

**Riparian Shrubby Vegetation Protection  
Against Herbivore Browsing**

by

**John C. Buckhouse**

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**Water Resources Research Institute  
Oregon State University  
Corvallis, Oregon**

**WRR-94**

**August 1984**

RIPARIAN SHRUBBY VEGETATION PROTECTION  
AGAINST HERBIVORE BROWSING

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Final Technical Completion Report  
Project Number G864-04

Submitted to

United States Department of the Interior  
Geological Survey  
Reston, Virginia 22092

Project Sponsored by:

Water Resources Research Institute  
Oregon State University  
Corvallis, Oregon 97331

The research on which this report is based was financed in part by the United States Department of the Interior as authorized by the Water Research and Development Act of 1978 (P.L. 95-467).

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WRR1-94

August 1984

## ABSTRACT

Vexar<sup>R</sup> tubing, nylon mesh netting, and big game repellent (BGR) were tested under field and "feedlot" trial conditions to determine their effectiveness as browsing protective devices for young willows.

Under field conditions, during the winter months of 1983 and 1984 and in the absence of domestic livestock, the nylon mesh, vexar<sup>R</sup> tubes, and BGR provided some degree of browsing protection against beaver and deer. Frequency of browsing was 13%, 19%, and 26%, respectively, as compared to 45% on the controls.

In the field it was evident that certain challenges remained, however. The nylon mesh matted to the ground following periods of snow. Also, while flexible, it tended to lie prostrate in high, rushing waters. The vexar<sup>R</sup> tubes withstood crushing by snow moderately well, but were vulnerable to peak water flows. In addition, both the netting and the tubes were highly visible and subject to heavy vandalism by fishermen, trappers, and recreationists. Under field conditions, the BGR represented an improvement in protection over the control; however, its longevity following precipitation is unknown.

During the spring of 1984, a feedlot trial was conducted to determine the degree of protection these devices might offer against livestock browsing. The vexar<sup>R</sup> tubes were essentially neutral in that frequency of browsing was similar to the control plants. The BGR offered a moderate degree of protection. The nylon mesh netting, however, attracted the animals, apparently because it fluttered in the wind and piqued their curiosity. The browsing frequencies were 72%, 60% and 91%, respectively, as compared to 76% on the untreated controls.

It appears that under certain environmental conditions willow browsing protection devices and treatments may have some value, particularly against rodents and possibly deer. Their long-term value for protection against cattle appears to be slight and even, in the case of nylon mesh, negative.

## FOREWORD

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## ACKNOWLEDGEMENTS

The author wishes to acknowledge the Water Resources Research Institute, Oregon State University, for its role in the encouragement and funding of this project.

The Bureau of Land Management, Prineville, office, provided research sites along Bear Creek, willow cuttings for the Corvallis feedlot trials, and expert advice and professional interest throughout the study.

The Animal Science Department, Oregon State University, provided pastures and cattle for the feedlot trials in Corvallis.

I appreciate the agencies, institutions, and individuals who aided me throughout this effort.

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## INTRODUCTION

### The Research Problem

Throughout the entire western rangeland region, riparian zones are subjected to grazing and browsing pressure from wild and domestic herbivores. Riparian zones are especially critical focal points in semiarid and arid rangelands. Water quality, in terms of temperature and sediment load, is greatly affected by streamside vegetation. The shrubby vegetation next to the stream can help stabilize the bank and provide protection from direct solar radiation of the water's surface. This shrubby vegetation is also a prime target for browsing by domestic and wild herbivores. Damage to shrubby components of the vegetative communities by heavy livestock and/or wild ungulate grazing has been frequently reported. Yet evidence exists that a stream corridor in good condition can be maintained and grazed through appropriate managerial constraints. Apparently, the key to rejuvenating abused streamside vegetation and providing improved water quality is to give adequate protection to the shrubby component of vegetation to enable it to grow sufficiently large to withstand some twig removal by browsing animals. In the past, this has been accomplished at the cost of fencing and the associated lost grazing opportunities.

