COMPARISON OF METHODS TO QUANTIFY BITE RATE IN CALVES GRAZING WINTER OATS WITH DIFFERENT STRUCTURES
INTRODUCTION

Argentina
INTRODUCTION

IGER Solid-State Behaviour Recorder (SSBR)

Developed to record jaw movements of cattle and sheep grazing temperate ryegrass pastures

Graphical representation of grazing jaw movements from associated software ‘Graze’

Bites are identified by the presence of a secondary sub-peak

Non-biting

GJM

Bites
INTRODUCTION

However, in our previous studies of grazing behaviour on young ruminants (calves) grazing tall pastures of winter oats or ryegrass the SSBR-Graze method appeared to fail in the identification of biting jaw movements.
QUESTIONS

✓ Can the SSBR-Graze method be used to accurately identify biting jaw movements in this scenario?

✓ Can the accuracy of SSBR-Graze be dependent of the sward structure?

✓ In addition, can the acoustic recorder method provide reliable results?
OBJECTIVE

To compare three methods for identifying biting jaw movements:

   Visual Observation (VO)

   Solid State Behaviour Recorder (SSBR)

   Acoustic Recorder (AR)

in calves grazing winter oats with different structures.
MATERIALS & METHODS

- **Sward**: winter oats (Avena sativa) with 3 different sward surface height (SSH):
  
  - **T** (Tall)
  - **M** (Medium, $T \times 0.5$)
  - **S** (Short, $T \times 0.25$)
MATERIALS & METHODS

Three sward structures:

- TALL: 50.4 cm
- MEDIUM: 25.3 cm
- SHORT: 13.9 cm
### MATERIALS & METHODS

**Sward characteristics:**

<table>
<thead>
<tr>
<th>Structure</th>
<th>SSH (cm)</th>
<th>Herbage Mass (g DM m(^{-2}))</th>
<th>L:PS</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>50.4 ± 9.9</td>
<td>550.4 ± 73.8</td>
<td>2.01 ± 0.24</td>
</tr>
<tr>
<td>M</td>
<td>25.3 ± 4.9</td>
<td>303.5 ± 84.3</td>
<td>1.02 ± 0.36</td>
</tr>
<tr>
<td>S</td>
<td>13.9 ± 3.4</td>
<td>143.8 ± 42.6</td>
<td>0.28 ± 0.25</td>
</tr>
</tbody>
</table>
MATERIALS & METHODS

**Animals**: 9 Holstein-Friesian calves (138 ± 11 kg BW)

**Measurements**: Bite rate (5 minutes grazing sessions) by:
- VO (4 observers)
- SSBR-Graze
- AR

**Experimental protocol**: Calves grazed the 3 sward structures on a random sequence
3 animals per day
MATERIALS & METHODS

Experimental Protocol

DAY 1

DAY 2

DAY 3

5 minutes 5 minutes 5 minutes 5 minutes 5 minutes 5 minutes 5 minutes 5 minutes 5 minutes
MATERIALS & METHODS

Quantification of number of bites

SSBR - Graze 8.0

AR - Aurally and by wave pattern

VO – Mean value of 4 observers
MATERIALS & METHODS

Statistical Analysis

Bite rate

Number of bites eating time$^{-1}$

 Analysed as a completely randomised design - ANOVA

Individual animals: replicates
RESULTS

No significant differences in the number of bites recorded by the 4 observers ($P=0.48$)
RESULTS

Bite Rate (number of bites minute$^{-1}$):

<table>
<thead>
<tr>
<th>Structure</th>
<th>VO*</th>
<th>SSBR</th>
<th>AR</th>
<th>RMSE</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>37$^a$</td>
<td>29$^b$</td>
<td>37$^a$</td>
<td>8.0</td>
<td>0.03</td>
</tr>
<tr>
<td>M</td>
<td>44$^a$</td>
<td>33$^b$</td>
<td>43$^a$</td>
<td>5.1</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>S</td>
<td>37$^a$</td>
<td>32$^b$</td>
<td>38$^a$</td>
<td>4.7</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Independently of the structures, bite rate showed significant differences between VO and SSBR.

However, there were no differences between VO and AR.

*Mean value of the 4 observers
CONCLUSIONS

- In this context, the SSBR-Graze method failed to quantify the number of bites.

- Acoustic Recorder showed to be a reliable method to estimate the number of bites.

- However, the lack of a software for identifying and classifying the jaw movements of the sound files restricts its use to short term experiments.
THANK YOU FOR YOUR ATTENTION