK: 115.0 to 150.0 kg). If a calf is slaughtered one day or more after reaching the age of eight months, it is classified as carcass category Z (young bovine) and proceeds are almost halved as a result.



Cooperations with regional butchers and direct marketing from the farm allow for individual slaughter dates and individual quality requirements and meat prices to be set.

Table 1: Pricing schedule for Ecoland veal calves (example from Germany)

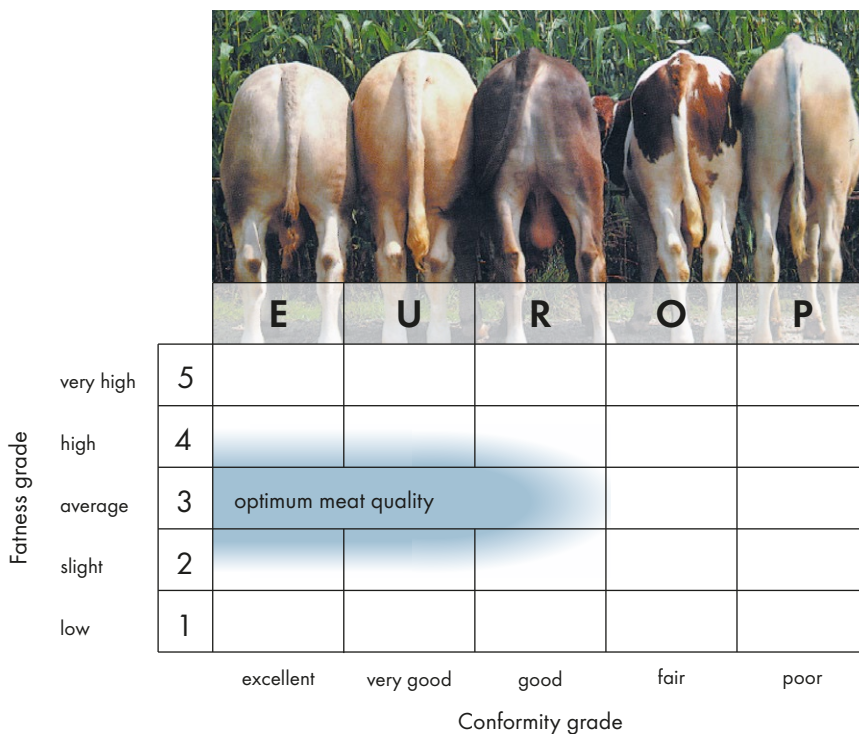
	U3	U2	U1	R3	R2	R1	O3	O2	O1	P3	P2	P1
Dressed weight	Prices in € per kg carcass weight											
< 80.0 kg	5.00	5.00	4.80	5.00	5.00	4.80	4.70	4.80	4.50	4.20	4.30	2.50
< 90.0 kg	5.60	5.60	5.20	5.40	5.40	5.50	5.30	5.30	4.30	3.20	3.20	2.70
90.0-140 kg	5.90	5.90	5.80	5.90	5.90	5.80	5.70	5.80	5.30	4.50	4.70	3.40
> 140.0 kg	5.40	5.40	5.30	5.40	5.40	5.30	5.20	5.30	5.00	4.80	4.80	3.20
> 160.0 kg	4.40	4.40	4.30	4.40	4.40	4.30	4.10	4.30	4.10	4.20	4.20	3.00
Young bovine (Z)	2.50	2.50		2.50	2.50	2.50	2.00	2.00		2.00	2.00	1.50
	Ecoland member farms receive boni of 10 cents per kg on top of the prices of the organic pricing schedule											

Prices for veal calves vary between regions and abattoirs. The schedule shown therefore only gives an overview of pricing for different carcass grades of organic calves.

Fat cover, a meat quality characteristic, correlates with the intramuscular fat and thus also with the meat's taste. For prime organic meat, the correct degree of fattening should therefore be achieved where possible. Moreover, insufficient fat cover often results in massive price penalties. These requirements are rooted in the conventional calf fattening system, which requires the use of antibiotics and

milk powder or milk replacer and these practices are problematic from an ecological, health and ethical point of view. Conventional milk replacers in the EU contain ecologically problematic palm oil and often soya. Without these aids, calves often do not meet the above requirements at the age of eight months or less.

Figure 2: Assessment of conformation and fat cover class



The EUROP carcass classification system is used to assess carcasses in terms of their conformation (E = excellent to P = poor) and their fatness grade (5 = very high to 1 = low fat cover). The blue area indicates the optimum range.

How long is a calf naturally a calf?

A young bovine can be distinguished from a calf on the basis of anatomical, physiological and ethological characteristics. The various characteristics provide clues, but are not all indicative of the exact same point in time:

1. Beginning eruption of the first molars at about 6 months. However, the eruption of all molars is completed only by the age of 24–28 months.
2. A 90%:10% size ratio of rumen to abomasum, corresponding to the fully developed ruminant digestive system. This ratio is reached at the age of one year.
3. Hollowing of the horn. This process begins at the age of one year.
4. Weaning of the calf by its dam in wild cattle herds. This process takes place at the age of 8–12 months.

None of the criteria have been used so far to determine the upper age limit for calves to be marketed as veal. However, the above criteria indicate that the age limit of 8 months for organic calves, which is customary in the industry, is set rather low. In the Netherlands, Belgium and Spain, meat from young bovines up to the age of 12 months is still marketed as veal.

The German Animal Welfare Ordinance (Tier-schutz-Nutztierhaltungsverordnung, TierSchNutzV) considers a calf to be a “domestic bovine animal up to 6 months of age”.

In the EU and UK, pursuant to EU Regulation No. 1308/2013 Article 78 Para. 1 a) in conjunction with Annex VII Para. IV No. 1 a) and b), the following age classification has applied to the labelling of meat from bovines less than 12 months old since 2014:

- Veal: “age on slaughter: less than 8 months”.
- Rosé veal/beef: “age on slaughter: from 8 to less than 12 months”.

Challenging marketing

Unattractive prices for farmers, high rearing costs and the lack of organic finishing farms have resulted in most organic calves being sold to the conventional trade. In the EU and UK, calves older than 14 days are allowed to be transported for up to 19 hours (with a one-hour break). They are often transported across national borders, to finishing farms located mainly in Holland, Belgium, Italy and France. Many calves get sick in the process and many die. In Germany, 90% of all calves are marketed by four companies in the northwest.

Approaches to economic organic beef production require an overall concept that takes various aspects into account:

Aiming for high added value

Critical for economic organic beef production are the achievement of high added value by means of direct marketing and regional butchers, high meat quality and good base ration utilisation by the animals.

Milk price supplement for fattening “brother calves”

Following the lead of the *Bruderhahn-Initiative* in poultry farming, which literally translates into English as “brother rooster initiative” and is designed to prevent the culling of male chicks, a comparable

system involving the creameries would be conceivable. Since the animal welfare debate is becoming ever more prominent in Germany, it can reasonably be expected to extend to other livestock species. A surcharge on the milk price could make it possible to cover the costs of fattening the brother calves.

Cooperation in the value chain

The organic veal market is subject to strong seasonal fluctuations on both the supply and demand side. The price of veal therefore also varies greatly.

For farms engaged in calf fattening it is usually profitable to sell the fattened calves between November and the end of the year, when the animals come off pasture and prices are high. However, it is crucial that they are finished to a level that allows for the full organic price for the calves or fattening bulls and bullocks to be achieved.

But as there is a shortage of organic beef on the market at other times of the year, a more continuous supply to the market would be desirable. In the project entitled *Grünlandschutz durch ein innovatives Bio-Weiderindkonzept* (an innovative organic pasture-raised beef concept for grassland protection), which is funded by the German Federal Office for Agriculture and Food, a concept is to be developed that enables a continuous supply to the market and integrates the complete value chain up to and including meat marketing.

