Technology/Methods

Playing Softball With the Rancher

The softball stubble height method.

By Paul Curtis

Introduction

How many times does a rancher who grazes livestock on public lands hear they can use 50% of the key herbaceous forage species? Yet, the rancher does not fully understand, or lacks familiarity with, how that would be measured or determined by the specific public land management agency. As a result, the rancher may use the grazing allotment based on the agency's authorized period of use. At the end of the grazing season the rancher finds that there is 1 or 2 inches average stubble height remaining on the key herbaceous species and the measured utilization is 70% after the livestock are removed. The rancher is then in a position of exceeding the use level objectives. This is, in effect, a communication gap that often results in resource objectives not being fully realized in public land management. To help the rancher and the range conservationist better manage the resource and reduce the time necessary to do so, the following softball stubble height method is suggested to monitor the forage utilization.

Looking at Figure 1, of the 5 Indian ricegrass plant heights, where would you graze to achieve to 50% use by weight? Using the Interagency Height–Weight method (US Department of the Interior–Bureau of Land Management 1996), if the ungrazed Indian ricegrass is 16 inches tall, then when there are 5.5 inches remaining, there is a 50% utilization level by weight. How often do we leave that much stubble height?

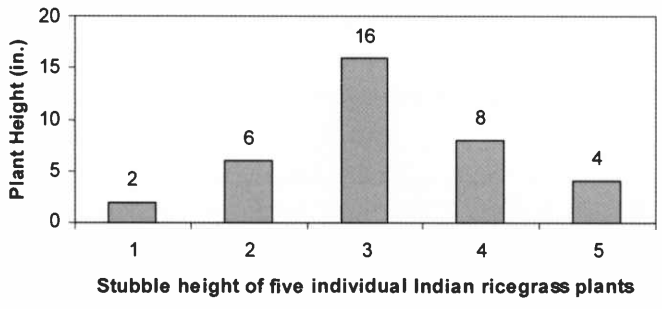

Figure 1. *To what height you would Graze for 50% utilization levels by weight.*

Background on a Variety of Utilization Measurement Methods Employed by Public Land Management Agencies

The Interagency Stubble Height Method for utilization is the measurement of stubble height, or height (in centimeters or inches) of herbage left ungrazed at any given time. The Interagency Height –Weight Method involves the measurement of heights of ungrazed and grazed grass or grasslike plants to determine average utilization. Measurements of plant heights recorded along transects are converted to percent weight utilized by means of a utilization gauge (Lommasson and Jensen 1938).

The Interagency Key Species Utilization Form is a technique that combines the Landscape Appearance Method and the Ocular Estimate Method. Utilization levels are based on an ocular estimate of the amount of forage removed by weight on individual key species. Observations are recorded in one of seven utilization classes: 0–5%, 6–20%, 21–40%, 41–60%, 61–80%, 81–94%, and 95–100%.

Background on Stubble Height and Its Relationship to Utilization Levels

In measuring utilization levels, the plant community, rather than individual plants, is measured. So, how is it known when 50% use of this community has been reached?

The only way to really get even use on each plant of a particular species would be to use a lawn mower. That is obviously not the case in livestock grazing. Most animals are selective in their eating habits and the use of individual plants by species is not uniform.

The stubble remaining after grazing directly influences its ability to trap sediment, provide cover and protection for birds, and supply forage for other animals (Hall and Lindenmuth 1998). A critical part of range management is to maintain enough vegetative cover to protect the soil from erosion processes (Holechek, Pieper, and Herbel 2001). Several studies show that standing ungrazed herbage and mulch greatly influence forage production by their effect on water infiltration in the soil (Beutner and Anderson 1943; Rauzi and Hanson 1966; Schwan, Hodges, and Weaver 1949). Stubble height can also affect how animals eat. A cow reaches her tongue out the side of her mouth, draws in forage, tastes it, and bites off a mouthful, filling her rumen quickly when forage is plentiful (Hall and Bryant 1995). As stubble height lowers to 3 or 4 in, the herbage is too short for the cow's tongue to draw it into her mouth so they start eating in bites. Bites take in less forage and less quality of forage; so more time is required to fill her rumen (Van Soest 1982). Studies have shown that the top 50% (by weight) of the grass plant has better quality feed value than the bottom 50% (by weight), as determined by National Resources Conservation Service Rangeland Management Specialist Steve Deeter (personnel communication) using the Nutritional Balance Analyzer Program (Stuth, Hamilton, and Conner 2002), a program analysis of fecal samples. This goes along with the 4-inch stubble height. As a result, the cow begins eating less palatable species. When a cow has to bite and then move there is more energy expended. This is very important in the winter months when the cow is in the later stages of gestation and the forage is low in crude protein and energy and in the spring when the cow is lactating and trying to get ready to breed back.

The Softball Stubble Height Method: Details and Rationale

The Softball Stubble Height Method requires a standard-sized softball and knowledge of the vegetative communities being studied. The softball is approximately 4 inches in diameter or height when placed on the ground. As a visual aid, the softball would provide a rapid, easily discernable and repeatable method to estimate stubble height to 4 inches and the utilization level(s) on the respective key species (Figure 2).

The rancher could use his fist, but how big is his fist? Variation in fist size is why the softball is proposed as a measuring guide. But a fist could be used as a guide if the rancher is caught without his softball.

