ABSTRACT

Although the dairy cow plays an integral role in the ecology of sound food production, its welfare, as well as economic efficiencies and soundness of food production under modern industrial-scale systems of management, are questioned. Major areas of welfare concern are identified and reforms and ethical guidelines suggested.

INTRODUCTION

The cow, sacred to many cultures and probably to some of our own ancestors also, is a creature toward which we all have a great debt (22). Its castrated male offspring, as oxen, provide most of the draft power for agricultural and other purposes in much of the world, and its manure is a valuable fertilizer, fuel, and building material. As a ruminant, it converts forages (and by-products of the food industry in more developed nations), which have no nutritive primary product, to milk. As such, the cow is an integral part of ecologically sound food production, although its grazing habits and water requirements are maladaptive in many arid and semi-arid regions, contributing to overgrazing, destruction of habitat, and soil erosion. Improvements of genetic adaptability of more productive crossbreeds have done much to reduce this problem in these regions by reducing herd size, but in many regions, cattle are still the wrong species in the wrong place (15).

In the US overgrazing is more a problem of beef than dairy production. However, the use of grains to boost productivity of dairy cattle is an ecologically and economically questionable practice, especially in view of the overproduction of milk, the surplus of which is a burden on the taxpayer. The composition of milk also raises consumer concerns, notably the excess fat and low protein percentage of some breeds. Also, antibiotic residues and other chemicals that may be ingested as feed contaminants and are secreted in the milk, such as aflatoxins and pesticides, in addition to accidental contaminants of feed and forage (as by polychlorinated biphenols, radiation fall-out), necessitate rigorous controls and costly regulations.

WELFARE ISSUES

There are limits to economies of scale (5, 17), and average returns to management may be higher for medium-sized dairy herds (65 to 70 head); lowered productivity per cow is a common reason for lower returns in larger (100 plus) herds (4). An important element may be the amount and quality of individual care and attention each cow receives. Large feedlot-style dairies in California (where some herds are 2,000 to 4,000 head) raise welfare questions, especially the “diluted” attention by stockpersons who must oversee several hundred cows, and the lack of provision of shade and muddy or dusty lots that are not conducive to udder or foot health (12). The average productive life of such cows is little more than 4 to 5 yr (personal observations). There may be a national trend toward larger dairy herds and “factory” scale operations with reduced labor and reduced care of individual cows. Maximizing the biological efficiency of each animal is not cost effective for all systems: a welfare deficit is incurred.

The attitude and personality of those in charge of stock are significant variables in productivity of the cow (23), and generally hired labor do not do as well as owner-operators and family members. The same holds true for calf mortality (14); tender loving care and understanding are an integral part of good husbandry. Livestock husbandry proficiency training and certification (as in the United Kingdom) would be worth instigating, especially for large herd operations owned by absentee stockholders.
Maximum biological efficiency of the cow depends upon a close human bond, lack of fear, zero flight distance, and selection for docility, these being key elements in highly productive cows (2, 13). It is because of this combination of factors that the welfare of dairy cows, especially in small and medium-sized, owner-operated herds, is generally far superior to that of other farm animal species (12). Ruminants are probably more adaptable to confinement and to a relatively monotonous environment than other species because, as Albright (2) has pointed out, rumination is a more inner-directed activity, which may, to some extent, placate the need for outer-directed activity such as exploration, foraging, and rooting as with swine.

Although close correlation between temperament, careful individual attention, and high lactation have done much to ensure the welfare of dairy cows, there still remains the major problem of a welfare deficit in larger herds when economic efficiencies necessitate reduction of quality and quantity of individual attention. In addition, there are other welfare issues the dairy industry must address:

1. Transportation of injured and sick cows to slaughter often entails additional stress and suffering. Animals not fit enough for transportation should be killed on the farm.

2. Dehorning of calves should include a local anesthetic, and caustic chemicals that can cause eye damage and skin infection should be prohibited.

3. Prolonged stanchion-tying of cows, especially in winter months, should be discontinued in favor of the free-stall open-barn system, which has done much to improve the welfare of cows (3). Alternatively, where tie-stalls are used, the cows could be allowed out into a yard or field for 3 to 5 h per day, weather permitting.

4. Separation of calf from cow is a traumatic event. The sooner it is done, the less attachment has developed, thus reducing the psychological stress of separation (16). It is advisable to allow the cow to groom the calf after it has taken colostrum, because this stimulation increases colostrum uptake (24).