Measures to reduce the use of antibiotics

Minimise the risk of infection

In order to reduce the use of antibiotics, infection risks must be minimised. To this end, some **basic rules must be** observed in husbandry and feeding, which are crucial for the calves' health:

1. Calves must receive thick, yellowish colostrum from their own mother or another cow from the same farm:
 - At least 2 litres of first colostrum in the first 2-3 hours after birth.
 - Another 2 litres of first colostrum within the following 6 hours (total of at least 4 litres in the first 8 hours after birth).
 - Dam's milk for at least another 3 days.
2. The calves should be transported as little as possible and should ideally not move farms before they are 10 weeks old. If they are moving farms, they should preferably move at 4-5 weeks of age, not at the very young age of 2-3 weeks. It is best for the calves if they are not moved until 2 weeks post-weaning.
3. In their first 10 weeks of life, the calves should come together with as few calves from other houses as possible. However, even at 10 weeks, they may still contract diseases. Group sizes of less than 10 calves are good.
4. The calves must be given plenty of clean bedding and housed draught-free, but in fresh air.
5. The calves must be able to consume at least 8 litres of warm whole milk per day, spread over several meals (in the case of ad libitum feeding, the milk does not have to be warm).

Assess alternative systems

Most organic farms nowadays pay attention to the administration of sufficient colostrum (Point 1). However, not enough attention is paid to avoiding transports and the pooling of calves (Points 2 and 3). Points 4 and 5 are also not met in all cases.

Often the prices organic farms receive for their calves do not cover the high rearing costs. Many organic farms therefore sell their calves at the earliest possible time. Due to the lack of organic finishing farms, a large proportion of calves end up on conventional fattening holdings. As soon as they are handed over to the conventional trade, organic standards no longer apply.

Organic farms that hand over their calves to the trade at 2-3 weeks do not know how they will be kept later on. Calves are generally brought together from several farms and fed milk substitute powder, i.e. Points 3 and 5 are not met.

For welfare reasons, it is not possible to dispense with the preventive use of antibiotics in conventional calf fattening. Therefore, alternative systems are needed to be able to meet Points 2, 3 and 5. Some organic farms have developed such systems on their own initiative. These systems are presented on pages 14 to 28.

Consider the animals' needs

The more consideration is given to the calves' physiological needs and natural behaviour, the healthier and happier they are. The following measures contribute to good calf health.

Clean calving pen

Calves should be born in large, clean calving pens, in a quiet environment, and if possible without assistance. The navel should be checked shortly after birth and disinfected if necessary (on farms experiencing recurring problems with navel infections).



A clean and spacious calving pen where the animals can stay for about a week. Twice daily, the dam is brought to the milking parlour for milking. The dam just received her carrot ration.

Good colostrum

The calf should get colostrum as early as possible, ideally from the dam's udder. Good colostrum is mainly obtained from older, healthy cows that had been dry for at least 6 weeks, do not leak milk and have lived on the farm for at least 7 weeks. If the dam does not meet these criteria or if her first colostrum is found not to be thick and yellow, the calf should be given colostrum from another cow on the farm that has been slowly thawed and warmed to 40 °C. Colostrum intake must be well monitored, even if the calf is suckling. Sometimes the calf does not suckle for quite some time (more than 1 hour) or it drinks too little. In such cases, the calf should be bottle-fed additional freshly milked or thawed colostrum.

How calves feed in wild herds

- 6–8 suckling acts per day of about 7 minutes each in the 1st and 2nd week.
- 4–5 suckling acts per day of about 10 minutes each from the 3rd week onwards.
- Daily suckling time of about 50–60 minutes
- Intake of 1–2 litres of milk per suckling act and about 8–16 litres total per day.
- Major suckling effort
- Weaning at the age of 8–11 months
- Intake of roughage and water from the 1st day of life



When viewed from the side at a distance of 2–3 m, as little as possible of a calf's coat should show soiling or wet areas.

Sufficient dry bedding

The calf pen must never be wet or dirty. Fresh bedding must be added daily and soiled bedding cleaned out. Calves must have a lying area with sufficient dry bedding. Plenty of straw also provides good thermal insulation. Missing or wet bedding can result in respiratory issues and navel inflammation.

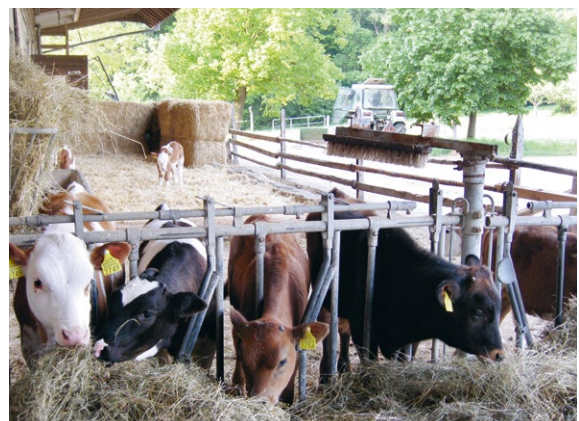
Good air circulation, but no draughts

Calves must never be exposed to draughts, as they easily contract respiratory diseases. Moreover, the ambient air must be fresh and dry.

To check the strength of the draught, light a match at the calves' lying height; if it goes out easily, there is too much draught; if it does not go out, air circulation is sufficiently low. Whether the air is fresh or stuffy can be determined by how comfortable one feels in the barn. A hose ventilation system can easily and cheaply provide fresh air without causing draughts. Good air circulation in a barn is also evidenced by the calves lying spread out over the whole area and not crowding together in one section.



When the calf is lying down and its extremities are not visible because they are covered in straw, there is enough bedding; if the extremities are fully visible, there is not enough bedding.



It's perfectly fine to keep calves out in the fresh air as long as they are protected from draughts.



Calf blankets allow the calves to use more energy to build up their immune system.

Mould on the ceiling or on wooden beams is an indicator of an excessively humid housing climate and insufficient air circulation.

Warmth

Calf blankets can be useful in cold temperatures and for young calves as they reduce the amount of energy the calves need to maintain their body temperature.

Sun and shade

Calves should be able to escape direct sunlight and always need a shady retreat, especially in summer. In winter and on cool days they should be able to lie in the sun. Sunlight protects the animals from rickets and acts as a disinfectant.



Igloos also need to be in the shade, otherwise they can get very warm inside in the summer. An easy way to check the climate in a calf igloo is sit down inside when the sun is shining and temperatures are high.

Good water and hay

From their first day of life, calves must have ad-lib access to fresh water and very good first-cut/second-cut hay.

Insulated walls

Calves like to lie against a wall. Walls should therefore not be cold, especially in winter. Ideally, the walls are insulated or covered with straw bales. Timber walls get less cold than concrete or brick walls.

Hygienic housing

After each batch, the pen or igloo must be cleaned using a high-pressure cleaner. All surfaces must then be allowed to dry completely and, if possible, be exposed to UV light (daylight) over a 24-hour period.

Keeping in small groups

Cattle are herd animals and should not be kept on their own. This is also true for calves. In nature, calves would join a group of young animals mere days after their birth. Group housing is much more species-appropriate and therefore recommended. Pursuant to the EU Organic Farming Regulation, calves must be kept in groups from their 2nd week of life.



Keeping the calves in small groups on their home farm is a good starting point for good animal health

Table 2: Minimum husbandry requirements pursuant to the EU Organic Regulation

Live weight (kg)	Indoor area Minimum area/animal	Outdoor area Minimum area/animal
up to 100 kg	1.5 m ²	1.1 m ²
up to 200 kg	2.5 m ²	1.9 m ²
up to 350 kg	4.0 m ²	3.0 m ²
> 350 kg	5.0 m ² ^a	3.7 m ² ^b

a...A minimum of 1 m² per 100 kg; b...A minimum of 0.75 m² per 100 kg



Frequent rotation of pasture plots together with older bovines or other livestock species or grazing together with horses reduces parasitic pressure on the calves.

Pasture

It is not mandatory for calves to be given access to pasture, but it is a useful practice. Light and outdoor exercise are good for them and lets them learn species-typical pasture and social behaviour. However, calves should not graze on separate calf pastures for long periods, as this greatly increases the risk of infestation with parasites.

Castrating male calves

Male calves that are fattened for more than 7 months must be castrated if they are to be kept together with female youngstock. The castration of male cattle causes a strong change in their hormonal balance, which influences fattening traits, meat quality, and behaviour. While faster growth and better feed conversion are arguments in favour of bull fattening, easier handling and better meat quality weigh the choice in favour of bullocks.

