

## POSITION PAPER

# What to do with surplus dairy calves? Welfare, economic, and ethical considerations

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## 1 Description of the problem

The major aim of dairy farming is the production of milk, with the sale of calves and cows of much lesser importance. Thus, it is an enterprise centred on female animals. However, the typical male:female sex ratio of calves born is 50:50, which generates a large number of male calves that are not required on the dairy farms. Additionally, it is estimated that sufficient numbers of replacement females can be produced from 60% of the lactating herd (de Vries et al., 2008), which means that some of the female calves born on the farm are also surplus to requirements. What to do with these surplus calves, particularly the large number of male calves, has always been a problem in dairying.

There are a number of possible routes for these calves. They may be euthanised on the farm they were born on. They may be reared on that farm for a few days and then transported for slaughter at an abattoir for hides, pet food, or rennet. These calves are known as ‘bobby’ calves in many countries. Calves may also be reared for veal or beef. Calves destined for veal production are transported to rearer units at approximately eight days of age and slaughtered at about 8 to 10 months of age. Calves reared for beef are typically transported to specialised farms and reared until they reach mature slaughter weight at 18 months or more.

The route for each calf varies between countries depending on the dairying system, calf price, and the consumer

preference for veal or beef. In countries where veal is produced, such as the Netherlands, France, and Italy, all surplus calves are used in veal production (Sans and Fontguyon, 2009). However, where there is a viable specialist beef industry and consumers prefer beef to veal, such as in Ireland and the UK, dairy calves may enter the beef rearer system. However, the demand for dairy-bred calves in the beef-rearer market fluctuates according to the number of calves available and the capacity of the beef-rearer farms. For instance, in countries with pasture-based dairying systems, such as Ireland, New Zealand, and Australia, calving occurs almost entirely in the spring. This means that there is a glut of calves at this time, which is more than the beef rearing systems can cope with. Calves may be euthanised on the origin farm soon after birth or sent for slaughter as bobby calves. At other times of the year, they may enter the beef rearing systems. However, in countries such as Sweden and Denmark, with low numbers of specialised beef breed animals, good prices are paid for calves from the dairy herd reared for beef on specialised farms (FVE, 2017).

There are a number of standpoints to consider when trying to decide what is the “right” thing to do with these calves. Firstly, there is the ethical viewpoint that encompasses the societal or personal moral values governing actions and outcomes. There is also the issue of animal welfare to consider. Animal welfare involves the health, basic functioning, and emotional states of animals and their ability to live natural

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lives (Fraser, 2008). There is an important consideration as to whether the animal can achieve “a life worth living” or even “a good life” (FAWC, 2009). There is also the issue of economic sustainability for the farm. The aim of this position paper is to consider each outcome with respect to these standpoints and discuss new options and developments.

### 1.1 Euthanised on the farm of birth

A large number of male calves are killed soon after birth on the farm they were born on (the origin farm). Statistics are not always available from all countries, but it suggests that up to 22% of dairy bull calves in the UK (AHDB, 2017) may be euthanised on the origin farm soon after birth. If this is done by a veterinarian or other trained person, and humane methods are used, the welfare of the calf will not be compromised (FVE, 2017). However, if not, slaughter by ill-equipped or fatigued farm staff can have serious implications for calf welfare.

On ethical grounds, however, the creation of unwanted lives in dairying and the ending of lives after a few days are serious concerns that are frequently debated in the media. In terms of economic sustainability, the primary goal of having the cow lactating is achieved via the birth of the calf, and the calf itself is a secondary product. If a good price is not being offered for the calf, early euthanasia may be the only viable option. However, farmers do not like slaughtering calves, so finding a viable market for them is a better option.