5. Care of unwanted bull calves needs particular attention. Not all dairy farmers provide them with colostrum. Ideally, if they are intended for veal production, they should be transported directly to the veal producer, thus avoiding the stress and disease exposure at auctions. Prior to transportation they should be fed colostrum to provide some disease protection. Closer integration between the dairy and veal industries is needed.

6. Rearing dairy calves in separate straw-bedded loose boxes outdoors for the first 8 wk or so of life is conducive to their overall health and well-being, provided they have frequent human contact. Health advantages may outweigh the costs (to the animal) of social deprivation. However, under good management (sanitation and herd health care maintenance), raising calves in group-pens (at 6 wk of age or after weaning, possibly with access to a nurse-cow) is a viable and probably more humane alternative, especially on farms raising their own calves.

7. Some US producers raise their veal calves in straw-bedded or wood-slatted group-pens (20). Recognizing the greater potential for disease problems in an “open” herd of veal calves of random origin, there are legitimate health reasons for raising them initially in separate crates. But as with dairy calves, veal calves must be given the freedom for greater social interaction and physical activity by being transferred to group-pens, (ideally straw-bedded) after 6 to 8 wk of age. Continued confinement in small crates in which they cannot walk, turn around, or interact freely with others is ethically questionable.

8. Excellent reviews and research on such welfare related topics as design and numbers of free-stalls per group of cows, floor material and surface, feeder-space allowances, social dominance and density, thermoregulation and ventilation, milking machine design and pressures, lay-out of holding pens and chutes to and from the milking parlor, diet especially during gestation and lactation, have been published. These studies not only reflect the close correlation between welfare and maximizing individual productivity but also demonstrate what a significant contribution dairy scientists can make to enhancing herd health, well-being, and productivity (12).

9. Production-related diseases, especially metabolic disorders such as ketosis, are of economic concern. The nutritional requirements of high-yielding cows may be met inadequately, and further research is needed. It seems that, in the quest to maximize productivity at the
lowest possible costs, dairy cows may be pushed beyond their physical limits into a borderline stress condition that increases their susceptibility to diseases and metabolic disorders and requirements for certain essential nutrients such as niacin. McCullough (18) writes:

In recent years, levels of milk production have been pushed higher and higher. This desirable change has been accompanied by an increasing incidence of metabolic problems such as ketosis, displaced abomasums, fat cows, and ulcerated rumens. This complex of events is related to the level of grain fed and the feeding programs involved. Feeding heavy grain rations during lactation and the dry period usually accompanies a high incidence of these problems. (p. 84).

In conclusion, the dairy cow is and will continue to be a vital and integral part of ecologically sound, regenerative agricultural production. Many of the welfare issues raised in this paper can be rectified through education and by the establishment of voluntary codes and dairy farm accreditation. A “humane grade” on a carton of milk or packet of cheese or butter would appeal to many consumers, and many dairy farms would qualify for such a grade today. But if dairy farms are to become fewer and larger, a trend that may develop in eastern and midwestern states along the lines of the large dairy “factories” on the west coast, along with vertical integration and corporate (nonfarm) ownership and monopoly, it may be accurate to predict that the welfare of the dairy cow and of the small and mid-sized independent family farmer will be in jeopardy. Farmers’ cooperatives are a viable alternative.

Political and economic aspects aside, there are many welfare related issues that necessitate further research and funding, especially in applied animal behavior, stress evaluation, and objective welfare assessment. Science cannot give all the answers, however, nor should politics and economics alone dictate what research should be done and what scientific findings should be applied to improve the health and well-being of farm animals and the maximization of their biological efficiency on an individual basis. There are ethical questions and constraints also, because dairy cows and other farm animals are not simply biomachines. They are sentient and to some degree sapient; and they have social, emotional, and behavioral needs [which may be interpreted philosophically as their rights (11, 19, 21)]. This places a moral burden upon us, as their stewards, to ensure their treatment and the conditions under which they are raised are optimal for their overall physical and psychological well-being, regardless of economic rationalizations to the contrary.

An interdisciplinary science of animal welfare is evolving (8, 12), which ultimately may give us the tools to assess objectively subjective states in animals and to facilitate the design of environments most conducive to their physical and emotional well-being. Dow (9), for example, states:

Using a strictly scientific approach, our tendency to attribute feelings to animals cannot be proven. Nevertheless, there are arguments that lead to the so-called ‘analogy conclusion.’ It seems unlikely that there should be no similarity between animals and man when the behavioral and physiological organization of so many animals is so like that of man. (p. 10).

Because there are limitations in scientific empiricism as an objective tool to measure subjective states of animals, ethical guidelines are necessary to offset these limitations of the scientific method and present scientific knowledge.

