

The Effect of Season, Walking Surface and Sire Identification on Thin Soles in Dairy Cattle

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Introduction

Thin soles have become a major economic problem in large total confinement dairies in the United States. The cause appears to be multifactorial and relates to factors that result in an increase in sole horn wear. Factors such as the distance cows have to walk on concrete to be milked, poor cow comfort, claw horn moisture content and horn quality, heat stress and overtrimming have been implicated. The purpose of this study was to: a) investigate the incidence of thin soles over a period of 12 months from two herds in relation to month of year b) determine the incidence of thin soles in first lactation cows in Herd 1 for the 9 months prior and 9 months following installation of rubber on walk ways and c) determine any sire effect on thin soles for first lactation cows in Herd 1.

Materials and Methods

Approximately 3221 lactating cows (Herd 1)(April 2003 to March 2004) and 2100 lactating cows (Herd 2) (April 2005 to March 2006) were studied. Both herds are situated in different states in the country but with similar ambient temperature and humidity conditions in the summer. Cows in both herds were housed in free stalls and cooled during the summer months with sprinklers. Walking surfaces consisted of grooved concrete. In Herd 1 rubber was installed on walkways, transit lanes and around feed bunks. Thin-soled cows were identified by professionally trained hoof trimmers based on a soft flexible sole on thumb pressure during daily examination of animals presented with clinical lameness.

Results

The incidence of thin soles for the 12-month period was 30.1% for Herd 1 and 7% for Herd 2. The highest incidence occurred between August and December

with peak incidence during November and December for Herd 1. This was significantly higher ($p=0.001$) compared to the rest of the year. For Herd 2 the peak incidence occurred during August and September. For 1st lactation cows in Herd 1 the frequency of all lameness for the 9 months prior to installation of rubber was 66.9%. Following rubber installation the frequency of lameness was 21.8%. The frequency of thin soles for 1st lactation cows was 32.6% prior to installation of rubber and 4% following rubber installation. Sire identification was available on only 349 first parity cows in Herd 1. Sire variance for clinical lameness from a logistic model that included month of calving effect (PROC GLIMMIX, SAS, 2005) was positive but smaller than its standard error.

Significance

The higher incidence of thin soles during the summer could be associated with a higher claw horn moisture content resulting in softer and more flexible horn with a more rapid rate of wear. The seasonality observed also suggests that heat stress contributed to lameness either through alterations in cow comfort (that is, more standing and less lying time), influences on rates of laminitis (by virtue of increased rates of rumen acidosis) or both. Distance walked and nutritional influences were not studied but may have also contributed to thin soles as a consequence of increased sole wear rumen acidosis and laminitis. Differences in the incidence of thin soles in herds may be due to differences in the claw horn change recorded. Both sole flexibility and sole/white line separation in the abaxial toe region (Zones 1 & 2) are common physical changes associated with thin soles. In some instances white line separation is the preferred terminology, which complicates incidence and prevalence studies. Sole flexibility should be used as the basis for diagnosis and recording of thin soles.