Stem Count Index: A Browse Survey Technique

By Jimmy Rutledge

How does a habitat manager determine whether their management is having beneficial or adverse impacts on the very habitats they are trying to manage?   Obvious ways are looking for indicators or evidence within the plant or animal community. That is one reason we collect harvest data on white-tailed deer.

When it comes to habitats though, the norm for years was cursory habitat evaluation surveys. Wildlife biologists or range professionals would assess the relative condition of plants, whether they appeared healthy or unthrifty, noting the presence or absence of seedlings, what species were present, and evidence of unusual plant mortalities. In areas such as South Texas which is known and characterized by its unique climate and diverse woody plant communities, this subjective method provided managers with limited ability to quantify browsing of woody plants. A disadvantage of this technique is that adverse effects on habitats are sometimes visible only after several years of occurrence.

While numerous research studies have shown that deer prefer forbs over any other class of vegetation, recent times have reminded us that when drought occurs not many forbs are produced and woody plants and cactus become the most important and stable parts of the habitat.

Within the woody plant community white-tailed deer have preferences- the most palatable plants receive the greatest browsing pressure. Moderate browsing stimulates the sprouting of lateral buds along stems and increases the number of stem tips available, which is beneficial. However negative impacts to preferred woody plants occur when over-browsing, severe pruning, or hedging affect the plant's ability to capture sunlight and convert it to food through photosynthesis thereby shrinking and weakening the root system. During extended periods of drought, plants with weakened root systems are most vulnerable to death.   When this occurs, the preferred species in the plant communities could be lost, compromising habitat quality.

A number of years ago the Texas Parks and Wildlife Department recognized the need for developing a technique that would sample our diverse woody plant communities, yield sound scientific quantifiable data, and be sensitive enough to allow managers to

detect relative stocking intensities. This would assist managers in making the best habitat management decisions possible.

THE TECHNIQUE

In the mid 1980's, Jim Yantis, TPWD wildlife biologist (retired), refined Dan Lay's existing habitat appraisal method to make the method applicable to other ecological regions. Yantis's modification of Lay's method is the basis for current TPWD stem count index (SCI) technique.

The first step of a SCI is to determine soil types, their accompanying ecological sites, and their abundance and distribution across the property. A published soils survey is necessary to locate the different ecological sites that occur on the ranch. If possible, it is best to sample in every significant ecological site or Dave-Hewitt-007.gifdifferent plant community. Selection of sampling site is further determined on a particular property by avoiding areas that may be concentrating animals such as dependable water sources, permanent feeders, area of recent manipulation or prescribed burning.   This minimizes any potential bias and insures that an accurate assessment of habitat conditions is achieved.

Upon arriving at the selected site, take note of species distribution and composition. Begin counting stem tips within reach of a deer. Care should be taken to avoid sampling plants along cattle or deer trails. Once the more common species have been sampled at a site, observers move to a new site and repeat the sampling process.

A minimum of three different plants per species are sampled until 100 stem tips are counted, with no more than 34 stem tips counted on any individual plant. This minimizes the bias of counting a particular plant that has been heavily browsed. All stem tips sampled should be within a deer's reach. One hundred stem tips sampled per species constitutes an encounter. A tally counter is used to count the number of browsed stem tips. Multiple species should be sampled at each site/stop, but encounters for the same species must be at least 30 yards apart, preferably 100 yards if sampled at the same stop. Stem tips browsed only by cattle, deer, or exotic ungulates are counted utilizing this technique. Rodent or rabbit bites are not included. (Rodent and rabbit bites can be identified by the angle and shape of the cut and the absence of a tuft of plant material.)

Data are compiled and analyzed once sampling on a ranch has been completed. Plants are grouped by palatability classifications of first, second, or third choice. The total number of bites counted is divided by the total number of stem tips counted for each individual species to determine percent of stem tips bitten. All species in a palatability class can be averaged to determine percent of browsable stem tips that were bitten. These values are then compared to a stocking intensity table developed for South Texas (Table 1). Biologists use this information to make assessments about the health and quality of the habitat. Specifically, these data are used to adjust management recommendations including stocking rates of livestock and deer.

Table 1. Browse utilization by palatability classes for known deer densities. Deer densities: low=14 acres per deer, moderate=9 acres per deer, high=4 acres per deer.

	Palatability Classes		
Stocking Intensity	**1st**	**2nd**	**3rd**
Low	34	12	5
Moderate	43	17	5
High	45	27	11

In late 2003, Caesar Kleberg Wildlife Research Institute scientists approached TPWD and informed us of a research study where differing known deer densities were going to be studied in paired 200 acre enclosures with half of them being supplementally fed while the other half were not. We were asked if we would like to test and conduct our Stem Count Index technique inside these enclosures with known deer densities. We have been sampling the enclosures twice a year since sampling began in February of 2004, once in summer usually early August and once during the winter usually during early February.

Some of the questions that have been asked about the technique are beginning to be answered. Questions such as "Does supplemental feeding influence the browsing on native vegetation?" "Do rainy years influence results versus drought years?" "Is winter time the best time to sample or can summer sampling yield similar results?"

Statistical testing of the data indicates a very strong relationship between number of deer and number of bites on stem tips of second choice plants during the winter regardless of whether feed is present or not and regardless of a dry or wet year.   These results have supported our early belief that winter is a best time to sample and yields the best results while being sensitive enough to detect differing stocking intensities or deer densities within the enclosures.

This technique is a product of many years of study and commitment by many professionals including our respected colleagues and friends at Caesar Kleberg Wildlife Research Institute.

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SUPPORTING LITERATURE

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