In theory there are three methods: castration using elastic rubber rings (elastration), Burdizzo castrators, and surgical removal of the testicles. Elastration is prohibited in the European Union (EU). In the EU, castration must be carried out by a veterinarian. Procedures are regulated by [EU Directive 98/58/EC](https://eur-lex.europa.eu/eli/dir/1986/58/1986-05-19) (eur-lex.europa.eu), and, for the UK, [2007 No. 1100 Animals, England](https://www.legislation.gov.uk/ukdsi/2007/1100) (legislation.gov.uk).

When **castrating with Burdizzo or Klupp castrators**, the blood vessels including the spermatic cords are pinched, thus cutting off the blood supply to the testicles. If using this method, the animals should be older than 4 months as otherwise tissue regeneration may occur. The method requires regular monitoring of castration success.

During **surgical castration**, the spermatic cords are cut and the testicles are removed. For the animal this is a more significant intervention as it results in an open wound.

Burdizzo or Klupp castrator	
Advantages	<ul style="list-style-type: none"> • No wound • Low cost
Disadvantages	<ul style="list-style-type: none"> • Painful swelling • Requires regular monitoring • Uncertain castration success
Surgical removal of the testicles	
Advantages	<ul style="list-style-type: none"> • Fast wound healing • Castration success ensured
Disadvantages	<ul style="list-style-type: none"> • Open wound • Acute pain

It is impossible to unequivocally state which of the two methods is the more suitable, as both have their pros and cons. However, it can be said that the younger the calves, the less stress is caused by castration. Early castration between the 2nd and 4th month of life promotes marbling, i.e. intramuscular fat accumulation, while castration around the 6th month of life results in a more male conformation. Therefore, late castration makes more sense for stock from dairy lines.

Pursuant to organic standards, **local anaesthetics or pain relief** must be provided when castrating, or preferably both (e.g. under Bioland and Naturland organic standards).



With teated drinkers, the teats must be placed slightly higher so that the calf can drink in as natural a position as possible.

Regular feeds of whole milk

In the first few days, it is best for the calves to suckle their dams. After that, calves can also suckle on a foster-cow.

If suckling is not an option, the calves should always receive warm (39 °C) whole milk from a teat bucket. The hole in the teat must not be overly big to make sure that the calves do not drink too fast.

Calves should be able to drink at least 3 litres per suckling act 3 times a day for the first 3 weeks, and subsequently around 4 litres at least twice daily (also see the box on page 8). Milk feeding should continue for at least 4–6 months (although usually shorter for rearing calves).

Those who have an automatic calf feeder can feed the calves ad libitum. This method is beneficial for their digestion because they can drink smaller amounts more frequently throughout the day. In total, a calf should receive roughly 1000 kg of milk over five months.

Ad libitum milk feeding

As an alternative to warm, fresh whole milk, unheated milk can be fed ad libitum. This can be prepared from the farm's own cow's milk by inoculating it with organic yoghurt or by adding acid and can then also be used as a starter to inoculate new milk.

Sour milk can be kept for about a day without refrigeration even in summer and can be fed ad libitum from a teat barrel with teats (i.e. without an automatic calf feeder). The acidification suppresses pathogens such as *E. coli* or *S. aureus*.

Calves should be given access from the beginning. This ensures that they take in small amounts and drink slowly, thus preventing overloading of the abomasum and/or diarrhoea. Under such conditions, even non-acidified, hygienically perfect milk can be fed cold.

For ad libitum cold administration, the teat bucket/barrel must be cleaned at least once daily using hot water.

Vaccinations

If individual viral calf diseases occur frequently, dam vaccination should be considered (e.g. against coronavirus).

Sufficient selenium supply

On farms suffering from selenium deficiency it makes sense to supply highly pregnant cows with selenium to avoid deficiencies or white muscle disease in new-born calves.

Appropriate breeding

Breeding orientation is also important for calf health. Calves from dual-purpose breeds and first crosses between purebreds are generally more robust than calves from dairy breeds.

Dual purpose-breed bulls should pass on easy calving traits. Good muscling is particularly important in dairy-breed bulls.

Regular contact

Calves should be comfortable with the presence of humans. The first days of life are formative in this regard. Petting and friendly treatment in the first days ensures that the calves are more trusting and less easily stressed throughout their lives. It is also important to pet and calmly coax the animals before and after ear-tagging, castration or dehorning. After the procedure is completed, the calves should only be let go once they have calmed down.



Friendly and calm contact and a bit of daily stroking makes calves calm and trusting, even if they are allowed to suckle.

Supportive therapy in case of illness

If calves get ill despite preventive measures having been taken, home remedies may help in many cases, either on their own or as a supplement to veterinary therapy. In the UK, the “[Guidance for prescribing vets on the use of the cascade](#)” must be followed (gov.uk/search/all).

Treating calf diarrhoea

- Do not stop milk feeding, but give small amounts at least 3 times a day.
- Observe recommended milk temperature and hygiene rules.
- Replace lost fluids using electrolyte solution or WHO solution (rehydration solution containing glucose, sodium chloride and other electrolytes).



This electrolyte drink contains ground linseed.

Feeding plan for scouring calves with a body weight of 40–50 kg		
Morning	1.5–2 l	Whole milk
Morning	1–1.5 l	Electrolyte drink
Noon	1.5–2 l	Whole milk
Afternoon	1–1.5 l	Electrolyte drink
Evening	1.5–2 l	Whole milk
Late in the evening	1–1.5 l	Electrolyte drink
Total amount: 7.5–10.5 litres of fluids per day		

Electrolyte solution can be made from 3.5 g salt (NaCl), 1.5 g potassium chloride (KCl), 2.5 g sodium bicarbonate (NaHCO₃) and 20 g organic glucose per litre of water or tea.



This calf is orally administered a herbal home remedy.

- **Herbal remedies** such as oak bark tea, black tea, chamomile tea, tormentil tea or carrot soup (prepared from 0.5 kg carrots, 1 litre water and 3 g table salt, boil for 1 hour, puree) are administered by bottle; blueberries are given dried or as a tea; ground linseed are given with the milk fed or the oral electrolyte solution. For further advice see “Healing Herbs for Animals” by Cäcilia Brendieck-Worm, Franziska Klarer and Elisabeth Stöger, Haupt Verlag, Bern.
- **Homeopathic remedies:** *Calcium carbonicum*, *Podophyllum*, *Chamomilla*, *Arsenicum album*, *Carbo vegetabilis*, *Nux vomica*, *Veratrum album*, *Pulsatilla*. For application instructions see “Handbuch zur homöopathischen Stallapotheke” by S. Flury, W. Gisler, A. Knüsel, C. Krüger, O. Luder and A. Schmidt.

Treating respiratory diseases

- Eliminate causes such as draughts or stuffy, humid air.
- Inhalation of chamomile tea and essential oils.
- Spray essential oils into the ambient environment.
- Give fennel, anise or thyme tea as a drink or mix with a little concentrate feed and feed along with the herbal residue.
- Give a cold extract of marsh mallow (*Althea officinalis*) as a drink.

Treatment in case of weakness

- Careful administration of black tea, green tea or coffee.

Veterinary help is required...

- if the calf stops drinking.
- if the calf is unstable when walking or standing, or if it is unable to stand.
- if the calf's temperature is higher than 40 °C for more than 12 hours.
- if tenting of the skin when pinched and lifted at the upper eyelid or on the neck does not return to normal within two seconds (meaning that the calf is severely dehydrated).
- if the calf's head is tilted or one ear is drooping (ear infection).

Treatment for external parasites

During the winter housing period, diseases caused by ectoparasites such as mites, sucking and biting lice as well as skin fungal infections such as trichophytosis are common problems.

Signs of ectoparasites include itching, restlessness, eczema and sores. Bald patches of skin, especially on the head, neck and tail, are signs of fungal skin infections.

Causes of ectoparasite infestations often include both poor hygiene in housing, a lack of opportunities for natural coat care, insufficient supply of nutrients, minerals and trace elements, and a poor housing climate.

