COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 15.12.1995
COM(95) 711 final

COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

on the welfare of calves

PREFACE

Article 6 of Council Directive 91/629/EEC laying down minimum standards for the protection of calves[1] states in its first paragraph:

"Not later than 1 October 1997, the Commission shall submit to the Council a report, drawn up on the basis of an opinion from the Scientific Veterinary Committee, on the intensive farming system(s) which comply with the requirements of the well-being of calves from the pathological, zootechnical, physiological and behavioural points of view, as well as the socio-economic implications of different systems, together with proposals relevant to the report's conclusions."

The Council of Agriculture Ministers, in its meeting of January 1995, called on the Commission to make this report as soon as possible.

At the request of the Commission, the Scientific Veterinary Committee (Animal Welfare Section) established an expert working group to draft a report under the Chairmanship of Professor D.M. Broom, Department of Clinical Veterinary Medicine, Cambridge University. The members of the working group, selected on the basis of their scientific expertise in the matter and not as representatives of their countries, were:

Professor D.M. Broom, Department of Clinical Veterinary Medicine, University of Cambridge, UK, assisted by Mr R. Kirkden of the same department;

Dr H.J. Blokhuis, Institute for Animal Science and Health, Zeist, NL;

Dr E. Canali, Istituto di Zootecnica Veterinaria, Università di Milano, IT;

Prof. A.A. Dijkhuizen, Wageningen Agricultural University, NL;

Dr R. Fallon, Grange Research Centre, IRL;

Dr P. Le Neindre, Institut National de la Recherche Agronomique, Theix, FR;

Prof. H. Saloniemi, College of Veterinary Medicine, Helsinki, FI;

Prof. A.J.F. Webster, Dept. of Clinical Veterinary Science, Bristol University, UK;

Dr P. Van Houwelingen, European Commission. (Secretary)

The working group has presented its draft report to the Scientific Veterinary Committee. On the basis of the draft report of the working group, the Committee has elaborated this opinion and presented it to the Commission. This opinion will be sent separately to the European Parliament and the Council. This Communication draws upon the report of the Scientific Veterinary Committee.

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(1) OJ N° L 340, 11.12.1991, p. 28

INTRODUCTION

Welfare.

Animals have evolved physiological and behavioural methods to cope with the various difficulties which they encounter during their lives. Since all animals have evolved so that each species is adapted in a particular way to a particular environment, any definition and assessment of welfare must take account of the environment, physiology and behaviour specific to the animals under consideration. The welfare of an animal is a condition intrinsic to the animal; it is not a set of values transferred to the animal by humans.

In the course of their lives, animals may encounter difficulties ranging from the trivial to the life-threatening. Individual animals cope with these difficulties with varying success, depending on their environmental, physiological and behavioural circumstances. The outcome ranges from the best result, which is no adverse effect, to the worst, which is death. Between these extremes, the welfare of the animal can vary from very good to very poor.

The above considerations result in the following definition of welfare:

the welfare of an individual is its state as regards its attempts to cope with its environment.

Needs

The term "needs" is used in this Communication to describe both requirements which are essential for life and requirements which are not essential for life but which are of significant importance to the animal. It does not include preferences which are of little importance to the animal.

Farm animals have an array of needs similar to those of their wild ancestors, although some needs have been modified in the course of domestication. It is obvious that fundamental requirements, such as those for food, drink and shelter, are unchanged from wild to domestic species, but it may be less obvious that the impetus in wild ancestors to perform certain behaviours associated with reproduction, and with obtaining food, drink and shelter, is still present in domestic animals.

Like welfare, a need is an intrinsic characteristic of an individual. It is defined thus:

A need is a requirement, which is a consequence of the biology of the animal, to obtain a particular resource or respond to a particular environmental or bodily stimulus.

MEASUREMENTS OF WELFARE.

