Importance of Forbs on Southwestern Ranges

Rex D. Pieper and Reldon F. Beck

Forbs, as a class of range plants, are often looked upon with disfavor when they occur on rangelands. There is good reason for this unfavorable view of forbs. Many forbs are opportunistic and do invade disturbed areas. If vigor of grasses is lowered by heavy grazing, forbs often increase. Because of this phenomenon many range managers consider ranges with abundant forbs to be deteriorated. Some of these forbs may be poisonous and can create additional problems for livestock operators. With this reputation, it is not surprising that forbs have not been held in high favor among some livestock operators and range workers in the past.

However, forbs played a role in most U.S. grasslands before the advent of large livestock operations. In many cases, they were overshadowed by taller grasses and perhaps largely ignored except by early botanists. Some discerning livestock operators recognized the value of these plants and their ability to finish livestock. But it really wasn’t until interest in livestock diets and the development of the esophageal fistula technique that researchers could assess adequately the importance of range forbs.

Contribution of Forbs in the Diet

Forbs are important components of livestock diets in the Southwest (Table 1). Studies using esophageal fistulated animals showed that cattle diets contained about 30% forbs on a yearly basis. Obviously, these results do not show seasonal differences, which may be pronounced in many instances. At Fort Stanton, located in south-central New Mexico, forb content of the diets was low in the growing season when grass growth was high and again in the spring when forb growth had largely disappeared. Forb content of the diets was highest in late spring when some of the cool-season forbs were green and the grass was dormant, and again in the fall when forb growth was at a maximum. Annual forbs such as portulaca were important components of cattle diets in the summer of 1974, following a severe drought (Allison et al. 1977).

The one study conducted with sheep supported the idea that sheep prefer forbs. Yearly sheep diets contained nearly 60% forbs in south-central New Mexico (Table 1).

On desert grassland range, forb content of the diet depends largely on availability. Herbel and Nelson (1966) found that winter was the period of lowest forb content of both Hereford and Santa Gertrudis diets. Rosiere et al. (1975) reported lowest forb contents in diets during spring and summer.

Nutritive Content of Forbs

In addition to supplying considerable quantities of forage for grazing animals, forbs also furnish high quality forage. Table 2 shows that five important Southwestern forbs averaged more than 12% protein on a yearly basis, while phosphorus content was above 0.15% for all species and above 0.20% for four of the five species. Apparently, forb forage is readily digestible and nutrients can be utilized by the animals, as shown by studies in Colorado (Wallace et al. 1972).

Data in Table 2 do not show seasonal changes in nutrient concentration. However, in most cases forbs are consumed when they are growing and their nutritive content is fairly high. In contrast, the protein content of grasses is seldom over 10 or 12% and only at the highest point during the growing season (Nelson et al. 1970 and Pieper et al. 1978). In some cases, it is

Table 2. Protein and phosphorus contents and digestibility of important Southwestern forbs.

<table>
<thead>
<tr>
<th>Species</th>
<th>% Protein</th>
<th>% Phosphorus</th>
<th>In vitro O.M. Dig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dakota verbena1</td>
<td>12.0</td>
<td>0.29</td>
<td>77</td>
</tr>
<tr>
<td>Scarlet globemallow</td>
<td>14.3</td>
<td>0.21</td>
<td>60</td>
</tr>
<tr>
<td>Carruth sageworth</td>
<td>12.8</td>
<td>0.25</td>
<td>67</td>
</tr>
<tr>
<td>Leatherweed</td>
<td>12.7</td>
<td>0.15</td>
<td>–</td>
</tr>
<tr>
<td>Fendler bladderpod</td>
<td>14.3</td>
<td>0.21</td>
<td>–</td>
</tr>
</tbody>
</table>

1 Data from Dakota verbena, scarlet globemallow and carruth sageworth are from Cordova (1974).
2 Data on leatherweed croton and fendler bladderpod are from Nelson et al. (1970). Digestibility was not determined for these species.

Table 1. Forb contributions to livestock diets on southwestern ranges.