How to deal with ectoparasites

- Eliminate causes such as excessive stocking density, insufficient fresh air and lack of light.
- Rub in essential oils or coconut oil.
- Apply preparations containing neem or chrysanthemum extract externally.

Treatment for internal parasites

Preventative deworming is not permitted in organic farming. Great emphasis must therefore be placed on prophylactic measures.

Endoparasite infestations are to be taken very seriously as they can cause stunted growth and poor well-being and thus inflict long-term damage. Heavy worm burden can also be fatal. Animals are particularly susceptible in their first grazing period.

Typical signs of worm infestation include diarrhoea, emaciation, a dull coat and/or coughing.

Internal parasites can only be effectively controlled by means of proper pasture management:

- Frequently rotate animals between pasture plots.
- Only turn out calves onto plots that had not been previously grazed that season or that had been cut pre-grazing.
- Fence off wet areas and keep drinking areas dry.
- Young animals should only graze in good weather.
- If possible, graze the areas beforehand (or together) with cattle in their second grazing season. These are almost immune to gastrointestinal worms and reduce the risk of infection for the younger animals.
- If possible, graze the areas alternately with different animal species, as most endoparasites are host-specific.
- If you suspect parasitic infection, submit faeces for analysis and treat the animals for specific parasites, where necessary.



Calves that are heavily infested with endoparasites become emaciated and suffer from scouring. Very severe infestation can be lethal to the animal.

Species-appropriate rearing and fattening systems

Medium-intensity fattening of calves not needed as replacements is often considered unprofitable and therefore impractical. However, some organic producers have been showing, in some cases for years, that it is possible to fatten calves in a more species-appropriate manner and with minimised antibiotics use.

No farm move, or purchases from only a small number of holdings

From a calf health point of view, it is prudent to either fatten the animals on the home farm or to move them to a fattening holding with foster-cows (sale during the suckling period or as weanlings)

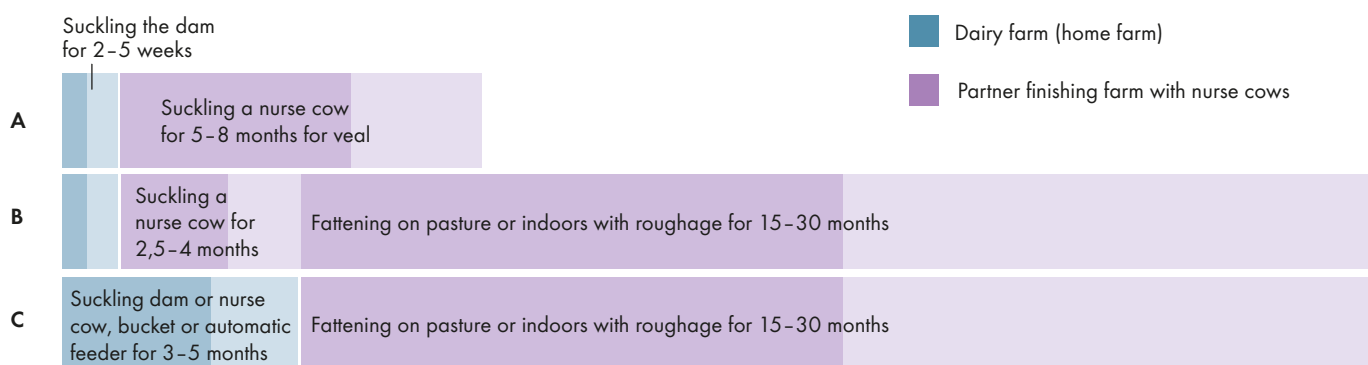
and to buy in calves from only a small number of farms. This approach calls for a good partnership between the home farm and the finishing farms. If both partner farms are certified organic, this has the additional advantage of the animals remaining in the organic value chain.

Within the two systems, there are different variants in terms of feeding intensity and desired finishing weight.

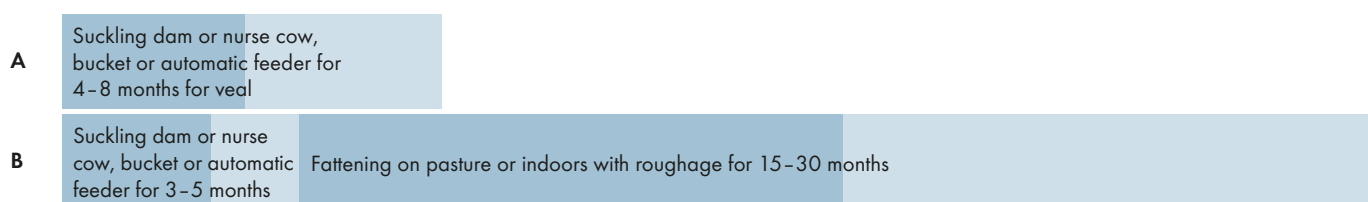
For good health, calves should be able to suckle on foster-cows directly after an early farm move. In contrast, fattening or rearing on the home farm can be done on the dams and/or foster-cows or by means of bucket or automatic calf feeders.

Figure 3: Tried and tested systems for species-appropriate fattening of dairy calves

System 1: Farm move to partner finishing farm (with or without milk feeding)



System 2: Fattening or rearing on the home farm



In the EU – but not the UK – veal calves are usually kept in closed barns with slatted floors, without bedding and with little or no fibre in their diet. This is where the majority of “white veal” comes from. However, in the UK calves for veal tend to be kept in naturally lit straw barns, fed a suitable diet, and some have access to pasture. These differences be-

tween EU and UK veal calves mean that UK veal calves have a higher quality of life. Under [RSPCA Assured](https://rspcaassured.org.uk) (rspcaassured.org.uk) this is enhanced further by strict requirements around the volume of milk-fed, how long for, provision of environmental enrichment and increased space allowances.

Examples of farms in Germany

Farm feature 1

Rearing of bought-in 4-week-old calves from dairy farms on foster-cows, fattening of bullocks with additional purchase of approximately 5-month-old bullocks from suckler herds.

Farm profile

Naturlandhof Mayr, DE-82418 Riegsee

Georg and Veronika Mayr

Breeds: Simmental (suckler cows, dairy calves), Murnau-Werdenfels, other breeds

Herd size: 130 bullocks, 5 foster-cows

Rearing and fattening system: Fattening of own and bought-in male calves on foster-cows for fattening; farm move at 4–5 weeks of age; no dairying.

Housing system: Deep litter barn with separate feeding and lying areas/cubicle loose house with access to pasture in summer to about 12 months of age, then cubicle house with high-bed cubicles and mats for comfort; three-month housed finishing phase.

Grazing system: Pasture access for younger bullocks (up to about 12 months, supplementary feeding indoors), full pasture for older bullocks (older than 12 months).

Marketing: Regional marketing via restaurants and organic slow food butcher.

Association: Naturland

Conversion / Motivation

The farm has been extensively managed since the early 1990s. Frustration with the development of milk prices in particular led to the conversion to finishing cattle. To this end, a new barn meeting organic standards was built outside of the village in 2013. Dairying was discontinued.

The decisive factor for choosing the fattening of bullocks over bulls was marketing. Consumers consider pasture-raised beef and especially beef from hill farms to be of higher quality and beef from castrated males inherently differs from that of intact males (bulls). Moreover, for reasons of safety bulls must not be grazed on alpine pastures.

Good fattening traits and, above all, good meat quality are important to the farm manager, as is his desire to keep healthy animals from the region that are accustomed to being handled. Depending on the calf market situation he is prepared to add at least €0.20–0.40 per kg to the going rate in order



The Naturland-certified Mayr farm fattens bullocks of different breeds, mainly Simmentals and Murnau-Werdenfels cattle.

to obtain that kind of animal. The farm manager's primary objective is not to produce calves himself, as he believes that there are already enough organically produced calves.

Breeds

About two thirds of the calves for fattening are bought from nearby dairy farms. One third comes from suckler herds.

- Approximately 50 % of the animals kept for fattening are Simmentals.
- Approximately 30 % of the animals kept are Murnau-Werdenfels cattle, a triple-use breed traditionally kept in the region and valued for its particularly good meat quality. Due to competition from higher performing breeds, this breed was on the verge of extinction but is now subsidised under a breed preservation programme.
- The remaining cattle are Pinzgauer or crosses of Simmental cows with Belgian Blue or Blonde d'Aquitaine bulls.

