

Comparison of methods for estimating forage mass in grazing systems of the south Brazilian Pampas

Grün A.¹, Gierus M.¹, Carvalho P.F.C.², Pinto C. E.², Brambilla D.²

¹ Grass and Forage Science/Organic Agriculture, Institute for Crop Science and Plant Breeding, Christian Albrecht University Kiel, D-24118 Kiel, Germany

² Forage Plants and Agrometeorology Dept., Federal University Rio Grande do Sul, 91501-970 Porto Alegre, Brazil



Introduction:

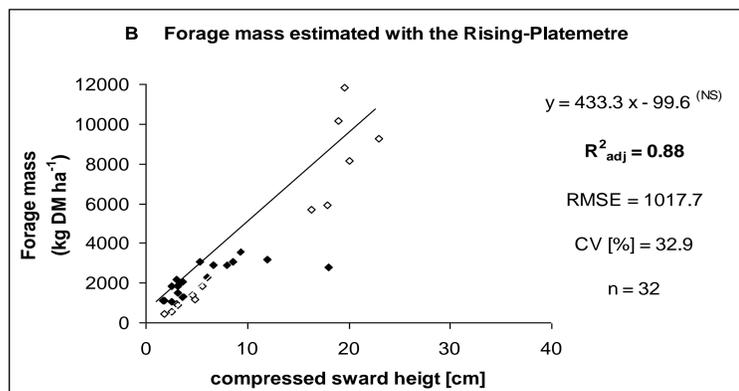
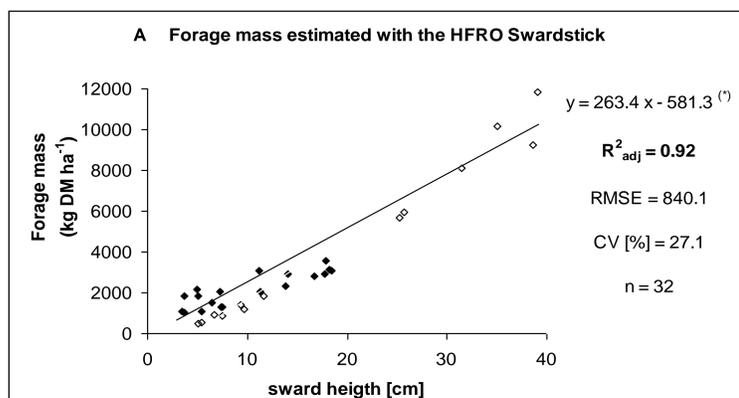
- A reliable estimate of forage mass is essential to adjust adequately the grazing pressure and to avoid overgrazing particularly for the complex heterogeneous swards of subtropical natural grassland
- Due to their practical efficiency, the accuracy and the application of indirect forage mass estimates like sward height and compressed sward height were determined

Methods:

- **Data:** obtained from two grazing experiments located in Eldorado do Sul; 46 m a.s.l. with Podsol and Plinthosol dominant soils and subtropical climate
- **Sampling:** in September and October 2008 on extensive and intensive managed pastures of natural grassland grazed by cattle and established as randomised block design with two field replications respectively
- **Sward height:** measured with the HFRO Sward stick (SW)
- **Compressed sward height:** measured with the Rising Platemetre (RPM)
- **Regression analysis** was performed using the DM yield obtained by hand clipped squares above ground level (X-axis) and the sward height [cm] obtained with either SW or RPM (Y-axis).



Results:



Despite of the strong heterogeneous sward structure, both instruments showed a linear relationship with forage mass and adequate accuracy.

The sward density was, as expected, higher for the RPM (433 kg DM cm⁻¹) compared to the SW (263 kg DM cm⁻¹), as shown in Figure 1.

The coefficient of variation is quite high as a result of the inclusion of the inferior and superior layer in the forage mass estimates.

The SW performed marginally better than the RPM which had a limited application in swards with taller tussock grasses (>25 cm) that appear mainly in less frequently grazed areas in the paddock.

It is questionable if they are relevant for the forage budgeting under practical conditions.

However, the agile RPM required less physical effort and more measurements could be performed in the same time over a larger area as observed by SILVA *et al.* (2003).

Figure 1. Forage mass estimate [kg DM ha⁻¹] using HFRO Swardstick (A) and Rising Platemetre (B) for extensive and intensive natural grassland of the Pampas in South Brazil, including superior and inferior grazing layers; statistical analysis with SAS 9.1; Statistical significance ($P < 0.05$) for the intercept with tendency to zero (significant*)

Conclusion:

Forage mass estimates using indirect methods like HFRO Sward Stick or Raising Platemetre are applicable for large scale grazing systems in the complex subtropical natural grassland of the Pampas and for the development of sustainable grazing concepts.

Astrid Grün, B.Sc.

Grass and Forage Science/Organic Agriculture,
Institute for Crop Science and Plant Breeding

Christian Albrecht University Kiel,
D-24118 Kiel, Germany



References:

- MANNETJE, L. t (2000) Measuring Biomass of Grassland Vegetation. In: MANNETJE, L. t JONES, R.M. (eds), 2000. *Field and Laboratory Methods for Grassland and Animal Production Research*. CABI Publishing, Wallingford, UK, 151-177
- NABINGER, C., MORAES, A. de, MARASCHIN, G.E. (2000) Campos in Southern Brazil. In: LEMAIRE, G., HODGSON, J., MORAES, A. de, NABINGER, C., CARVALHO, P.C. de F. (eds.), CAB International 2000. *Grassland Ecophysiology and Grazing Ecology*, CABI Publishing, Wallingford, UK , 18, 355-376
- SILVA, S.C. da, CUNHA, W.F. da, 2003. Méétodos indiretos para estimar a massa de forragem em pasto de *Cynodon* ssp. Pesquisa Agropecuaria Brasileira, 38, 981-989

