Modified Step-point System for Botanical Composition and Basal Cover Estimates

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Highlight: Instructions for use and assembly are presented for a modified step-point sampler. Modifications were made to eliminate bias and to increase ease of use.

Basal-hit, single point sampling in botanical census has been shown to be effective and efficient (Goodall, 1952). Evans and Love (1957), describing the step-point method of sampling, concluded that the method's accuracy and objectivity made it suitable for valid analysis of field research plots.

Step-point sampling uses a single pin lowered perpendicularly to the soil surface through a notch in the toe of the sampler's boot at a 30° angle to the ground. Basal or foliage hits may be recorded. Nonplant hits are recorded as misses and the species nearest to the point in a forward, 180° arc is recorded. Information is obtained for basal or foliage cover of individual species, their collective total, and for percentage composition. An estimated frequency may be obtained by grouping points.

Subconscious selection of plants that affects pin placement is a serious defect (Cain and Castro, 1959; Goodall, 1952), which random selection of a single pin from a point frame with several pins would alleviate (Goodall, 1952). Using a single pin instead of groups of pins reduces the number of points needed for comparable accuracy (Blackman, 1935; Goodall, 1952; Greig-Smith, 1957). Single pin measurements require one-third as many points as groups of pins do for comparable accuracy (Goodall, 1952), and time required is reduced to one-sixth or one-eighth that required for the point-frame method (Evans and Love, 1957).

The point-frame modification presented here seeks to eliminate subconscious bias in point placement and to make single-point sampling easier.

Point-frame Design

The basic design of the point frame is shown in Figure 1. The sampling point (a) is offset from the initial ground contact (b) to alleviate subconscious placement by the sampler. The distance it is offset varies with the angle the point rod makes with the horizontal. The inset shows the

Fig. 1. Diagram of the modified step-point sampler (a—sample point, b—initial contact points).
Pine Sawdust as a Roughage Replacement in Gestating Beef Heifer Rations

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Highlight: No abortive tendencies were noted with Angus X Hereford crossbred heifers when fed a corn-roughage ration containing 25% sawdust during the last one-third of the pregnancy period. Inclusion of sawdust in the ration did not affect the calving difficulty score or birth weights.

Previous studies have shown that pine sawdust levels up to 10% of the total ration presented no visible toxicity symptoms with calves fed a growing ration during a 90-day period (Kamstra and Minyard, 1970). Also, no detrimental effects on either feedlot performance or carcasses were shown with cattle fed high energy rations for 115 days when sawdust was used to replace half the alfalfa roughage in a 90% concentrate ration. (Sylter and Kamstra, 1971b).

Sawdust has been suggested as a possible roughage in wintering rations for breeding stock in the range areas when other roughage materials are in short supply. The purpose of this study was to ascertain whether any toxicity might result from incorporating sawdust in wintering rations for pregnant heifers. Special emphasis was given to the possibility of embryonic abortion, since pine needles have been suggested as a causitive factor by Canadian researchers as early as 1927 (Bruce, 1927).

Materials and Methods

Twelve Angus X Hereford crossbred pregnant heifers were randomly allotted to two pens of six each. Experimental rations consisted of either 20 lb per head daily of grass and alfalfa loose hay or 20 lb of a mixed ration consisting of 25% ground corn, 25% sawdust, and 50% ground alfalfa hay starting December 24, 1970. These rations were calculated to be approximately equivalent in TDN and crude protein levels. Trace mineral salt and dicalcium phosphate (50-50) were provided free choice. Animals were weighed monthly, calves were weighed at birth, and calving difficulty was subjectively scored (Table 1, footnote). Animals were taken off treatment at calving.

Results and Discussion

No abortive tendencies were observed during this trial. The first calf was born February 18 and the last calf on June 8. Sawdust feeding was terminated on March 16, since only two animals remained on each treatment. The average calving date was March 23 and March 22 for the control and sawdust groups, respectively. One set of twins was born in the sawdust-fed group, although not attributable to sawdust feeding. Both rations supported adequate weight gains during the period fed (Table 1).

No significant differences were noted in calving difficulty or calf birth weights (Table 1).

Table 1. Weight changes and calving results.

<table>
<thead>
<tr>
<th>Ration</th>
<th>Control</th>
<th>25% Sawdust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number in lot</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Average wt 12-24-70</td>
<td>878.3</td>
<td>883.3</td>
</tr>
<tr>
<td>Average wt 03-16-71</td>
<td>904.2</td>
<td>925.8</td>
</tr>
<tr>
<td>Average calving score</td>
<td>1.7</td>
<td>2.3</td>
</tr>
<tr>
<td>Average birth wt of calves</td>
<td>56.7</td>
<td>59.4</td>
</tr>
</tbody>
</table>

1Weights included four heifers post-calving and two pre-calving in each lot.
2Scored as follows: 1 = no difficulty; 2 = slightly difficult; 3 = difficult, calf puller needed; 4 = extremely difficult.
3Includes one set of twins.

Previous work (Kamstra and Minyard, 1970) would suggest that not only is sawdust, fed at levels up to 25% of the ration, nontoxic, but it serves as a nutritive component as well. They found that fecal excretion of fiber did not increase proportionally with increases in sawdust in the ration. Increasing the level of sawdust from zero to 5% increased fecal fiber excretion from 39.6% to 40.0%; but when sawdust was increased to 25% of the ration, the feces contained only 46.6% fiber. In vitro dry matter digestibility ranged from 6 to 10% when used as the only substrate during a 48-hour fermentation period. This would suggest that stock could not be maintained on high sawdust rations unless the sawdust is treated to increase utilization, even if abortive tendencies or other toxicity factors were not critical.

Summary and Conclusions

Feeding a ration containing 25% raw pine sawdust to first-calf beef heifers during the last one-third of gestation resulted in no abortion or intake problems. No differences were noted in calf birth weights or calving difficulty in heifers fed the control or sawdust rations. Based on these results, it would appear