Corn Silage Management Practices on California Dairies

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Objectives

1. Describe current silage management practices on California’s San Joaquin Valley dairies.

2. Identify opportunity to optimize silage management.
Methodology

In April 2013, a silage management survey was mailed to dairy producers in California’s San Joaquin Valley.
Methodology

Producers received an envelope containing:

1) an invitation letter to participate in the study,
2) a double sided two-page survey, and
3) a pre-paid return envelope.
Response rate was 14.5% (161/1,100).

Herd size:

- < 500 cows (n=21)
- 500 to <1,000 cows (n=40)
- 1,000 to <2,000 cows (n=46)
Results Outline

- Silage Harvest
- Silage Covering
- Monitoring Silage
- Silage Feeding
- Future Considerations
Silage Harvest
Who decides the harvest date?
# Who decides harvest date?

- **Dairy producer alone (53.5%)**
- **Dairy producer + Grower, Chopper and/or Nutritionist (23.3%)**
- **Chopper (12.0%)**
- **Grower (7.3%)**
- **Nutritionist (0.7%)**

- No dairies involved all members of the silage team.
- Nutritionists were involved in only four dairies.
How is dry matter evaluated prior to harvest date?
A total of 37.5% of the surveys provided no information on how dry matter was evaluated. Almost all respondents estimated dry matter by checking the milk line.
What is the chopping capacity during harvest?
Most dairies used two choppers during harvest. The most popular chopper size was 8 row. In 25% of dairies, harvest capacity was 16 rows or more (up to 40 rows).

<table>
<thead>
<tr>
<th>Number of Choppers</th>
<th>Dairies (%)</th>
<th>N= 145</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>35.9</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>50.3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td>4 or 5</td>
<td>2.7</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chopper Size</th>
<th>Dairies (%)</th>
<th>N= 147</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 row</td>
<td>17.7</td>
<td></td>
</tr>
<tr>
<td>8 row</td>
<td>67.3</td>
<td></td>
</tr>
<tr>
<td>10 row</td>
<td>15.0</td>
<td></td>
</tr>
</tbody>
</table>
What is the packing capacity and delivery rate?
### Packing Tractor and Delivery Rate

<table>
<thead>
<tr>
<th>Packing Tractors</th>
<th>Dairies (%)</th>
<th>Mean Delivery Rate (tons/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>70.3</td>
<td>186</td>
</tr>
<tr>
<td>2</td>
<td>28.9</td>
<td>179</td>
</tr>
<tr>
<td>&gt;2</td>
<td>1.4</td>
<td>200</td>
</tr>
</tbody>
</table>

- Most dairies were using a single packing tractor.
- In 50% of dairies, delivery rate ranged from 150 to 200 tons/hour.
Do you weigh every truck load during harvest?
• **Only 62%** of dairies weighed every truck load delivered to the dairy. An on-farm scale was the most common scale used.
How many varieties and fields do you put in one silage structure?
Fields and Varieties in One Structure

- **Number of fields:**
  30% of dairies put six or more fields in the same silage structure (up to 21 fields, 3,000 cow herd).

- **Number of varieties:**
  23% of dairies planted three to five varieties.
How long does it take to fill the largest structure?
Most dairies (48.5%) filled their silage structure in \( \leq 3 \) days.

- In four dairies, filling the silage structure took 30 days or more.
How long do you wait before feeding?
• Only 11.1% of the producers waited more than 8 weeks before they fed the new silage.
Do you use inoculants during harvest?
Inoculants were used in 56% of the dairies.

- Inoculants were applied on the chopping equipment (72%), on top of the truck (21%), and during packing (7%).
Silage
Covering
When do you cover your silage?
Covering Silage Structures

• Most dairies (68.8%) covered their silage structure within 24h after structure completion. All dairies covered by 72h.
• A total of 20% of the dairies reported to cover silage as it was filled.
What do you use to cover your silage?
Double plastic layer was used by 70.9% of the dairies. Most of those using double plastic layer (88.4%) used oxygen barrier technology.
How often do you pull your plastic back?
• A total of 45.5% of the dairies reported pulling back the plastic once a week.
How many feet of plastic are you removing?
A total of 36.4% of the dairies reported pulling 7 feet or more of plastic each time.
Silage Monitoring
Do you evaluate DM during harvest?
### Dry Matter during Harvest

- Only **67%** dairy producers monitored dry matter during harvest.