Process from birth to slaughter

- The dairy calves are personally collected from the dairy farms when they are 4–5 weeks old and weigh approximately 90 kg.
- The suckling calves are divided into two groups and housed separately, one group consisting of younger calves and one of calves close to weaning.
- The calves are fed twice a day on 5 Simmental foster-cows. During feeding times, the cows are locked in the feed front, where the distance between feeding places is particularly wide so that the calves have sufficient space to suckle between the foster-cows.
- The udders are cleaned before the younger calves are given access to drink ad-lib.
- Then the younger calves are brought back to their separate section and unweaned calves from the older group are allowed to drink the



A new finishing barn was built for the bullocks in 2013. Bullocks of less than 12 months are kept in the loose house with separate lying and feeding areas.

remaining milk. Adhering to this sequence ensures that the younger calves are not pushed out of the way.

- This system depends on the foster-cows calving evenly throughout the year so that there is always roughly the same amount of milk available.
- The number of new calves purchased is another regulator that serves to match the number of calves to the quantity of milk available. Each calf is factored to require 800–1000 l of milk over 3 months.
- After weaning, the calves are moved to 3 group pens in a deep litter barn with separate lying and feeding areas.
- At the age of 4–5.5 months, the calves are castrated with the Burdizzo castrator, a process that according to the farm manager works well.
- The castrated young bullocks are fed hay and silage and, up to and including their 10th month of life, up to 1.5 kg of concentrate feed per head and day consisting of 30 % barley, 30 % wheat and 40 % grain maize. The concentrate feed is purchased from a regional feed merchant.
- During the summer months, the animals additionally graze out on pastures close to the barn during the day for 6–10 months.
- To this age segment are added already castrated weanlings which are kept in the same manner. Roughly 50 weanlings are bought in per year.
- The older bullocks no longer receive concentrate feed and are kept on alpine and other pastures during the grazing season from about the beginning of May to the end of October. Depending on plot structures, these pastures are grazed continuously or in rotation.
- The cattle do not receive supplementary feeds during the grazing season.
- During the winter months, the cattle are housed and are fed only silage and hay.

- Bullocks greater than 12 months of age are no longer kept in deep litter pens, but in a two-row cubicle loose house with high-bed cubicles equipped with rubber mats for comfort. The farm manager pays great attention to a high level of animal comfort. The new barn was constructed to allow 10 m² per animal. Cattle brushes and mineral licks are installed in all group pens. A scraper system keeps the passages clean. A 1:1 animal to feed space ratio is strictly adhered to and, where structurally possible, tombstone feed front were installed for the horned cattle. The barn construction is therefore at odds with the usual attitude to housing for fattening bullocks, which is to build as cheaply as possible or to repurpose old buildings.
- The finishing phase begins three months before reaching slaughter maturity, which is about 2.5 years for Simmentals with average daily gains of 800 g, and 3–4 months later for Murnau-Werdenfels cattle.
- For finishing, the animals are brought in from the pasture into the barn, even in summer. In winter, a separate finishing group is formed, which is kept in a cubicle loose house.
- During the finishing phase, the animals are fed more hay to build up firm, white fat over the exterior of the carcass. In addition, the bullocks are fed 1–1.5 kg of concentrate feed per day, similar in composition to that fed in the rearing phase.

Health

- The strongest focus is on endoparasites as they are the most frequent cause of health problems. New calves coming onto the farm are treated against coccidia once immediately after being housed and again 2.5 weeks later.
- In addition, the cattle are vaccinated against dermatophytosis (ringworm), which tends to be introduced into the herd when bringing together calves of different provenances.
- In order to avoid the introduction of pathogens, the farm manager only buys in healthy calves and collects them personally from their home farm. He pays handsomely for healthy stock.
- Later in the fattening period and with the onset of the grazing period, lungworms, gastrointestinal worms and liver fluke are the prominent issues for bullocks. They are therefore dewormed twice a year.



During feeding times, the foster-cows are locked in the feed front, where the distance between feeding places is particularly wide so that the calves have enough space to suckle.

- Effective microorganisms are used on the farm as a supplementary measure.
- If possible, homeopathic treatments are also given and attention is paid to a good mineral supply for a strong immune system.

Marketing

- When it comes to slaughtering, 1 or 2 bullocks are transported to the abattoir in the farm's own trailer.
- Depending on the intended outlet, roughly half of the animals are taken to a small abattoir in the neighbouring village, the other half to the district abattoir.
- The animals are not graded there. However, if an animal is too fat, the weight of the excess fat is deducted from the dressed weight.
- There are no exact figures for the killing out percentages, but the dressed weight tends to be around 50 %.
- The Simmentals dress out at about 400–480 kg, Murnau-Werdenfels bullocks at 360–390 kg.
- The meat is matured for about 1.5 weeks and then dressed by the butcher.
- The Murnau-Werdenfels beef is sold to a restaurant in Munich, while the Simmental beef goes to seven restaurants in the farm's vicinity as well as to a restaurant on the Zugspitze.
- The farm manager established these marketing channels entirely on his own. Marketing is quite time-consuming in its organisation.
- The farm manager receives €5.70 per kg for the Simmental beef, and €7.00 per kg for that of the slower-growing and smaller Murnau-Werdenfels bullocks. A farm enterprise evaluation is not yet available. The farm as a whole achieves a good economic result, not least due to farm's involvement in landscape conservation management efforts, to which the bullocks contribute.

Advantages of the system

- Regional provenance of the calves.
- High meat quality through fattening of bullocks.

Disadvantages of the system

- By bringing together calves from different farms, special attention must be given to diseases and endoparasites, especially coccidia. Only healthy calves are purchased.
- Meat marketing is arduous and time-consuming, but fair prices can be achieved by working with partners in the catering industry.

Farm feature 2

Fattening of 3-month-old weaned calves bought in from dairy farm as part of a permanent co-operation; fattening of own calves from suckler herd; fattening of bulls for up to 15 to 21 months; direct marketing and regional marketing (e.g. restaurant).



Own bulls from the Simmental suckler herd are fattened together with bought-in black-and-white and red-and-white Holstein bulls as well as Simmental bulls, with the Simmental bulls showing better fattening traits.

Farm profile

Demeter farm Braun on the Riegenhof,
DE-74535 Mainhardt
Doris and Edmund Braun

Breeds: Own animals: Simmentals; purchased calves: red-and-white and black-and-white Holsteins, Simmentals

Herd size: 6 suckler cows, purchase of approximately 8 weaned 3-month-old bull calves per year from a dairy farm as part of a permanent cooperation, one stud bull.

Rearing and fattening system: Suckler herd, with fattening of own and purchased bull calves, housed and on pasture.

Housing system: Deep litter loose house with exercise yard in winter, pasture in summer

Grazing system: Full grazing; out on pasture from April to October

Marketing: Direct marketing in own farm shop, sales to other farm shops and some sales to an organic restaurant

Association: Demeter (both cooperating farms)

Conversion / Motivation

In 2015, weaned bulls were bought from the neighbouring dairy farm for the first time. The basic idea was to fatten the already existing bull calves rather than to produce additional animals for fattening. For a nearby Demeter dairy farm, this provided an opportunity to sell the calves without placing them into conventional channels. Moreover, fattening the external animals eased the workload. Since then, every year about eight weaned bull calves have been bought in from the cooperating dairy farm.

Feeding

- In summer, the bulls are fattened on pasture. From October to April they are fed grass silage and hay.
- The fattening animals are given roughly 0.5 kg of grain 1–2 times a week. The aim is a daily weight gain of 800 g, although in reality it is more like 400–550 g, especially with the Holsteins.

Animal health

- The animals are in excellent health. Since all calves are purchased at about 3 months of age, were reared on their dams and received a lot of milk, illnesses are rare.
- Isolated incidences of diseases are treated homeopathically.
- There was no need for antibiotic treatments in recent years, as calf mortality was below 1 %.
- Bulls are not castrated and keep their horns.

