

Patterns of Pen Stocking Density on Drylot and Freestall Dairy Farms in the Western United States

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Introduction

Stocking density in dairy cattle pens appears to affect resting time, feed intake, milk production, lameness, reproduction, hygiene, behavior, and health of the cows. Stocking density can be calculated by the number of linear feet of bunk space per cow, number of cows per freestall, or number of cows per drylot area. Stocking density measures are part of animal welfare auditing guidelines and are important for veterinary investigation of herd health and performance concerns. The purpose of this project was to describe the features of all the cattle pens on large dairy farms in the west and assess farm-level stocking density by pen.

Materials and Methods

The 45 farms selected for this study were a subset of 401 dairy farms from the western US that were studied over an 18-month follow-up period. These farms were selected as a follow-up to a study of *Salmonella* prevalence and were herds whose bulk milk tested positive for *Salmonella*. In a cross-sectional study, a total of 942 pens on the study farms were evaluated for number of cows, production class for the pen (non-lactating, youngstock, milking) number of freestalls, drylot area, and shade area of the drylot pens. Density indices were calculated for each pen based on pen type and age of cattle in the pen. The number of cows per stall in freestall pens, number of cattle per 600 ft² of drylot pen area, and the number of cattle per 48 ft² of shade in the drylot pens were calculated. A pen was considered crowded if the density index was >1.2 (120% stocking density based on stalls, drylot area, or shade area) for adults or >2.4 for youngstock.

Results

A total of 833 pens were included in the evaluation. The number of pens per farm ranged from seven

to 48, with an average of 21 pens per farm. Seventy-five percent of the pens were dry-lot pens. The percentage of crowded pens by farm ranged from 0-77.8% (seven of nine total pens on one farm). On average, 38% of each farm's pens were considered crowded. Pen crowding was conditional on the age of the animals in the pen, 9% of youngstock pens (< 5 months of age), 25% of older youngstock pens (5-15 months), 11% of heifer pens (16-24 months), and 55% of pens with adult animals. The adult pens were designated for bulls (about 4%), dry cows (13%), fresh cows (9%), hospital cows (7%), market cows (2%), and lactating cows (65%). Using our index of crowding, 10% of the 231 freestall pens were considered crowded and 52% of the drylot pens were considered crowded. Drylot pens were four times more likely to be considered crowded compared to freestall pens (95% CI 2.8, 6.0; $P < 0.001$). Overcrowding by cattle group varied. Seventeen percent of bull pens, 46% of dry cow pens, 22% of fresh cow pens, 41% of hospital pens, 86% of market cow pens, 32% of milking cow pens, and 38% of youngstock pens were considered crowded. Dry cow pens were 1.6 times more likely to be crowded compared to fresh cow pens.

Significance

Although much needed attention has been given to cow comfort in the last 20 years, the focus has been primarily on freestall barns and freestall design. The results of this study indicate that there are many drylot pens on western farms that may be overcrowded, more so than the freestall pens evaluated. Dairy veterinarians may need to investigate stocking density in these pens, as it may affect performance as found with overcrowded freestall pens.