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ON FARM RIPARIAN GRAZING DEMONSTRATION

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Abstract

Two farm demonstrations were designed to show effects of periodic grazing of riparian areas. Sites were monitored for vegetative cover, degree of treading or hoof prints and dung deposition within three m of stream edge following grazing by beef cattle. A fenced enclosure was established along a 350 m stream reach on Farm-1, and eleven permanent stations were monitored following six graze periods over 12-months. Farm-2 involved grazing of two 0.13 ha paddocks, each of which contained a 22 m stream reach. On Farm-1 the cover improved following riparian exclusion, and evidence of treading in the 11 stations declined following each graze period. On Farm-2, vegetation was dense in the beginning, and one day graze periods with high stock density did not result in significant soil exposure, even though hoof prints were evident at more than 30% of the transect points. Having access to a drinking water tank 45 m up slope did not influence cover nor dung deposition in the riparian zone. The number of dung patties found within 3 m of the stream edge ranged from 15 to 28/100 m (Farm-1) and from 41 to 96/100 m (Farm-2). Estimates of potential dung N deposited within three m of the entire reach of the respective streams was 565 g and 83 g. This project showed ways to use riparian areas with minimal impact on its function.

Keywords: riparian, grazing, excreta, demonstration, soil cover

Introduction

Uncontrolled livestock access to riparian zones often damages stream bank stability and degrades water quality by removing vegetation, trampling stream banks and depositing excreta, but the degree of damage depends on many site specific factors (Marlow et al. 1987; Clark, 1998). There is only limited evidence that controlled or management intensive grazing of such zones in the humid temperate regions will provide a suitable alternative to complete stream exclusion (Weigel et al. 2000).

Legal regulation of grazing management practices is being considered in many areas; publicly funded cost-share programs are available to assist in the implementation of Best Management Practices to protect water quality. However, acceptance of such funds, requires the farmer to totally exclude grazing animals from all streams and surface waters. While many farmers want to protect water quality, they do not want to forfeit their rights to manage parts of their farm for plant species control and feed use. Two demonstrations were established to show the effect of short graze periods on excreta deposition, vegetative cover and treading of small riparian areas.

Materials and Methods

The perennial streams monitored on two Piedmont North Carolina farms were classified as slightly entrenched E Channels with silt/clay as the dominant material particle size (Rosgen, 1996). At Farm-1, the length of stream reach was 365 m, and the width of the stream bed averaged two m. Prior to the initiation of this demonstration a herd of 35-50 mature beef cows (450 kg) continuously grazed the single pasture at a fixed stock density for much how much 5 months or 10 months? of the year. In April, 1994 an electric powered fence (single 12 ga. Al wire) was installed approximately 6 m away from the stream edge so that animals could be excluded from the stream. Within the 365 m reach, 11 severely eroded areas were selected as permanent Astations@. The stations size averaged 2.4 m high by 7.5 m long. On six occasions cattle were grazed within the stream enclosure at a stocking density of 79 hd/ha. The forage along the stream edge and in the adjacent pasture was mostly (>80%) tall fescue (*Festuca arundinacea* Schreb.); other species included bluegrass (*Poa pratensis),* nimblewill (*Muhlenbergia Schreberi*), crabgrass, *(Digitaria spp*), dog fennel *(Eupatorium capillifolium),* and horseweed *(Conyza canadensis*). Forage mass following the short graze periods was never less than 1500 kg/ha.

On two occasions, the number of dung patties were counted within three m of the stream edge and within the 11 stations. The 11 stations were visually scored for vegetative ground cover, severity of treading and number of dung patties. Severity of treading was visually determined based on a score ranging from 0-5 (5 = significantly disturbed by hoof-action).

Farm-2 had two paddocks arranged whereby 30% of the paddock was in the riparian area. One paddock had a drinking water tank at the west end (45 m up slope from the stream). The stream bed width averaged 0.7 m with a depth of 0.3 m. On two occasions beef heifers (350 kg)

where grazed at a stock density of 86-98 hd/ha for a 24-hr period (April, 1998) or three 12-hr overnight periods (July, 1998). Four transect lines were established at equal-distance across the riparian area. Before and after each grazing a determination was made at 0.61 m intervals along the transect line to record the contact with vegetation, bare soil, dung or hoof print. Total contact points was 110 within the stream only (S) treatment and 123 in the stream + tank (ST) treatment. The vegetation in the whole riparian zone (18 x 22 m) was equal parts tall fescue, rushes (*Juncus spp.*) and sedges *(Cvperus spp.*). Tall fescue made up more than 90% of the vegetation outside the riparian zone of the paddock; forage availability remained above 1500 kg/ha post grazing.

