Choice of breeds and husbandry practices influencing the safety of milk and milk products in smallholder dairy farms in peri-urban Nairobi, focusing on brucellosis

By
Flavien KASSE NDONGO,

Co-authors
Prof. Dr. Anne Válle Zárate, Prof. Erastus Kang’ethe
Dr. Marianna Siegmund Schultze, Dr. Makita Kohei

ICOPHAI congress, Addis Ababa, Sep 2011
Introduction

Kenya: 85% of dairy cattle population in East Africa (Omore, 2004).

Dairy sector: Large farm holders: 20%
Smallholders: 80%, located around cities (Omore, 2004).

Problems: Poor husbandry and processing practices, poor hygiene.

Consequences: Occurrence of livestock diseases such as brucellosis (zoonosis).
Brucellosis prevalence in Kenya: 2% to 15% (Kang’ethe, 2001).

Hypotheses: - Some breeds are more susceptible to brucellosis
- Certain practices increase the risk of contamination of milk with brucellosis

Objectives: - Determine the prevalence of brucellosis in each breed,
- Describe husbandry and processing practices,
- Identify risk factors for brucellosis.
Materials and Methods

Study area: Kasarani Division

- Area: 85 km²
- Population: 339,000 inhabitants

Farm survey

Table 1: Number of farms surveyed in each stratum

<table>
<thead>
<tr>
<th>Herd size</th>
<th>Breed</th>
<th>Exotic</th>
<th>Crossbreed</th>
<th>Local breeds</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small (1 to 3 cows)</td>
<td></td>
<td>17</td>
<td>41</td>
<td>7</td>
<td>65</td>
</tr>
<tr>
<td>Medium (4 to 15 cows)</td>
<td></td>
<td>22</td>
<td>12</td>
<td>1</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>39</td>
<td>53</td>
<td>8</td>
<td>100</td>
</tr>
</tbody>
</table>

- Selection applied: guided by the extension officer
- Milk sample collection: 100 farms and 20 milk shops

Laboratory investigation

- Milk Ring Test
- Indirect ELISA

Data analysis: Mostly descriptive
Results

Breeds kept in Kasarani
- Friesian (85% of farms),
- Guernsey (16% of farms),
  Ayrshire (44% of farms)
  Local breed (8% of farms)

Breeding techniques
- Artificial Insemination : 92%
- Natural mating : 8%

Feeding system
- Zero-grazing : 86%
- Seasonal-grazing : 14%

Feedstuff
(see Table 2)

Table 2: Feedstuff used in Kasarani

<table>
<thead>
<tr>
<th>Feed</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Napier grass</td>
<td>100</td>
</tr>
<tr>
<td>Dairy meal</td>
<td>96</td>
</tr>
<tr>
<td>Natural grasses</td>
<td>86</td>
</tr>
<tr>
<td>Crop residues</td>
<td>84</td>
</tr>
<tr>
<td>Hay</td>
<td>21</td>
</tr>
<tr>
<td>Brewery waste</td>
<td>10</td>
</tr>
<tr>
<td>Poultry waste</td>
<td>6</td>
</tr>
</tbody>
</table>
Results

Milking and processing

– Hand milking : 99%
– Machine milking : 1%

– Processing: Milk fermentation (*mala*)
  • Farmers : 2%
  • Milk sellers : 100%

– Hygienic practices
  • Cleaning the cattle shed
  • Washing hands and utensils before milking
  • Washing and drying the udders before milking
  • Boiling milk before consumption
Results

Milk channels

Dairy farms (producers)

66%

Mobile milk sellers

1%

Milk sellers (shops and bars)

26%

Cooperatives

7%

Consumers

Figure 1: Milk channels in Kasarani
Results

Brucellosis prevalence

- Overall prevalence
  MRT: 6%,
  ELISA: 0%

- Prevalence by breed and system

**Table 3**: Prevalence of brucellosis according to MRT

<table>
<thead>
<tr>
<th>Effect</th>
<th>Categories</th>
<th>Number of infected farms</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>System</td>
<td>Zero-grazing</td>
<td>6 out of 86</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>seasonal-grazing</td>
<td>0 out of 14</td>
<td>0</td>
</tr>
<tr>
<td>Breed</td>
<td>Crossbred</td>
<td>4 out of 53</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Exotic breed</td>
<td>2 out of 39</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Local breed</td>
<td>0 out of 8</td>
<td>0</td>
</tr>
</tbody>
</table>
Results

Figure 2: Observed potential risk factors for brucellosis and other possible hazards likely to occur in different steps of production in Kasarani

Production

Potential risk factors for brucellosis
- From an infected area (33%)
- From areas where prevalence is not known (24%)
- Grazing (14%)
- Use of natural grasses (86%)
- Bull service (8%)
- Calf handling (10%)
- Handling aborted foetus

Other possible biological or chemical hazards
- M. bovis
- C. parvum (Laberge 1996)
- M. bovis (Rahman 2008)
- Antibiotic residues (Omore 2004)
- M. bovis
- Faecal coliforms
- E. coli O157:H7 (Omore 2004)
Figure 3: Observed potential risk factors for brucellosis and other possible hazards likely to occur in marketing channels.
Discussion & Conclusion

No evidences

Potential critical points identified

- **At farm level**
  - Purchasing cow from an infected area
  - Grazing
  - Feeding with natural grasses
  - Natural mating

- **At market level**
  - Collection and mixture of milk from different areas
  - Milk fermentation using unboiled milk

Farmers and sellers have poor knowledge of brucellosis and hygienic practices

Trainings on good farm practices are recommended

Farmer → cooperative → consumer: should be developed
Acknowledgments

Thank you