

EFFECTS OF NITROGEN AND PHOSPHORUS FERTILISER ON GROWTH AND YIELD OF IRONWEED (*Vernonia galamensis*)

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ABSTRACT

Ironweed (*Vernonia galamensis*) is a promising new crop for industrial oil but information on its response to fertiliser is scanty. A field experiment was conducted at the University of Nairobi Field Station farm during 2 seasons (January to May 1998, season 1 and March to August 1998, season 2) to determine the effects of nitrogen (N) and phosphorus (P) fertiliser rates on growth, photosynthetically active radiation (PAR) interception and seed yield of 2 *Vernonia galamensis* cultivars (ethiopica and gibbosa). N was applied at 0, 75 and 150 kg N/ha, and P at 0, 45 and 90 kg P₂O₅/ha. The experiment was a 2 x 3 x 3 factorial laid out in a randomized complete block design with 3 replications. N and P application significantly increased total dry matter (TDM), photosynthetically active radiation (PAR) interception and leaf area index (LAI) of both varieties in late vegetative and reproductive stages. Gibbosa had consistently higher TDM, LAI, PAR and was taller compared to ethiopica throughout the growing season. Average seed yield of gibbosa was 2.3 times higher than that of ethiopica in both experiments. The highest TDM, LAI and seed yields were obtained at the highest N and P levels. Gibbosa had a significantly higher number of capsules/plant but a lower harvest index (HI) compared to ethiopica.

Vernonia species are well adapted to a wide range of climatic conditions including arid and semi-arid regions (Gilbert, 1986; Perdue, *et al.*, 1986), and hence are potential plants for these areas. *Vernonia galamensis* grows wildly in East Africa, strongly indicating that the region could be its centre of diversity. Variety "ethiopica" is known to mature fairly fast under hot and dry conditions (Amuyunzu, 1998, personal communication) but its growth under cooler conditions is not known. "Gibbosa" being a forest margin subspecies was presumed to be adapted to cooler conditions.

Nitrogen and P have been recognised as the major nutrients limiting crop production in the tropics (Tisdale *et al.*, 1990; Sanchez *et al.*, 1997). Soil N and P depletion is mainly through continuous cultivation, off-farm nutrient export and inadequate replenishment resulting in net loss, therefore, necessitating external input. The objective of this experiment was to investigate the growth and yield of 2 *vernonia* varieties (*Vernonia galamensis* subspp. *galamensis* var. "ethiopica" and *Vernonia galamensis* subspp. *gibbosa*). in response to fertiliser N and P application.

MATERIALS AND METHODS

A field experiment was carried out at the