There are heavy pressures on livestock owners and rangeland owners/managers in the West to halt grazing in riparian zones or to fence these areas so that aquatic habitats and water quality may be better protected. These options are very costly, particularly because access to water is so essential for livestock in the arid and semiarid parts of the country. Low-cost innovative techniques are needed. Plastic-mesh bud caps have been used to protect replantings in forest clearcuts. Their application to riparian-zone plantings needed feasibility-testing to determine if quick, low-cost rejuvenation of overgrazed streambanks might be possible while continuing to permit appropriate livestock browsing of mature riparian vegetation.

## The Research Objective

The project research objective has been to determine the feasibility of plastic vexar<sup>R</sup> tubing, nylon mesh netting, and chemical big game repellents to provide browsing relief for riparian shrubby species. Riparian shrubby species are important because they stabilize and shade rangeland water-courses.

## RELATED RESEARCH AND ACTIVITIES

The water quality problems associated with bank denudation and the thermal enrichment associated with riparian vegetation removal have been documented (Meehan and Platts 1978). In addition, the ability of a healthy riparian system to withstand grazing pressure is known (Claire and Storch 1977). However, only a few studies in this region deal with amelioration of impacts (Bohn 1983, Kauffman 1982).

There are no published studies dealing with non-fencing means of providing protection to vegetation in a grazing setting. However, the OSU Department of Fisheries & Wildlife has initiated a study dealing with human scent as a big game deterrent (deCalesta 1984--personal communication). Additionally, a potentially germane study conducted in Oregon dealt with a number of physical barriers evaluated for the degree of deer browsing protection they afforded Douglas-fir seedlings (DeYoe and Schaap 1982). The researchers indicated that physical barriers were able to provide effective protection to the seedlings.

## METHODS AND PROCEDURES

Four treatments (Vexar<sup>R</sup> tubing, nylon mesh netting, big game repellent (BGR) and control) plots were established in the field near Prineville, Oregon, on Bear Creek and in a controlled livestock, "feedlot" trial near Corvallis, Oregon. Figures 1, 2, and 3 illustrate these treatment methods. Thirty-one willow (Salix spp) shoots were marked and prepared in



each treatment at Bear Creek. Seventy-five willow cuttings were transplanted from Bear Creek, rooted in fiber containers, marked and prepared in each treatment at Corvallis.

The field experiment at Bear Creek was conducted during the winter months (September-March) 1983-1984. The feedlot experiment was a week-long trial conducted at the OSU beef cattle facility near Corvallis. Six yearling steers lodged in a five acre pasture in early June, 1984, had access to the three hundred randomly located potted and treated willows.

Frequency of browsing occurrence was noted at each location and within each treatment.



Figure 1. Vexar<sup>R</sup> tubing as a protection device for young willows.

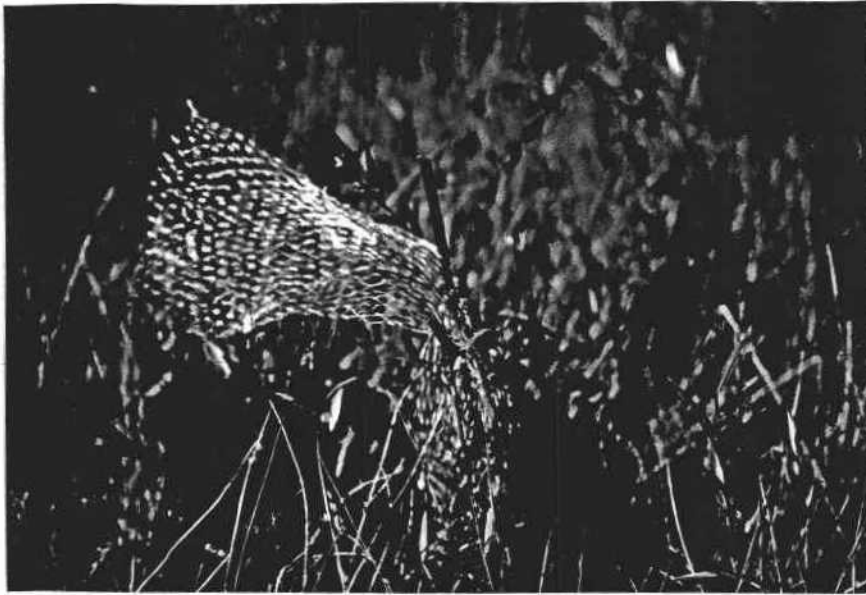


Figure 2. Nylon mesh netting in place on a rooted willow shoot.



