

Abstract

A field experiment was conducted at Jomo Kenyatta University of Agriculture and Technology between 2001 and 2002 to determine nitrogen use in maize–pigeonpea intercrop system. The experiment was laid out as a randomized complete block design replicated four times. Treatments included two pigeonpea maturity types: two long-duration types (erect and semi-erect) and one medium-duration type intercropped with maize (Katumani Composite) or sole crop. Data on plant total N uptake, litter fall, N fixed and soil mineral N at key phenological stages were determined. Results showed that intercropping maize and pigeonpea increased maize grain N concentration compared to sole maize, an indication of nutritional quality improvement. Long-duration cultivars had the highest plant N uptake and contributed high amount of N through litter fall and biological fixation compared to medium duration. Soil mineral N increased over time, probably due to soil N mineralization or pigeonpea N contribution through litter fall decomposition which ranged from 3.9 to 7.6 t/ha. Maize yield and N uptake in subsequent season after pigeonpea were higher in plots previously planted with pigeonpea than those planted continuously with maize. In conclusion, this study showed that long-duration pigeonpeas may play an important role in low-input maize production systems primarily through N cycling (probably through capture of deep soil N pool and litter) and through biological nitrogen fixation and this improves maize yield and quality.