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Chlorophyll, nitrogen and mineral concentration of grass species found in semi-arid rangelands of South Africa

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Abstract
Mineral requirements of livestock, especially cattle and sheep are supplied by grass species, and the growth stage of grass plays an important role in supply of mineral nutrients. Most of these perennial grass species have generally been undervalued mainly because of insufficient knowledge about their potential feeding value and little documentation about their potential nutritive value in different growth stages. The present study was conducted to assess the chlorophyll, nitrogen, and mineral concentration of grass species at different growth stages under greenhouse at the North-West University, Molelwane farm, North West province, South Africa. The soil, collected from different villages, was mixed and samples were drawn for chemical analysis before being used on a potting medium. Nine grass species *viz*., *Anthephora pubescens*, *Cenchrus ciliaris, Chloris gayana, Dactylis glomerata, Digitaria eriantha, Eragrostis curvula, Festuca arundinacea, Panicum maximum* and *Themeda triandra* were used for the experiment. The grasses were harvested at different growth stages and analysed for nitrogen and minerals, and measurements were taken for chlorophyll only at the elongation stage and averages were recorded. *Eragrostis curvula* (47.28 CCI) had a higher ($P<0.05$) chlorophyll content, while *F. arundinacea* (34.50 CCI) had a lower ($P>0.05$) chlorophyll content. At the elongation stage, *P. maximum* had the highest ($P<0.05$) Mg (3.23 g/kg) content, whereas *A. pubescens* and *F. arundinacea* had the lowest ($P<0.05$) Mg concentration at the same stage. *Panicum maximum* (503 mg/kg) had a higher ($P<0.05$) Fe concentration when compared to all grass species except for *E. curvula* at maturity stage. *Anthephora pubescens, D. glomerata, E. curvula, F. arundinacea, P. maximum* and *T. triandra* had better mineral concentrations. Since these grass species cannot individually supply the adequate minerals required by each livestock in different production stages, they can complement each other with a high crude protein rich diet to meet the nutrient requirements for all livestock.

Keywords: Chlorophyll, Livestock productivity, Macro-elements, Rangelands, Semi-arid, Trace elements