



University of Kentucky  
UKnowledge

---

International Grassland Congress Proceedings

21st International Grassland Congress / 8th  
International Rangeland Congress

---

## The Effect of Vegetative Cover in the Erosion Prevention of a Cattle Trodden Slope Pasture

T. N. Pande

*National Institute of Livestock and Grassland Science, Japan*

H. Yamamoto

*National Institute of Livestock and Grassland Science, Japan*

Follow this and additional works at: <https://uknowledge.uky.edu/igc>

 Part of the [Plant Sciences Commons](#), and the [Soil Science Commons](#)

This document is available at <https://uknowledge.uky.edu/igc/21/3-2/33>

The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

---

This Event is brought to you for free and open access by the Plant and Soil Sciences at UKnowledge. It has been accepted for inclusion in International Grassland Congress Proceedings by an authorized administrator of UKnowledge. For more information, please contact [UKnowledge@lsv.uky.edu](mailto:UKnowledge@lsv.uky.edu).

## The effect of vegetative cover in the erosion prevention of a cattle trodden slope pasture

T .N . Pande , H . Yamamoto

National Agricultural Research Organization , National Institute of Livestock and Grassland Science , Shiono , Japan .E-mail : tarapand@gmail . com , osayamd@affrc . go . jp

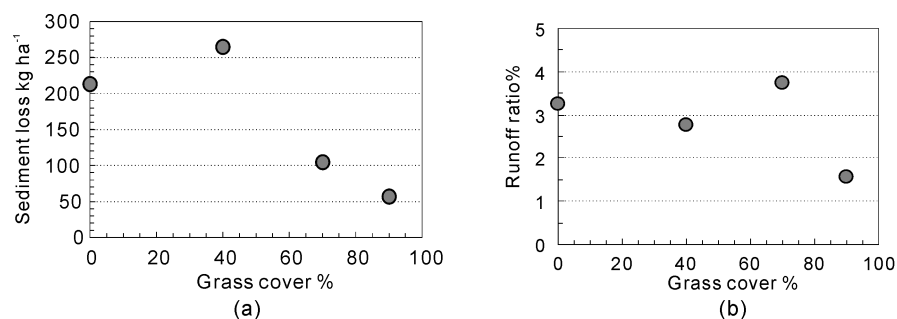
**Key words :** vegetation cover , tiller density , soil loss , slope pasture Japan

**Introduction** Grazing is the effective means of harvesting energy and protein from steep pastures in mountainous country . However , there are risks associated with the practice , such as degradation of the soils that sustain pasture communities . Details of the effect of vegetative cover of a grazed pasture on soil loss with runoff water are not clearly understood .

The loss of vegetative cover caused by grazing at high stock densities ( Warren et al . 1986a ) allows direct impact of raindrops on soils ( Lal and Elliot , 1994 ) . Damage to vegetation and soils by hoof trampling increases when cattle are grazed on moist soils ( Betteridge et al . 1999 ) . This paper reports a field study , designed to determine the effect of vegetative cover on soil loss with runoff water , of a slope pasture in the mountain trodden by cattle , untrodden with vegetative cover and untrodden with no vegetative cover .

**Materials and methods** An experiment was conducted in Japanese mountain pasture to quantify the effect of vegetative cover on soil loss with runoff water . Four plots , each of 8m × 22m area , were fenced to exclude cattle from grazing . Duplicate plots of ( 20m × 2m ) were with no vegetation cover ( Bare ) , and with 90 , 70 and 40 percent vegetation cover of 8 cm pasture height trodden by zero , three or six cows of approximately 300 kg body weight for 15 minutes on steep pasture on 14 June and 30 September , 2004 . Measurements included pasture cover , tiller density and soil loss in runoff water .

**Results and discussion** Pastures with no vegetation cover and with 40 percent vegetation cover resulted in a greater soil loss with runoff water . Increased soil sediment loss with runoff water mainly resulted from the area with no vegetation cover and with low vegetation cover ( Figure 1a ) . Runoff ratios for the low and high trodden plots and bare plot were higher than vegetative plot . Nevertheless sediment loss from the low trodden plot was low compared to the high trodden plot ( Figure 1b ) showing a similar runoff ratio . Results indicate that vegetation cover negatively act to soil surface by reducing the raindrop impacts and the runoff water entrainment .



**Figure 1** Relationship between grass cover and soil sediment loss (a) and between grass cover and runoff ratio (b) from control , lightly and heavily-trodden , and bare-ground sites of steep pasture during the months July to November ( values are total of the months ) , 2004 .

**Conclusions** Pastures with high or moderate vegetation cover was less seriously affected than pastures with low vegetation cover or bare ground for soil loss , indicating that steep pastures with low vegetation cover or with bare places are more susceptible to soil erosion .

### References

- Betteridge K , Mackay AD , Shepherd TG , Barker DJ , Budding PJ , Devantier BP , Costall DA , ( 1999 ) . Effect of cattle and sheep treading on surface configuration of a sedimentary hill soil . *Australian Journal of Soil Research* 37 : 743-760 .
- Lal R , Elliot W . ( 1994 ) . Erodibility and erosivity pp . 181-208 . In : *Soil Erosion Research Methods* ( 2<sup>nd</sup> Ed . ) R . Lal ( ed . ) Soil and Water Conservation Society , Ankeny , Ia .
- Warren SD , Blackburn , WH , and Taylor CA , Jr . ( 1986a ) . Effects of season and stage of rotation cycle on hydrologic condition of rangeland under intensive rotation grazing . *J . Range Manage .* 39 : 486-491 .