

THE EFFECTS OF RELATIVE PLANTING DATES OF LEGUMES ON PRODUCTIVITY OF  
CASSAVA - LEGUME INTERCROP

by

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Dissertation for Master of Science (Msc) Degree in Agriculture (Plant production)

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2017

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## ABSTRACT

Crop production in the Limpopo Province of South Africa is limited by inadequate rainfall and poor soils, particularly in the smallholder sector. The incorporation of cassava into the existing cropping systems could be beneficial. However, cassava is a long duration crop that develops slowly during its early growth stages. Therefore, it may be necessary to introduce legumes that will grow and be harvested before cassava matures. Inclusion of legumes in cassava legume intercropping systems not only helps in improving soil fertility through biological nitrogen fixation and solubilisation of phosphorus but also provides compensation for food security and income generation as cassava reaches maturity. However, there is inadequate information regarding the optimum time to introduce legumes into cassava cropping systems under specific agro-ecological conditions. This study aimed at evaluating the effect of relative planting date of legumes on the productivity of cassava-legume intercrop.

Field experiments were conducted during 2014/2015 and 2015/2016 cropping seasons in Thohoyandou, Limpopo Province and Nelspruit, Mpumalanga Province. The experiments were laid out in a split-plot design with legume planting dates (same time with cassava, two weeks after cassava and four weeks after cassava) as the main plots replicated 3 times and five cropping systems (cassava sole, chickpea sole, cowpea sole, cassava-chickpea and cassava-cowpea) as the subplots. Plant height, number of primary and secondary branches and stem diameter were measured for cassava from 3 months after planting until 10 months after planting. For legumes plant height were taken for growth starting from 8 weeks after planting until physiological maturity. Yield and yield components for cassava such as root weight, root diameter, root length, shoot weight and number of roots was measured at 10 months after planting. Yield and yield components for legumes such as shoot biomass, number of pods per plant, number of seeds per plant, 100 seed weight, pod weight, number of pods, grain yield and harvest index were measured at physiological maturity. All data sets were subjected to analyses of variance using Genstat (Version 17), followed by mean separation using Least significant difference (LSD) at 5% probability levels.

The relative planting dates of legumes affected number of roots and root yield during the 1<sup>st</sup> season in Thohoyandou. The greater root yield was reported when legumes were planted 4 weeks after cassava followed by same time and 2 weeks after cassava respectively in 2014/2015 cropping season in Thohoyandou. The relative planting dates of legumes and

cropping systems significantly affected the yield and yield components of legumes in Thohoyandou. The highest legume yield and yield components were reported when legumes was planted same time with cassava followed by 2 weeks and four weeks after cassava. The relative planting dates of legumes had no significant effects on yield and yield components of cassava in both cropping seasons. Cropping systems only affected root diameter and root yield in 2014/2015 and shoot weight and root yield in 2015/2016 in Mpumalanga. The highest root yield and yield components was found when cassava was planted alone followed by cassava - Bambara and cassava - cowpea in both seasons in Mpumalanga. Root yield was reduced by 13201 kg $ha^{-1}$  in 2014/2015 and 20722 kg $ha^{-1}$  in 2015/2016 in Mpumalanga. The overall Land Equivalent Ratio (LER) was higher in intercropping as compared to sole cropping which suggest a positive productivity of cassava – legume intercrop. The relative planting dates of legumes and cropping systems affected the overall productivity of cassava – legume intercrop.

Key words: Cassava, legumes, intercropping, planting dates, productivity.