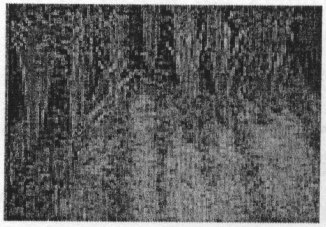
2.3.1 Mukungu, Mwiya. (2002). Effect of cowpea planting date and row arrangement on crop growth and yield in maize (*Zea mays* L.) and cowpea (*Vigna unguiculata* (L.) Walp.) intercrop. (Supervisors: Dr. D. M. N. Mbewe and Dr. K. Munyinda).

In order to improve the productivity of land in smallholder agriculture, intercropping of maize and cowpea has great potential. A study was conducted at the University of Zambia School of Agricultural Sciences Field Station in Lusaka during the 2000/01 season to evaluate the effect of cowpea planting date and row arrangement on the growth and yield of maize and cowpea. The objectives were to evaluate the arrangement and planting date of cowpea intercropped with maize and to assess the yield advantage and profitability of maize-cowpea intercrop system. Cowpea variety Lutembwe was planted on 3 planting dates as an intercrop with maize (Pool 16), on the same day, 14 and 28 days after maize. Four row arrangements 1:1, 1:2 (maize:cowpea) with maize 75cm and cowpea 50cm apart, as well as sole maize and sole cowpeas were used. The treatments were arranged in a split plot design with three replications. Planting dates were the main plots while row arrangements wre the sub-plots. Maize yield and yield components were not affected by treatment. Average yield however, was 2,735 kg/ha. cowpea yield and yield components were affected by the treatments. Average yields were 1,222kg/ha. sole crop cowpea produced the highest grain yield (1,934 kg/ha) followed by the 1:1 row arrangement (1,019 kg/ha) and leas was the 1:2 row arrangement (713 kg/ha). the average number of pods/plant was 6. Sole crop cowpea produced the highest number of pods/plant (9), followed by the 1:1 arrangement (5) and the least was the 1:2 arrangement (3). The number of pods/plant was highest when the crop was planted 14 days after maize. This produced 8 compared to 5 when planted with maize or 4 when planted 28 days after maize. There was a strong interaction of planting date and row arrangement ($P<0.001$) on number of pods/plant suggesting that planting cowpea in 1:1 row arrangement 14 days after maize was the most optimum combination. The average harvest index was 0.37. sole crop cowpea produced the



highest HI (0.43), followed by the 1:1 row arrangement (0.38) and least was the 1:2 arrangement with a HI of 0.29. Harvest index and number of pods/plant in cowpea were positively correlated with grain yield (r=0.95 and r=0.84, respectively). The land equivalent ratio (1.51) and financial gross returns (ZMK 278,000/ha) data showed relative yield advantage (51%) and profitability (37%) of maize/cowpea intercropping in the 1:1 row arrangement compared to the 1:2 row arrangement. Dry matter production, leaf area and leaf area index of cowpea were affected by planting date 42 days after planting maize. Cowpea dry matter production, leaf area and leaf area index was significantly (P,0.01) by row arrangement and generally reached their maximum at 63 days after planting maize, and declined thereafter. The tallest plants were observed when cowpea was planted 28 days after maize, and in the 1:2 row arrangements. These results indicate that cowpea in the intercrop, with canopy always below that of maize, suffered from competition for photosyntically active radiation, nutrients and water resources during both the vegetative and reproductive stages (nodulation, grain filling). The loss of leaves (leaf senescence, shedding) due to aging in cowpea explained the observed decline in dry matter production, leaf area and leaf area index. The results suggest that the 1:1 row arrangement was a better alternative for growing maize together with cowpea in an intercrop system.