

Remarks on the Transport of Unweaned Calves



Originally published as "Anmerkungen zum Transport nicht-entwöhnter Kälber (Remarks on the Transport of Unweaned Calves)" in: Amtstierärztlicher Dienst und Lebensmittelkontrolle, 27th yr., issue no 4, p. 185-195

Authors: Alexander Rabitsch and Michael Marahrens
Translated by *Connect Translations Austria GmbH*

Animal Welfare.
Worldwide.



Key words

control post, drinking, feeding, long distance transport, liquid feed, milk substitute, non-weaned calves, rest pause, rest period, supply.

Abstract

1. Drinking (electrolyte drinkers) by unweaned calves on board the trucks is possible in principle, but in no case, however, does it replace feeding with milk replacer as required, and additionally cannot be guaranteed for all individuals.
2. The behavioural and physiological needs-oriented administration of liquid feed (mostly milk replacers) to unweaned calves on board of trucks is due to technical reasons not possible and, moreover, would in many cases be the cause of digestive disorders in case of poor management.
3. During transport, the calves suffer from thirst and hunger; with increasing duration of the transport process the hunger becomes significant and gets animal welfare relevance.
4. Since the provision of water for all unweaned calves on board of the trucks cannot be guaranteed, and since feeding liquid feed on board is not possible at all, the transport of these animals shall be limited to 9 hours, if they are subsequently unloaded and fed immediately afterwards at a control post, and if they are provided with the necessary care according to their physiological and behavioural needs and rested for 24 hours. Otherwise, the transport must be limited to a maximum of 8 hours.
5. In principle, means for long-distance transport of unweaned calves (for any transport over a duration of more than 8 hours) require an explicit approval for this animal category; an approval "for cattle" is not sufficient.
6. All current truck approvals for the long-distance transport of unweaned calves are illegal, especially as the vehicles do not offer any behaviour- and need-based administration of either drinking liquid or liquid feed.

1. Introduction

The following questions will be dealt with in this work²,

1. whether and to what extent the needs of unweaned calves for drink and feed can be satisfied during long-distance transportation,
2. whether unweaned calves experience pain, suffering or harm relating to the provision of water and feed during long-distance transportation.

From his own experience as an animal transportation inspector in Carinthia, Austria between 1998 and 2012, the lead author knows of various transportation processes with completely unsuitable drinking systems in place which, however, were explicitly approved for the long-distance transportation of unweaned calves.

The lead author has had similar negative experiences with authorised vehicles and the transportation of calves under Art. 14 as an employee of various NGOs (www.animals-angels.de, www.animal-welfare-foundation.org and www.tierschutzbund-zuerich.ch).

The lack of compliance with the regulations for transporting unweaned young animals is clearly an ongoing and systematic failure of member states, who were also criticised during inspection visits by the Inspection Service of the EU Commission (FVO), for example at the following “missions”: DG(SANCO)2010-8384 (Czech Republic, p. 19); DG(SANCO)2010-8387 (Poland, p. 19) (quoted from ANIMALS ´ ANGELS, 2016); DG(SANCO)2012-6526 (Lithuania, p. 15); DG(SANTE) 2017-6107 (Germany, p. 5 et seq.).

2. Physiology and Purpose

2.1. Unweaned

Unweaned young animals are not yet able or insufficiently able to feed themselves with solid feed and are wholly or overwhelmingly dependent on liquid food. Their food is provided either in the form of milk or milk substitutes. They are far more dependent on the care of their mothers or human carers in comparison to weaned animals.

Unweaned calves are – just like unweaned lambs, fawns, and other ruminants – functionally monogastric animals, especially as, although they have three pre-stomach compartments (rumen, reticulum, and omasum), only the abomasum is fully formed at this point. The growth and development of the pre-stomach compartments take place hand in hand with the supply and consumption of coarse feed (hay, straw), so that the first rumination generally begins at two weeks (SCHEUNERT and TRAUTMANN, 1976) and animals can be weaned off milk from 6 weeks (lambs, fawns) or 8 weeks (calves) (COM, 2009a; RABITSCH and FRANZKY, 2015). Under semi-natural husbandry conditions (i.e., suckler cow husbandry on pasture), young animals drink their mother’s milk for a lot longer.

Young animals are only considered weaned if they are no longer dependent on liquid feed but can survive entirely on coarse feed and water.

2.2. Breeding Calves / Working Calves

In dairy herds, a replacement rate, i.e., the addition of young cows, of 25 to 30% is desirable. In the case of a restocking, as far as possible all female young should be reared so that no more animals need to be bought and the superior animals can be chosen (HILBK-KORTENBRUCK, 2019). This means that most of the female offspring remains at the farm for breeding, while this need simply does not exist for male offspring and these animals can be sold as working calves in the calf or bull fattening sectors. Even female calves which are not suited to breeding are, for the most part, sold on elsewhere.

Due to the small number of specialised calf fattening farms in Austria and most German federal states, the animals are sent away to other federal states as early as 2 to 3 weeks, or very often on long journeys to Spain or the Netherlands.

Various drinking schemes have been created in practice, and these also differ in purpose: Fundamentally, milk or milk substitutes are considered an expensive, labour-intensive feed and are problematic from a hygiene perspective. For this reason, they should be used as little as possible (TRAUSCHKE, 2008). Their use is particularly low where there is an animal which is virtually

useless and worthless and is to be taken from the farm as soon as possible, as with the male progeny of dairy breeds. By contrast, calves which stay with their mothers drink much more milk per day and thus grow distinctly larger and develop a better constitution (MACCARI, 2012).

Potential savings are sought at the farm instead, where during a daily feed of a kilo of milk substitute per calf, per day, the daily expense is only 1.50 EUR to 3.00 EUR (WEYRAUCH, 2015).

It follows from the above that calves destined for breeding and female calves for auction are thus worth between two and several hundred Euro at the age of 2 to 3 weeks (LK-K, 2019; RBW, 2020), while male calves of a similar age are sold, under certain circumstances, at around 30 to 50 Euro, occasionally for as low as 8 Euro (ARD, 2020).

Not least due to the reasons listed above, but also due to their weak immune systems, unweaned calves must be treated for the purpose of annex I, chap. I, 2. of the Council Regulation (EC) No 1/2005 (Council Regulation (EC) No 1/2005 of 22 December 2004 on the protection of animals during transport and related operations and amending Directives 64/432/EEC and 93/119/EC and Regulation (EC) No 1255/97) as “animals that present physiological weaknesses”, whose ability to be transported is restricted, at least to a large degree. Therefore, there are high standards imposed on supply technology and the supply management, as well as the requirement for sparing use of transport for the prevention of unnecessary pain and harm in accordance with art. 3 of Council Regulation (EC) No 1/2005.

2.3. Behavioural and Physiological Needs

2.3.1. Physiological needs for food/drink

For the rearing and fattening of calves there are guidelines for the provision of energy and protein which provide specific amounts of energy in megajoules (MJ) and raw protein in grams required for self-preservation and growth, dependent on the current body weight and the genetically determined and desired growth rates respectively (e.g., LFL, 2019). There are similar guidelines with reference values for water, dependent on environmental temperatures (DLG, 2014).

2.3.2. Nutritional requirements for self-preservation/energy expenditure

Strictly speaking, the estimate of a basic requirement exclusively relating to self-preservation (survivability) is a very theoretical undertaking, especially as only the cost of growing a calf can be deemed an energy demand. Other criteria include movement, maintaining balance during transport, above all however, the maintenance of body temperature at environmental temperatures beyond the optimal temperature for the species or age group.

A calf needs considerably more energy both at temperatures below +5°C (cold stress) and above +30°C (heat stress), than in the “comfort zone” between 10 and 25°C in order to maintain its homeostasis (equilibrium of the physiologically optimal temperature).

Calves between 3 and 6 weeks need between 16 and 22 MJ of energy and between 160 and 240g of raw protein daily in indoor enclosures (DROCHNER *et al.*, 2008).

This demand is greater during transportation due to increased muscle stress and energy use.

2.3.3. Amounts of drink

It is important to note that a calf with a body mass of 90kg needs between 8 litres of liquids at +5°C

and 13 litres at +28°C (DLG, 2014). However, calves will drink up to 18 litres a day if freely available (MACCARI, 2012).

Calves need around 10 to 20% of their body mass in the form of fluid intake daily in indoor enclosures (temperature-controlled milk or milk substitutes) (KHAN *et al.*, 2011).

2.4. Food Consumption / Swallowing

Although new-born calves are able to eat hay in a playful manner in their first days and begin to ruminate at only 2 to 3 weeks, they overwhelmingly consume liquid food up to 6 weeks. Only then can they gradually begin to be weaned, so that a diet of solely coarse fodder is possible at 8 weeks at the very earliest, depending on the breed. In this way, for calves dependent on liquid feed, thirst and hunger are always intrinsically linked.

Cattle drink by sucking. Unweaned calves do not consume feed drinks (milk, milk replacers) by licking, spooning or slurping, but by sucking. Sucking on teat-like structures with a weak, malleable surface is instinctive, whereas drinking from free surfaces must first be learnt. Drinking from metal dispensers with overpressure does not correspond to the normal behaviour of calves.

The act of sucking consists of an intake phase (ca. 75%), in which a vacuum is created in the mouth cavity with help of the dorsum of the tongue which is trough-shaped, and a swallowing phase (ca. 25%), in which excess pressure is created by pressing the tongue to the palate, while the liquid flows towards the throat and is then swallowed down in a reflex motion. This cycle of sucking and swallowing takes place up to 120 times per minute. The act of sucking lasts several minutes and occurs 3 to 8 times a day under natural conditions (on average 6 times; there are slightly different opinions on this in the literature, e.g., LFL, 2004).

