Defining “Lamb” Maturity

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ASI Convention
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What is Lamb?

1) Young Sheep (32%)
2) Red Meat Alternative (25%)
3) Delicious and Flavorful Attributes (20%)
4) Delicacy, High End Meat (9%)
5) Healthy Protein (7%)
6) Other (6%)

Hoffman et al., 2015
Dine a Little on the Wild Side
Tamarack Lamb & Wool

- Lamb sticks vs. Sheep/Mutton sticks
- Grass-fed meat
- Naturally raised lamb
  - Grazing management
    - Carbon sequestration
    - Improved soil biology
  - “Healthier for you, the planet, and better for the animals.”
- Wholesome, savory product
BCS Livestock

- 100% natural grass fed ground lamb
- Producing and marketing local lamb and wool
- Labeling meat as ground mutton
- Sold at the Evergreen IGA in Winthrop, WA
Meat from an ovine carcass is labeled either as lamb, sheep, or mutton.
Product Uniformity
Lamb Flavor = Quality Eating Experience
Age Determination for Lamb

65% of respondents request young lamb; most commonly described as under one year of age as lamb.

“People would rather pay a little more money than buy a bad-flavored, gamey lamb.”

“Absolutely, young lamb is necessary. I tend to gravitate to smaller, younger lambs because I think the flavor is so much better. There is no gamey flavor in young lamb. If bigger lamb tasted that good, I would buy them, but they don't. From a retail standpoint they probably don't look as big, so I understand.”

“The lambs need to be under one year of age. We need to clearly define what lamb is in the U.S.A.”

Hoffman et al., 2015
USDA Yield/Quality Grade

Are USDA Yield and Quality Grade standards and application currently meeting the needs of the industry?

USDA Yield Grade: 8.3% of Retailers
USDA Quality Grade: 33.3% of Retailers
Grocers and Grading

- If grocers were worried about animal age/size, they purchased small (< 65 lb) carcasses.

- “When big lambs came through. Lots of store complaints and have to trim a lot of fat. If meat cutter is not happy with the product they tend to not sell it.”
United States Standards for Grades

Live animal descriptors of age class include:

- **Lamb** – an immature ovine (usually less than 14 months of age) that has not cut its first pair of permanent incisor teeth.

- **Yearling** – an ovine (usually between one and two years of age) that has cut its first pair of permanent incisor teeth but not the second pair.

- **Sheep** – an ovine (usually greater than 24 months of age) that has cut its second pair of permanent incisor teeth.
USDA-FSIS does not have a specific definition for “lamb” nor explicitly identify boundaries for age of animal in product labeling originating from ovine (sheep) species.

The only age-specific labeling claim includes the term “spring lamb” or “genuine spring lamb,” applicable only to carcasses of new-crop lambs slaughtered during the period of March and the first week of October.
FSIS Directive 6100.2

Defined that a young sheep or lamb (ovine) carcass meets the following criteria:

1. The presence of a break joint (epiphysis) of the distal metacarpal bone of either foreleg

2. Written documentation that the ovine is less than 14 months of age

3. The non-eruption of the first pair of permanent incisors is also considered adequate support for labeling sheep as “lamb.”
• Cut gall bladder bile duct (tapeworms)
• Palpate the kidneys
• Palpate lymph nodes
  – prefemoral, superficial inguinal, supramammary, popliteal, and prescapular
• Palpate the back, sides, and shoulders
• Lift the forelegs
Dentition

Photo: Sheep CRC & MLA
Break/Spool Joints
Break/Spool Joints
Yearling

Acceptable terms for meat derived from sheep between one and two years of age include “yearling ovine,” “yearling mutton,” and “yearling sheep meat,” but not “yearling lamb.”

---USDA Policy Labeling Book
False or Misleading Labeling

Code of Federal Regulations (9 CFR Part 317.8)

• USDA-FSIS personnel indicated that to label product as lamb that does not meet the FSIS policy on lamb labeling is false or misleading.

• All lamb is inspected for wholesomeness; however, since grading is not mandatory, the overall quality of ungraded lamb may be higher or lower than USDA-graded lamb found at retail.
Uniformity of Labeling

• Is ground/processed meat from a 5 year old ewe labeled lamb/sheep meat/mutton?
• How does old crop or “ungraded” lamb fit?
• Can we improve consistency of American Lamb with USDA Directive 6100.2?
Least squares means for lamb flavor attributes between age class (corresponding range of ground cooked patties).

<table>
<thead>
<tr>
<th>Age(^1)</th>
<th>Lamb flavor Intensity</th>
<th>Off-flavor</th>
<th>Aroma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamb</td>
<td>27.38(^a) (16-43)</td>
<td>9.42(^b) (0-28)</td>
<td>29.65 (19-42)</td>
</tr>
<tr>
<td>Yearling</td>
<td>21.44(^b) (12-35)</td>
<td>5.32(^b) (0-26)</td>
<td>31.76 (16-45)</td>
</tr>
<tr>
<td>Mature</td>
<td>24.56(^{ab}) (14-44)</td>
<td>22.56(^a) (1-63)</td>
<td>29.0 (22-53)</td>
</tr>
</tbody>
</table>

| SEM       | 1.40                   | 1.84       | 1.40 |
| P-Value   | 0.0151                 | <0.0001    | 0.3423 |

\(^{a, b, c}\) Means within column lacking common superscripts differ (P < 0.05).