Results and Discussion

Vegetative ground cover of the 11 stations (Farm-1) was below 20% prior (April 1994) to erecting the fence (Fig. 1). The stations were the most heavily used sites for cattle crossing and drinking water, but the cover gradually increased over the season. Estimates of the severity of treading (Fig 1) showed a gradual decline following each graze period, from score of 4.3 (5=severely treaded) following the first grazing on June 1, 1994 to no evidence of treading following the May, 1995 grazing. The amount of treading damage on the 11 stations was strongly related to historical use of a particular station; for example, over the duration of the observations, the treading scores for stations 2, 3, 4 and 10 twice the scores of other stations. There were 28 and 15 dung patties/100 m of stream reach in the January and April graze periods, respectively (Fig. 2). The cattle grazed the enclosure for 72 hours in January, but only 24 hours in April.

Data from Farm-2 indicated that vegetative cover (ranged from 80 to 97% based on point intercept method) can be maintained with short graze periods of high stock density (86-98 hd/ha).

Providing access to an alternative drinking water tank made no difference in vegetative cover before nor after grazing, but the grazing area and riparian area was so small cattle tended to use the riparian area regardless of their need for water or forage. The forage in the riparian area was not eaten, but was mainly trampled from hoof action; 30-38 % of the point intercepts post grazing were in contact with hoof prints. The number of dung patties within 3 m of stream edge ranged from 41 to 96/ 100 m of stream reach (Fig 2). These numbers appear in stark contrast to those observed at Farm-1, and is attributed to the small land area being grazed and the fact that heifers had no prior exposure to riparian areas.

To provide some indication of the amount of N that was deposited within three m of the steam edge estimates of N concentration and daily excreta production were made as reported by Whitehead (1995). Assuming N content in dung to be 0.8 g/100 g DM consumed and daily intake to be 2.5 kg DM /100 kg BWT, it was estimated that the amount of dung N that would be found along the stream (within 3 m of edge) would be 565 g (Farm-1) and 83 g (Farm-2) for each grazing; these numbers expressed per 100 m of stream reach were 155 g (Farm-1) and 368 g (Farm-2). These assumptions did not account for the dung that may have been deposited directly into the stream, and they did not account for the N in urine nor its deposition.

In conclusion, demonstrations provided an indication that short grazing periods on riparian zones can allow for acceptable vegetative cover and very small amounts of potential dung near the stream. Such demonstrations can be used to assist farmers in deciding how to manage riparian zones.