2.5. Oesophageal Groove Reflex

The oesophageal groove reflex (more accurately the reticular groove reflex) is an involuntary motion sequence in the reticulum of calves during the sucking phase. The purpose of the reflex is to carry the milk on the shortest distance along the reflexing mucosal, muscular bulges of the oesophagus through the reticulum and omasum directly to the abomasum, where it can be digested.

In the case of suboptimal feeding systems, the provision of liquid feed which is too cold and the effect of great stress, a poor head and neck position (TAMTÖGL *et al.*, 2013), weakness or illness, this reflex can fail to occur, or only occur partially, so that milk gets to the omasum, which is not yet fully formed, and due to a lack of fermentation and putrefaction processes can lead to indigestion and diarrhoea.

The physiological act of sucking (also with the “correct” head position), but not the act of swallowing, ensures the triggering of the so called “oesophageal groove reflex” in the suckling calf, which prevents a misdirection of the milk in the developing pre-stomach compartments (rumen, reticulum, and omasum) and directs the drink directly to the fourth stomach, the abomasum (KAMPHUES, 2014, cit. in: MARAHRENS and SCHRADER, 2020).³

³ Contrary to BRAMMERTZ, 2014: Neither the form of the drink (for animals which suck or drink out of buckets), the sucking position, the diameter of the mouth, nor the temperature of the milk, nor the concentration of the milk substitute influence the development of the oesophageal groove reflex (This study, however, only looked at 6 animals).

A misdirection in the pre-stomach compartments can cause fermentation failure, which can lead to serious diarrhoea.

2.6. Protein Digestion / Rennet Coagulation

After a meal of liquid feed (milk or milk substitute), protein is digested in the abomasum of the calf, in which the lactoprotein Casein is converted by the Rennin enzyme Chymotrypsin into the digestible Para-Casein. The pH level in the abomasum is increased from 1.4 to 6.0 while drinking, so that it can get back to the initial level again within around six hours. This means that there is an ideal pH level for milk curdling in the abomasum two hours after drinking.

Dissolved substances are transported within two to three hours further along into the small intestine, while the coagulated substances are digested further.

2.7. Rest Phase

The process of digesting the lactoprotein (Casein coagulation) lasts at least three hours, during which the calf rests physiologically recumbent.

An essential prerequisite for the prevention of indigestion in milk calves is the observance of a period of rest after consumption of milk. Over a period of around 3 hours while resting, the coagulation of Casein by enzymes occurs in the abomasum. Calves need appropriate places to lie down for this, with suitable bedding (BRAMMERTZ, 2014, MARAHRENS and SCHRADER, 2020).

2.8. Milk / Milk Substitutes / Electrolytes / Water

In their first weeks of life, the digestive system of calves is suited to the structure of whole milk. If milk substitutes are used instead of whole milk, these should include 50 to 60% skimmed milk. The smaller the proportion of skimmed milk, the greater the risk of digestion problems. Such problems can also occur due to added plant proteins, which are difficult to digest for young animals due to their lack of enzymes while still young (TRAUSCHKE, 2008; HERZOG *et al.*, 2020).

Electrolyte solutions primarily compensate for electrolyte losses, while the nutritional value of such solutions is questionable (MARAHRENS, 2019) or exceedingly low, and is not sufficient at all to satisfy the need for carbohydrates and proteins (HERZOG *et al.*, 2020). The provision of an electrolyte solution cannot therefore be seen as “feed”, since this does not satisfy the nutritional needs of the calves. An electrolyte solution is only sufficient as a bridge between two meals for a short period of time. Thus, it is vital (essential for survival) that unweaned calves are given milk/ milk substitutes as feed.

A single water supply without feed may satisfy the liquid needs of unweaned calves, if provided appropriately by means of a suction action on a malleable rubber teat, but it is completely unsuited to their physiological needs, and there is also the danger of water intoxication (with haemoglobinaemia and haemoglobinuria) (ROSENBERGER, 1978).

2.9. Intervals between food consumption / drinking

Under natural conditions, calves suck on the udder of their mothers 3 to 8 times a day, on average 6 times. Under agricultural conditions, calves kept individually generally suck twice daily, more rarely thrice daily. If calves are fed once every 12 hours, then they present nonspecific signs of extreme hunger long before the impending feeding time, such as increased vocalisation, and in

groups increasingly sucking one another as well as an increasing competition between themselves for drinking liquids.

Extension of the intervals and consequences

If calves show signs of hunger during 12-hour feeding intervals, some time before the expected feeding time, then this will be even worse if there is a delay or absence of feed. Modest bodily discomfort develops gradually, occasionally however quickly, in extremely unpleasant and then life-threatening sensations: the animals suffer from the impact of a withdrawal of feed, which goes against their natural self-preservation instinct, and from surroundings which they perceive to be life-threatening (BERNATZKY, 1997).

The longer the hunger lasts, the more serious the impact will be on their welfare. Gradually it will lead to significant suffering, which is expressed with steady bleats and licking the environment – be it licking each other, or the equipment within lorries, e.g., bars, drinking nipples.

This suffering can only be stopped by satisfying the needs of the animals and sating their hunger by feeding them.

Exclusively providing the animals with water or electrolyte solutions – aside from the fact that such a procedure 12 or more hours after the last feed is not adequate, i.e., does not satisfy the need of the animals – can only satisfy the needs of sucking calves partially and for a short period.

Furthermore, periods of hunger can lead to a decrease in pH levels in the abomasum, which can lead to ulcers. A twice daily feeding regime can exacerbate this problem in the face of the physiological need for more frequent milk when the calves are sucking freely. (Conclusion in: MARAHRENS and SCHRADER, 2020).

Furthermore, an absent or considerably reduced feed has significant effects on the immune system of the calves which are, in any case, overburdened during transport. Moreover, these calves are “immunologically weak” due to their age (Conclusion in: MARAHRENS and SCHRADER, 2020), a condition of increased susceptibility to field infections, especially as their maternal antibodies start to break down, while their own defence against infections is still underdeveloped.

3. Legal bases

3.1. Art. 3 of the Regulation (EC) Nr. 1/2005

In Art. 3 para 1 of the Regulation (EC) Nr. 1/2005⁴ (hereafter: EU-ATR) – just as in Recital Nr. 11 – the principle of precaution and hazard prevention is laid out⁵. Even the serious, realistic, and not merely distant possibility that injuries or unnecessary suffering “could” be inflicted upon an animal or several animals, must lead thus to a change in transportation planning or a cessation of transportation (MAISACK *et al.*, 2016).

Before a journey can take place, all necessary arrangements must have been made to minimise

⁴ COUNCIL REGULATION (EC) No 1/2005 of 22 December 2004 on the protection of animals during transport and related operations and amending Directives 64/432/EEC and 93/119/EC and Regulation (EC) No 1255/97 [Official Journal Nr. L 3 of 5/1/2005, p. 1-44].

⁵ Art.3, Para 1: “No person shall transport animals or cause animals to be transported in a way likely to cause injury or undue suffering to them.”; Recital (11): “...basic principle according to which animals must not be transported in a way likely to cause injury or undue suffering to them...”.

the length of the journey and to meet the needs (see 2.3. and MARAHRENS, 2019) of the animals during the journey [Art. 3 (a)]; the means of transport must be designed, constructed, maintained and operated so as to avoid injury and suffering and ensure the safety of the animals [Art. 3 (c)]; water, feed and rest must be offered to the animals at suitable intervals, and this must be appropriate in quality and quantity to their species and size [Art. 3 (h)]. Hence it must be ensured that the welfare conditions of the animals are appropriately maintained [Art. 3 (f), 2. s.].

These general conditions set out in Art. 3 become important where issues related to animal welfare are not, or not sufficiently, regulated in the annexes of the Regulation: In this case, the answer to each question is ascertained by looking at the recitals and general conditions (MAISACK *et al.*, 2016). Objectively, this relates above all to the provision of age-appropriate liquid feed in intervals necessary for preventing suffering, as well as the existence (together with the amount, distribution and accessibility) of drinking equipment suited to the physiological needs of unweaned calves.

3.2. Transport Restrictions

There are **transport bans** where the general conditions of Art. 3 cannot be adhered to and the welfare of the animals cannot be guaranteed during the whole length of the journey, and where animals are not fit for transport.

Transport Restrictions for calves arise due to the age of the animals: According to the EU-ATR calves up to the age of 9 days can be transported a maximum of 100 km, from 10 to 13 days a maximum of 8 hours, from 14 days⁶ a maximum of 19 hours, and after weaning, which can happen at an age of 2 months at the earliest, 29 hours.

3.3. Short-distance / Long-distance transportation

A “long journey” is, according to Art. 2 (m) EU-ATR, a journey that exceeds 8 hours, starting from when the first animal of the consignment is moved. Thus, a long-distance journey lasts more than 8 hours, whereas a short-distance journey lasts less than 8 hours; loading and unloading times are to be included in these periods (cf. 3.5.1.).

For long-distance transportation of domestic Equidae, cattle, sheep, goats and pigs, the vehicle and its equipment must be approved in accordance with Ann. I, Chap. VI in conjunction with Art. 3 leg. cit.

3.3.1. Place of departure

The “place of departure” means the place where an animal is first loaded onto a means of transport, providing it had previously been kept at this location for at least 48 hours. [Art. 2 (r)].

3.3.2. Assembly centre

As an exception, the place where an animal is first loaded onto a means of transport is not a place of departure if the animal is brought to an official assembly centre, which also fulfils the conditions of Art. 9 EU-ATR, and begins its primary journey from there. Thus, the animals can be loaded again at the assembly centre onto a 2nd means of transport, if the journey is less than 100km [Art. 2 (r) i)]. If the journey is more than 100 km however, the animals must have been accommodated with

⁶ As per § 10 (4) (German) Animal Transport Regulation (TSchTrV), “Calves under 14 days old cannot be transported domestically”.

sufficient bedding, untied and watered for at least six hours prior to the time of departure from the assembly centre [Art. 2 (r) ii]).