Figure 3. Application of chemical, big game deterrent (BGR) to a riparian willow.

## RESULTS AND DISCUSSION

Field and feedlot trials were conducted to determine the relative effectiveness of vexar<sup>R</sup> tubing, nylon mesh netting and big game repellent (BGR) over non-treated controls as young willow grazing/browsing protection schemes.

It became apparent in handling each of these devices and treatments that certain physical characteristics enabled them to possess ease-of-handling attributes appropriate to various settings. If one were dealing with willow cuttings, yet to be planted, the vexar<sup>R</sup> tubes were very easy to use. By inserting the cutting into the tube from the top toward the bottom, lateral branches were preserved and the protection device was prepared in one motion. If existing and rooted material was to be protected, the nylon mesh netting was preferred since it could be stretched to accommodate the fragile lateral branches. Both the tubes and the netting required a stake to hold the willow and its newly placed armor upright. The BGR was especially easy to work with. It did require daily mixing, but was relatively odorless and was simple to spray on a plant with a handheld misting bottle.

Problems with environmental conditions were quickly evident, however. The author feels that the effectiveness of the BGR was lessened by repeated precipitation. Snow easily matted the nylon mesh netting to the ground. High runoff waters bent and buried the netting and swept away the tubes.

Most frustrating, however, was the vandalism problem which was experienced. The netting and the tubes are highly visible and were located in riparian zones which were subject to frequent travel by fishermen, trappers and recreationists. These individuals can easily remove, in minutes, the protection devices which took hours to install.

While the devices provided some degree of browsing protection against deer and beaver, they backfired when used to protect against cattle browsing. The cattle were apparently curious about the fluttering, visible nets and tubes. Seventy-seven percent of the vexar<sup>R</sup> tubes were rubbed or pulled off the willow cuttings in the feedlot trial. One hundred percent of the nets were removed!

Browsing protection was better against deer and beaver than against cattle. Each treatment in the winter field trial displayed some degree of protection as compared to the controls. This is shown in Table 1. The nylon mesh netting experienced only 13% browsing frequency as compared to 19% for the vexar<sup>R</sup> tubes, 26% for BGR and 45% on the controls. The winter field trial was in the absence of domestic livestock presence.

When the same treatments were subjected to livestock in a week-long feedlot trial, the cattle showed a slight tendency to avoid the BGR treated plants, no particular difference associated with the vexar<sup>R</sup> tubes, and an attraction for the nylon mesh netting as compared to the control plants. The browsing frequencies were 60% for BGR, 72% for vexar<sup>R</sup> tubes, 91% for nylon mesh netting and 75% for the untreated controls (See Table 1).

Table 1. Frequency of Browsing Occurrence.

Trial	Vexar <sup>R</sup> tubes	Nylon Mesh Netting	Big Game Repellent	Control
Field*	19%	13%	26%	45%
Feedlot**	72%	91%	60%	76%

\* Conducted during the winter (Sept.-March) 1983-1984; no domestic livestock present.

\*\* Conducted June 12-18, 1984; accessible to six yearling steers in a 5-acre pasture.

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## SUMMARY AND CONCLUSIONS

During the winter of 1983-1984 and spring of 1984, separate trials were run to determine the effectiveness of vexar<sup>R</sup> tubing, nylon mesh netting, and big game repellent (BGR) as browsing protection devices and/or schemes against domestic and wild herbivore predation of young willows.

Each treatment had unique physical characteristics which enable it to have positive or negative attributes in a given environmental setting.

The research suggested that these devices/methods are not particularly promising as effective tools to prevent cattle browsing of young willows. However, it does suggest that a degree of protection against deer and/or beaver is available. Depending upon snow conditions and the status (cuttings versus existing and rooted plants) of the young willows, vexar<sup>R</sup> tubes or nylon mesh netting may afford some browsing relief during an establishment stage.

Finally, one must be careful of placement within the riparian zone. Vandalism is likely to be high along popular streams, especially those with easy access. It may be possible to eliminate some vandalism and cattle attraction problems if the nets and tubes could be manufactured in a green rather than yellow color.

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