PROGRESS REPORT
ON GRAZING CAPACITY AND TREE REPRODUCTION STUDIES
Period July 3 to July 16 inclusive

A summary of the results of the last two weeks shows a good many interesting things, particularly the trend of the livestock weights, plant utilization, and tree-seedling mortality. The cattle are now being handled on foot during weighing time. They are driven to the corrals and put through the scale without the aid of horses.

Important notes on utilization are being obtained by using field glasses to observe the grazing habits of the cattle. By approaching the animals slowly and carefully it is possible to get within a relatively few feet (8 to 50) of them, and even without field glasses observations can be made on their selection and grazing of plant species.

Daily records are now being made on salt consumption, and an initial effort started to check the losses attributable to climatic factors, rodents, and game. A study of the accompanying tables will indicate the trends of some of the factors measured.

Climate

Only a trace of precipitation was recorded during this period and temperatures were slightly lower than in the previous weeks, although not enough to materially hinder the trend of plant growth and development or to affect the behavior of the livestock. It is significant that critical temperatures occur close to the ground surface. Notice in the table that a minimum freezing temperature of 30°F was recorded 1/4 inch below the ground surface, whereas the minimum air temperature 4 1/2 feet above the ground in the instrument shelter was 36°. At the other extreme, a maximum of 158°F was recorded for the
CUMULATIVE PROGRESS REPORT SUMMARY
BURGESS SPRING EXPERIMENTAL RANGE
June 19 to July 16 inclusive

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1. Precipitation (inches)  
   Max. 0  0
   Av. max. 89  84
   Av. min. 80  76
   Min. 47  46

2. Air temperature (°F)  
   Max. 157  158
   Av. max. 151  144
   Av. min. 42  41
   Min. 30  36

3. Soil temperature (°F)  
   (1/4" below ground surface)  
   Max. 33  35
   Av. 20  25
   Min. 5  7

4. Relative humidity (%)  
   Av. max. 62  72
   Av. min. 16  20

5. Wind movement (miles/day)  
   Max. 10  11
   Av. 8  8
   Min. 6  3

6. Evaporation  
   Porous cup atmometer (cc's/day)  
   Max. 99
   Av. 72  64
   Min. 15

   Water trough (gallons/day)  
   Max. 6  7
   Av. 8  3
   Min. 6  3

7. Water consumption  
   (gallons/day/steer)  
   6  7

8. Water yield, Cone Troughs well  
   (estimated % of capacity)  
   100  100

9. Salt consumption  
   (lbs/day/steer)  
   0.11  0.09

10. Animal weights, lbs. (Av./steer)  
    Total gain to  
    Breed No. 6/19 7/2 7/16 7/16/animal  
    Angus 5 711 772 821 110
    Hereford 5 776 835 872 96
    Shorthorn 5 781 847 903 122
    All breeds 15 756 818 866 110
    Gain per day for period 4.4 3.4
    Cumulative total gain from  
    June 19 to end of period 62 110
11. Plant utilization by cattle
The 12 key species utilized during each period are listed approximately in order of preference and volume consumed. Number 1 denotes top rank and number 12 bottom rank.

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<table>
<thead>
<tr>
<th>Order</th>
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<tbody>
<tr>
<td>Carex sp.</td>
<td>1 3</td>
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<tr>
<td>Festuca idahoensis</td>
<td>4 1</td>
</tr>
<tr>
<td>Bromus marginatus</td>
<td>3 6</td>
</tr>
<tr>
<td>Sitanion hystrix</td>
<td>5 8</td>
</tr>
<tr>
<td>Crepis acuminata</td>
<td>6</td>
</tr>
<tr>
<td>&quot; monticola</td>
<td>2</td>
</tr>
<tr>
<td>Eriogonum nudum</td>
<td>7</td>
</tr>
<tr>
<td>Balsamorhiza sagittata</td>
<td>8 5</td>
</tr>
<tr>
<td>Stipa elmeri</td>
<td>9 11</td>
</tr>
<tr>
<td>Phacelia heterophylla</td>
<td>10</td>
</tr>
<tr>
<td>Senecio arnicaoides</td>
<td>11</td>
</tr>
<tr>
<td>Purshia tridentata</td>
<td>12 2</td>
</tr>
<tr>
<td>Aster sp.</td>
<td>4</td>
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<tr>
<td>Achillea millifolium</td>
<td>7</td>
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<tr>
<td>Geum triflorum</td>
<td>9</td>
</tr>
<tr>
<td>Gilia leptalea</td>
<td>10</td>
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<tr>
<td>Eriophyllum sp.</td>
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Approximate average moisture content of forage for period: 70 63

12. Pine seedling record
No. alive at end of period: 2308 1366
No. died during period: 848 937
Cumulative mortality from June 19 to end of period: 848 1785
Estimated mortality for period by causes (%)
- Climatic factors: 85 95
- Rodents, insects, etc.: 10 4
- Livestock: T T
- Unknown: 5 1
soil temperature compared with a maximum air temperature of 84°F. This points to the necessity of measuring temperatures as well as other factors at a time and place that most nearly correlate with the reactions of the factors studied.