The provision of fresh water alone is not sufficient in this case, as the total time resting at the assembly centre and travelling in the first journey to the centre lasts 15 hours, and only the provision of a feed drink can satisfy the physiological need of the animals for feed (s. also 2.9.). Thus, unweaned calves must be fed obligatory at the assembly centre before loading according to their physiological and behavioural needs, including the suckling act.

Per Art. 2 (b), a consignment is to be formed at an assembly centre of animals originating from different holdings.

In Germany an assembly centre is to be set up and run per the requirements of the Animal Welfare – Farm Animal Husbandry Ordinance (TierSchNutzV). If calves are to be accommodated at assembly centres for dispatch according to Art. 2 (b) of the EU-ATR, then these assembly centres must be explicitly equipped and approved with feeding installations for unweaned calves. This is not necessary for assembly centres that are used exclusively for the sale and marketing of calves. (§ 1 para. 2 Nr. 2 TierSchNutzV)

3.3.3. Control post

A “control post” is, according to Art. 2 (h) of the EU-ATR, an officially authorised staging point, as referred to in Regulation (EC) No 1255/97⁷. In accordance with Ann. 1, Chap. V 1.5. of the EU-ATR, domestic Equidae, cattle, sheep, goats and pigs – if they have not reached their place of destination within the maximum timeframe of the Regulation – must be unloaded, fed and watered at a “control post” and be rested for at least 24 hours.”

In order to provide a feed which meets the needs of unweaned calves, a minimum of 3 meals must be provided during a 24 hour stay at a staging point. On arrival, after around 12 hours, as well as 3 hours before re-loading. Unloading of calves exclusively for their feeding is not permitted.

The organiser is responsible for these 3 meals as well as another feed after arriving at the place of destination.

Thus, the organiser at the place of departure (assembly centre) is to arrange at least four feeds satisfying the needs of the calves, depending on their supply before the long transport (in the case of transportation more than 100km to the assembly centre): 3 at the control post and one more at the place of destination, particularly as another feed must be provided around 12 hours after the last feed at the control post.

The idea that animals ought to be rested at control stations for just 12 hours (and not a minimum of 24 hours) relates exclusively – even from a teleological perspective – to the condition specified in Ann. I, Chap. V, 1.7. (b) EU-ATR, namely, that after being transported on ferries, on which the animals remain in the lorries – and also only on direct links between two geographical points of the Community (and not between the Community and Third Countries) – these animals must then be unloaded and rested for a period of 12 hours in the port of destination or in its immediate vicinity, if the maximum permissible journey time on sea was exceeded (CURIA, 2006).

⁷ Council Regulation (EC) No. 1255/97 of 25 June 1997 concerning Community criteria for staging points and amending the route plan referred to in the Annex to Directive 91/628/EEC, (Official Journal Nr. L 174 of 2.7.1997 p.1-6).

A period of rest at a control post of less than 24 hours is prohibited – apart from the example above.

3.3.4. Place of destination

A “place of destination” is the place where an animal is unloaded from a means of transport and either accommodated for at least 48 hours prior to its onward transport, or slaughtered (only animals to be slaughtered) [Art. 2 (s)].

It is the task of the organisers of long-distance transportation to check the place of destination or the receiving store for its suitability and capacity to receive the consignment and to demonstrate this to the authorising veterinary authorities (ANIMAL WELFARE PLATFORM, 2019). This seems essential considering the recurring rumours that certain places of destination are merely distribution centres where transportation by no means ends but is continued after just a few hours.

Therefore, an assembly centre cannot be the place of destination unless it is intended to house the animals there for at least 48 hours prior to further transport. (MAISACK and RABITSCH, 2018).

The veterinary authority must be persuaded, before they authorise transportation, that the animals will actually remain at the specified place of destination for at least 48 hours. It is a prerequisite for authorising transportation that the veterinary authority must be persuaded that the animals will actually remain at a specific place of destination for at least 48 hours. (ANIMAL WELFARE PLATFORM, 2019).

3.3.5. Place of transfer / Assembly centre hopping

A “place of transfer” is a place where animals have changed means of transport, or where the animals have rested for less than 48 hours [Art. 2 (t)].

If, after they have been sent to an assembly centre, the animals are then taken to a place which has been designated a place of destination in the accompanying documentation which is itself an assembly centre, and if the animals are not rested for 48 hours in accordance with Art. 2 (s) i), but are re-loaded shortly after – e.g., after 6 hours in accordance with Art. 2 (r) ii) –, then this is clearly illegal (MAISACK *et al.*, 2016; MAISACK and RABITSCH, 2018), especially as

- the maximum permissible journey time begins upon loading at the first assembly centre
- thus by “hopping” between assembly centres the real journey length can be concealed
- it contravenes the teleological purpose of the EU-ATR, according to which transportation

over long distances is to be limited as far as possible [Recital (5)] and the length of the journey is to be minimised as far as possible [Art. 3 (a)].

3.4. Familiarisation

Animals must be in position to be able to become accustomed to the mode of transport (Ann I, Chap III, 1.1.), as well as the mode of feeding and watering (Ann I, Chap III, 2.7.).

Calves which are only accustomed to teats, artificial rubber teats, or teats made of another malleable material which allow the calf to suck naturally, before they are placed in a vehicle, will not be able to become accustomed to metal nipples or nipples made of hard material, or other drinking devices they are unused to, such as drinking basins with open water surfaces, in the short

period after loading or while travelling. These calves need to be provided with drinking devices they are already used to, i.e., a malleable rubber teat which is suited to a sucking action. (HERZOG *et al.*, 2019; MARAHRENS and SCHRADER, 2020). Therefore, and because there can sometimes be too much water from traditional water points in animal transports, buckets with malleable teats must be brought along (COM, 2009a). When using buckets, it is important on the one hand that unweaned calves can more easily recognise the buckets as a source of feed, which on the other hand means the amount of feed they consume can be controlled.

3.5. Journey times

The maximum journey times are specific to each species and their needs and are, per Ann. I, Chap. VI in conjunction with Art. 3 leg. cit., 19 hours for calves, lambs, kids, foals and piglets. Loading and unloading times are included in the above calculations (see below). Furthermore, these animals must, after a duration of transport of 9 hours, be given a rest period of at least one hour sufficient for them, in particular, to be watered and, if necessary, fed; once rested they can be transported for a further 9 hours.

3.5.1. Loading and unloading times

Both loading and unloading times are to be included in calculating the actual and the maximum permissible journey times (COM, 2007a; COM, 2007b; COM, 2020b⁸; RABITSCH and WESSELY, 2012; MAISACK *et al.*, 2016; MAISACK and RABITSCH, 2019a, b). The journey thus begins when the first animal is loaded and ends when the last animal is unloaded. The journey must be planned in such a way that the last animal is unloaded at the very latest by the moment the maximum permissible journey length is reached.

From the authors' own experiences, the loading of a three-story articulated lorry with around 200 three-week old calves takes at least 1 hour, unloading is sometimes quicker.

The practice in some places to load up to 280 three-week old calves onto an articulated lorry is illegal in view of the requirements of Chap. VII B. in conjunction with the reference above (loc. cit.) *"With such loading densities deviations are possible based on the weight and size of the animals as well as their body shape, the weather conditions and the expected journey length"*. Since calves between 2 and 3 weeks old – already kept alone due to their weak immune system – are physiologically weak (see 2.2.), which limits their ability to be transported to a not insignificant extent, and since the cited amount of space needed is simply the minimum requirement (COM, 2009b), more space must be provided if the journey is over 8 hours in length or when hot, and thus the loading density must be reduced. The loading density must be reduced by 30% (ANIMAL WELFARE PLATFORM, 2019).

3.5.2. Rest break (period) – Rest time

Rest break (period): Water, feed and rest are to be offered to unweaned calves at suitable intervals [Art. 3 (h)] and are to be appropriate in quality and quantity to their species and size. In the case of long-distance transportation this means that unweaned calves must, after a journey of 9 hours, be given a rest period of at least one hour sufficient for them in particular to be watered and, if necessary, fed [Ann. I, Chap. V, 1.4.(a)].

This Regulation thus requires that these animals receive water or another liquid drink after

⁸ cit. COM, 2020b: *"The journey time should always be counted from the time the first animal is loaded into the means of transport at the place of departure until the last animal is unloaded at the place of destination"*.

travelling a maximum of 9 hours in any circumstance, however a feed only if there is an actual need for one (“*if necessary*”). A feed is not only concerned with satisfying the animal’s energy demand – since that can also be satisfied in the short term by providing electrolyte solutions with glucose –, but rather, and above all, by satisfying their protein demand (MARAHERNS, 2020).

For more information on their actual demand for feed during transportation, in particular after distribution from an assembly centre, see also 2.9. and 5.3.

This one-hour break after a journey of 9 hours is only a minimum requirement, i.e., it can be extended in the interests of the animals. It actually has to be extended, if necessary, to ensure that all the animals can feed and drink sufficiently (MAISACK *et al*, 2016). Unweaned calves in particular need a rest break, undisturbed and lying recumbent, which will reduce the risk of diarrhoea. The rest break is extended at the cost of the second journey log, which then has to be shortened so that it does not exceed the limit for unweaned calves of 19 hours travel [CURIA, 2014; Rabitsch, 2014 [citing the Commission⁹]].

Rest time: On the other hand, animals must be rested after the end of the maximum permissible journey length at the place of unloading, before they can be transported again. The rules concerning rest periods, among others, also apply equally for journeys of less than 8 hours as well as for long-distance journeys over 8 hours.

48 h This rest time shall be 48 hours from arrival at the place of destination [Art. 2 (s) i)].

24 h If further transport is planned from here after the rest time – then the transport process consists of several stages – and this recovery phase takes place at a control post according to Art. 2) (h), then it shall be 24 hours. This rest time of 24 hours may not be shortened, not even when the first journey is, for example, only half of the maximum permissible journey length.

