

Abstract

Common bean (*Phaseolus vulgaris*) is an important crop in Kenya. Good quality seed availability for farmers is usually a major constraint. Bean seed quality is often affected by soil deficient nutrients and suboptimal intercropping systems practiced by farmers. Combined effects of N fertilizer at 0 kg N per ha, 50 kg N per ha and cropping systems comprising of four patterns namely Research, Farmers, *Mbili mbili* and pure bean stand practices were studied and evaluated in an intercrop involving beans and maize (*Zea mays*) in the year 2006. The objectives of the study were to determine the effects of cropping systems and N fertilizer application at different locations on bean seed quality. Two field experiments were conducted at the Kenya Agricultural Research Institute (K.A.R.I) in Kenya at its centers, at Kisii and Kibos. Maize hybrid 614D and bean variety *KK 8* were used. The studies comprised four cropping systems and two N fertilizer levels in a Randomized Complete Block Design replicated four times. The results showed that *Mbili* system significantly ($P \leq 0.05$) increased the seedling dry matter and seed vigour by 42% and 42% respectively, while the research method increased the seed germination percent by 10.6%. However, bean seed quality parameters such as seedling growth rate, shoot length and seed sizes were unaffected by the intercropping systems. Nitrogen fertilizer increased 1000 seed weight at the Kisii site by 4.5% while at Kibos it reduced the shoot length by 42%. Thousand seed weight, seed germination and shoot length were higher in Kisii than Kibos while cropping systems \times fertilizer \times location interaction increased seedling growth rate and vigour by 20% and 18% respectively. It was concluded that cropping systems increased the seedling dry matter and seed vigour and N fertilizer increased 1000 seed weight and reduced shoot length of the beans, planting location affected seed quality and cropping systems \times N fertilizer \times location interactions increased seed vigour. Seed vigour which is considered as one of the physiological characteristics of a seed, can also be the best indicator to be used to determine the performance of field crops under adverse conditions.