

# The relationship between herd size and milk somatic cell counts of Irish dairy cows: A retrospective cohort study

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## Introduction

Within the EU25, Ireland was the 8<sup>th</sup> largest producer of cows milk, producing 5.2 million tonnes of milk. Ireland is one of the worlds leading producers of infant nutrition products, producing 15% of the worlds powdered infant formula (IBEC, 2007), which requires low somatic cell count (SCC) milk.

Somatic cell counts are the single most important indicator of milk quality, elevated milk SCC above 200,000 cells/ml are usually indicative of infection.

Within the EU, commission regulations state that food operators must initiate procedures if raw bulk tank milk SCC exceed 400,000 cells/ml (EC, 2006; rolling geometric mean over 3 months).

## Objectives

The objectives of this study were to determine the relationship between herd size and;

- Geometric mean individual cow milk SCC
  - above 200,000 cells/ml (*MSCC200*) over an entire lactation
  - above 400,000 cells/ml (*MSCC400*) over an entire lactation.
- First test day milk SCC (cows ≤ 50 days in milk)
  - above 200,000 cells/ml (*50SCC200*)
  - above 400,000 cells/ml (*50SCC400*)

## Materials and Methods

Individual cow monthly milk records for all cows in Ireland that were milk recorded in 2009 were obtained from the Irish Cattle Breeding Federation (ICBF) and data on herd size was obtained from the Department of Agriculture, Fisheries and Food, Animal Identification and Movement system (AIM).

Data was restricted to cows with ≥7 monthly records in order to calculate geometric mean SCC.

Data was managed using Microsoft Excel<sup>®</sup> and analysed using STATA<sup>®</sup>. Maps were generated using ArcGIS<sup>®</sup>.

Descriptive analyses were performed and individual herds were mapped to visually identify their location relative to the national dairy cattle population density (Figure 1).

Data were analysed using multivariable logistic regression models, with random effects to account for clustering of cows within herds.

## Results

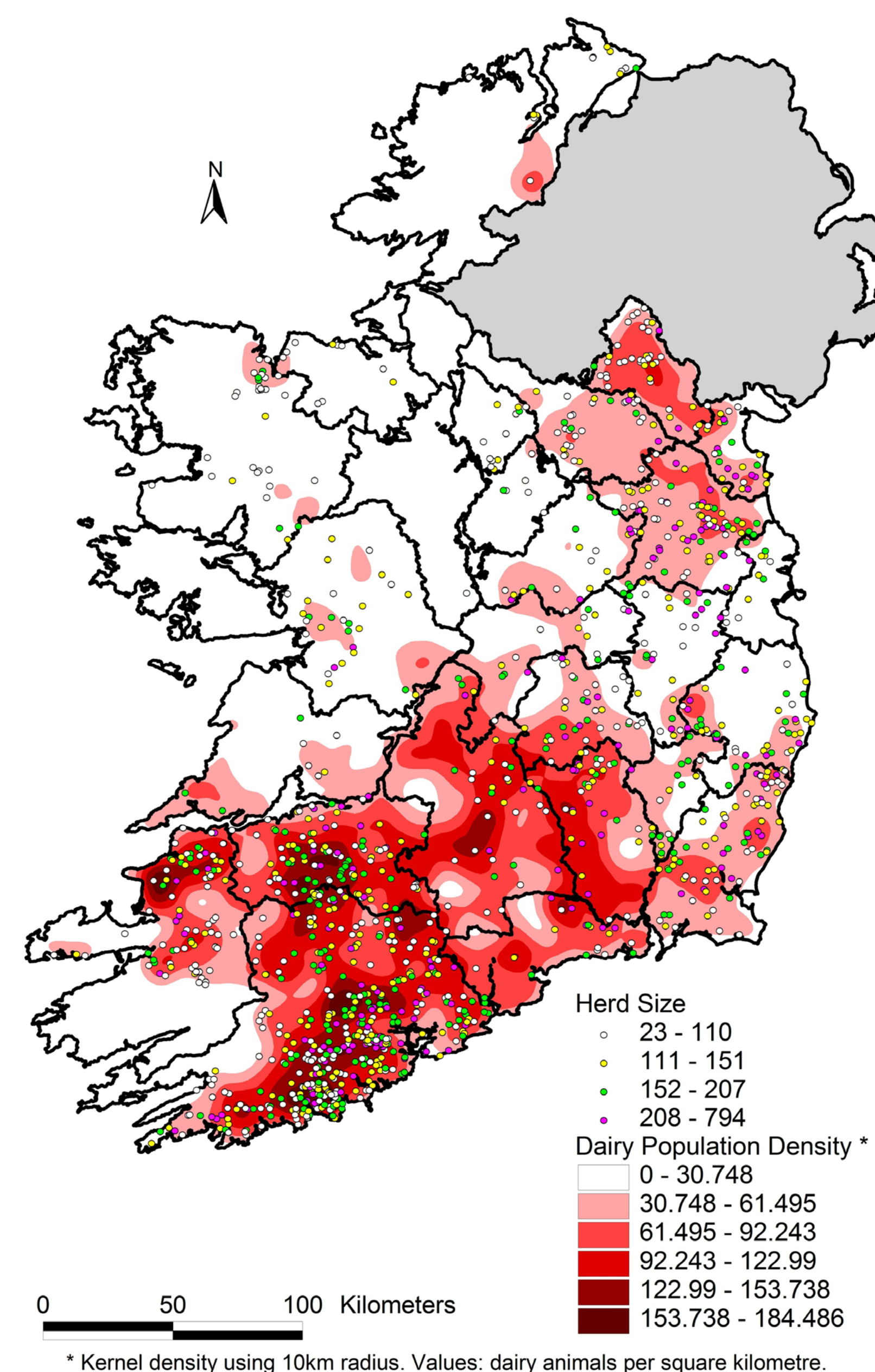


Figure 1: Locations of herds used in this study relative to the dairy cattle population density in Ireland.

- 26% and 11% of cows had *MSCC200* and *MSCC400*, respectively.
- 22% and 13% of cows had *50SCC200* and *50SCC400*, respectively.
- *MSCC200* was associated with cows from larger herds
  - 152 to ≤ 207 V's ≤ 110 cows; OR 1.24, 95% CI 1.09-1.14, P=0.001
  - ≥ 208 cows V's ≤ 110 cows; OR 1.36, 95% CI 1.18-1.58, P<0.001
- *MSCC400* was associated with cows from larger herds
  - 152 to ≤ 207 V's ≤ 110 cows; OR 1.29, 95% CI 1.12-1.48, P<0.001
  - ≥ 208 cows V's ≤ 110 cows; OR 1.42, 95% CI 1.21-1.66, P<0.001
- *50SCC200* was associated with cows from larger herds
  - 148 to ≤ 200 V's ≤ 107 cows; OR 1.15, 95% CI 1.04-1.28, P=0.01
  - ≥ 201 cows V's ≤ 107 cows; OR 1.30, 95% CI: 1.16-1.46, P<0.001
- *50SCC400* was associated with cows from larger herds
  - 148 to ≤ 200 V's ≤ 107 cows; OR 1.20, 95% CI 1.07-1.34, P<0.001
  - ≥ 201 cows V's ≤ 107 cows; OR 1.34, 95% CI 1.18-1.52, P<0.001

## Conclusions and future work

There is an association between herd size and milk SCC, with implications for both animal health and the marketability of Irish milk.

These results are important given Ireland's desire to increase milk supplies by 50% by the year 2020 (DAFF, 2010).

Further work is needed to examine the impact of herd expansion, not just herd size, on SCC.