Effect of region and herd size on dairy management parameters

G. H. Oleggini, L. O. Ely, and J. W. Smith

The University of Georgia
Introduction

Environmental, cultural, and market differences have led to different management systems among US dairy regions.

Dairy management strategies change constantly following the availability of new technologies and market signals.

Herd expansion has been a big change.
Determine if significant differences in management exist among herds of different sizes and regions of the U.S.

- In which parameters are they significantly different?
- How big are these differences?
- How these differences have evolved during the last decade
Material and methods

• Dairy Herd Improvement Records (DHI)
  – 1998
  – 17000 dairy farms
  – 37 states

• Data grouped into:
  – 6 herd sizes:
    • 20-49, 50-99, 100-149, 150-249, 250-449, > 449 cows
  – 3 regions: North, Midsouth, South
Materials and methods

• **DHI records**
  – 1990-1999 data set
  – 107,484 observations, analyzed 41,129 obs.
  – 8 variables

• **3 Regions and 6 herd sizes**

• **Statistical analysis**
  – Ls means
  – Proc. reg
  – Reg. Coefficients compared through T-test
RESULTS
Milk production by region
(kg/cow/year)

<table>
<thead>
<tr>
<th>Region</th>
<th>Milk Production (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>9412 a</td>
</tr>
<tr>
<td>Midsouth</td>
<td>8501 b</td>
</tr>
<tr>
<td>South</td>
<td>7839 c</td>
</tr>
</tbody>
</table>
Milk production per cow by region

Reg. coefficients with the same letter are not significantly different (P<0.05)
Milk production by herd size (kg/cow/year)
Days open by region

North: 156.8 c
Midsouth: 171.1 b
South: 180 a
Days open by region

- North: 4.65 a
- Midsouth: 4.42 a
- South: 4.72 a
Days open by herd size

- 20-49 cows: 164.8 bc
- 50-99 cows: 167.9 bc
- 100-149 cows: 173.3 a
- 150-249 cows: 173.0 a
- 250-449 cows: 170.5 ab
- >449 cows: 166.1 ac
Total feed cost and IOFC per cow by region ($/year)

- **North**: $1105.7, Income over feed cost $1071.8
- **Midsouth**: $1731.9, Income over feed cost $1098.4
- **South**: $1629.7

$ vs. $/

- **Total feed cost**
- **Income over feed cost**
Total feed cost per cow by region

Reg. Coefficients with the same letter are not significantly different (P<0.05)
Total feed cost and IOFC per cow by herd size ($/year)

<table>
<thead>
<tr>
<th>Cows</th>
<th>Total feed cost</th>
<th>Income over feed cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-49</td>
<td>1010.2 c</td>
<td></td>
</tr>
<tr>
<td>50-99</td>
<td>1013.3 c</td>
<td></td>
</tr>
<tr>
<td>100-149</td>
<td>1673.6 c</td>
<td>1170.1 b</td>
</tr>
<tr>
<td>150-249</td>
<td>1679.7 c</td>
<td>1123.9 b</td>
</tr>
<tr>
<td>250-449</td>
<td>1767.1 b</td>
<td>1174.8 a</td>
</tr>
<tr>
<td>&gt;449</td>
<td>1786.3 b</td>
<td>1159.4 ab</td>
</tr>
</tbody>
</table>

The graph shows the total feed cost and income over feed cost for different herd sizes, with values provided for each category.
Somatic cells content by region

North: 326.4 c
Midsouth: 399.7 b
South: 435.1 a
Somatic cell score by region

-0.013 b
-0.005 b
-0.058 a

North Midsouth South
Somatic cells content by herd size

- 20-49 cows: 435.8 a
- 50-99 cows: 386.1 bc
- 100-149 cows: 396.2 b
- 150-249 cows: 386.5 bc
- 250-449 cows: 367.8 cd
- >449 cows: 350 d

Legend:
- a
- b
- c
- d

1000/ml
Somatic cell score by herd size

R. Coef: -0.05 a -0.04 b -0.02 cd -0.03 bd -0.03 bc -0.01 d
Conclusions

There were significant differences among regions and herds of different size for most of the variables.

* North had the highest IOFC basically as a result of higher milk production.
  - better reproductive performance and lower incidence of mastitis

* Larger herds had higher IOFC than smaller as a result of higher milk production and same feed cost/cwt.
Conclusions

Over the period from 1990 to 1999:

- Milk production per cow, days open, total feed cost, feed cost/cwt, and IOFC increased

- Somatic cell score decreased

- The rate of change for the studied management parameters varied among regions and herd sizes
Differences among regions:

- Became greater for milk production, SCS, total feed cost, total feed cost/cwt, and IOFC

- Days open were constant
Differences among herd sizes:

- Total feed cost became greater

- Milk production, Days open, Feed cost/cwt, IOFC, were constant

- SCS became smaller
BENCHMARKS USED FOR EVALUATION

SET UP FOR REGION AND HERD SIZE