### 1.2 Slaughtered under ten days of age (bobby calves)

As they are low-value animals, they may also not be given good quality housing and treatment on the origin farm during their time there. There are major welfare issues with the transportation, handling, and slaughter of very young calves. Many countries with a bobby calf industry have regulations governing the condition of the animal before transportation and the age at which it can be transported. For instance, in New Zealand, calves must be at least four days of age before they can be transported to the abattoir. Australian regulations require the calf to be five days old. In the EU, calves less than ten days old may only be transported over distances less than 100 km. All countries require calves to be deemed fit for travel. While the mortality rate for the transport of bobby calves is low (0.1 to 0.68%; MPI, 2017), the transportation and the withholding of feed before transport is likely to be very stressful for these very young animals. A study in New Zealand showed that the calves suffer from dehydration and show signs of scour and respiratory disease (Boulton et al., 2018). This indicates that there are major welfare issues with this use of surplus calves, likely because of the impact of food deprivation and transportation on very young animals.

Economically, the calves have very little value, but the sale of bobby calves is likely to be more cost-effective than euthanasia. Strict legislation could be put in place to safeguard their welfare, but this use of very young calves is unlikely ever to become entirely publicly accepted for ethical reasons, with regular media and public outcries. Again, finding a viable market that allows these calves to be reared to an older age is preferable, as long as welfare is considered.

### 1.3 Veal calves

Rearing calves for veal or beef production is a viable option, which may gain consumer acceptance if done in a welfare-friendly manner. There are two major types of veal produced in Europe: white veal and pink (or rosé) veal. To produce white veal, the calf is fed predominantly a liquid milk replacer diet and slaughtered at 20 to 26 weeks of age. Calves for pink veal production are fed milk replacer until 8 to 9 weeks of age and then weaned onto a diet that promotes rumen development, which is more typical for a growing calf. However, there are still significant welfare problems associated with the rearing of calves for white veal. The feeding of a predominantly milk diet causes anaemia and other digestive problems associated with feeding milk diet to an animal whose gut should be processing solid feed (EFSA, 2012). EFSA therefore recommends that some solid feed is provided for these calves beyond two weeks of age to allow for the development of healthy rumen function.

There are also issues around the quality of housing provided for these calves. Some producers still house single calves in pens for one to many weeks after their birth. There is growing research showing that isolation is detrimental to the welfare and behavioural development of the calf. When the calves are group-housed, they may not get enough space to sufficiently rest if stocking densities are high (Faerevik et al., 2008). Flooring is also an issue, with concrete and slatted floors causing injuries to the legs (Brscic et al., 2012). In terms of animal welfare, there are clearly concerns about this rearing system, but a good standard of calf welfare can be ensured with good housing, nutrition, and management.

In terms of economics, rearing calves to provide a human food source is a viable use of a “by-product” of the dairy industry. Ethically, this could be seen as a societal good, as long as the animals at least live “a life worth living”.

### 1.4 Rearing surplus dairy calves for beef

Increasing numbers of male and female pure-bred dairy calves and dairy-cross calves are being reared for beef in the UK and Ireland. At least half of the beef produced in England is a product of the dairy herd (AHDB, 2017). Additionally, more calves in traditional veal production areas are being reared for beef than previously (Sans and Fontguyon, 2009). In the UK and Ireland, this form of beef production is being coordinated by specialist companies which have contracts to supply beef to retailers and supermarkets. In this case, calves are procured from dairy farms at 1 to 4 weeks of age and transported to specialist rearer units. The calves may be moved directly from the dairy farm to the rearer if an agreement between the farms exists, or, more typically, they are transported to a collection centre, where batches of calves of a similar age are assembled and then transferred to the rearer units. The calves are initially fed milk replacer and then weaned onto a solid diet. The calves may stay on these units until slaughter or may be transferred at 3 to 6 months to a finishing unit. These calves are affected by a number of health and welfare issues. Firstly, because surplus dairy calves have a low monetary value, the dairy farmer has no vested interest in ensuring that the surplus calves is in prime

health and condition even when they are sold to rearer units. The calves may be transported over long distances (between Ireland and Spain, for instance), so it is important to ensure adequate rest, feed, and water during the period of transport. Calves from different farms and from different countries may be mixed together. Calves may then be exposed to diseases to which they have no immunity. Being transported is stressful for calves, which makes them more susceptible to disease. The outcome is that there is often high occurrence of disease in the days after arrival at the rearer unit (Taylor et al., 2010). While the rearing of calves for beef is an ethically good way of utilising surplus calves and an efficient way of producing beef, tight regulations surrounding the transportation and care of the animals and further research into how to limit disease are required.

