Feeding and drinking behavior of dairy cows at heat stress

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Introduction

Heat stress in dairy cattle

Increased body temperature
Panting
Drooling
Profuse sweating
Lethargy or restlessness
Search for shade
Increased standing time
Increased water intake
Reduced dry matter/feed intake
Reduced rumination
Reduced milk production
Reduced reproductive performance

- 420€/cow/year
Thermal Heat Index (T.H.I.)


Adapted from: http://www.bom.gov.au/
Heat stress in dairy cattle in Greece

- Period of Heat Stress risk: April to October
- 61.8% of Greek dairy farms located in Central Macedonia (Northern Greece)
- Rural area – Rice cultivation
- By 2021: av. Max Temperature (summer) +2.5°C
  +40 “tropical nights” per year
  (nights when av. temp. >20°C)

Adapted from: National Climate Change Adaptation Strategy (NCCAS), 2015
Objective

Effects of cows’ heat stress on nutritional behavior?
Materials and methods

- Free-stall system with individual beds
- 12 healthy Holstein cows
- 24h video recording for 5 months
- Temperature and relative humidity recorded at 5min. intervals
- Statistical analysis: SPSS® v.21 (a=0.05)
Materials and methods

- Two experimental groups

Controls-C
n=12
Within the thermo-neutral zone
av. T.H.I.=54.6

Heat Stressed-HS
n=12
Under heat stress
av. T.H.I.=87.6
Materials and methods

• Two 24h recordings were evaluated
• Behavioral aspects of feeding and drinking
• Analysis for 3 time zones:
  - Morning: 8.00-12.00,
  - Afternoon: 16.00-18.00 and
  - Evening: 19.00-20.30
<table>
<thead>
<tr>
<th>Time Zone</th>
<th>Activity (minutes)</th>
<th>Group</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>±SE</td>
</tr>
<tr>
<td>M + A + E</td>
<td>Feeding</td>
<td>39.28*</td>
<td>4.955</td>
</tr>
<tr>
<td></td>
<td>Drinking</td>
<td>12.63</td>
<td>4.752</td>
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</tbody>
</table>

P ≤ 0.05

P e 0.05
## Results

<table>
<thead>
<tr>
<th>Time Zone</th>
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<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>±SE</td>
</tr>
<tr>
<td>M</td>
<td>Feeding</td>
<td>60.62*</td>
<td>9.276</td>
</tr>
<tr>
<td></td>
<td>Drinking</td>
<td>26.57</td>
<td>12.359</td>
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<tr>
<td>Time Zone</td>
<td>Activity (minutes)</td>
<td>Group</td>
<td>Significance</td>
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<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>±SE</td>
</tr>
<tr>
<td>A</td>
<td>Feeding</td>
<td>22.95*</td>
<td>6.093</td>
</tr>
<tr>
<td></td>
<td>Drinking</td>
<td>3.86*</td>
<td>0.596</td>
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</tbody>
</table>
## Results

<table>
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<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean ±SE</td>
<td>Mean ±SE</td>
</tr>
<tr>
<td>E</td>
<td>Feeding</td>
<td>32.33 5.383</td>
<td>27.84 3.340</td>
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<tr>
<td></td>
<td>Drinking</td>
<td>4.57 0.785</td>
<td>2.97 1.005</td>
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</tbody>
</table>
Conclusions

• Stressed cows spent significantly more time feeding in total, while their drinking activity was limited.
Conclusions

More feeding (Pd0.05) 53.4% less drinking
Conclusions

79.15% less feeding

80.45% more drinking (P<0.05)
Conclusions

Similar eating and drinking time (P<0.05)
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Thank you for your attention!