Husbandry in summer and winter

- From April to October, weather permitting, all the animals are out on the pasture day and night, grazing fresh grass.
- From October to April, the animals are in a deep-bedded free-stall barn with a concrete exercise yard.
- One group consists of the suckler cows with their calves and the stud bull, a second group consists of the female offspring and the suckler cows that are not to be mated, and the third group consists of the fattening bulls.



In winter, the fattening bulls on the Braun farm are kept in the deep litter loose house with a large integrated exercise yard.

Process from birth to slaughter

- The cows on the cooperating dairy farm calve throughout the year. There, the calves are raised on their dams for 3 months and then weaned.
- The weanlings are transported 30 km to the Braun farm where they are initially housed together for a few days. Depending on the season, they are then either moved out to pasture or indoors into the group pen for fattening bulls.
- Calves are fattened in the barn and out on pasture, depending on the season, for a period of 1–1.5 years.
- Every year about a dozen bulls are slaughtered; it is always the heaviest of the group that are selected.
- The calves are not castrated as experience has shown that especially the dairy calves, when castrated, do not gain sufficient weight in 1–1.5 years.
- The bull beef is sold in the farm’s own shop, in other farm shops in the region and to a restaurant.

Advantages of the system

- Calves reared on their dams can express natural behaviours and consume significant amounts of milk.
- Little concentrate feed is needed for fattening.
- The smaller number of suckler cows eases herd management.
- The bulls are given access to pasture.
- Initial rearing on the home farm results in good animal health.
- Bulls are not subjected to veterinary interventions.

Disadvantages of the system

- High cost of purchasing weanlings.
- The killing out percentage of the black-and-white Holstein-Friesian bulls in particular is poor.
- According to the farm manager, the system is currently not really economical for both the dairy farm and the finishing farms.



The “detached” design of the deep litter loose house, with structurally separated lying and feeding areas that are divided by an activity area, allow for flexible division of the animals into groups.

Farm feature 3

Calf rearing on buckets for own bull fattening, combined with purchases of 8-month-old weanlings from suckler herds through the livestock trade, 22–24 months fattening, dairy farming, marketing through the trade

Farm profile

Ermlandhof-Biohof Kluth, DE-54426 Malborn
Paul and Sebastian Kluth

Breeds: Own Simmentals, bought-in Limousin and Angus weanlings

Herd size: 30 dairy cows, all calves are raised, plus about 20 bought-in Limousin weanlings. The stud bull is always one of the fattening bulls.

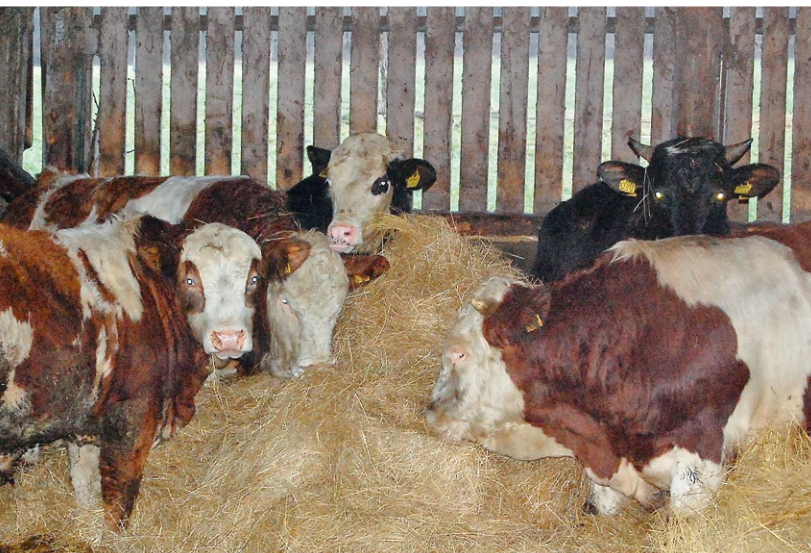
Rearing and fattening system: Rearing of own calves on buckets (restricted milk quantities) for 4–5 months; separation of sexes at 6–7 months; weanlings are purchased at 4–8 months of age.

Housing system: Straw-bedded sloped floor house with outdoor run for fattening bulls

Grazing system: Pasture for cows; fattening bulls are not turned out.

Marketing: Via *Erzeugergemeinschaft Bio-Rind & Fleisch GmbH RLP*, an organic beef producer association in the state of Rhineland-Palatinate

Association: Bioland



In the mixed bull groups of different provenances, horned and polled respectively, occasional fights for dominance break out in the barn in winter.

Conversion

With the conversion to organic agriculture in 1980, the farm began to fatten their own bulls. In 2006, a new shed was built to house young cattle and fattening stock.

The farm also keeps dairy cattle and laying hens, cultivates 78 ha of arable and 39 ha of grassland.

While the herd is bred genetically polled, half of the bulls are still horned.

Feeding

- The calves get the dams' colostrum, followed by 2 litres of whole milk twice a day from the bucket drinker for 4–5 months.
- Fattening bulls and dairy cows are fed hay and silage and roughly 2.8 kg of cereal meal per head and day.

Animal health

- The farm only buys weaned animals of about 8 months of age or older. At this age, the animals usually already have a well-developed immune system and are hardly more susceptible to disease than the other stock.
- Cases of disease only occur in the calves, primarily scouring. The diseases are usually treated. Antibiotic treatments are rarely necessary. The mortality rate is about 6 %.
- Preventive measures against diseases include regular mucking out, cleaning and liming the housing. Each calf always has its own feeder bucket and sometimes charcoal is mixed into the milk.

Process from birth to slaughter

- The cows calve throughout the year. Calves are separated from their mothers after birth and bucket-fed for 4–5 months.
- At 6–7 months of age, males and females are separated. Bull calves are taken to the bull fattening section where they are divided into groups of 8–13 animals, depending on their size and the size of the pen.
- Bulls are fattened for 22–24 months on silage, hay and cereal meal in the straw-bedded sloped floor house with year-round access to a concrete outdoor run.
- Each year, an additional 20 or so Limousin and Angus weanlings are bought in from organic suckler farms. The cattle dealer lets the farm know when he has several weanlings at hand. If there are free spaces at the time, the farm buys the weanlings.



The straw-bedded sloped floor house for the fattening bulls was built in 2006 as a simple round pole construction with monopitch roofs.

- If possible, the new weanlings are first housed together in a group pen for a while before joining another group.

Advantages of the system

- Long milk feeding phase.
- No farm move for the farm's own bull calves.
- Bulls are not subjected to veterinary interventions.
- Hardly any antibiotics required.
- Relatively low workload of about 2.5 hours per day.

- Sales opportunities via *Bio Rind & Fleisch GmbH RLP* are very good most of the time.
- Good milk yields of the Simmental cows as well as good beef yields of the Simmental bulls.

Disadvantages of the system

- Bulls don't get access to pasture, but can access outdoor yard year-round.
- Separation of mother and calf immediately after parturition.
- Fights for dominance within the groups do occur.

Farm feature 4

Male calves for fattening reared in suckler herds with permanent contact to their dams, bull fattening (8–24 months), dairy farming, direct marketing

Farm profile

Hofgut Oberfeld Landwirtschaft AG,
DE-64287 Darmstadt
Kathrin Goebel

Breeds: One third German Black Pied cattle (*DSN, Deutsches Schwarzbuntes Niederungsirind*), two thirds black-and-white Holstein cows (lines bred for lifetime performance), Holstein stud bull.

Herd size: 40 dairy cows, all calves are reared, stud bull

Rearing and fattening system: Calves reared on their dams for 5 months, sold as veal or bull beef.

Housing system: Bedded lying area (shallow bedding) for dairy cows, calves and fattening bulls
Grazing system: Access to pasture from April to November for dairy cows, calves and fattening bulls

Marketing: Direct marketing, with two thirds being ordered cuts and one third of the cuts being sold in the farm shop.

Association: Demeter



Close to the milking parlour (back right), dams and suckling calves have their group pen with a calf creep.

Conversion

Shed construction plans in 2012 already took into account the finishing of the farm's own bulls. As a DSN suckler herd was already being kept, demand for the beef as well as sales outlets were already established. With the completion of the dairy unit in 2013, dairying and fattening of the male calves commenced.