12 h Art. 1. para 1 1. of the Reg(EC)1255/97 modified by Art. 36 of the EU-ATR defines control posts as “*places where animals [...] are rested for at least 12 hours or more*”. This 12-hour stay is only valid, however, for the unloading of animals from roll-on-roll-off transports on ferries travelling between direct links within the Community, especially since only the paragraph relevant here, i.e., Ann. I, Chap. V, 1.7.(b)¹⁰, refers to this time period and animals cannot be unloaded anywhere, but essentially only at approved staging points.

3.5.3. Extension of the maximum journey length

1. The maximum permissible journey time for short-distance journeys of 8 hours can be extended if the additional requirements of Chapter VI leg. cit. are met (Ann. I, Chap. V, 1.3.), so that unweaned calves over 14 days old, for instance, can thus travel for 19 hours [Ann. I, Chap. V, 1.4. (a)].
2. The maximum journey time for both short- and long-distance journeys may be extended by two hours, taking into account the proximity to the place of destination, in the interests of the animals (Ann. I, Chap. V, 1.8.).

⁹ Authentic Interpretation of the European Commission of 7.11.2012 [FVO, Grange, IRL, Meeting of contact points Reg.(EC)1/2005].

¹⁰ Ann. I, Chap. V, 1.7.(b) of the EU-ATR: “*In the case of transport by sea on a regular and direct link between two geographical points of the Community by means of vehicles loaded on to vessels without unloading of the animals, the latter must be rested for 12 hours after unloading at the port of destination or in its immediate vicinity unless the journey time at sea is such that the voyage can be included in the general scheme of points 1.2 to 1.4.*”

This can be the case, for example, if the planned route cannot be completed in the scheduled time due to unforeseeable circumstance like, for example, road closures. Hence this should prevent the need to unload the animals at an emergency shelter shortly before reaching their goal.

Exceeding the maximum permissible journey time cannot be planned for in advance in any way. [RABITSCH, 2014; ANIMALTRANSPORTGUIDES, 2018; MARSCHNER *et al.*, 2018; COM, 2020a¹¹; cf. ECJ-Judgement in Case C-469/14 (CURIA, 2014)]¹².

3.6. The equipment within vehicles

3.6.1. The general requirements of vehicles used for the transportation of animals can be found in Ann. I. Chap. II.

Essentially, injuries and suffering must be avoided and the safety of the animals ensured; For example, there must not be any gaps between the dividing wall and the ground or the dividing wall and side wall, in which the animals can get body parts caught and thus trapped or injured (RABITSCH, 2014; GAYER *et al.*, 2016; MARSCHNER *et al.*, 2018).

The vehicles must always have roof coverings; an appropriate and sufficient fresh air supply and circulation above the standing animals must be ensured; the ground surfaces must be non-slip; calves less than 6 months old must be able to lie on sufficient bedding; the animals must be accessible for inspection and care.

A supervisor must be in a position to be able to reach, examine and, if necessary, treat each individual animal in a vehicle. That is not possible for example if the internal height of the vehicle is too low for a person trying to examine an animal (MAISACK *et al.*, 2014).

Each animal must be directly accessible for monitoring and care. For this, there must be side access to each loading level and bay, in addition to the tailgate at the front, which is big enough for a person to “pass through” and care for the animals with feed and, in emergencies, with water. Individual calves must be unloaded by these openings if required as part of obtaining approval for the transportation of these animal categories (MARSCHNER *et al.*, 2018).

3.6.2. The additional requirements of road vehicles for long-distance transportation of domestic Equidae, cattle, sheep, goats and pigs are, per Ann. I, Chap. VI leg. cit.:

A light-coloured and insulated roof, bedding for all animals; partitions; ventilation systems; a temperature monitoring system and alarm system; a “navigation system”, de facto a tracking system [cf. Art. 2 (o) leg. cit]; as well as water or other liquids, a water tank and the inclusion of feed (appropriate to the animals’ needs) and, where necessary, feeding equipment.

The drinking and feeding equipment for unweaned calves

The issues of feeding and drinking as well as the equipment needed are debated extensively in Part 5.

11 Bernard van Goethem in SANTE G2/SR/iv[2020] 1118375; “... the possibility of extension by two hours... should only be allowed in cases of unforeseen situations occurring during the journey and only in the interest of the animals”.

12 contrary to this: ZAR, 2019.

3.7. Legal bases

1. It is therefore not permissible to handle animals or consignments of animals which actually come from another place of departure via an assembly centre acting as the place of departure and thus conceal the actual start of transport and the actual journey time (cf. MAISACK *et al.*, 2016; MAISACK and RABITSCH, 2018).

This is/was standard practice during the transportation of unweaned calves, e.g., from the Baltics or from Austria to Spain.

2. It is prohibited to keep animals at control points for less than 24 hours if they are transported solely by road.

This is/was standard practice for the transportation of unweaned calves, in particular from Germany, Austria and other countries to Catalonia/other parts of Spain.

3. It is prohibited to take animals from an official place of destination if they have not stayed there for at least 48 hours.

However, this is/was standard practice for the transportation of unweaned calves to Vic and other places in Catalonia/other parts of Spain.

4. Legal opinions

4.1. The European Commission (“COM”)

1. Loading and unloading times are to be included in calculating the journey time (COM, 2007a, b, COM, 2020b).
2. Calves under 2 months old are considered unweaned (COM, 2009a), i.e., the weaning of calves is only possible from 2 months.
3. Drinking bowls and metal nipple drinks are unsuitable for unweaned animals (COM, 2009a).
4. The vehicles must have buckets and malleable sucking devices (COM, 2009a).
5. Unweaned calves are only to be transported when the outdoor temperature is above 0°C (COM, 2009a).

4.2. The “Transport Guides”

This project by the Directorate-General for Health and Food Safety (SANTE) of the European Commission has developed and distributed guides for good and better practices for animals which are transported within the EU and in Third Countries for slaughter, fattening and breeding. The good practice describes the full implementation of the minimum requirements of the EU-ATR, the better practice goes further.

1. Only if the vehicle is fitted with suitable feeding equipment can the maximum permissible journey time for unweaned calves be 19 hours (ANIMALTRANSPORTGUIDES, 2018).

2. The provision of liquid feed to unweaned calves is not possible with current technology (ANIMALTRANSPORTGUIDES, 2018; cf. also: MARAHRENS, 2019).
3. Calves can only be properly provided with feed and drink (or milk/milk substitutes in the case of unweaned calves) – electrolyte solutions are not feed! – if they are unloaded specifically for this purpose. According to Animal Transport Guides (ANIMALTRANSPORTGUIDES, 2018), this should take place at control posts or at assembly centres approved for this purpose which have suitable equipment. However, unloading solely for feeding is not permitted as per EU-ATR in either control posts or assembly centres; moreover, the assembly centres – at least in Germany – are not authorised to allow this.
4. Calves should be fed individually and rested for at least 1 hour, preferably 3 hours, before they can continue their journey (ANIMALTRANSPORTGUIDES, 2018; cf. also: MARAHRENS and SCHRADER, 2019).

4.3. Literature

See 2.1. to 2.9. and 8.2.

5. The transportation of unweaned calves in reality

In light of the authors' experiences, it is clear that unweaned calves have been transported illegally over long distances for many years. Although the length of such journeys is often far more than 19 hours, the calves have been and are still only provided with water and no electrolyte solutions, let alone any milk substitutes, and although the vehicles often only have metal nipple systems in place 15 years after the Animal Transport Regulation came into effect, more than 99% of animals have survived and continue to survive such conditions during transportation.

A low death rate during transport and on arrival is considered a success by the industry. However the food deprivation suffered during transportation, which is seriously damaging to the physiological needs of the animals, [only provided with drink, but no liquid feed for at least 19 hours, often over 30; no humane treatment (ARD, 2020)] is not taken into account by this industry, nor is the large spread of illness among the animals up to 3 weeks after arrival at the desired location, which necessitates an increase in the use of disease treatments in the days and weeks after transportation, (KNOWLES, 1995; EFSA, 2004; FIORE *et al.*, 2010; MARAHRENS, 2019; MARAHRENS and SCHRADER, 2020). The significant increase in the death rate just 2 weeks after transport (FIORE *et al.*, 2010), and the unlawful transportation systems are also considered insignificant [loading and unloading times are not included; failure to adhere to Art 2 (s); Art. 3 (h); Ann. I Chap. V, 1.8.)] (ZAR, 2019; ARD, 2020).

In the case of traditional rearing for the purpose of restocking, the farmers essentially aim not to re-stall the calves in their first weeks of life at the farm, and thus by providing more feed, to care for the improvement of their constitution, their organ development and body weight gain; the animals thus develop more quickly ("metabolic programming" in MACCARI, 2012, MACCARI *et al.*, 2015). In complete contrast to this caring and proactive approach, calves for fattening are transported at the very moment the effect of maternal antibodies begins to fade, when their ability to create their own antibodies has not yet really started ("Immunological Void", see e.g., JOSERA-AGRAR, 2019). Moreover, they end up poorly prepared and poorly fed in a situation where they are confronted suddenly with pathogens from many various biocenoses and transported on a vehicle which does not provide them with adequate liquid feed (see below). Thus, long-distance transportation of calves - as explained below - does not conform to good professional practice.

5.1. Drinking devices

The standard method of caring for unweaned calves is still the provision of drinking water through a metal nipple device for a period of 1 hour after each 9-hour journey (Fig. 1) In this case changing the position of the mandrel/seal of the nipple will affect the flow of liquid, sometimes also making it excessively pressurised.