## 2 Possible solutions

### 2.1 Better breeding: sexed semen and choice of sires

The first action that could be taken is to reduce the number of male calves born. This can be achieved through the use of sexed semen. The use of sexed semen in a herd can mean that 90% of the calves born are female (Holden and Butler, 2018). In the early years of the use of sexed semen, conception rates were low (de Vries et al., 2008). However, in recent years, new technologies for producing sexed semen have substantially improved its fertility (Vishwanath and Moreno, 2018), which should make its use more widespread. Sexed semen is not always available for all bulls, particularly those of high genetic merit. The use of sexed semen will not entirely eliminate the problem of surplus calves, as other strategies are needed to reduce the numbers of unwanted females, but would go a long way to reducing the numbers of unwanted males.

The use of beef sires, such as Wagyu or Aberdeen Angus, in dairy herds would produce both male and female calves that have a higher value for the beef and veal markets (FVE, 2017). Beef-cross calves grow faster and produce a carcass that is more acceptable for the veal and beef market (Coleman et al., 2016).

### 2.2 Consumer perception and consumer choice

There is a major societal trend toward the use of convenience foods (Kearney, 2010). There is also a greater call for good standards of animal welfare in veal and beef production (EC, 2019). Eating quality beef from dairy-beef calves is equal to that of pure-bred beef animals, although the visual aspects of the meat (yellow fat in Jersey animals, for instance) may be poorer than those of specialist beef breeds (Coleman et al., 2016). However, if the meat from these animals was used in processed food, this would overcome the problem. If beef products that use veal or calves from dairy-bred sources could be manufactured, this would add value to the surplus calves. This would likely improve their care to a higher standard (Sans and Fontguyon, 2009) and would also mean that fewer would be euthanised on origin farms.

If data on the condition of calves on arrival at the abattoir was collected, it could provide valuable feedback to the

hauler and farmers to drive improvement. Arguably, the drive for cheap food results in certain classes of animal, such as male calves, having a low value. Educating consumers on animal welfare may result in greater respect for the animal.

### 2.3 Keeping calves with cows

A system that is comparatively uncommon, but is praised for its high ethical and animal welfare standards, is the practice of keeping calves with their mothers. In this system, the calves are kept with the dam for 3 to 5 months after birth, and then they are weaned. This system allows for the development of a strong cow-calf bond, which has nutritional and behavioural benefits for the calf. Calves reared with their dams have up to three times higher growth rates in the 14 days after birth compared to calves reared without the dam (Flower and Weary, 2001). However, this may be partly due to the practice of feeding separated calves a restricted amount of milk to encourage the consumption of solid feed. Because of the high level of milk intake, dam-reared calves experience a more pronounced growth check once weaned (Fröberg and Lidfors, 2009; Roth et al., 2009), which is also seen in conventionally reared calves on a high milk allowance. Calves reared with their dams show better social response to threats from older cows in situations of aggression (Buchli et al., 2017), suggesting that the system benefits the development of social behaviour. Appropriate social strategies are important in modern dairy farming as cows are often kept in large groups, in indoor spaces which contrasts with the living conditions of their wild counterparts. Dam-reared calves are also more likely to eat novel food types (Costa et al., 2014), engage in more positive behaviours such as social play (e.g. Wagner et al., 2013), and are better at changing learnt patterns of behaviour (Meagher et al., 2015).

There has been some concern about keeping immunologically naive calves with adult cows. The adult cows may be carrying disease, but not showing symptoms, and pass the disease to the calves. A review suggested that there are some studies showing higher levels of disease and some showing no difference (Beaver et al., 2019). This suggests that careful health management is needed, but that disease challenges can be overcome. The high growth rates suggest that beef production can be a viable outcome of cow-calf systems. The product will appeal to consumers with high ethical standards. Little economic analysis of these systems has been carried out, and this is needed to determine whether beef production from these systems is economically viable. However, raising calves in this way is arguably the most ethical and welfare-friendly way of rearing calves for meat production.

