A COMPUTER PROGRAM FOR PROCESSING FORAGE RESEARCH DATA

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A COMPUTER PROGRAM has been prepared to perform all the routine tasks associated with calculation of forage research data and the preparation of summary tables. Analysis of variance is not included in this program, but is computed separately.

This program represents the joint efforts of an agronomist, who made decisions on what output data would be required in the forage research program, and a professional programmer. A very detailed listing of all input data and required output data was prepared.

Exact instructions on the calculation and summarization procedures to be followed were written in everyday English. The program then took this preliminary statement and translated it into the Fortran computer language. The agronomist and programmer worked jointly to develop a series of data sheets which were suited to the needs of both the technicians collecting field data and the keypunch operators. All routine information, including formats and table headings, was included in the permanent memory of the program so that only variable information need be submitted and punched for each experiment.

The program is suitable for use in experiments with silage, as well as with ordinary grass, legume, and grass-legume mixtures. The following input items are standard for all types of experiments:

- Experiment number
- Year
- Replication number
- Treatment number
- Number of cuttings per year
- Individual cutting number
- Harvested area
- Plot number
- Total green weight
- Green weight of subsample
- Dry weight of subsample

In order that botanical composition for individual plots might be summarized, provisions were made to record either percentages of grass, legume, and weed estimated by observation, or actual weights of hand-separated grass, legume, and weed portions of forage samples.

Additional information on the growth and production of silage crops is obtained by processing the following input data for the silage experiments:

- Total number of plants per plot
- Number of lodged plants per plot
- Number of ears per plot
- Weight of stalk, leaf, husk, ear, and grain from a hand-separated subsample.

The summarized data output for the grass-legume experiments includes tables on each of the following: percentage of grass, legume, and weed; percentages of dry matter; yield of grass, legume, weed, total dry matter, and weed-free dry matter in pounds per acre; and total dry matter and weed-free dry matter. Data output for silage experiments includes tables on yield of dry matter per acre, percent of dry matter in forage, percent of dry matter in feed, percent of dry matter in forage, percent of dry matter in feed, percent of dry matter in forage, and percent of dry matter in feed.

The data from each experiment are recorded on special data sheets which were suited to the needs of the experiment. After the basic yield information is fed into the program, the decision to process the botanical composition data from a silage experiment is triggered by a key number on the data sheet designated as possibility 1, 2, or 3.

The summary data output includes tables on yield of dry matter, percent of dry matter in forage, percent of dry matter in feed, and percent of dry matter in forage. The summary tables are printed in the general form of Table 2, which is ready to send to the keypunch operator.

Since information in columns 1, 2, and 3 of the data sheet may vary greatly from one experimental unit to another, machine copies of these routine numbers are required in the forage research program. If the data represents a silage experiment, columns 5, 6, and 7 contain the total green plot weight and the green and dry weight of the moisture sample. Columns 8, 9, and 10 contain the botanical composition data, either as visual estimation percentages or as actual weights.

After the data sheets are filled in, they are typed directly to the computing center for processing. Since information in columns 1, 2, and 3 may vary greatly from one experimental unit to another, machine copies of these routine numbers are required in the forage research program. If the data represents a silage experiment, columns 5, 6, and 7 contain the total green plot weight and the green and dry weight of the moisture sample. Columns 8, 9, and 10 contain the botanical composition data, either as visual estimation percentages or as actual weights.

The summarized data output for the grass-legume experiments includes tables on each of the following: percentage of grass, legume, and weed; percentages of dry matter; yield of grass, legume, weed, total dry matter, and weed-free dry matter in pounds per acre; and total dry matter and weed-free dry matter. Data output for silage experiments includes tables on yield of dry matter per acre, percent of dry matter in forage, percent of dry matter in feed, percent of dry matter in forage, percent of dry matter in feed, percent of dry matter in forage, and percent of dry matter in feed. The summary tables are printed in the general form of Table 2.

Table 1. Completed data sheet for one replicate of one cutting from a grass-legume experiment.

<table>
<thead>
<tr>
<th>Experiment Number</th>
<th>Cut Number</th>
<th>Replication</th>
<th>Treatment</th>
<th>Yields (lbs/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>18.9</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5.5</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>40.0</td>
</tr>
</tbody>
</table>

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