STUDIES ON MAIZE-COWPEA AND MAIZE-GROUNDNUT INTERCROPPING SYSTEM.

BY



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ABSTRACT

An experiment was conducted at the Agriculture Faculty Farm of the Eastern University during the period May - September 1989 to study the growth yield and yield variations of Maize (Zea mays), Cowpea (Vigna unguiculata) and Groundnut (Arachis hypogaea) planted either as sole crops or Groundnut or Cowpea as intercrop between Maize rows planted either simultaneously or 2 weeks and 4 weeks before planting maize. Maize plants were tallest when planted as sole crop or when maize and groundnut were planted simultaneously. Plant height was lower and similar when groundnut was planted either 2 weeks or 4 weeks before maize. Height of maize was affected similarly when cowpea was the intercrop but maize was taller when cowpea was planted 2 weeks before maize than when it was planted 4 weeks before maize.

Number of leaves in Maize was higher when it was the sole crop or when maize and groundnut were planted simultaneously. Leaf number in maize was lower and similar when groundnut was planted 2 weeks or 4 weeks before maize.

Dry weight of leaves in maize was higher when it was the sole crop or when groundnut was planted simultaneously or 2 weeks before maize. When groundnut was planted 4 weeks before maize dry weight of leaves of maize was reduced by 50% compared to that in sole crop when cowpea was the intercrop leaf dry weight was higher when cowpea and maize were planted simultaneously. Planting cowpea 2 weeks and 4 weeks before maize reduced leaf dry weight by 59% and 33% respectively compared to sole crop maize.

Stem dry weight of maize was higher when it was the sole crop or when groundnut and maize were planted simultaneously. Planting groundnut 4 weeks before and 2 weeks before maize reduced stem dry weight of maize by 50% and 61% respectively compared with sole crop maize. When cowpea was the intercrop stem dry weight of maize was higher as a sole crop and when maize and cowpea were planted simultaneously. When cowpea was planted 4 weeks and 2 weeks before maize stem dry weight was reduced by 25% and 72% compared with sole crop. Root dry weight of maize was higher when it was the sole crop or when groundnut and maize were planted simultaneously. Planting groundnut 4 weeks before and 2 weeks before maize reduced root dry weight of maize by 71% and 58% respectively compared with sole crop maize.

In maize-cowpea intercropping root dry weight of maize was higher as a sole crop and when maize and cowpea were planted simultaneously, when cowpea was planted 4 weeks and 2 weeks before maize root dry weight of maize was reduced by 76% and 59% respectively compared with sole crop maize.

In Maize-Groundnut combination Leaf area of maize was higher when it was the sole crop or when groundnut and maize were planted simultaneously. Planting groundnut 4 weeks before and 2 weeks before planting maize reduced leaf area of maize by 60% and 36% respectively compared with that in sole crop maize. When cowpea was the intercrop leaf area of maize was higher when maize was the sole crop and when maize and cowpea were planted simultaneously, When cowpea was planted either 2 weeks or 4 weeks before maize leaf area of maize ______ was reduced by 72% compared with sole crop maize.

Days to 50% flowering of maize was reached earlier when it was the sole crop or when groundnut and maize were planted simultaneously. However 50% flowering was 2 days earlier when maize and groundnut were planted simultaneously. Planting groundnut 4 weeks before and 2 weeks before maize delayed 50% flowering by 8 days and 5 days respectively compared with sole crop maize.

When cowpea was the intercrop days to 50% flowering was earlier when it was the solecrop or when cowpea and maize were planted simultaneously. When cowpea was planted 4 weeks and 2 weeks before maize days to 50% flowering in maize was delayed by 13 days and 5 days respectively compared with sole crop maize. Number of cobs per plant in maize was higher when it was the sole crop or when groundnut and maize were planted simultaneously. Planting groundnut 4 weeks before and 2 Weeks before maize reduced the number of cobs by 35% compared with sole crop maize. When cowpea was the intercrop, number of cobs per plant in maize was higher when maize was the sole crop and when maize and cowpea were planted simultaneously. When cowpea was planted 4 weeks and 2 weeks before maize number of cobs was reduced by 44% and 41% respectively compared with that in sole crop maize.

Total grin yield of maize was highest when it was planted simultaneously with groundnut, there being an increase by about 14% in grain yield compared with that in sole crop maize. Planting groundnut 4 weeks before and 2 weeks before maize reduced grain yield by 40% and 36% respectively compared with sole crop maize.

In maize-cowpea combination, total grain yield of maize was highest in sole crop maize. When cowpea was planted either 4 weeks before maize or 2 weeks before maize or simultaneously with maize, grain yield of maize was reduced by 44%, 19% and 14% respectively compared with sole crop maize.

Groundnut plants were taller when planted either simultaneously or 2 weeks before planting maize. Plant height was lower and similar when groundnut was planted either 4 weeks before maize or as a sole crop. Number of leaves in groundnut was largest when groundnut was planted 2 weeks before maize and lowest number of leaves in groundnut when it was planted simultaneously with maize. Number of leaves of groundnut was intermediate when ground nut was planted as a sole crop or when it was planted 4 weeks before maize.