## 3 Conclusions

The large numbers of surplus calves, particularly male calves, killed soon after birth on dairy farms continues to be a major problem. The public is opposed to this practice for ethical reasons, and it therefore poses a major reputational risk to the dairy industry. There are a number of ways to address this problem. Firstly, the use of sexed semen could markedly reduce the number of male calves produced. The use

of beef sires in the dairy herd may also increase the demand for and the value of calves from the dairy herd. Secondly, we can find ways to rear these calves for meat production in humane and ethical farming systems. It is unlikely that the public will ever entirely accept the transportation of very young calves for slaughter, so rearing systems of high standards should be promoted. The increasing number of dairy calves being reared for beef is encouraging, but disease and transportation stress issues need to be dealt with. The minority practice of keeping calves with cows has high ethical and welfare value. Full economic analyses are necessary to determine how this system can be adopted more widely.

## REFERENCES

- AHDB (2017) Beef production from the dairy herd [online]. Agriculture and Horticulture Development Board 2017. Retrieved from <<https://beef-andlamb.ahdb.org.uk/wp-content/uploads/2017/08/Beef-production-from-the-dairy-herd.pdf>> [at 24 June 2020]
- Beaver A, Meagher RK, von Keyserlingk MAG, Weary DM (2019) A systematic review of the effects of early separation on dairy cow and calf health. *J Dairy Sci* 102(7):5784–5810, doi:10.3168/jds.2018-15603
- Boulton A, Kells N, Beausoleil N, Cogger N, Johnson C, Palmer A, Laven R, O'Connor C, Webster J (2018) Bobby calf welfare across the supply chain – final report for year 1. MPI Discussion Technical Paper:2018/44, Wellington: New Zealand Ministry for Primary Industries, 224 p. Retrieved from <<https://www.agriculture.govt.nz/dmsdocument/30005/direct>> [at 24 June 2020]
- Brcsic M, Leruste H, Heutinck LFM, Bokkers EAM, Wolthuis-Fillerup M, Stockhofe N, Gottardo F, Lensink BJ, Cozzi G, Van Reenen CG (2012) Prevalence of respiratory disorders in veal calves and potential risk factors. *J Dairy Sci* 95(5):2753–2764, doi:10.3168/jds.2011-4699
- Buchli C, Raselli A, Bruckmaier R, Hillmann E (2017) Contact with cows during the young age increases social competence and lowers the cardiac stress reaction in dairy calves. *Appl Anim Behav Sci* 187:1–7, doi:10.1016/j.applanim.2016.12.002
- Coleman LW, Hickson RE, Schreurs NM, Martin NP, Kenyon PR, Lopez-Villalobos N, Morris ST (2016) Carcass characteristics and meat quality of Hereford sired steers born to beef-cross-dairy and Angus breeding cows. *Meat Sci* 121:403–408, doi:10.1016/j.meatsci.2016.07.011
- Costa JHC, Daros RR, von Keyserlingk MAG, Weary DM (2014) Complex social housing reduces food neophobia in dairy calves. *J Dairy Sci* 97(12):7804–7810, doi:10.3168/jds.2014-8392
- de Vries A, Overton M, Fetrow F, Leslie K, Elcker S, Rogers G (2008) Exploring the impact of sexed semen on the structure of the dairy industry. *J Dairy Sci* 91(2): 847–856, doi:10.3168/jds.2007-0536
- Donovan GA, Badinga L, Collier RJ, Wilcox CJ, Braun RK (1986) Factors influencing passive transfer in dairy calves. *J Dairy Sci* 69(3): 754–759, doi:10.3168/jds.S0022-0302(86)80464-7
- EC (2019) EU agricultural outlook for markets and income, 2019–2030 [online]. European Commission, Brussels: DG Agriculture and Rural Development. Retrieved from <[https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/agricultural-outlook-2019-report\\_en.pdf](https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/agricultural-outlook-2019-report_en.pdf)> [at 24 June 2020]