Welfare can be assessed by measurements of **behaviour, physiology, health** and **production**. Although in some cases a single measurement may give an indication of the state of an animal, it is usually necessary to evaluate several indicators to obtain a clear assessment.

Behaviour

Preference tests present the animal with choices, for example between different foods or housing systems. The strength of a preference determines whether it can be regarded as a need; this can be assessed by monitoring the amount of abnormal behaviour and physiological stress which occurs when the preference is denied, and by measuring how hard the animal is prepared to work to achieve it.

Aversion tests measure the strength of an animal's aversion to a stimulus. They are of some use in measuring the effects of housing systems on animals but their results may be confounded by learning effects.

Deprivation and motivation. Animals remain motivated to perform certain behaviours even if they are prevented from doing so by their physical environment. This results in abnormal behaviour patterns in which the animal performs the motivated behaviour in an altered form or an unusual context. The strength of motivation may be assessed by measuring how much the animal is prepared to "pay", in energy or time, to perform the behaviour.

Stereotypies are repeated, relatively invariate sequences of movements which have no obvious purpose. They develop when the animal is severely or chronically frustrated, indicating that it is having difficulty in coping and its welfare is poor.

Aspects of the behaviour of calves which have been investigated using some or all of the above indicators are: sucking, cross-sucking, licking, self-licking, oral stereotypies, posture, locomotion, exploration reactivity and social behaviour.

Physiology

Cortisol/corticosterone production occurs in diverse difficult situations and is useful in welfare assessment. As these hormones are also produced in situations such as courtship and mating, which are not harmful to the animal, it is essential to obtain other information about the state of the animal when they are being used to assess welfare.

Heart rate can be used to assess the effects of short-term problems, in conjunction with other measurements of behaviour.

Immune response. Several measurements of the activity of the immune system can be used to measure stress.

All of the above measures have been used in the assessment of calf welfare.

Health

Mortality rate is a crude but unequivocal indicator of poor welfare. Published values for calves from birth to 6 months range from 1% to over 30%. In calves from 1 to 7 days of age the commonest cause of death is septicaemia due to poor hygiene or inadequate colostrum intake. In older calves, the main causes are diarrhoea and pneumonia which can be attributed indirectly and in part to conditions of feeding and housing. An inverse correlation has been found between mortality and the cash value of calves, indicating that mortality rates can be minimised if the financial incentive is great enough.

Morbidity rates are also an indicator of the welfare status of a herd, but are less precise than mortality rates. The major diseases of calves are: diarrhoea, pneumonia, rumen disorders, abomasal damage, anaemia, navel infection and arthritis.

Performance

Care must be taken in using performance as an indicator of welfare since although a substantial reduction in the growth rate of a calf would indicate poor welfare, the reverse does not indicate that welfare is good. Young mammals can continue to grow rapidly when their welfare is poor.

THE NEEDS OF CALVES

Calves need *colostrum*, to provide immune protection during the first weeks of life, and they need the nutrients provided by *milk or milk substitutes*. They need to show *searching, licking and sucking* behaviour in order to obtain colostrum and milk; deprivation of a teat results in re-directed sucking of other objects or other calves and can lead to oral stereotypies.

Rest and *sleep* are essential for calves. When resting and sleeping they adopt certain postures, including stretching their legs so that the width of the space occupied by the calf is equal to its height at the withers when standing.

Exploratory and escape behaviour is shown by all calves, and inability to perform these behaviours may contribute to the high incidence of oral stereotypies in confined calves. Their stress response to handling and transport is substantially greater if they have been kept in individual pens rather than in groups, and have had little previous human contact. Frequent gentle contact has been shown to be beneficial to calves.

Exercise is necessary for normal bone and muscle development; after 6 months in a crate many calves have severe locomotor problems.

Calves need to eat *roughage* and to *ruminate*. The extent of abnormal behaviour in calves fed only milk is very substantial and the welfare of calves older than 4 weeks fed on such a diet is not good.