It is ethically imperative to endeavor to strike an equitable balance between economic and other human needs and our moral duty to meet animals’ basic needs and not subject them to social and environmental-experiential privations and restrictions that are beyond their abilities to adapt. That is, their welfare is dependent upon the degree to which they are able to adapt without stress or suffering to the environments that are provided for them. Husbandry conditions also should allow the animal some opportunity to develop, explore, and experience its telos to some degree, its intrinsic nature of “cowness” (12).

The following basic guidelines should be adopted to govern the management of animals under human stewardship. No husbandry system should deny the environmental requirements of the animal’s basic behavioral needs, a tenet clearly expressed in West Germany’s animal protection act. Those needs, as designated by Carpenter (7), should include the following minimal environmental requirements:
1) freedom to perform natural physical movement; 2) association with other animals, where appropriate, of their own kind; 3) facilities for comfort-activities, e.g., rest, sleep, and body care; 4) provision of food and water to maintain full health; 5) ability to perform daily routines of natural activities; 6) opportunity for activities of exploration and play, especially for young animals; and 7) satisfaction of minimal spatial and territorial requirements, including a visual field and "personal" space. (From these requirements, a number of systems are unacceptable, notably small, barren cages for laboratory primates, cats, and dogs; caging of wild animals in many research facilities, municipal and roadside zoos, and fur farms; and several factory farming systems such as sow stalls, hen batteries, and veal crates.)

Deviations from those principles should be avoided as far as possible, but where such deviations are absolutely unavoidable, efforts should be made to compensate the animal environmentally. Falconer (10) states:

The improvements that have been made by selection in these (domesticated breeds) have clearly been accompanied by a reduction of fitness for life under natural conditions, and only the fact that domesticated animals and plants do not live under natural conditions has allowed these improvements to be made. Artificial breeding then makes a population more profitable but less fit. (p. 179).

Although "fitness" may be improved through environmental and genetic engineering, the revolutionary new age of biotechnology with its computer enhanced, scientifically sanctified control, creation, and exploitation of life is not without potentially iatrogenic consequences. Without a radical change in values, we may, in attempting further control over life, become captive of our own controls, enslaved by the narrowness of our world view and desires. I anticipate that future applied research on farm animal husbandry and veterinary medicine will verify the thesis that I have presented in detail elsewhere (12), which is not simply that intensive husbandry methods are inhumane but rather that they are pathogenic. A major contributing factor to the pathogenic nature of intensive, confinement husbandry systems may be what Ader and others (1) term immunosuppressive psychosocial stress. Overcrowding and emotional distress are two recognized etiological factors. This problem may be exacerbated further by agrochemical contaminants of animals' feed, notably by pesticides, many of which are known now to be immunosuppressive (6) and even by routine, preventive vaccinations (12). This phenomenological correlation between emotional distress, stress, and disease resistance has been investigated extensively under controlled laboratory conditions (1) and goes far beyond Selye's relatively simplistic and mechanistic model of stress, which is accepted so widely today. This new model may prove to be as relevant to the health and welfare of domesticated animals as to our own health and well-being also.

"Factory" farming has become a highly controversial issue, I believe, because it evokes many metaphors: the subjugation of life to the industrial system; the subordination of individuals' rights and autonomy to goals of efficiency and productivity; the maintenance and propagation of life under wholly unnatural conditions; the dependence of life upon drugs, vaccines, and technology.

The social relevance of these metaphors may be unconscious in the minds of critics of factory farming. The controversy over the rightness or wrongness of factory farming is highly political and socially relevant, literally and metaphorically. Perhaps there is some wisdom, some atavistic survival instinct, in the abhorrence that many have not only for the conditions under which farm animals are kept but for the human condition also. Defenders of this animal industry are quick to judge all criticisms as anthropomorphic, utopian idealism, and any suggestions of alternative husbandry systems are dismissed as a return to primitive, uneconomical methods; and consumers, after all, need and expect a cheap and plentiful supply of farm animal produce. Surely neither the critics nor the supporters of factory farming are totally wrong in their perceptions. Animals living at high density, like us, need vaccines and drugs to control and treat disease. We believe and hope that animals can adapt to these conditions and we to our condition, and science and technology certainly can help in this regard.

But as there are limits to subordination of
human rights for the good of society, so limits must be placed upon subjugation of animals in the service of society. It is, therefore, for an informed society to decide where the ethical limits should be set, economics and public benefits notwithstanding. The basis for our decisions must not be weighed by economic interests or science alone but by ethics also, because our exploitation of animals incurs an enormous debt, a moral obligation to maximize their well-being in return for their contribution to our own.

REFERENCES