



A 100-Year Review: Animal welfare in the *Journal of Dairy Science*—The first 100 years¹

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ABSTRACT

This paper outlines the history and development of research in the area of animal welfare as reflected in the 100 yr that the *Journal of Dairy Science* has been published. The first paper using the term “animal welfare” was published in 1983; since then (to May 2017), 244 papers that reflect growing interest regarding how farm animals are cared for have been published. Much of the scientific work to date has focused on issues related to cow health, such as lameness, and methodologically many papers use behavioral measures. In addition to this science-based research, the journal has taken on the role of publishing work of social scientists that addresses the role of the human factors relating to animal welfare, including research on citizen, consumer, and farmer attitudes toward welfare issues. We call for further research focused on societal perspectives and for new biological research focused on developing issues, such as cow–calf separation and pasture access.

Key words: animal well-being, animal care, animal behavior, animal rights

INTRODUCTION

This review outlines the history and development of scholarly work on the topic of animal welfare as reflected in the 100 yr that the *Journal of Dairy Science* (JDS) has been published. Coverage of this topic has expanded dramatically over the past 30 yr, with the greatest expansion occurring very recently. Animal welfare is an area of application rather than a discipline and is amenable to a variety of disciplinary approaches, including physiology, genetics, nutrition, sociology, and so on. Animal behavior has been an especially useful disciplinary approach to welfare questions, but behavioral studies also address more basic issues (e.g., the nature of social relationships) and practical issues (e.g.,

heat detection) that are not related to animal welfare. In the current paper we focus on animal welfare but highlight how the field of animal behavior has played a role in finding solutions to improve dairy cattle welfare.

In the sections that follow, we define what we mean by animal welfare and the types of concerns that it encompasses, provide a brief history of animal welfare as a social movement, and focus on how animal welfare issues have been addressed within JDS, identifying how far we have come and key papers where possible. We end with our vision for how research in dairy welfare will continue to develop in the years to come.

What is Animal Welfare?

The study of welfare is focused on improving the lives of animals, but exactly what this means has changed over the past century. Traditionally, a good life has been associated with good health and appropriate levels of production, but scholars working on health or production might not think of themselves as working on welfare. Although both health and production are associated with good biological functioning on the part of the animal, sometimes the methods used to address health and production goals may introduce other types of welfare concerns.

A more modern view of welfare concerns how the animal feels (Duncan, 2004); this view would support changing procedures to minimize negative affective states (e.g., pain) and promote positive states (e.g., pleasure). The main challenge with this approach is scientific, and much research has been devoted to developing and validating methods to assess emotional states in animals (Weary et al., 2017). Some authors have also argued that allowing animals to live reasonably natural lives (e.g., providing the ability to express natural behaviors such as drinking milk through a nipple in calves) is also an important dimension to animal welfare, explaining why some standards require access to more natural environments (e.g., pasture) or the ability to perform key behaviors (e.g., the cow nursing her calf).

In 1997, David Fraser and colleagues published a conceptual paper calling for the integration of all 3

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approaches (biological functioning, natural behavior, and affective states), arguing that welfare problems can emerge in any of these 3 areas and that the best practices will address all 3 areas of concern (Fraser et al., 1997). These arguments were specifically applied to dairy cattle in a review by von Keyserlingk et al. (2009), where it was argued, for example, that allowing cows to seek shade on a hot day (natural behavior) will help prevent the cow from feeling uncomfortably hot (affective state) and reduce the health and production risks associated with heat stress (biological functioning). According to this framework, it would be misguided to address one type of welfare concern (e.g., high rates of enteric and respiratory infections in dairy calves—a biological functioning concern) by imposing a solution that introduces new welfare concerns around natural living and affective state (e.g., the use of individual housing that prevents natural interactions and play).

Animal welfare is an ethical concept and is subject to societal input. Progress on welfare relies on science, in part to provide evidence that can aid in the process of consensus building between the various stakeholders, but this scientific work must not occur in a vacuum. The science should instead be grounded in an understanding of societal values that help identify issues and anticipate objections to new practices (Weary et al., 2016).

Animal Welfare as a Social Movement

Criticisms relating to the standard industry practices associated with the care and handling of farm animals first entered the mainstream media in the mid-1960s following publication of the book *Animal Machines* (Harrison, 1964). This book described housing and production practices for laying hens, broiler birds, and veal calves and highlighted the unnaturalness (i.e., lack of sunshine, fresh air, and space) of these systems. The negative reaction by the British public motivated the UK government to commission the report titled “Report of the Technical Committee to Enquire into the Welfare of Animals Kept Under Intensive Livestock Husbandry Systems” (Brambell, 1965). This report argued that animals should have the freedom “to stand up, lie down, turn around, groom themselves and stretch their limbs” and that many of the standard systems for rearing farm animals were morally unacceptable.

The findings of the Brambell (1965) report were used to develop the Five Freedoms by the Farm Animal Welfare Council (FAWC, 1992): (1) freedom from thirst and hunger; (2) freedom from discomfort; (3) freedom from pain, injury, and disease; (4) freedom to express normal behavior; and (5) freedom from fear and distress. Similar events have taken place in other coun-

tries. Most notably, Sweden passed animal welfare laws in 1988 effectively banning zero-grazing systems for dairy cattle (Ministry for Rural Affairs—Government Offices of Sweden, 2009). The European Union has promoted farm animal welfare, announcing within its first directive in 1991 that, among other things, focus must be placed on care and housing of dairy calves (for additional discussion see von Keyserlingk and Hötzel, 2015).

At the time of publication of *Animal Machines* (Harrison, 1964), only 2 federal laws in the United States regulated the treatment of farm animals. The Twenty-Eight Hour Law (USDA, 1873), passed to protect livestock during transport to slaughter, required that after 28 h of travel in the United States by rail, steam, sail, or “vessels of any description,” livestock must be unloaded and provided feed, water, and a resting area for a minimum of 5 consecutive hours before resuming transport. The *Humane Methods of Slaughter Act* (USDA, 1958) required that livestock must be rendered insensible before slaughter (see also Mench, 2008). More recently, a number of farm animal welfare laws have been enacted at the state level within the United States. The first of these was enacted in Florida in 2008, resulting in a ban on gestation stalls for sows. Since then, 9 states have effectively banned a variety of standard industry practices. A particularly well-known example is the 2008 California ballot initiative (Proposition 2) that, effective January 1, 2015, required that “calves raised for veal, egg-laying hens, and pregnant pigs be confined only in ways that allow these animals to lie down, stand up, fully extend their limbs, and turn around freely.” The passing of Proposition 2 in California resulted in additional consequences. Senate bill 135, dated October 11, 2009, made an amendment to section 597n of the penal code, relating to animal abuse, that specifically banned tail docking of cattle (California Legislative Information, 2009).

These types of legislative changes have driven industry-led responses, including the development of guidance documents for farmers and verification procedures to provide assurance that farms are meeting these guidelines. In Canada this process has been led by the Dairy Farmers of Canada and Canada’s National Farm Animal Care Committee (NFACC, 2014), who have worked together to create a code of practice for the care and handling of dairy cattle (DFC-NFACC, 2009). The US counterpart was led by the National Milk Producers Federation, who published the first version of the Farmers Assuring Responsible Management (FARM) program in 2009; this document has gone through 2 substantive revisions since then (NMPPF, 2016). Whether these industry-led approaches will provide the necessary assurances to the public is unknown.

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