<table>
<thead>
<tr>
<th>Dry Matter Method</th>
<th>Dairies %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Lab</td>
<td>41.7</td>
</tr>
<tr>
<td>Koster tester</td>
<td>39.6</td>
</tr>
<tr>
<td>Microwave</td>
<td>5.9</td>
</tr>
<tr>
<td>Commercial lab plus microwave/koster</td>
<td>11.8</td>
</tr>
<tr>
<td>Squezing/Truck weights</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Do you evaluate particle length and kernel processing?
Chop length was monitored in 80.4% of the dairies. Only 4% of the dairies reported to monitor chop length with a measuring tape or Penn State Shaker box.
Most dairies (92.5%) monitored kernel processing. Most of them visually, and only 4% by using the bucket method.
Silage Feeding
How do you remove your silage from the structure?
Silage Removal

- 85.1% front end loader
- 10.8% rake
- 4.1% facer
What is the depth and width removed each day?
Width and Depth Removed

<table>
<thead>
<tr>
<th>Width Removed</th>
<th>Depth Removed (in)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt; 6</td>
<td>6 to &lt;12</td>
</tr>
<tr>
<td>Whole</td>
<td>22</td>
<td>15</td>
</tr>
<tr>
<td>Half</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Third</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Fourth</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Total (%)</td>
<td>25.5</td>
<td>21.3</td>
</tr>
</tbody>
</table>

- Whole width of the face was removed in 53.9% of the dairies.
- <6 in. were removed in 25% of the dairies.

Dairies (n)
How many inches of spoiled forage are on the top surface?
Top Surface Spoilage

- A total of 10% of the dairies had spoilage above 6 inches
What animals are fed the spoiled forage?
33% of the dairies fed spoiled silage to heifers and/or dry cows.
12% of the dairies fed spoiled silage to lactating cows, heifers and dry cows.
Future Considerations
### Future Considerations for Silage Management

<table>
<thead>
<tr>
<th>Future consideration for silage management</th>
<th>1†</th>
<th>2</th>
<th>3</th>
<th>Responses (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase silage storage area</td>
<td>24.3</td>
<td>55.9</td>
<td>19.9</td>
<td>136</td>
</tr>
<tr>
<td>Increase the number of packing tractors</td>
<td>29.7</td>
<td>37.0</td>
<td>33.3</td>
<td>138</td>
</tr>
<tr>
<td>Plant brown mid-rib (BMR) varieties</td>
<td>23.7</td>
<td>34.4</td>
<td>42.0</td>
<td>131</td>
</tr>
<tr>
<td>Buy a defacer to remove silage</td>
<td>13.7</td>
<td>33.1</td>
<td>53.2</td>
<td>139</td>
</tr>
<tr>
<td>Create drive-over piles</td>
<td>34.8</td>
<td>32.6</td>
<td>32.6</td>
<td>138</td>
</tr>
<tr>
<td>Pour concrete pads for silage storage</td>
<td>64.7</td>
<td>29.5</td>
<td>5.8</td>
<td>139</td>
</tr>
<tr>
<td>Harvest corn as shredlage</td>
<td>3.2</td>
<td>28.2</td>
<td>68.5</td>
<td>124</td>
</tr>
<tr>
<td>Purchase a farm scale</td>
<td>51.1</td>
<td>27.7</td>
<td>21.2</td>
<td>137</td>
</tr>
<tr>
<td>Use oxygen barrier technology film to cover</td>
<td>63.2</td>
<td>23.5</td>
<td>13.2</td>
<td>136</td>
</tr>
<tr>
<td>Use inoculants</td>
<td>57.8</td>
<td>17.0</td>
<td>25.2</td>
<td>135</td>
</tr>
<tr>
<td>Build bunkers</td>
<td>8.2</td>
<td>7.5</td>
<td>84.3</td>
<td>134</td>
</tr>
<tr>
<td>Kernel process corn silage</td>
<td>89.0</td>
<td>6.6</td>
<td>4.4</td>
<td>136</td>
</tr>
</tbody>
</table>

†1 = I am already doing this; 2 = I would like to do this in the future; 3 = I will not do this in the future
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Silage pit in the Central Valley (late 1930’s)
Photo Courtesy of Alan George, retired UCCE Farm Advisor in Tulare County