- EFSA Panel on Animal Health and Welfare (AHAW) (2012) Scientific opinion on the welfare of cattle kept for beef production and the welfare in intensive calf farming systems. *EFSA Journal* 10(5):2669, doi:10.2903/j.efs.2012.2669
- Faerevik G, Tjentland K, Lovik S, Andersen IL, Bøe KE (2008) Resting pattern and social behaviour of dairy calves housed in pens with different sized lying areas. *Appl Anim Behav Sci* 114(1–2):54–64, doi:10.1016/j.applanim.2008.01.002
- FAWC (2009) Farm animal welfare in Great Britain: past, present and future. London: Farm Animal Welfare Council, 70 p
- Flower FC, Weary DM (2001) Effects of early separation on the dairy cow and calf: 2. Separation at 1 day and 2 weeks after birth. *Appl Anim Behav Sci* 70(4):275–284, doi:10.1016/S0168-1591(00)00164-7
- Fraser D (2008) Understanding animal welfare. *Acta Vet Scand* 50:S1, doi:10.1186/1751-0147-50-S1-S1
- Fröberg S, Lidfors L (2009) Behaviour of dairy calves suckling the dam in a barn with automatic milking or being fed milk substitute from an automatic feeder in a group pen. *Appl Anim Behav Sci* 117(3–4):150–158, doi:10.1016/j.applanim.2008.12.015
- FVE (2017) FVE position on killing unwanted offspring in farm animal production [online]. Brussels: Federation of Veterinarians of Europe (AISBL), FVE/doc/045, 5 p. Retrieved from <[https://www.fve.org/cms/wp-content/uploads/045-Surplus-animals\\_adopted.pdf](https://www.fve.org/cms/wp-content/uploads/045-Surplus-animals_adopted.pdf)> [at 29 June 2020]
- Grøndahl AM, Skancke EM, Mejdell CM, Jansen JH (2007) Growth rate, health and welfare in a dairy herd with natural suckling until 6–8 weeks of age: a case report. *Acta Vet Scand* 49(1):16, doi:10.1186/1751-0147-49-16
- Holden SA, Butler ST (2018) Review: Applications and benefits of sexed semen in dairy and beef herds. *Animal* 12(S1):s97–s103, doi:10.1017/S1751731118000721
- Meagher RK, Daros RR, Costa JHC, von Keyserlingk MAG, Hötzel MJ, Weary DM (2015) Effects of degree and timing of social housing on reversal learning and response to novel objects in dairy calves. *PLoS ONE* 10(8):e0132828, doi:10.1371/journal.pone.0132828
- MPI (2017) Mortality rates in bobby calves 2008–2016. MPI Information Paper:2017/01, Wellington: New Zealand Ministry for Primary Industries, 22 p. Retrieved from <<https://www.mpi.govt.nz/dmsdocument/16501/direct>> [at 24 June 2020]
- Roth BA, Barth K, Gyax L, Hillmann E (2009) Influence of artificial vs. mother-bonded rearing on sucking behaviour, health and weight gain in calves. *Appl Anim Behav Sci* 119(3–4):143–150, doi:10.1016/j.applanim.2009.03.004
- Sans P, de Fontguyon G (2009) Veal calf industry economics [online]. *Rev Méd Vét-Toulouse* 160(8–9):420–424. Retrieved from <<https://hal.inrae.fr/hal-02658908/document>> [at 24 June 2020]
- Taylor JD, Fulton RW, Lehenbauer TW, Step DL, Confer AW (2010) The epidemiology of bovine respiratory disease: What is the evidence for predisposing factors? [online] *Can Vet J* 51(10):1095–1102. Retrieved from <<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2942046/>> [at 29 June 2020]
- Vishwanath R, Moreno JF (2018) Review: Semen sexing – current state of the art with emphasis on bovine species. *Animal* 12(S1):s85–s96, doi:10.1017/S1751731118000496
- Wagner K, Barth K, Hillmann E, Palme R, Futschik A, Waiblinger S (2013) Mother rearing of dairy calves: Reactions to isolation and to confrontation with an unfamiliar conspecific in a new environment. *Appl Anim Behav Sci* 147(1–2):43–54, doi:10.1016/j.applanim.2013.04.010

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