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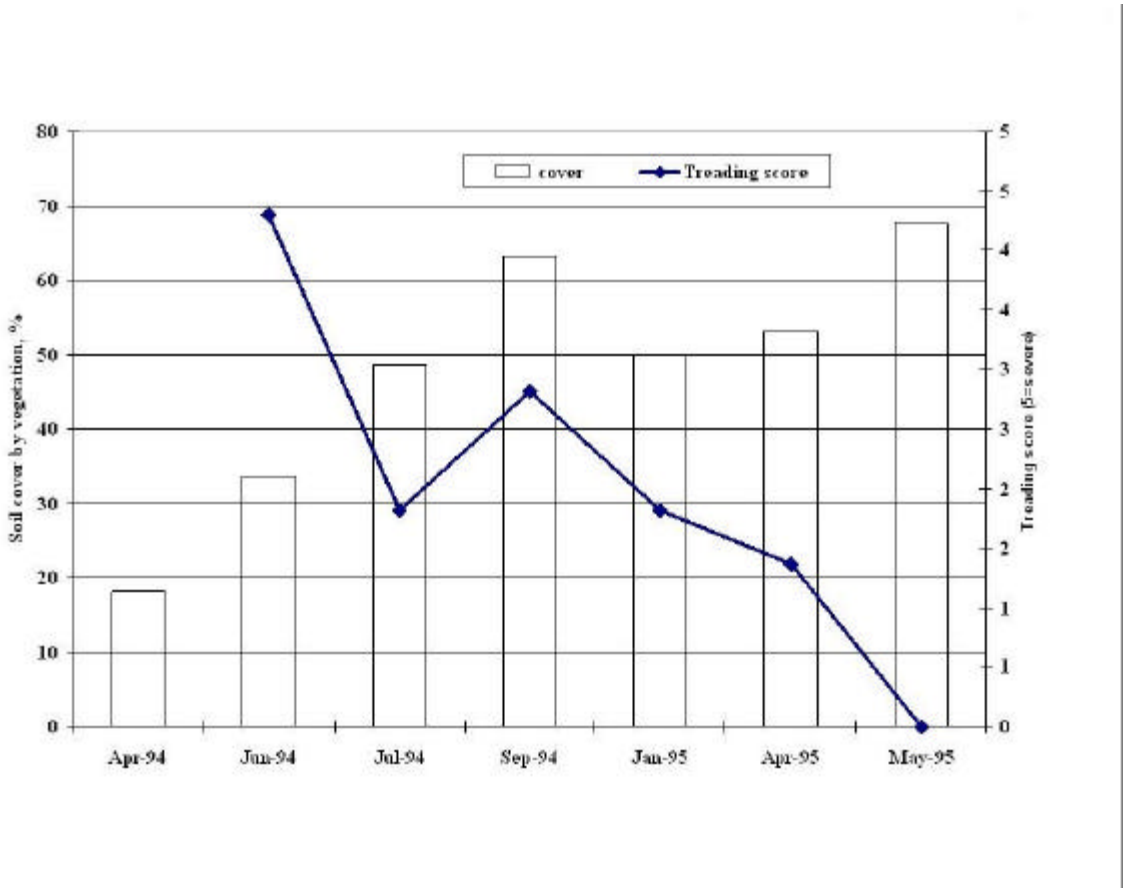

Figure 1 - Soil cover and treading scores for 11 stations along 365 m stream reach following one to three day graze periods by beef cattle.

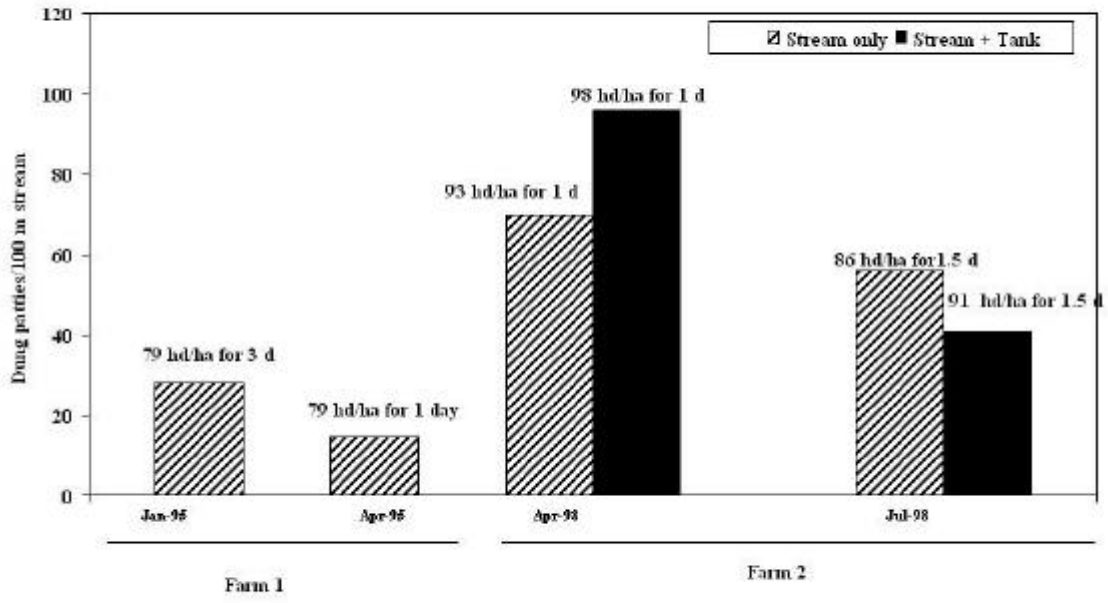

Figure 2 - Total number of dung patties per 100 m of stream following one to three day graze periods by beef cattle