Humidity values went up during this slightly cooler weather, as would be expected. Wind movement increased appreciably, but interestingly enough the trends in evaporations followed temperature and humidity rather than wind velocity. An average of about 8 gallons of water was lost from the evaporation trough, which is a duplicate of the one out of which the cattle drink water. The size is approximately 40 inches wide and 16 feet long.

Forage

The forage still showed a high moisture content but there was an indication of the beginning of a decline. The forage crop was at its peak of development and growth during this period, and the beginning of mass drying was evident.

The cattle continued to do the unexpected and grazed species of plants that were least expected to be grazed. Festuca, Carex, Bromus marginatus, Sitanion and Balsamorhiza, as previously, formed the bulk of the feed. In addition, however, Purshia tridentata, Aster, Achillea, Geum and Eriophyllum were important additions.

Some of the plants previously grazed such as Crepis monticola, C. acuminata, and Senecio sp., dried up and contributed but a small amount to the bulk this time. Purshia tridentata was first grazed late in the last period and formed a most important part of the feed during the last 14 days. The rather heavy use of Aster sp., Geum triflorum, Gilia leptalea and Eriophyllum sp. was a new observation.
The heavy use of Sitanion hystrix and the last-named herbs is in opposition to general reports on this species. What the cattle will eat hereafter will be seen in later reports. Although they are quite selective in what they eat during short periods, it seems that they will ultimately graze most of the species on the area at one stage of plant growth or another.

Livestock

The average gain in weight of 3.4 lbs. per steer from July 3 to July 16 is still a phenomenal increase for a cut-over timber range type. It can hardly be considered that the steers have not regained the shrinkage losses that they suffered on their drive to the range and that the present gains in weight are not a good reflection of the value of the type for producing beef.

A range of this character will have to be considered as an important beef-producing area and will have to be rated high in the classification of the ranges of the State. For what length of time gains can be expected on this type will be partially answered by future examinations, but the fact that the animals came on to the range three weeks late prevents the story from being completed for the early part of the season. As a matter of fact, it seemed that substantial gains could have been made by the cattle even before June 1.

One of the things that this year's work has pointed up so far is the desirability of running stock on the experimental range from a very early date to a relatively late one so as to get a full curve on the reaction of livestock to the forage. This will be tried next year.

The order of increase in weights of the different breeds is still the same. The Shorthorns are first, the Angus second, and Herefords last. The
comparison between breeds is weakened by the lack of close uniformity among the steers. The importance of selecting animals of the same age, size, conformation, type, etc. has been emphasized by the results obtained to date. In future work, careful selection of animals will have to be made whether one or more than one breed is used.

One factor which has contributed to the unsatisfactoriness of the weights obtained for the animals has been that of water consumption before weighing. It is practically impossible to get all of the cattle to drink or to get those that do take water to take a "normal" fill. The excitement at weighing time prevents it. Perhaps preventing the animals from drinking on the day that they are weighed would give better results for each animal as well as the group. Some attempt will be made in that direction next year.

Water consumption has gained slightly, tying into the loss in moisture content of the forage. Salt consumption has declined .02 pounds per day per animal.

The need for gentle steers in an experimental pasture, where more frequent contact is made with the animals than under normal range conditions, was pointed out by one excitable steer in the present herd. Not only has it been difficult to weigh this particular animal, but from time to time he has unduly excited the other animals, which is not desirable under any condition. He has become so unruly that fear has been felt that he might seriously injure himself in attempting to escape from the corrals, pens or livestock scales.

**Plot Work**

It was found impossible to examine all the quadrats again for utilization and continue with the rest of the systematic records. It now looks
as though only one more complete utilization examination can be made and that it will have to be made at the end of the grazing season.

**Seedlings**

A total of 937 seedlings died during this period. As usual, climatic factors took most of them, rodents a few, and livestock practically none. There were about 1,366 live seedlings left on July 16. When the critical dry period is reached, a considerable number of the seedlings left are expected to die.