Calves need to *avoid disease and parasitism*, and they have evolved a number of

behavioural mechanisms for the maintenance of good health, including grooming and foraging. Excessive grooming in the form of self-licking, seen frequently in crate-housed calves, may be a result of inability to groom the hind part of the body increasing the desire to groom those parts which can be reached.

Calves need *contact with their mothers*, or stimuli providing comfort similar to that obtained from their mothers. Although they can survive early separation, there are clear advantages in terms of health and vigour in calves which are left with their mother.

Calves need *social interaction* with other cattle. Group-housed calves show little competitive behaviour which could be considered harmful, and they obtain clear benefits from social facilitation. Calves housed individually make strenuous efforts to see and touch other calves.

CALF REARING SYSTEMS

The "natural" situation

Neither the domestication of cattle nor breeding programmes have altered the biological relationship between cow and calf. Under farming conditions, the system nearest to the natural situation is that of suckler beef production in which the calf remains with its mother, usually at pasture, for most of its life. Under these conditions, calves suckle for at least 8 months and normally eat little solid food until 2 to 3 months of age, although rumination begins within the first month of life.

As long as these calves are provided with suitable pasture or concentrate food, suitable shelter when necessary and are given appropriate veterinary care, there are no major welfare problems intrinsic to this system.

However, calves produced as a by-product of the dairy industry cannot be reared in this way and must be separated from their mothers at an early age. Two main rearing systems in which calves are isolated from their mothers have been developed:

* the veal calf system, in which the consumption of solid food is minimized, and

* the early weaned system, in which the consumption of solid food is maximised.

The veal calf system

Approximately 30 million calves are born each year in the Community, and about 6 million of these are reared for veal production. The main veal-producing Member States are France, Netherlands and Italy, and the main veal-consuming Member States are France, Italy and Germany.

Meat colour

The objective of this system is to obtain pale pink meat (often incorrectly referred to as

"white meat") with a low content of the muscle iron pigment myoglobin. For historical reasons, the pale colour is believed by some consumers to indicate high quality. This belief stems from the very ancient tradition, referred to in the bible, that a young calf feeding only on its mother's milk gave the most tender meat; the slaughter of such an animal was an extravagant luxury reserved for special occasions.

In fact, the colour of veal presented to the consumer depends on a number of factors, including the iron status of the calf at birth, the diet, the methods of rearing and transport and the treatment of the animal and the carcase at slaughter. For example, a calf with a low myoglobin content may, if subject to ill-treatment during transport and before slaughter, produce darker meat than one with a higher myoglobin content whose carcase has been electrically stimulated after slaughter to hasten the onset of rigor mortis.

Even the relationship between dietary iron content, blood haemoglobin level and muscle myoglobin is a complex one. It is, however, possible to rear a calf with a haemoglobin level high enough to maintain good health and vigour, and which yields meat pale enough to command the highest quality grading for veal.

Diet

As calves are usually born with a low reserve of iron, and the iron content of milk is low, calves fed only on milk have very low haemoglobin levels. If the haemoglobin level falls to the point where the calf becomes clinically anaemic, it ceases to thrive and is greatly at risk of dying from pneumonia or diarrhoea. For this reason, the practice is developing of giving calves an injection of iron shortly after birth, and possibly repeating it after two or three weeks, to achieve a high haemoglobin level in the initial growth period when the calf is most at risk of contracting a potentially fatal disease. On a milk-only diet, the level of haemoglobin, and consequently myoglobin, will decrease over the fattening period to a low level at the time of slaughter. This practice has become feasible with the increasing length of the fattening period which has developed over the last decade in Europe.

The lengthening of the fattening period for veal calves has also led, to a limited extent, to the introduction of foodstuffs other than milk or milk substitutes into the diet. It is unacceptable from the point of view of welfare to maintain a calf in the pre-ruminant stage beyond the age of three months. In order to allow the normal development of the rumen, roughage must be added to the diet. Roughage is food high in cellulose and related compounds and of low digestibility, i.e. it is high in fibre. Roughage for calves should contain "long" fibre (more than 10mm in length) to provide sufficient mechanical stimulation to induce rumination.