<table>
<thead>
<tr>
<th>Range type</th>
<th>Season</th>
<th>Type of livestock</th>
<th>% Forb contribution to diet</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue Grama Grassland, N.M.</td>
<td>Yearly average</td>
<td>Cattle</td>
<td>32</td>
<td>Thetford et al. 1971</td>
</tr>
<tr>
<td>Blue Grama Grassland, N.M.</td>
<td>Yearly average</td>
<td>Sheep</td>
<td>60</td>
<td>Thetford et al. 1971</td>
</tr>
<tr>
<td>Blue Grama Grassland, N.M.</td>
<td>Yearly average</td>
<td>Cattle</td>
<td>25</td>
<td>Allison et al. 1977</td>
</tr>
<tr>
<td>Blue Grama Grassland, N.M.</td>
<td>Two-year average</td>
<td>Cattle</td>
<td>28</td>
<td>Havstad 1977</td>
</tr>
<tr>
<td>Desert Grassland, Ariz.</td>
<td>Fall</td>
<td>Cattle</td>
<td>&gt;10</td>
<td>Galt et al. 1969</td>
</tr>
<tr>
<td>Desert Grassland, N.M.</td>
<td>Yearly average</td>
<td>Cattle</td>
<td>33</td>
<td>Rosiere et al. 1975</td>
</tr>
<tr>
<td>Desert Grassland, N.M.</td>
<td>Yearly average</td>
<td>Cattle</td>
<td>30</td>
<td>Herbel and Nelson 1966</td>
</tr>
<tr>
<td>Desert Grassland, N.M.</td>
<td>Yearly average</td>
<td>Cattle</td>
<td>35</td>
<td>Gonzalez-Rodriguez et al. 1977</td>
</tr>
</tbody>
</table>

The authors are with the Department of Animal and Range Sciences, New Mexico State University, Las Cruces.
probably the presence of forbs which minimizes the importance of supplemental feeding of range livestock. In times of extremely high costs of supplemental feed, forbs may be quite valuable on rangelands.

Discussion
Grasses no doubt will remain the mainstay of the range livestock industry. However, the importance of forbs to the grazing animal needs to be recognized. They are generally more easily digestible and more nutritious than grasses, but also possess many weaknesses. For example, many forbs are not readily available for consumption during dormant seasons. Often, they are subject to physical losses following frost or senescence. They are probably not as reliable as grasses for forage production. Many forbs are unpalatable and pose weed problems. Often they are toxic to grazing animals if too much is consumed. This is particularly a problem on Southwest ranges, where forbs are often the only green plants in some seasons.

Management systems to favor forbs or at least take advantage of them or to avoid them are difficult to implement. However, livestock operators and range people need to be aware of the contribution of forbs. More consideration should be given to them in calculating stocking rates and evaluating treatment effects.

Literature Cited
Allison, Christopher, D., Rex D. Pieper, Gary B. Donart, and Joe D.


WASHINGTON STATE UNIVERSITY invites nominations and applications for the position of CHAIR of the Department of Forestry and Range Management.

The Department is composed of 21 faculty, 42 graduate students (Masters) and 309 undergraduate students. Major teaching, research and extension activities include facets of forestry, range management, wildlife habitat management and wildland recreation.

QUALIFICATIONS: Ph.D. in a professional discipline represented in the department or closely allied to those disciplines; administrative skill or potential knowledge of the university environment, preferably including undergraduate and graduate teaching experience; sound credentials in an area of research represented in the department or closely allied to it.

APPOINTMENT: July, 1980

SALARY: Negotiable

APPLICATIONS: Submit letter of intent, resume and name and addresses of at least three (3) references to: Ben F. Roche, Jr., Chairman-Search Committee, Department of Forestry and Range Management, Washington State University, Pullman, Washington 99164.

DEADLINE: April 30, 1980 or until a suitable applicant is found. Washington State University is an Equal Opportunity/Affirmative Action Employer. We encourage minority, women, handicapped, Vietnam-era and disabled veterans, and/or aged persons to apply and identify themselves as such in their applications.