The group of cows without calves is housed adjacent to the pens for the older calves (background left) and the cow-calf group (background right).

The milk produced is processed in the farm's own creamery and the cereals are used in the on-farm bakery. Beef, baked goods, cheese and dairy products are marketed through the farm shop and the farm café.

Feeding

- Calves stay with their dams for the first 2–3 months of their life.
- After that, they are given access to their dams twice daily for about 30 minutes prior to milking.
- The calves are given ad-lib access to roughage and get some barley meal in the period prior to weaning.
- Dams get high-quality alfalfa/grass/clover hay as well as 1–2 kg of barley meal per head and day.
- In winter, the fattening bulls are fed alfalfa/grass/clover hay and about 0.5 kg of cereal screenings per head and day from 5 months of age.
- From April to November, the animals are out on pasture, where they may receive supplementary alfalfa/grass/clover hay in hay feeders.

Fattening bull rations are designed for daily weight gains of 700–800 g.

Animal health

- There are occasional cases of scouring in calves, mostly due to excessive milk intake. There have been no respiratory illnesses in recent years.
- Calf mortality rate is 5 %.
- The fattening animals do not usually fall ill.
- Treatment is usually homeopathic. Antibiotics have not been required in recent years.
- As a preventive measure, the calves are reared on their dams and the calves' and dams' pens are mucked out frequently.
- The animals are not dehorned.

Animal husbandry in winter and summer

- At 5 months of age, the male calves are grouped in pens of 8 animals in the two-section shallow bedded pen with integrated exercise yard (partly uncovered flat concrete feeding aisle). Care is taken to ensure that they are all of a similar age.
- Between April and November the bulls are on a pasture well away from the home farm to prevent them from joining the heifers and dairy cows. The calves are put out to pasture for the first time post-weaning, so their age at first grass depends on when in the year they were born. First and second season grazers are always mixed to mitigate against parasitic diseases.

Process from birth to slaughter

- The cows calve throughout the year and the calves are raised on their dams. The dams are milked twice daily during the entire period.
- At 5 months of age, the calves are weaned and separated by gender.
- Roughly half of the bulls are slaughtered at 8 months and marketed as veal, the other half are slaughtered at 15–24 months, depending on demand, and marketed as beef. The farm is also considering the addition of young bull beef to their range in the future.
- Due to the high demand for meat, crossbreds are purchased for fattening in some cases, and occasionally heifers whose offspring is not intended for replacements, mated with an Angus bull.
- The slaughter performance of the crossbred and DSN bulls is clearly better than those of the Holstein-Friesian bulls. The crossbred bulls are often more shy than the pure dairy bulls.

Advantages of the system

- Natural cow-calf relationship as a result of calves being reared on their dams.
- Bulls are given access to pasture.
- Low use of concentrate feed due to feeding high-quality hay.
- High demand in the farm shop due to urban proximity.

Disadvantages of the system

- Significantly less milk for sale due to calves being reared on their dams.
- Dealing with older bulls can be dangerous and requires experience.
- There is a need to buy-in additional animals as demand for the beef exceeds production, which tends to be on the low side.

Farm feature 5

Suckler-rearing own male calves for fattening, direct marketing

Farm profile

Hofgut Rengoldshausen, D-88662 Überlingen
Mechthild Knösel

Breed: (Swiss) Original Braunvieh

Herd size: 50 cows + 50 calves per year + 3 bulls for breeding and about 50 young stock

Rearing and fattening system: Calves weaned at 4 months of age, bulls fattened on pasture up to 24 months; all female and male calves reared for fattening or as replacements; dairying; own bulls for breeding.

Housing system: Cubicle loose house for the cows and the cow-calf group, deep litter loose house and group igloo for calves, bedded pens for fattening bulls and fattening heifers (shallow bedding).

Grazing system: Full grazing

Marketing: Direct marketing of beef (50–60%) and milk (Demeter certified raw milk).

Association: Demeter

Conversion

In the past the male calves had been sold into the conventional trade for fattening. In 2000, the farm expanded their housing to make room for finishing bulls. Today, all calves are raised on the farm and all animals not used as replacements are fattened.

Feeding and animal health

- All animals are fed aerated hay, second-cut hay and carrots (supplement), but no concentrate feed.
- Male calves are not castrated.
- Illnesses are rare and can mostly be treated homoeopathically.
- As the farm produces certified raw milk, excellent hygiene is a given.
- The mortality rate is practically zero.

Animal husbandry in winter

- The cows live in a cubicle loose house.
- Breeding bulls are housed in a separate section.
- Calves live with their dams in a cubicle loose house from about the second day of life to the age of roughly 12 weeks (cow-calf herd) in a separate section of the barn with calf creeps, later in separate deep litter loose houses and in igloos with runs.



The cow-calf herd has its own compartment in the cubicle loose house with a calf creep.

- Animals for fattening are housed in separate bedded cubicles.
- Calves and fattening bulls are kept in groups of similar age.

Animal husbandry in summer

- The dairy cows fully graze on grassland, heifers and fattening bulls up to the age of 1.5 years are out on permanent pasture. In their final six months the fattening bulls graze part-time, during the day or at night, depending on weather conditions; their main ration is cut grass-clover fed indoors.
- Calves are given ad-lib access to hay and water.
- Older fattening bulls are fed cut grass-clover indoors.



The young bulls are out on permanent pasture up to the age of 18 months, while the older bulls have access to pasture for half the day.

Process from birth to slaughter

- The cows calve year-round.
- For calving, the cows are moved into maternity pens, where they remain with their calves for 1–2 days post-partum. From the second day onwards, the dams are milked in the parlour.
- The calves stay with their dams in the cow and calf group day and night for about 12 weeks. These cows are also milked twice daily.
- From their 13th–15th week of life, the calves are given access to their dams twice daily for suckling.
- In their 16th week of life, the calves are separated from their dams (with a three-day transition phase during which the dam and calf come together once a day). After that, calves can suckle dams of younger calves twice daily.
- In their 18th week of life, the calves are gradually weaned within a week: initially they are allowed to suckle the foster-cows twice-daily after the younger calves, then only once a day. This gradual process reduces stress.

- Post-weaning, bull calves are placed in groups of similar age in in bedded pens or put out to pasture.
- Heifer calves are also housed in separate bedded pens or put out to pasture.
- Bulls and fattening heifers are slaughtered at around 24 months of age.

Advantages of the system

- Enables natural dam-calf relationship.
- No farm move until slaughter.
- No castration of bull calves.
- Good human-animal relationship.
- Healthy animals. Antibiotics only in emergencies.
- No concentrate feed required.
- Good daily weight gains.
- Good income thanks to direct marketing.

Disadvantages of the system

- None.

Farm feature 6

Raising own dairy calves on automatic calf feeders up to 4 months, 24 months bull fattening, farm slaughter, direct marketing

Farm profile

Marienhof Gerlfangen, DE-66780 Rehlingen-Siersburg, Karin and Stefan Zenner

Breeds: 50 % black-and-white Holstein-Friesian, 50 % Simmental

Herd size: 95 dairy cows, roughly 60 fattening stock; bulls of different breeds (HF, Simmental).

Rearing and fattening system: Raising own dairy calves on automatic calf feeders up to 4 months of age, dairy heifers used as replacements, bulls fattened 24 months indoors.

Housing system: Cubicle loose house for cows, deep litter loose house with separate lying and feeding areas with year-round outdoor yard access for bulls

Grazing system: No pasture for fattening bulls

Marketing: Own abattoir, direct marketing via farm shop, approx. 15 % of the slaughtered bulls are marketed via *Bio Rind & Fleisch GmbH RLP*, an organic beef producer association in the state of Rhineland-Palatinate

Association: Bioland

Conversion / Motivation

The first bulls were fattened in 1992. In 2011, a completely new barn was built, which also accommodates all the stock for fattening.

The rationale for the conversion to fattening was rooted in the direct marketing approach, with the meat complementing the farm's own range of dairy products and baked goods.

The bulls are not castrated, as trials with fattening bullocks were discontinued due to slow weight gain.