© A. Rabitsch

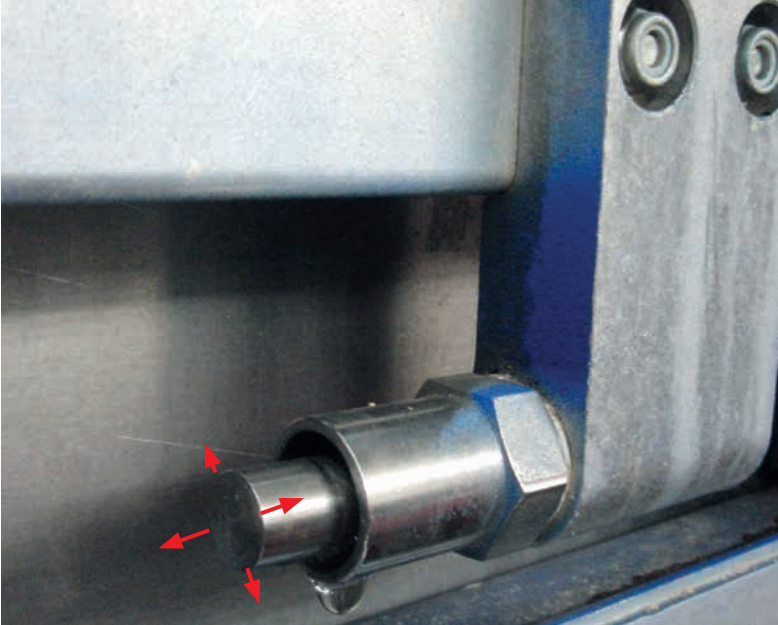


Fig. 1: Metal nipple device

Although some calves, when hungry and searching for feed, are able to get the mechanism of such drinking devices working by licking and sucking their surroundings (ARD, 2020) (Fig. 2, 3), it must be assumed that these nipples are in no way suited to safely providing unweaned calves with sufficient drinking water (RABITSCH, 2014; MARAHRENS and SCHRADER, 2020). Besides the many obstacles while trying to drink (Fig. 2), many are simply not accessible (Fig. 4); but these metal nipples are mostly not even recognised by the calves as drinking sources in the first place (Fig. 5) (RABITSCH, 2014).

© A. Rabitsch



Fig. 2: Metal nipple device; activated; obstructed by the nose guard.

© A. Rabitsch



Fig. 3: Licking a metal nipple device



Fig. 4: Metal nipple device; inaccessible



Fig. 5: Metal nipple device; unrecognised by the calves

Lately, due to a more stringent interpretation of the Animal Transport Regulation, but especially due to the increased understanding of the needs of unweaned calves, the provision of drinking liquids, and especially of feeding liquids, by means of malleable sucking devices has been required, just as the European Commission stipulated back in 2009 (COM, 2009a).

Simply putting a malleable plastic case over a metal nipple (Fig. 6, 7) does not enable a calf to suck on it properly in any sense. Here, as with (the underlying) metal nipple device, a valve is opened so that the liquid fills the “teat” and runs out or – depending on the pressure in the drinking system – squirts out (Fig. 8) and fills the calves’ mouths without any further action needed. In this respect, the calves are not able to suck in the manner described in 2.4. paragraph 3., namely alternating between a sucking phase, which takes up most of the time, and a subsequent swallowing phase, even on this type of artificial teat (MARAHRENS and SCHRADER, 2020), especially since the need to suck is completely absent in such devices.



Fig. 6: Metal nipple device covered in plastic

In any case, the calves are only offered water through these devices, although it would be possible to provide a pure electrolyte solution without the addition of sticky glucose, whereas the provision of a sugary electrolyte solution or a milk substitute does not seem possible. Such solutions would cause the drinking system to clog and make cleaning impossible.



Fig. 7: Metal nipple device covered in plastic



Fig. 8: Pressurised liquid sprays from the nipple; the calves cannot suck on this

Hence unweaned calves are not provided with nutrition (in the form of a milk substitute) during long-distance journeys on board vehicles, rather they just receive a drink, mostly water, and at best an electrolyte liquid. It is very unclear from a technological perspective in this regard, whether all the animals are able to drink sufficient quantities.

The provision of an electrolyte solution – as explained at 2.8. – cannot be viewed as feed.

5.2. Intervals between drinking

Whenever calves are loaded at an assembly centre for long-distance transportation of (more than 8 hours up to) 19 hours, then at most they just receive water or electrolytes, rarely milk substitutes too (ZAR, 2019). At the “place of destination”, often just a distribution centre for deals between farms more or less far away from each other (ARD, 2020), the animals again are just given electrolytes (ZAR, 2019).

Thus, the calves can undergo a long period without a drink.

- The journey to the assembly centre can last 8 hours – including loading and unloading.

This is not too demanding for the average physiological needs of the calves, although the needs of individual calves after short breaks from drinking are not being taken into account.

- The animals stay at the assembly centre for at least 6 hours (when delivered over 100km distances).
- 9 hours after the start of loading the first animal, unweaned calves must be provided with drink; in reality, only a few calves can recognise the drink on offer in the 1-hour rest period; even fewer animals can consume sufficient quantities of liquid in that time.
- After the second 9-hour journey, i.e., at the control post or the place of destination, the unweaned calves must be provided with drink again.

To properly provide for calves on board articulate lorries, the provision of water or (better) electrolyte solutions is only satisfactory and both adequate and sufficient to their needs, when it can be ensured that each individual is able to recognise the drinking device as it is, they give off drinking liquid (i.e. are not broken), can be reached by the calves, and are actually being reached, and when the animals can consume the amount of water needed within the minimum 1 hour break, unhindered, and actually do this in practice.

This is not the norm in any case.

Above all it must be emphasised that the above only relates to intervals between drinking times, not for feeding.

5.2. Intervals between liquid feeding

As outlined in 2.2., calves for sale which are not destined for breeding or restocking, rather for the calf, bull or heifer fattening processes, are fed a restricted amount or barely enough to sustain themselves out of business considerations. Consequently, they end up in the cattle trade without any considerable energy reserves.

Then they are brought to the assembly centre for the subsequent long-distance journey.

- If the distance covered is under 100km, then this takes at least 1¼ hours (on the basis of a top speed of 80 km/h) excluding loading and unloading. However, this is not taken into account when calculating the journey length of the subsequent (long-distance) journey; the animals can simply be re-loaded straight away [Art. 2 (r) i)].
- If, however, the distance covered is over 100km and up to 8 hours long, so the animals are accommodated for at least six hours after unloading at the assembly centre, where they are provided with sufficient bedding, untied, and watered [Art. 2 (r) ii)].

If the unweaned calves are provided with milk substitutes at both the assembly centre and the place of destination, the period without feed is at least 19 hours (Fig. 9).

If the unweaned calves are provided with milk substitutes only at the assembly centre but not after being unloaded at the designated place of destination (ZAR, 2019), the period without feed is clearly more than 19 hours (Fig. 9).

If the unweaned calves are not provided with milk substitutes at the assembly centre, but straight after unloading at a designated place of destination, then the period without feed is clearly more than 19 hours, at least more than 26 ¼ hours if the journey to the assembly centre is over 100km (Fig. 9).

If the unweaned calves are not provided with milk substitutes at the assembly centre nor after unloading at a designated place of destination, then the period without feed is clearly more than the 19 hours maximum permissible journey length set out in the Regulation: In this way, the animals could only be provided with water after a period of 33 hours, without receiving any feed.

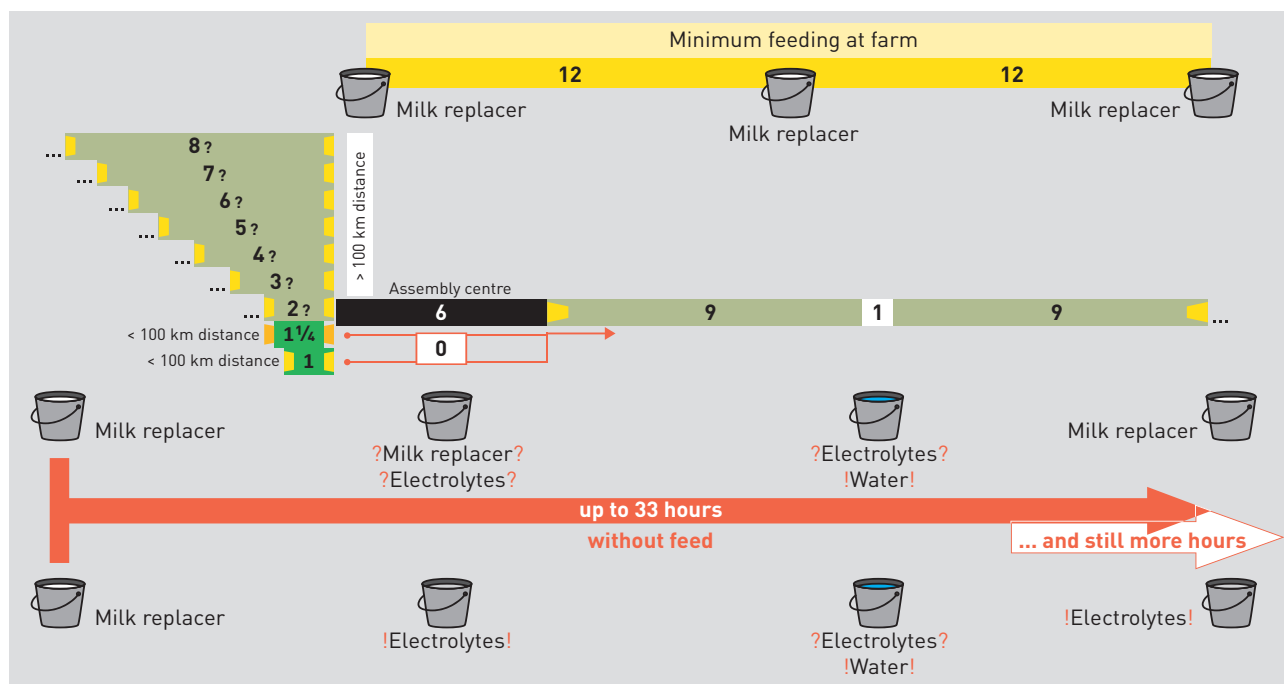


Fig. 9: Drinking, Feeding intervals per current practice

Thus, the interval between 2 feeds is in any case significantly more than 12 hours, i.e., the boundary beyond which the animals can suffer, as described above (see 2.9.).

