

# Effects of sheep kraal manure on growth, dry matter yield and leaf nutrient composition of a local *Amaranthus* accession in the central region of the Eastern Cape Province, South Africa<sup>#</sup>

S Mhlontlo, P Muchaonyerwa and PNS Mkeni\*

Department of Agronomy, Faculty of Science and Agriculture, University of Fort Hare, Private Bag X314, Alice 5700, South Africa

## Abstract

Indigenous vegetables that supply abundant amounts of protein, vitamins, calories and minerals could alleviate problems of malnutrition, in developing countries. *Amaranthus* is one such vegetable that could be domesticated and cultivated but information on its fertility requirements is scanty. A dry-land field experiment was therefore conducted to study the effects of sheep kraal manure application rates on growth, fresh and dry matter yields, nutrient uptake and grain yield of one of the *Amaranthus* accessions that grow in the wild in the Eastern Cape. The treatments were sheep kraal manure rates ranging from 0 to 10 t/ha and an NPK {2:3:4(30) + 0.5% Zn} fertiliser as a positive control at 150 kg/ha. Low manure rates ( $\leq 2.5$  t/ha) resulted in plant heights and fresh matter yields which were comparable to those in the unfertilised control, whereas higher rates (5 and 10 t/ha) and NPK fertiliser gave greater plant heights and higher yields at both 30 and 60 days after transplant (DAT) ( $p < 0.05$ ). At 30 DAT, manure application rates of  $\geq 2.5$  t/ha and the NPK fertiliser treatment, produced greater shoot dry-matter yields ( $\geq 29.35$  g/plant) than the unfertilised control (17.11 g/plant). Uptake of N and P in the leaves increased with increase in manure application rate with N uptake reaching a maximum of 308 mg N/plant at a manure rate of 2.5 t/ha which corresponded with the maximum dry matter yield of 45.97 g/plant. There was no effect of manure rate or fertiliser on residual soil N and Ca, whereas P, K, Mg and Zn were increased ( $p < 0.005$ ). The findings suggested that  $\geq 2.5$  t/ha sheep kraal manure could result in growth, nutrient uptake and yield comparable to 150 kg/ha NPK fertiliser for the *Amaranthus* accession used in this work.

**Keywords:** *Amaranthus* accession, sheep manure, dry matter yield, nutrient composition, residual nutrients