

**Nitrogen fixation and seed yield of winged bean (*Psophocarpus tetragonolobus* (L.) DC)
under various support systems**

ABSTRACT

A field experiment was carried out to determine the effects of support systems (0, 1, and 2-m height) on nodulation, nitrogenase activity, accumulation and partitioning of total nitrogen (N) and seed yield of a local cultivar of winged bean (*Psophocarpus tetragonolobus* (L.) DC). Plants grown with 2-m supports produced substantial nodule mass, the highest rate of nitrogen fixation, increased nitrogen accumulation of the plant, and seed yield compared to those grown with 1-m supports and unsupported plants. Nitrogenase activities increased and reached a peak at the onset of flowering i.e. 70 days of growth (D70) but declined during the pod formation stage in plants grown with a support system. On the contrary, unsupported control plants recorded a peak nitrogenase activities 14 days before flowering. The descending order of total plant nitrogen accumulation at D140 was plants with 2-m supports (6.30 g N plant⁻¹) > those with 1-m supports (4.06 g N plant⁻¹) > control plants (2.10 g N plant⁻¹), reflecting the beneficial effect of support systems on N₂ fixation as mentioned earlier. Supported plants contributed significantly higher leaf N at the vegetative stage. Consequently, seed N was also significantly higher than in unsupported plants. There was a seven-fold increase in seed yield for plants grown on 2-m supports compared with unsupported plants. The beneficial effects of 2015 yield of winged bean are discussed.

Keyword: Nitrogen fixation; Seed yield; Winged bean