This potential period of suffering can only be avoided by feeding unweaned calves in intervals not greater (or not significantly greater) than 12 hours, i.e., a nutrient solution in the form of a milk substitute. Thus, the calves must inevitably be fed during transportation, i.e., on board the articulated lorry (cf. MARAHRENS and SCHRADER, 2020).

Feeding unweaned calves on board articulated lorries in such a way is, however, simply not possible (cf. EFSA, 2008), since

- current drinking systems prohibit the use of milk substitutes: “The provision of drinks as feed for unweaned calves is not possible with current technology” (ANIMALTRANSPORTGUIDES, 2018; cf MARAHRENS, 2019),
- current vehicles are not fitted with a drinking system compliant with the requirements of Ann. I, Chap. VI, 2., in particular 2.3., and nor are they fitted with a sufficient number of buckets with malleable nipples in accordance with the requirements of Ann. I, Chap. VI, 1.4. and 1.5. and the Commission’s letter, Number SANCO D5 DS/dj D(2009) 450351, (COM, 2009a),
- it seems that it cannot be guaranteed that the calves will be supervised when feeding when loaded in three stories,
- it is not possible for 2 transport supervisors to monitor the calves to ensure that each animal consumes adequate quantities of feeding drink in a one-hour break when loaded in three stories.

If, however, unweaned calves are provided with a milk substitute during the one-hour break on board the articulated lorry, contrary to the above, then it would be questionable whether the oesophageal groove reflex and thus abomasal digestion could occur properly due to the circumstances listed in 2.5. and 2.6., at the very least it would not be certain. However, in all likelihood this will lead to considerable indigestion.

Thus, calves cannot currently be fed with milk substitutes on board articulated lorries properly, i.e., not in a way suited to their needs (ANIMALTRANSPORTGUIDES, 2018).

Further minimum requirements for the transportation of unweaned calves, which are not feasible at this point in time, will be put forth (MARAHERNS and SCHRADER, 2020), above all,

- that supervisors should be able to reach each individual calf in the loading bays of the vehicle, especially as many animals are not able to find the teat and thus must be led to it directly,
- that there must be a teat available for each calf in a group (loading pen) to prevent competition between the calves,
- that the teats (either with buckets or automated feeding devices) must be filled with drink before being deployed to prevent the calves sucking on nothing or on air and thus avoiding the teat altogether.

6. Conclusions

1. In principle, unweaned calves can drink on metal nipples covered with rubber teats while on board articulated lorries. As a rule, however, calves only drink from these devices to a limited extent, often in uncontrollable amounts, and not all of them are able to.
2. It cannot be guaranteed that all unweaned calves on board articulated lorries will be able to consume sufficient and controlled amounts of drink.
3. It is not currently possible to provide unweaned calves with liquid feed on board articulated lorries which is suitable and adequate for their needs (cf. EFSA, 2008).
4. The calves become increasingly thirsty and hungry during the transportation process (see 2.3.2.), the latter in particular becoming significant as the journey gets longer.

7. Solutions

7.1. Illegal practices

The currently practiced “solution” of feeding unweaned calves after a period of at least 19, sometimes up to 33 hours, despite their demand for feed in the meantime, is illegal. This practice is also illegal if the animals receive an electrolyte solution offered by means of malleable teats while travelling, since the animals do not just have a need to suck and drink liquids – which is impossible with “over-pressurised teats” anyway (cf. 5.1. and Fig. 8 as well as the Animal Welfare-Farm Animal Husbandry Ordinance) – but far more they have a demand for nutrition. This demand must be fulfilled in accordance with the requirements of Art. 3 (a), (f) 2. half-sentence and (h) in conjunction with Ann. I, Chap. V, 1.4. (a) (cit: “*fed, if necessary*”); there is a need to feed them. Just providing drink and not feed will lead to unjustifiable and unavoidable suffering.

Furthermore, it should be noted at this point that the practice in some places of unloading the suckling calves (at the latest) 9 hours after the start of the journey (i.e., after the first journey) just to provide them with feed and to then reload them is neither provided for nor legal per Council Regulation (EC) 1/2005:

Neither control posts [Art. 2 (h), s. 3.3.3. (Control posts) and 3.5.2 (Rest breaks – Rest times)], nor assembly centres [Art. 2 (b)], nor places of rest or reloading [Art. 2 (t)] are envisaged or permitted for such short stays for feeding.

Such a transportation practice would lead to large logistical and hygiene problems if widely implemented, but especially in respect of cleaning and disinfecting the facilities in question.

Such a practice leads to additional and unnecessary burden and suffering on the animals [cf. Recital (13)¹³ as well as obviously extending the total journey length [cf. Art. 3 (a)¹⁴] way beyond 19 hours, which is however illegal in consideration of the ECJ Judgement in Case C-469/14 (CURIA, 2014).

Among all it should be noted that, per Annex I, Chap. VI, 1.3. “the means of transport shall carry a sufficient quantity of appropriate feeding stuff for the feeding requirements of the animals in question during the journey concerned” and 1.4. “where specific feeding equipment is used for the feeding of animals... that equipment shall be transported in the means of transport”, as far as this is “necessary”. According to their needs and behaviour the care of the animals must therefore take place on board the vehicle.¹⁵

Since this is not possible according to findings obtained thus far, the transportation of unweaned calves on vehicles which allow the calves to drink on board do not conform to the law (cf. EFSA, 2008), especially as there is not yet an “automatic” supply system in place which is suited to their physiology and behavioural requirements and allows the two phased sucking action, as demanded in the Regulation, neither for electrolyte solutions, nor milk substitutes, nor for their temperature control (cf. MARSCHNER *et al.*, 2018; cf. MARAHRENS, 2019), whereas on the other hand unloading the calves for a short period just to provide them with a feed drink is illegal.

7.2. Legally compliant, valid solutions

Any form of transportation which does not necessitate feeding the animals is legally compliant with EU-ATR, i.e., primarily short-distance journeys up to 8 hours.

A journey of 9 hours is also legally compliant – including loading and unloading –, if the unweaned calves are then unloaded at a control post for 24 hours, watered and fed and allowed to rest, before the next journey begins. According to the requirements of EU-ATR this is only permitted in approved vehicles.

If it were possible to provide each and every unweaned calf with a sufficient amount of electrolyte solution during a break at the latest 9 hours after the start of the journey, then a journey in which the animals were provided with another meal at the latest 12 hours after the last feeding drink would also be legal. However, the reliability of such drinks provided on board is questionable, as already explained.

¹³ Recital (13): “The unloading and subsequent reloading of animals could also be a source of stress for them and contact at control posts, formerly referred to as staging points, could in certain conditions lead to the spread of infectious diseases...”

¹⁴ Art.3, (a): “All necessary arrangements have been made in advance to minimise the length of the journey”

¹⁵ The technical requirements are laid out in the statement by Friedrich-Loeffler-Institut (Friedrich-Loeffler-Institut, MARAHRENS and SCHRADER, 2020)

Admittedly, the journey would be longer than nine hours in this hypothetical case, however no more than 12 hours (cf. the limits placed on the transport of poultry per Annex I, Chap V Nr. 2.1 of the Council Order 1/2005 due to limited opportunities to feed and water them while on board the vehicle). The feeding intervals would be chosen in such a way that the animals did not get so hungry as to cause them any suffering.

However, the present permitted system of 9-1-9 hours cannot guarantee the welfare of unweaned calves with all certainty while travelling.

Besides the actual or hypothetical legalities, hunger remains the most pervasive and primary problem for unweaned calves on long-distance journeys (AWF-TSB, 2016). It cannot be assumed with certainty that even with the best feed and conforming to technical requirements each individual animal will actually consume adequate quantities of liquid. Many unweaned calves need physical help from people in order to drink sufficient quantities of milk substitutes or electrolyte solutions (AWF-TSB, 2016). This can simply not be controlled on an articulated lorry.

Otherwise, it is clear from the above, in particular with regard to the treatment of unweaned young animals while travelling, that an urgent reworking of the ATR is needed for the purpose of extending the minimum age for long-distance transportation, or better for a reduction of journey times to 8 hours, to conform to legal requirements once again.

8. Bibliography

8.1. Legal bases

COUNCIL REGULATION (EC) No. 1255/97 of 25 June 1997 concerning Community criteria for staging points and amending the route plan referred to in the Annex to Directive 91/628/EEC, Official Journal Nr. L 174 of 2.7.1997.

COUNCIL REGULATION (EC) No 1/2005 of 22 December 2004 on the protection of animals during transport and related operations and amending Directives 64/432/EEC and 93/119/EC and Regulation (EC) No 1255/97.

2009 GER. REGULATION on the protection of animals during transport and for implementing Council Regulation (EC) No 1/2005 [Animal Transport Regulation - TierSchTrV, BGBl. [Federal Law Gazette]. I p. 375]

8.2. Bibliography

ANIMAL TRANSPORT GUIDES (2018): European Commission

- Guide to good practices for the transport of cattle ISBN:978-92-79-87126-9, <http://animaltransportguides.eu/wp-content/uploads/2016/05/Guides-Cattle-EC-Templ.pdf> (last accessed 27.12.2020).
- Information sheets on cattle transport, <http://animaltransportguides.eu/wp-content/uploads/2016/05/Cattles-Calves-FINAL.pdf> (last accessed 27.12.2020).

ANIMAL WELFARE PLATFORM, (2019): EU Platform on Animal Welfare, Recommendations to improve the development and exchange of coordinated actions regarding cattle exports to non.EU-

countries, https://ec.europa.eu/food/sites/food/files/animals/docs/aw_platform_plat-conc_exp-cattle-recom.pdf (last accessed 21.12.2020).