\(^1\)Age Lamb = 0 permanent incisors; Yearling = 2 permanent incisors; Mature = 2+ permanent incisors.
Off-flavor ratings for sex by weight

Hoffman et al., 2017
Animal Age & Flavor

<table>
<thead>
<tr>
<th>Item</th>
<th>Lamb</th>
<th>Long-fed</th>
<th>SEM 3</th>
</tr>
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<tbody>
<tr>
<td><strong>Longissimus dorsi</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lamb flavor intensity</td>
<td>38.7 f</td>
<td>44.3 e</td>
<td>3.57</td>
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<tr>
<td>Off-flavor intensity</td>
<td>11.4 d</td>
<td>14.1 c</td>
<td>2.73</td>
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<tr>
<td><strong>Ground shoulder patty</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Lamb flavor intensity</td>
<td>36.7 f</td>
<td>42.1 e</td>
<td>3.36</td>
</tr>
<tr>
<td>Off-flavor intensity</td>
<td>9.2 f</td>
<td>12.9 e</td>
<td>2.53</td>
</tr>
</tbody>
</table>

Jaborek et al., 2016
### Animal Age & Flavor

<table>
<thead>
<tr>
<th>Item</th>
<th>Lamb</th>
<th>Yearling</th>
<th>Mature</th>
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<tbody>
<tr>
<td><strong>Longissimus dorsi</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Lamb flavor intensity</td>
<td>39.9</td>
<td>40.9</td>
<td>44.5</td>
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<tr>
<td>Off-flavor intensity</td>
<td>11.2&lt;sup&gt;d&lt;/sup&gt;</td>
<td>10.6&lt;sup&gt;d&lt;/sup&gt;</td>
<td>17.7&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Ground shoulder patty</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lamb flavor intensity</td>
<td>37.8&lt;sup&gt;d&lt;/sup&gt;</td>
<td>41.8&lt;sup&gt;cd&lt;/sup&gt;</td>
<td>44.4&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Off-flavor intensity</td>
<td>9.7</td>
<td>12.2</td>
<td>14.1</td>
</tr>
</tbody>
</table>

Jaborek et al., 2016
Table 5.5. Frequency of off-flavors identified by panelists in ground shoulder samples from ewes in Trial 1.

<table>
<thead>
<tr>
<th>Item</th>
<th>Total</th>
<th>Diet</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>WSC</td>
<td>Alfalfa</td>
<td>Lamb</td>
<td>Yearling</td>
<td>Mature</td>
<td></td>
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<tr>
<td>Sweet</td>
<td>8.41</td>
<td>6.47</td>
<td>10.29</td>
<td>5.74</td>
<td>11.93</td>
<td>7.89</td>
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<tr>
<td>Sour</td>
<td>4.35</td>
<td>1.18</td>
<td>7.43</td>
<td>1.64</td>
<td>5.50</td>
<td>6.14</td>
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<tr>
<td>Salty</td>
<td>8.41</td>
<td>7.06</td>
<td>9.71</td>
<td>5.74</td>
<td>9.17</td>
<td>10.53</td>
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<tr>
<td>Bitter</td>
<td>3.48</td>
<td>4.00</td>
<td>2.94</td>
<td>0.82</td>
<td>4.59</td>
<td>5.26</td>
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<tr>
<td>Umami/meaty</td>
<td>17.70</td>
<td>14.12</td>
<td>21.14</td>
<td>14.75</td>
<td>17.43</td>
<td>21.05</td>
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<tr>
<td>Browned</td>
<td>13.91</td>
<td>11.76</td>
<td>16.00</td>
<td>12.30</td>
<td>15.60</td>
<td>15.04</td>
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<tr>
<td>Metallic</td>
<td>11.01</td>
<td>12.35</td>
<td>9.71</td>
<td>9.84</td>
<td>11.01</td>
<td>12.28</td>
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<tr>
<td>Livery</td>
<td>10.14</td>
<td>8.24</td>
<td>12.00</td>
<td>6.56</td>
<td>11.01</td>
<td>13.16</td>
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<tr>
<td>Bloody</td>
<td>1.45</td>
<td>1.76</td>
<td>1.14</td>
<td>2.46</td>
<td>0.92</td>
<td>0.88</td>
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<tr>
<td>Fecal/Barnyard</td>
<td>11.30</td>
<td>9.41</td>
<td>13.14</td>
<td>5.74</td>
<td>11.93</td>
<td>16.67</td>
<td></td>
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<tr>
<td>Urinary/Ammonia</td>
<td>5.51</td>
<td>7.06</td>
<td>4.00</td>
<td>5.74</td>
<td>4.59</td>
<td>6.14</td>
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<tr>
<td>Others</td>
<td>2.61</td>
<td>3.53</td>
<td>1.71</td>
<td>0.82</td>
<td>3.67</td>
<td>3.51</td>
<td></td>
</tr>
</tbody>
</table>
American Lamb

• Do we know our bullseye?

• How do we get there?

• Can we do it consistently?

Beginning with the End in Mind!
Any Questions???

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