The inclusion in the diet of roughage with a low iron content does not affect the colour of the meat, and the technique was used in France in the 1980s. However, due to slight extra costs with no extra profit, it has almost disappeared in that country. It is still carried out in the Netherlands.

Housing

Veal calves are gathered from dairy farms at about 1 to 3 weeks of age. They may have been deprived of colostrum and may pass through markets or collection centres, coming

into contact with large numbers of calves from different farms, and be highly stressed. Under these conditions of immune deficiency and exposure to multiple sources of disease, there is a high risk of spreading pneumonic and diarrhoeic pathogens such as salmonella among the veal population.

For this reason, veal calves should be kept in individual pens, under close supervision, for the first four to six weeks after arrival at the fattening unit. In France and Italy, most veal calves are kept for the whole fattening period in individual crates with solid sides, slatted floors and no bedding. In Italy, calves are sometimes tethered by the neck for the whole fattening period. This degree of confinement or tethering is not necessary for health reasons and is undesirable for welfare reasons.

Group housing systems are also used for veal calves. Systems with large groups on straw, with automatic feeders, have been developed in Switzerland, Germany, UK and France over the last 15 years, but in France the use of this system has declined due to management problems and uneconomical results. Electronically controlled feeders, which allow each calf a measured diet, have been developed but they are relatively expensive and are not common in veal production.

A system of group housing on slatted floors, with calves receiving milk twice daily from a bucket, has been in use for some years, particularly in the Netherlands. The calves usually also receive limited amounts of roughage in the form of straw pellets. The proportion of calves kept in this system in the Netherlands has increased from 4.7% in 1985 to 22.9% in 1995.

Early weaned calves

The main objective with early weaned calves, which are destined for beef production or as replacement breeding stock, is to develop their ability to ingest and digest solid feed as soon as possible. They are weaned from as early as 4 weeks, by which time their digestive tracts have started to develop adult characteristics, but they are not able to digest a full range of nutrients before about 3 months of age.

Diet

Feeding regimes for these calves vary, but a typical schedule would be to feed colostrum and whole milk for a week, then 20 to 25 kg of milk replacer powder over a six to eight week period with concentrates available *ad libitum* from 7 days of age. The calves would be eating about 1 kg of concentrate feed daily before weaning. A daily allowance of long fibre roughage (hay or straw) is provided to stimulate rumen development.

Housing

For the health reasons explained in relation to veal calves, early weaned calves are usually penned individually for the first one or two months of life. After that they are usually kept in groups indoors or at pasture.

There are many different combinations of housing and feeding systems used for early weaned calves. They may be kept at pasture, in group pens of varying size or in barns,

with or without bedding, given milk *ad libitum* or on a restricted basis, from buckets, teats or automatic feeders and fed a wide variety of concentrate diets.

No attempts are made to restrict their iron intake, prevent the development of the rumen or restrict their natural movements.

COMPARISON OF DIFFERENT SYSTEMS

A comparison of the different systems of calf rearing on the basis of the scientific studies referred to in their report led the Scientific Veterinary Committee to the following conclusions.

General management

1. Housing and management systems for calves should be designed so that the needs of the animals are satisfied and the welfare of the animals is good.

2. A variety of housing and management methods for calves intended as dairy herd replacers, beef animals and veal animals are in use and these methods vary in their effects on calf welfare. The best conditions for rearing young calves involve leaving the calf with the mother in a circumstance where the calf can suck and can subsequently graze and interact with other calves.

3. It is important that the calf should receive sufficient colostrum within the first six hours of life and as soon as possible after birth, in conditions which facilitate antibody absorption, preferably by sucking from the mother, so as to ensure adequate immunoglobulin levels in the blood.