Table 1 indicates that an average Galleta grass at 3.7-inch stubble height is equal to 48% utilization. An average of sand dropseed at 4.2-inch stubble height is equal to 54% utilization, and an average of Indian ricegrass at 4.2 inches is equal to 58% utilization.

An average of all three species is 4.4-inches average stubble height with a 49% utilization level. There were 16 plants (40%) above the softball and 24 plants (60%) below the softball. This shows that a 4-inch stubble height approximates 50% utilization level and approximately 50% of plants are above the softball and approximately 50% of the plants are below the softball.

Using the Interagency Key Species utilization form, 41–60% (midpoint of 50%) use levels indicate that half of the available forage (by weight) on key species appears to have been utilized. Using the information from Table 1 it can be inferred that

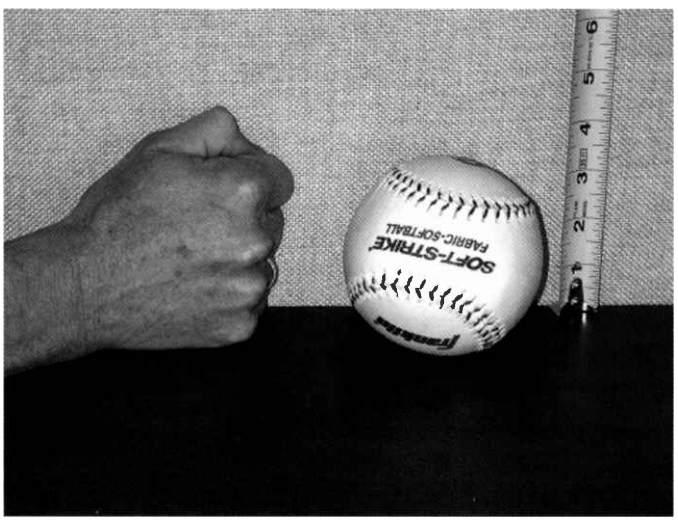

Figure 2. *Compared to a fist, a softball provides a standard-sized visual aid to easily and repeatedly estimate 4-inch stubble height.*

Table 1. Shows 4 plant species that were used to demonstrate the softball stubble height method of utilizations levels. Using the ruler and the softball reveal the same results.

Indian ricegrass 16 inches average height			Sand dropseed 18 inches average height		
Grazed height	% Use	Above or below softball	Grazed height	% Use	Above or below softball
1	80	B	1	80	B
1	80	B	1	80	B
2	70	B	2	65	B
2	70	B	2	65	B
3	60	B	3	55	B
3	60	B	3	55	B
4	55	A	4	45	A
4	55	A	4	45	A
6	45	A	4	45	A
16	0	A	18	0	A
4.2 inches average	58% use	4 plants above, 6 plants below	4.2 inches average	54% use	4 plants above, 6 plants below

Galleta grass #1, 16 inches average height			Galleta grass #2, 16 inches average height		
Grazed height	% Use	Above or below softball	Grazed height	% Use	Above or below softball
1	75	B	1	75	B
1	75	B	1	75	B
2	55	B	1	75	B
2	55	B	2	55	B
3	40	B	2	55	B
4	30	A	3	40	B
4	30	A	3	40	B
5	25	A	4	30	A
16	0	A	4	30	A
16	0	A	16	0	A
5.4 inches average	39% Use	5 plants above, 5 plants below	3.7 inches average	48% Use	3 plants above, 7 plants below

Ten plants of each species were measured and the grazed height is recorded in the first column with the average of the ten plants shown. Using the Interagency Height-Weight method, the utilization for that height is recorded and the average utilization for the ten plants is shown. The third column indicates whether the height remaining is above or below the softball height and the number of plants that are above or below that height.

A indicates above softball; B, below softball

15–25% of current seed stalks remain intact. Looking at the combined total of seed stalks of the species on the chart, there are 5 intact seed stalks (seed stalks that have not been grazed). Dividing the 5 seed stalks by 40 total plants; the result is 12.5%, which is close to the 15% seed stalks remaining as on the Interagency Key Species form.

Approximately 50% use on most key species, in the desert southwest, is 4 inches. Using a softball, the rancher would randomly toss the softball approximately 10 to 20 times. When half the plants are above the softball and half of the plants are below the softball, a 4-inch average stubble height remains (in an average precipitation year) or 50% utilization level. What if plant growth is above or below a normal year? It is felt that the 4-inch average stubble height should be held to no matter what kind of a year it is.

The Softball Stubble Height Method: Use in Public Land Management and Setting Resource Objectives

So what is our objective in relation to utilization levels? There are several reasons for leaving ground cover in the form of stubble. Stubble allows for plant regrowth and increases overall forage production, while overall ground cover provides for plant soil health and increases organic matter. They reduce raindrop impact and slow erosion, cool the soil with shade, and conserve moisture, while also providing for next year's livestock forage and adding to a drought reserve. Ideally, we want to leave enough stubble height to increase or maintain ground cover depending on the initial ecological condition of the site. This will increase or maintain the amount of moisture that goes into the ground when it does rain and enhance the vigor of both grazed and ungrazed forage species. In essence, leaving stubble and ground cover postgrazing will increase the biological capital (the part of a pasture animals eat) of the range (Burleson 2003).

So let's play ball to keep all of us more responsible by increasing ground cover and improving overall range conditions.

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