ANIMALS ´ ANGELS (2016): Hafner, C., Rabitsch, A, The Myth of Enforcement of Regulation (EC) No 1/2005 on the protection of animals during transport, Animals ´ Angels Press, ISBN: 978-3-9816696-4-0.

ARD (2020): www.ardmediathek.de/swr/player/Y3JpZDovL3N3ci5kZS9hZXggbzExOTMyODU/?fbclid=IwAR0jjGbxm9Ht5f52pKeB-H48ud_u_msPqkp9O2os5etFT9FvhC2iliiATKY (last accessed 21.12.2020).

AWF-TSB (2016): Animal Welfare Organisation / Tierschutzbund Zürich, The victims of the dairy industry: Long Distance Transport of Unweaned Calves and Lambs, https://www.animal-welfare-foundation.org/files/user_upload/Long_distance_transport_of_unweaned_calves_and_lambs_2016.07.21.pdf (last accessed 21.12.2020).

BERNATZKY (1997): Bernatzky, G. in: Sambraus H.H. and Steiger, A., Das Buch vom Tierschutz [The Book of Animal Protection], Ferdinand Enke Verlag Stuttgart.

BRAMMERTZ, 2014: Brammertz, C., Überprüfung der Schlundrinnenfunktion bei Kälbern und Junggrindern mittels sonographischer Untersuchung [Inspection of the oesophageal groove reflex in calves and young cattle by means of sonographic examination]; Diss. Zürich.

COM (2007a): European Commission to Ms. Moffat, Time spent for loading and unloading, SANCO D2 DS/dj D(2007) 420506 of 9.8.2007.

COM (2007b): European Commission to Mr Polten/BMELV, Calculation of the journey length, SANCO D2 LPA/dj D(2007) 420763 of 9.1.2008.

COM (2009a): European Commission, Long-distance transportation of unweaned calves and lambs, SANCO D5 DS/dj D(2009) 450351.

COM (2009b): European Commission, Space allowances are minimum measurements, SANCO D5 LPA/fr D(2009)450293.

COM (2020a): European Commission, Whether the extension by two hours, foreseen under point 1.8 of Chapter V of Annex I to Regulation (EC) 1/2005, can be calculated before the start of a journey or is only allowed in cases of unforeseen situations occurring during the journey, SANTE G2/SR/iv(2020) 1118375 of 8.5.2020 [Ares(2020)2443021].

COM (2020b): European Commission, Interpretation of the definitions of the terms “transport” and “journey”, SANTE G2/YSL/sc (2020)2868303 of 29.7.2020 [Ares(2020)3995555].

CURIA (2006): C 277/06. EU Court Ruling (Third Chamber) 9. October 2008 “Directive 91/628/EEC – Export refunds – Protection of animals during transport – Transport of bovine animals by sea between two geographical points of the Community – Vehicle loaded onto a vessel without unloading the animals – 12 hour rest period – Obligation” in Case C 277/06 Reference for a preliminary ruling under Article 234 EC from the Finanzgericht Hamburg (Germany), made by decision of 2 June 2006, received at the Court on 26 June 2006, in the proceedings Interboves GmbH v Hauptzollamt Hamburg-Jonas, <http://curia.europa.eu/juris/document/document.jsf?text=&docid=69092&pageIndex=0&doclang=de&mode=lst&dir=&occ=first&part=1&cid=3138743> (last accessed 21.12.2020).

CURIA (2014): C-469/14. Judgement of the Court (Third Chamber) 28. July 2016 “Reference for a preliminary ruling — Agriculture — Regulation (EC) No 1/2005 — Protection of animals during transport — Long journeys — Annex I, Chapter V, point 1.4(d) — Journey times and animal resting periods during transport — Transport of cattle — Concept of ‘rest period of at least one hour’ — Possibility of interrupting the transport several times — Article 22 — Delays during transport — Regulation (EC) No 1234/2007 and Regulation (EU) No 817/2010 — Export refunds — Requirements of the welfare of live bovine animals during transport — Regulation No 817/2010 — Article 2(2) to (4) of Regulation No 817/2010 — Official veterinarian at the exit point — Report and entry on the document evidencing the exit of the animals from the customs territory of the European Union regarding compliance or non-compliance with the relevant provisions of Regulation No 1/2005 — Unsatisfactory result of the checks carried out — Article 5(1)(c) of Regulation No 817/2010 — Whether or not that entry is binding on the national authority competent for the export refund” in Case C 469/14, a request for a preliminary ruling under Article 267 TFEU from the Finanzgericht Hamburg (Finance Court, Hamburg, Germany), made by decision of 29 August 2014, received at the Court on 14 October 2014, in the proceedings Masterrind GmbH v Hauptzollamt Hamburg-Jonas.

DLG (2014) [German Agricultural Society]: Deutsche Landwirtschafts-Gesellschaft [German Agricultural Society], DLG-Leaflet 399, Wasserversorgung für Rinder [Water Supply for Cattle]: Bauliche, technische und bedarfsgerechte Lösungen [structural, technical and needs-based solutions] https://www.dlg.org/fileadmin/downloads/merkblaetter/dlg-merkblatt_399.pdf (last accessed 12.01.2020).

DROCHNER *et al.* (2008): Drochner, W., Jeroch, H., Simon, O., Fütterung der Kälber [Feeding Calves], in: Ernährung landwirtschaftlicher Nutztiere [Nutrition of farm livestock], Verlag Eugen Ulmer, Stuttgart.

EFSA (2004): Opinion of the Scientific Panel on Animal Health and Welfare on a request from the Commission related to the welfare of animals during transport EFSA Journal (2004) 44, 1-36, www.efsa.europa.eu/de/efsajournal/doc/44.pdf.

EFSA (2008): Project to develop Animal Welfare Risk Assessment Guidelines on Transport, <https://efsa.onlinelibrary.wiley.com/doi/abs/10.2903/sp.efsa.2009.EN-21> (last accessed 21.12.2020).

EFSA (2011): Scientific Opinion Concerning the Welfare of Animals during Transport, EFSA Journal 2011;9(1):1966, www.efsa.europa.eu/de/efsajournal/pub/1966.htm (last accessed 21.12.2020).

FIORE *et al.* (2010): Fiore, G., Hofherr, J., Natale, F., Stifter, E., Costanzi, C., On-farm Mortality in Cattle., Joint Research Centre, Institute for the Protection and Security of the Citizen, European Commission.

GAYER *et al.* (2016): Gayer, R., Rabitsch, A., Eberhardt, U., Tiertransporte [Animal Transports]: Rechtliche Grundlagen, Transportpraxis, mit Prüfungswissen Befähigungsnachweis Tiertransport [Legal bases, transportation practices, professionally examined and qualified animal transport], Verlag Eugen Ulmer, ISBN-13: 978-3800174218.

HERZOG *et al.* (2020): Herzog, K., Biedermann, M., Franzky, A., Zur Tierschutzproblematik beim Langstreckentransport von nicht abgesetzten Kälbern [On the animal welfare issues during long-distance transportation of unweaned calves], Berl Munch Tierarztl Wochenschr. [Berlin and Munich Veterinary Journal], Schlütersche Verl.-anst., DOI 10.2376/0005-9366-19023.

HILBK-KORTENBRUCK (2019): Hilbk-Kortenbruck, K., Die passende Anzahl an Jungrindern, Elite – Magazin für Milcherzeuger [The proper number of young cattle, Elite - Magazine for Milk Producers], <https://www.elite-magazin.de/news/nachrichten/die-richtige-anzahl-an-jungrindern-11532488.html> (last accessed 21.12.2020).

JOSERA-AGRAR (2019): Immunitätslücken beim Kalb - „Damit die Immunantwort vom ersten Lebenstag an stimmt!“ [Lack of immunity in calves - “So the immune reaction is right from birth!”], Josera Ratgeber <https://www.josera-agrar.de/ratgeber-themen/tiergesundheit/kaelberkrankheiten/immunitaetsluecken-beim-kalb-damit-die-immunantwort-vom-ersten-lebenstag-an-stimmt/> (last accessed 21.12.2020).

KAMPHUES (2014): Kälber [Calves]. in: Kamphues, J. M. Coenen, P. Wolf, A. Liesegang, K. Eder, K. Männer, C. Iben, Q. Zebeli, E. Kienzle and J. Zentek (eds.) *Supplemente zur Tierernährung für Studium und Praxis*, 12. edition [Animal Nutrition Supplements for Study and Practice], 12. edition Verlag M.&H. Schaper GmbH, Hanover, p. 261-269.

KHAN *et al.* (2011): Khan A., Weary D.M., von Keyserlingk M.A.G., Invited review: Effects of milk ration on solid feed intake, weaning, and performance in dairy heifers. *J. Dairy Sci.* 94: 1071–1081.

KNOWLES (1995): Knowles, T.G., A review of post transport mortality among younger calves. *Veterinary Record* 137,406–407.

LFL (2004): Bayerische Landesanstalt für Landwirtschaft [Bavarian State Research Centre for Agriculture], Untersuchungen zur Reduzierung des gegenseitigen Besaugens bei Kälbern in Gruppenhaltung [Research into preventing calves sucking one another when housed together], https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=31&cad=rja&uact=8&ved=2ahUKEwiY8OmntvfnAhVtoosKHSwUCfA4HhAWMAB6BAgHEAE&url=https%3A%2F%2Fwww.lfl.bayern.de%2Fmam%2Fcms07%2Fpublikationen%2Fdaten%2Fschriftenreihe%2Fp_19802.pdf&usq=A0vVaw1NzU46zbcWJnnXvd70nv4x (last accessed 1.3.2020).

