ABSTRACT. A holistic approach to the subject of animal well-being suggests that it cannot be attributed to (or measured by) a single biological factor, but rather results from a summation of all influences upon an individual’s quality of life with a satisfactory overall outcome. The application of traditional mathematical methods (such as indexing) to the assessment of animal quality of life is limited by the lack of a meaningful unit of comparison, and by the difficulty of determining the relative importance of the wide range of welfare-relevant factors. The principle of cost-benefit dominance (CBD) offers significant methodological advantages in this regard. CBD does not require a standard unit of measurement, since only qualitative comparisons within attributes are required. This eliminates the necessity of weighting, relatively or absolutely, the importance of satisfying animals’ different biological needs. In addition, if some interattribute information is known, CBD offers the flexibility of four strategies to improve its effectiveness. A combination of these strategies with a functional classification of welfare-relevant information provides a useful methodological framework for the more objective assessment of animal husbandry systems.

1. INTRODUCTION

Traditionally, the only measures of acceptability of an agricultural production system were farmer approval and the quality, variety, and affordability of the food offered to the consumer. Today, however, a general public increasingly concerned with the ethical implications of its buying habits is forcing animal agriculture to measure its husbandry systems and practices against additional criteria including, but not limited to, farm animal quality of life. In fact, the method of assessment proposed here could be readily adapted to other issues affecting the overall moral acceptability of agricultural production systems: environmental impact, effects on rural communities, global feeding strategies.

Recent attempts to precisely and objectively define the concept of animal well-being have recognized its broadness, and the need for a
method of assessment that incorporates a holistic approach (Hurnik, 1979; Wood-Gush, 1980; Duncan and Dawkins, 1983; Baxter and Baxter, 1984; de Koning, 1984; Duncan, 1986; Mason and Mendl, 1993). It is thus simplistic to consider animal (or human, for that matter) well-being over the long-term as resulting from, or measurable by, a single parameter.

The challenge of such a holistic approach, however, is to integrate information on a variety of parameters and indicators from several sources into a single measure of overall animal quality of life. Mathematical methods of assessment are common in modern agricultural practice. Integrative indices based upon a variety of factors are used to evaluate such economically important animal traits as breeding value and body conformation. These indices combine the relative contribution of individual factors using a common measure, usually the economic value of the trait being evaluated, in an effort to maximize overall utility or benefit. It is tempting to try to evaluate animal quality of life in a similar fashion. However, no basal unit of comparison to which all factors of biological relevance may be meaningfully reduced has yet been identified.

This paper reviews two theoretical methods of assessing a complex set of variables: maximization of expected utility (MEU) and cost-benefit dominance (CBD), with specific regard to the problem of assessing animal well-being. At the theoretical level, CBD has been shown to have distinct advantages over MEU (Michalos, 1972). Four strategies of manipulating the requirements for and the effectiveness of CBD will also be discussed with specific reference to the problem of assessing farm animal quality of life. Finally, these strategies will be combined with a functional classification of welfare-relevant information to propose a theoretical framework for assessing animal husbandry systems.

2. MAXIMIZATION OF EXPECTED UTILITY

Maximization of expected utility (MEU) is the method of assessment widely used in animal agriculture to integrate information from a variety of sources into a single measure of quality. For example, conformation scoring of dairy cattle combines each animal’s score for frame capacity, rump, feet and legs, mammary system, and dairy character into a single number reflecting the overall desirability of