4. Calves need resources and stimuli which are normally provided by their mother. All calves should be given an adequate diet, appropriate conditions of temperature and humidity, adequate opportunities to exercise, good lying conditions, appropriate stimuli for sucking during the first few weeks of life and social contact with other calves from one week of age onwards. Calves reared without their mothers should receive considerate human contact, preferably from the same stockperson throughout the growing period.

Diet

1. Calves which lack specific nutrients, including iron, which are given a poorly balanced diet, and which are not provided with adequate roughage in the diet after four weeks of age can have serious health problems, can show serious abnormalities of behaviour, and can have substantial abnormalities in gut development. Every calf should receive a properly balanced diet with adequate nutrients.

2. Every calf should be fed fermentable material, appropriate in quality and sufficient in quantity to maintain the microbial flora of the gut, and sufficient fibre to stimulate the development of villi in the rumen. Calves should receive a minimum of 100g of roughage per day from 2 to 15 weeks of age, increasing to 250g per day from 15 to 26 weeks of age.

and preferably double these amounts.

3. There are clear signs of increased disease susceptibility and immunosuppression in calves whose blood haemoglobin concentration is below 4.5 mmol/litre; all calves should be fed in such a way that their blood haemoglobin level does not fall below this figure.

4. Calves should be fed from a teat during the first four weeks of life and should in any case be given a non-nutritive teat during that period. For group-housed calves a group of teats close together should be provided.

5. Calves which are diseased, and calves which are in hot conditions, often need to drink water as well as milk. All calves will drink water if it is available, and the provision of milk or milk substitute is not an adequate alternative. All calves should be provided daily with water to drink.

Housing

1. The welfare of calves is very poor when they are kept in small individual pens with insufficient room for comfortable lying, no direct social contact and no bedding or other material to manipulate. Every calf should be able to groom itself properly, turn around, stand up and lie down normally and lie with its legs stretched out.

2. In order to provide an environment which is adequate for exercise, exploration and free social interaction, calves should be kept in groups. Calves should never be kept at too high a stocking density. Larger groups are preferred because of the better possibilities for providing an adequate environment.

3. If the preferred system, group housing, is not possible, individual pens should provide an adequate space allowance and, with the exception of pens for calves which must be isolated for imperative health reasons, should have open sides and fronts which allow direct visual and tactile contact.

4. For both group-housed and individually penned calves, the minimum space allowance per calf which permits normal movements when the calf is standing up and lying down is height x body length x 1.1. The height is measured to the top of the withers and the length is measured from the tip of the nose to the caudal edge of the tuber ischii (pin bone). There is evidence of increasingly poor welfare as the width of an individual pen decreases below the height of the calf at the withers.

5. Tethering always causes problems for calves. Calves housed in groups should not be tethered except for periods of not more than 1 hour at the time of feeding milk; individually penned calves should not be tethered.

6. Appropriate bedding, for example straw, is recommended. Bedding must be changed at appropriate intervals and every calf should have access to a dry lying area, not just wet slats. Slatted floors must not be slippery.

Economics

1. Surveys of veal consumption show that there have been substantial reductions in several Member States in the last 7 to 10 years. Some of this decline is likely to be due to concern about the welfare of the animals. Such concern may well increase in all Member States so there will be continuing pressure on veal producers unless they are perceived to be keeping animals in ways which result in good calf welfare.

2. Of the total cost of veal production, about 45% consists of feed costs, 30% of the purchase price of the calf, 15% of fixed costs (housing and labour) and 10% of other costs.

3. Investments per calf in buildings and housing materials increase considerably with an increased space allowance in both individual and group housing, although a given increase in space per calf is cheaper in group housing than in individual housing.

ISSN 0254-1475

COM(95) 711 final

DOCUMENTS

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Catalogue number : CB-CO-95-742-EN-C

ISBN 92-77-98325-6

Office for Official Publications of the European Communities

L-2985 Luxembourg