LFL (2019): Bayerische Landesanstalt für Landwirtschaft [Bavarian State Research Centre for Agriculture], Gruber Tabelle zur Fütterung der Milchkühe, Zuchtrinder, Schafe, Ziegen, [“Gruber” table on feeding milk cows, breeding cattle, sheep, goats,] https://www.lfl.bayern.de/mam/cms07/publikationen/daten/informationen/gruber_tabelle_fuetterung_milchkuehe_zuchtrinder_schafe_ziegen_lfl-information.pdf (last accessed 21.12.2020).

LK-K (2019): Carinthian Chamber of Agriculture: Carinthian Breeding Cattle Auction, 5. December 2019 - St. Donat, <https://ktn.lko.at/ktn-zuchtrinderversteigerung-5-dezember-2019-st-donat+2500+3058789> (last accessed 13.01.2020).

MACCARI (2012): Maccari, P., Effekte unterschiedlicher Aufzucht Konzepte auf Gewichtsentwicklung, Gesundheitsstatus und metabolische Leitparameter von Holstein-Kälbern [Effects of various breeding techniques on the weight, health and metabolic control parameter of Holstein calves], Diss. Hanover.

MACCARI *et al.* (2015): Maccari, P., Wiedemann, S., Kunz, H.J., Piechotta, M., Sanftleben, P., Kaske, M., Effects of two different rearing protocols for Holstein bull calves in the first 3 weeks of life on health status, metabolism and subsequent performance. *J. Anim. Physiol. Anim. Nutr.* 99, 737-746.

MAISACK *et al.* (2016): Hirt, A., Maisack, C., Moritz, J., *Tierschutzgesetz – Kommentar* [Animal Protection Act - Commentary], Verlag Fritz Vahlen.

MAISACK and RABITSCH (2019b): Maisack, C., Rabitsch, A., Zur Auslegung der Begriffe „Beförderung“ und „Beförderungsdauer“ in der EU-Tiertransportverordnung (EG) Nr 1 / 2005 [Interpreting the terms “Journey” and “Journey length” in the EU Animal Transport Regulation (EC) Nr 1/2005], Amtstierärztlicher Dienst und Lebensmittelkontrolle [Official Veterinary Service and Food Control] 26, 200-206.

MAISACK and RABITSCH (2019a): Maisack, C., Rabitsch, A., Zur Auslegung der Begriffe »Beförderung« iSv Art 2 lit j bzw »Beförderungsdauer« iSv Anhang I Kapitel V Nr 1.2 bis 1.9 der EU-Tiertransportverordnung (EG) Nr 1 / 2005 [Interpreting the terms “Journey” per Art 2 lit j or “Journey length” per Annex I Chapter V Nr 1.2 to 1.9 of the EU Animal Transport Regulation (EC) Nr 1/2005], DOI: 10.25598 / tirup / 2019-4.

MAISACK and RABITSCH (2018): Maisack, C., Rabitsch, A., Tiertransporte – Verlängerung der Beförderungsdauer durch illegales „Sammelstellen-Hopping“ [Animal transports - extension of the journey by illegal hopping at assembly centres]. Amtstierärztlicher Dienst und Lebensmittelkontrolle [Official Veterinary Service and Food Control] 25, 92-95

MARAHRENS (2019): Marahrens, M., Zulassung von Transportfahrzeugen für den langen Transport von Kälbern [Approval of vehicles for long-distance transportation of calves]. TVT-News 2/2019, Tierärztliche Vereinigung für Tierschutz [Veterinary Association for Animal Protection].

MARAHRENS and SCHRADER, (2020): Animal Welfare during Transport: Technical requirements for long-distance transport of unweaned calves. Friedrich-Loeffler-Institut, German Federal Institute for Animal Health, Institute for Animal Welfare and Husbandry (ITT), Celle; https://www.openagrar.de/servlets/MCRFileNodeServlet/openagrar_derivate_00030363/Empfehlung-Tierschutz-beim-Transport_2020-03-12_en.pdf (last accessed 27.12.2020).

MARSCHNER *et al.* (2018): Länderarbeitsgruppe: Handbuch Tiertransporte [Federal state working group: Animal Transport Handbook], an implementation guide for COUNCIL REGULATION (EC) No 1/2005 of 22 December 2004 on the protection of animals during transport and related operations ... and for the Animal Protection Regulation of 11.2.2009. Version: May 2019: https://www.openagrar.de/servlets/MCRFileNodeServlet/openagrar_derivate_00022144/Handbuch-Tiertransporte-2019-05-inkl-Anlagen.pdf (last accessed 21.12.2020).

RABITSCH (2014): Rabitsch, A., Tiertransporte [Animal Transports]: Anspruch und Wirklichkeit [Requirement and Reality], Veterinärspiegel Verlag (schaefermuellerpublishing), ISBN: 978-3-86542-065-7, e-book ISBN: 978-3-86542-066-4.

RABITSCH (2016): Rabitsch, A., Befund und Gutachten bei Tiertransporten [Findings and Assessment of Animal Transports]. Wien Tierärztl Monat – Vet Med Austria 5, 283-304.

RABITSCH (2020): Rabitsch, A., Zum Transport nicht-entwöhnter Kälber [On the transportation of unweaned calves], Results, Executive Department of the State Commissioner for Animal Protection - Julia Stubenbord, Ministry of Rural Affairs and Consumer Protection, Baden-Württemberg, Germany; https://mlr.baden-wuerttemberg.de/fileadmin/redaktion/m-mlr/intern/dateien/PDFs/SLT/2020-05-10_Gutachten_Rabitsch_Transport_nicht_entwoehnter_Kaelber.pdf (last accessed 21.12.2020).

RABITSCH and WESSELY (2012): Rabitsch, A., Wessely, W., Zur Beachtung der Lenk- und Ruhezeiten der Fahrer im Zusammenhang mit Langstreckentransporten von Tieren 19, 99-109 [On the observation of driving and rest periods of drivers in connection with the long-distance transportation of animals].

RABITSCH and FRANZKY (2015): Rabitsch, A., Franzky, A., Unbestimmte Rechtsbegriffe und häufig gestellte Fragen zur Europäischen Tiertransportverordnung [Unclear legal terms and frequently asked questions concerning the EU Animal Transport Regulation]. Amtstierärztlicher Dienst und Lebensmittelkontrolle 22, 219-222 [Official Veterinary Service and Food Control].

RBW (2020): RBW-Auction Reports, <https://www.rind-bw.de/de/vermarktung/auktion/auktionsberichte/1125.html> (last accessed 1.3.2020).

ROSENBERGER (1978): Rosenberger, G. Krankheiten des Rindes [cattle diseases], Verlag Paul Parey, Berlin and Hamburg.

SCHEUNERT and TRAUTMANN (1976): Scheunert, A., Trautmann, A., Lehrbuch der Veterinär-Physiologie [Textbook of Veterinary Physiology], Verlag Paul Parey, Berlin und Hamburg.

TAMTÖGL *et al.* (2013): Tamtögl, M., Ofner-Schröck, E., Podstatzky, I.; Kälberhaltung am Biobetrieb [Keeping calves on organic farms], Bio-Institut der HBLFA Raumberg-Gumpenstein [Biomedical Institute of the Higher Federal Research and Education Centre - Raumberg-Gumpenstein], <https://www.raumberg-gumpenstein.at/cm4/de/component/jdownloads/finish/186-biologische-landwirtschaft-und-biodiversitaet-der-nutztiere/31088-foliensammlung-kaelberhaltung-am-biobetrieb.pdf> (last accessed 12.01.2020).

TRAUSCHKE (2008): Trauschke, K., Untersuchung zu Effekten von Menge und Zusammensetzung des Milchaustauschers in den ersten sieben Lebenswochen auf die Futtermittelaufnahme und metabolische Parameter von Kälbern bis zum Alter von acht Monaten [Investigation into the effects of the quantity and consistency of milk substitutes in the first seven weeks on the food consumption and metabolic parameters of calves up to eight months], Diss., Hanover.

WEYRAUCH (2015): Weyrauch, S., Umdenken in der Rinder- und Kälberfütterung [Rethinking the feeding of cattle and calves], <https://www.dr-susanne-weyrauch.de/gesundheits/allgemeine-grundlagen/kaelberfuetterung> (last accessed 21.12.2020).

ZAR (2019): Transport of calves using the example of a long-distance journey from Bergheim to Vic in Spain on 24 and 25.06.2019, https://zar.at/Aktuelles/Archiv/2019/20190904_Kurzfilm-zum-Thema-K%C3%A4lbertransport.html, <https://www.youtube.com/watch?v=eZXTdpgk7VA&feature=youtu.be> (last accessed 21.12.2020); ZAR = Zentrale Arbeitsgemeinschaft der Rinderzüchter Österreichs. [Central Working Group of Austrian Cattle Breeders] zar.at = Rinderzucht Austria [Cattle breeding Austria].

Abbreviations

Ann.	Annex
Art.	Article
cf.	Compare
Chap.	Chapter
EC	European Community
EFSA	European Food Safety Agency
EN	English
EU-ATR	Animal Transport Regulation (EC) Nr. 1/2005
FVO	Food and Veterinary Office, [Lebensmittel- und Veterinäramt]
leg. cit.	cited law

loc. cit. loco citato
Reg. Regulation
SANCO Directorate-General Health and Consumer Protection (now SANTÉ)

Addresses of the authors

Dr. Alexander RABITSCH
Veterinary Practice Rosental
Waldstraße 13
A-9170 Ferlach, Austria
www.rabitsch-vet.at
animalwelfare@rabitsch-vet.at

Dr. Michael MARAHRENS Dipl.Ing.agr.
Chair of the transport working group of
the Tierärztliche Vereinigung für Tierschutz
[Veterinary Association for Animal Protection] (TVT)
Bramscher Allee 5
D-49565 Bramsche
www.tierschutz-tvt.de/
marahrens@tierschutz-tvt.de

Animal Welfare.
Worldwide.