The farm has its own small abattoir, so that a large proportion of the fattening animals born on the farm are also slaughtered on the farm. The farm slaughters one bull per fortnight. The farm shop has a large customer base.

Feeding

- Calves stay with their dams for about half a day. After that they are bucket-fed colostrum for one week, followed by whole milk from the automatic calf feeder for 4 months.
- Calves have permanent access to hay, straw, grass silage and grain meal.
- Fattening animals are fed hay and grass-clover silage. Fattening bulls are also given grain meal once a day.

Animal health

- Diseases only occur in the calves, with around 20 per year getting sick. The most common illnesses are diarrhoea and flu-like diseases. Antibiotics have to be administered to about half of the sick calves. However, the calf mortality rate is low at about 1 %.
- After birth, the calves' navels are disinfected as a precaution and the calves receive selenium by injection, as they have frequently been found to be deficient.
- As the barn is not designed for horned cattle, half of the calves are dehorned by a veterinarian at the age of 2–4 weeks.

Animal husbandry in winter and summer

- The two-section deep litter barn for the bulls has a slatted-floor feeding aisle. Bulls have permanent access to the exercise yard.
- During the grazing season, the dairy cows have permanent access to pastures in the barn's vicinity.
- The own bred stud bull is housed in one of the groups of fattening bulls.

Process from birth to slaughter

- The cows calve year-round.
- After birth, the calves stay with their dams for about half a day and are then separated bucket-fed colostrum for a week.
- After that, the calves are fed whole milk by means of automatic calf feeders.
- Following separation from the heifer calves (at 8 weeks), the 10 largest male calves in each group are housed together, but still fed milk until they are 4 months old.
- Bulls are fattened for 24 months on hay, grass-clover silage and grain meal.

Advantages of the system

- All fattening animals born on the farm are slaughtered on the farm, thus eliminating live transports.
- Low workload of 1.5 hours per day.
- Own meat for direct selling in the farm shop.



The barn which was newly built in 2011 houses the dairy cows (left) and fattening bulls (right).

Disadvantages of the system

- No pasture access for the bulls, but year-round access to an outdoor yard.
- When sold to *Bio Rind & Fleisch GmbH RLP*, the black-and-white HF bulls achieve significantly lower beef quality grades than the Simmental bulls.



The Holstein and Simmental bulls are fattened up to the age of 24 months in a two-section deep litter loose house with permanent access to the exercise yard.

Farm feature 7

Own dairy calves reared on their dams for fattening bullocks, direct selling on markets and in self-service farm shop

Farm profile

Frecklinghof, DE-49545 Tecklenburg

Monique and Chiel van Dijk

Breeds: Simmental, Blaarkop, Holstein-Friesian

Herd size: 40–45 cows + female offspring, roughly 50 bullocks, stud bull

Rearing and fattening system: 90–120 days rearing on the dam with permanent contact, pasture-based fattening of bullocks to the age of 2.5 to 3 years.

Housing system: Two-section deep litter barn plus pasture, bullocks over 2 years of age: year-round free range.

Grazing system: Summer grazing in mixed groups with female offspring or year-round grazing (for bullocks over 2 years).

Marketing: Own meat processing; beef sold directly to consumers at weekly markets and in self-service farm shop

Association: Bioland



Heifers and bullocks are kept together for up to two years, out on pasture in summer and in the deep litter loose house in winter.

Conversion

In 2010, the first male calves were kept on the farm for fattening. The farm manager felt that selling his organically produced calves for conventional fattening was highly questionable as this was at odds with the intended circular economy model and his holistic farm concept.

At the outset there were no sales channels; these had to be built up gradually. Farm management decided in favour of fattening bullocks over bulls because bullocks are easier to handle on a dairy farm. Moreover, bullock beef is considered to be of higher quality than bull beef, which is an important consideration for direct marketing.

Breeds

- The dairy herd consists of various breeds and crossbreds. The majority are Simmental and Blaarkop cattle. The latter is an old and highly robust Dutch breed. In addition, there are some HF animals.

Process from birth to slaughter

- All calves born on the farm are raised on their dams for 90–120 days with day-round contact.
- Calving is seasonal, with the majority born between the end of February and mid-April. The advantage of this practice is that the calves are born into a “clean” grassland environment at the start of the grazing season at the beginning of March and have access to pasture right from the start. During the peak lactation period, the cows nutritionally benefit from the particularly energy-rich spring growth. As no concentrate feed is given, energy deficits can only be compensated for by high-quality base rations.
- Since the cows are milked only once daily, the calves receive considerably more than 1000 l of milk during the suckling period.
- After weaning, the animals spend the rest of the grazing season in mixed groups.
- Roughly 25 bullocks are fattened each year.
- Housing season usually does not start until December. The bullocks are housed in the mixed groups in a two-section deep litter barn and are fed hay and silage. The aim is to feed only hay, but supplies are insufficient.



Older bullocks are kept outdoors year-round with supplementary feeding. Prophylactic measures against parasites are important for fattening animals out on pasture.

- In their second grazing season, the animals are kept on pasture year-round in an all-bullock group.
- During the summer months, all fattening stock is kept on rotational pastures on lands away from the home farm.
- During the winter months, the older fattening animals are kept close to the barn, where they are fed hay from a fixed feeder.
- They reach slaughter age after 2.5–3 years with average daily weight gains of 600–700 g.

Castration

- Bull calves are castrated by means of surgical removal of the testicles.
- Castration is only carried out towards the end of the grazing season in favourable weather conditions, when the pressure from ectoparasites such as flies is lower and the immune system is not put under additional strain by wet and cold weather.
- Age at castration is dependent on when the animals were born and usually varies between 4 and 5 months, but can also be up to 10 months.
- Age at castration does not appear to affect meat quality. Only the animals' conformation is more bull-like if they are castrated late.
- The surgical castration option was chosen because it is always successful and safely eliminates hormonal effects. Moreover, there have never been any issues with wound healing, even without resorting to antibiotics. There are therefore no plans to change the castration method.

Health

- The calves very rarely get ill, which is attributed to the seasonal calving in spring and to the rearing the calves on their dams. Calf mortality is below 1 %.
- In one wet year, there were problems with liver fluke, which led to the loss of more than 5 % of the young bullocks. Moreover, the surviving animals' growth was greatly reduced due to irreversible damage caused to their livers.
- To date, animals suffering infestation with liver fluke have been treated with two different drugs.
- In future, liver fluke infestation is to be mitigated by fencing out wet areas in pastures and, above all, by reducing the cattle population in favour of other livestock species such as sheep and poultry.

Marketing

- A butcher's shop about 30 km away from the farm is rented from a retired butcher to slaughter the bullocks. The animals are transported there by the farm manager himself, slaughtered and halved. The farm manager has acquired the knowledge and skills required for slaughtering and processing and obtained the necessary certificates of competence.
- Depending on their conformation, the bullocks dress out at 350–450 kg with a killing out percentage of about 50 %.
- After a maturing period of 14 days, the beef halves are cut into the prime cuts and a variety of sausage products are produced. As bullocks are slaughtered year-round and the whole animal is utilised, the product range is adapted to consumer demand.

- To save travel time and costs, a slaughter and processing unit is being set up on the farm.
- The products are sold once a week at the market in Osnabrück and in a self-service shop on the farm.
- The farm is divided into two business branches, with the farming branch receiving €4.50 per kg dressed weight from the marketing branch and direct marketing earning €12.50–13.50 per kg dressed weight, resulting in a turnover of €4000–5000 per animal. Meat sales now contribute approximately 60% of the farm income.

Advantages of the system

- Seasonal calving in March allows for hygienically trouble-free births out on pasture and a good feed supply for the cows in peak lactation.
- Bulls can be kept out on pasture with the heifers without any problems.

Disadvantages of the system

- Marketing is very time-consuming and requires a great deal of personal commitment and time, but can then contribute significantly to the farm's income.

The examples presented here show that there are many ways to raise and fatten calves in such a way that they receive natural nutrition, express species-appropriate behaviour, and need antibiotics only in emergencies. In addition to the systems described above, there are of course other options. Good cooperation between partner farms and between farms and (direct) marketing brings with it economic benefits for all involved in all systems and also serves animal welfare.

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