Shrink and mortality of beef cattle during long distance transportation

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Abstract

The aims of this study were to determine the effects of long distance transport on shrink and mortality rate in cattle, and to understand the relationships between environmental temperature, bodyweight, shrink and dressing percentage. This survey was conducted on 121 transfers of bulls (Bos taurus) from commercial finishing units in Bugyi, Hungary to a public slaughterhouse in Ankara, Turkey between July and December 2010. A total of 3,874 bulls were transported and the journeys took approximately 30 h, including a 2-h rest period with water and feed available. In order to investigate the effect of thermal stress, the deviation of the average monthly ambient temperature from average six-monthly temperature was determined (d-value). Weight loss during transport and dressing percentage were determined monthly. The effect of month on shrink during transport was significant and average transport shrink was 5.57% during the six months. In general, the highest shrink rate was observed in the summer (August: 8.39%) and winter months (December: 7.27%), both of which are outside the thermoneutral zone for beef cattle. The lowest shrink rate was observed in the autumn months (October: 2.99%, November: 1.77%), which is within the thermoneutral zone. The mortality rate was 0.464% during transportations. Mortality rate was high but the effect of month on mortality rate was not significant. There was a moderate positive correlation between transport shrink and d-value. In conclusion, transportations within thermal comfort zone range and good quality animal handling are recommended in order to prevent the adverse effects of long distance transportation, such as shrink and mortality.

Keywords: animal welfare, cattle, dressing percentage, road transport, thermal stress, weight loss

Introduction

Beef cattle (Bos taurus) are normally transferred several times during their lifetime and transportation by road is the most common method (Philips et al 1991). Truck transportation is a stressor even under optimal conditions because of its adverse effects on production and health of beef cattle (Blecha et al 1984; Murata et al 1987; Grandin 2000; Arthington et al 2003). The process is often aggravated by exposure to conditions such as feed and water restrictions, or environmental insults such as extremes of heat or cold (Kenny & Tarrant 1987). Therefore, the physiological stress produced during long transport journeys negatively affects the welfare of cattle (Tarrant et al 1992; Knowles et al 1999).

Long distance transport may cause impaired immune function, bodyweight loss, increased morbidity and death (Knowles et al 1999; Coffey et al 2001; Gallo et al 2003). The bodyweight of cattle decreases during long distance transportation; this is the most common change and is known as shrink (Hutcheson & Cole 1986). Shrink involves body waste and tissue losses. Although transportation conditions have improved in recent years, shrink is a natural physiological process which is inevitable (Harman et al 1989). Shrink is a very variable factor that affects the cattle producer negatively during buying and selling cattle (Coffey et al 2001). The income of cattle producers is directly affected by shrink. Type of transportation, distance transported, loading density, transport time, temperature, age, sex, pre-transport diet, body condition and pre-transit management are factors that influence shrink and mortality rate. Shrink and mortality rate may also be highly affected by climatic conditions (Camp et al 1981; Philips et al 1991). González et al (2012) stated synergistic effects between transportation duration and environmental temperature determining that shrink increased in cattle after 30-h transportation at higher environmental temperatures. The shrink of 72 steers averaged 8.3% after 24-h transportation in the study of Tarrant et al (1992). Their study was conducted under ambient temperatures ranging from 3.6 to 16.4°C. In a study by Warriss (1990), the shrink value of cattle was 3–11% after 24-h transportation, while it was about 8% after 24-h transport in the studies of Shorthose (1965) and Lambooy and Hulsegge (1988).

The death of animals during transportation for slaughter is a main factor indicating the level of welfare in transported animals (Malena 2007). Mortality rates of other farm animals, such as swine (Sus scrofa) and poultry (Gallus domesticus), are higher than adult cattle transported by road (Knowles 1999). Henning (1993) reported a...