Days to 50% flowering in groundnut was earliest when it was the sole crop. When groundnut was planted either 2 weeks before maize or 4 weeks befoir maize, days to 50% flowering of groundnut was delayed by 3 days and when groundnut was planted simultaneously with maize days to 50% flowering was delayed by 5 days compared with sole crop groundnut.

Leaf dry weight of groundnut was higher when it was the solecrop or when groundnut and maize were planted simultaneously. Planting groundnut 4 weeks before and 2 weeks before maize reduced leaf dry weight of groundnut by 42% and 36% respectively compared with sole crop groundnut.

Stem dry weight of groundnut was highest when it was planted as a sole crop. When groundnut was planted either 4 weeks before maize or 2 weeks before maize of simultaneously with maize stem dry weight of groundnut was reduced by 38%, 52% and 48% respectively compared with sole crop groundnut.

Root dry weight of groundnut was highest when it was planted as a sole crop. Root dry weight was lower and similar when groundnut was planted either 4 weeks before maize or simultaneously with maize. When groundnut was planted 2 weeks before maize, root dry weight was reduced by 43% compared with sole crop groundnut.

Leaf area of groundnut was highest when it was planted as a sole crop. This was followed by treatment where groundnut was planted simultaneously with maize. When groundnut was planted either 4 weeks before maize or 2 weeks before maize, leaf area was reduced by 26% and 34% respectively compared with sole crop groundnut.

Number of pods per plant in groundnut was highest when it was planted as a sole crop, when groundnut was planted either 4 weeks before maize or 2 weeks before maize or simultaneously with maize. Number of pods per plant was reduced by 20%, 49% and 50% respectively compared with sole crop groundnut.

Total pod yield of groundnut was highest when it was planted as a sole crop, followed by treatment where groundnut was planted 4 weeks before maize. When groundnut was planted either 2 weeks before maize or simultaneously with maize total pod yield of groundnut was reduced by 59% and 65% respectively compared with sole crop groundnut. Number of nodules in groundnut was highest when it was planted 4 weeks before maize. It was lower when groundnut was planted as a sole crop and when groundnut was planted simultaneously with maize. When groundnut was planted 4 weeks before maize and 2 weeks before maize number of nodules was increased by 100% and 50% respectively compared with ______ sole crop groundnut.

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Cowpea plants were taller when planted either 2 weeks or 4 weeks before maize. Plant height was lower and similar in treatments where cowpea was planted as a sole crop or when cowpea was planted simultaneously with maize. Number of leaves in cowpea was highest when cowpea was planted as a sole crop. When cowpea was planted simultaneously with maize, number of leaves of cowpea was planted lowest. Number of leaves of groundnut was intermediate when cowpea was planted either 2 weeks or 4 weeks before maize.

Days to 50% flowering of cowpea was earliest when cowpea was planted 4 weeks before maize and this was followed by treatment where cowpea was planted 2 weeks before maize. When cowpea was planted as a sole crop or simultaneously with maize, days to 50% flowering was delayed by 9 days and 10 days respectively compared with solecrop cowpea.

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Dry weight of leaves in cowpea was higher and similar in treatments where cowpea was planted as a sole crop or 2 weeks before maize. When cowpea was planted either 4 weeks before maize and simultaneously with maize, dry weight of leaves in cowpea was reduced by 28% compared with sole crop cowpea.

Dry weight of stem in cowpea was highest when cowpea was planted as a sole crop, when cowpea was planted either 2 weeks before maize or 4 weeks before maize or simultaneously with maize, dry weight of stem was reduced by 44%, 20% and 59% respecitvely compared with sole crop cowpea. Dry weight of root in cowpea was highest when cowpea was planted as a sole crop and this was followed by treatment where cowpea was planted 2 weeks before maize. When cowpea was planted either 4 weeks before maize or simultaneously with maize dry wegith of root in cowpea was reduced by 45% and 50% respectively compared with sole crop.

Leaf area per plant of cowpea was highest when cowpea was planted 2 weeks before maize and this followed by treatment where cowpea was planted as a sole crop. When cowpea was planted either 4 weeks before maize or simultaneously with maize, leaf area of cowpea was reduced by 25% and 29% respectively compared with sole crop cowpea.

Number of pods per plant in cowpea was highest when cowpea was planted 4 weeks before maize and lower and similar in treatments where cowpea was planted as a sole crop or simultaneously with maize. When cowpea was planted 4 weeks before maize, number of pods per plant was increased by 23% compared with sole crop cowpea, and 50 more than 100% compared with treatments where cowpea and maize were planted simultaneously.

Total seed yield of cowpea was highest when cowpea was planted 4 weeks before maize and lowest when cowpea and maize were planted simultaneously. When cowpea was planted either 2 weeks or 4 weeks before maize, seed yield of cowpea was increased by 29% and 42% respectively complared with that in sole crop cowpea. Lowest yield (212 kg/ha) of cowpea was recorded when cowpea was planted simultaneously with maize.

Number of nodules per plant in cowpea was highest when it was planted as a sole crop. When it was planted either 4 weeks before maize or 2 weeks before maize or simultaneously with maize, number of nodules of cowpea was reduced by 27%, 65% and 82% respectively compared with sole crop cowpea.

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Estimated gross returns calculated at present market price, with intercropping compared with monoculture. Highest gross return was when maize was combined with groundnut, with groundnut being planted 4 weeks before maize. In maize-cowpea combination highest return was when cowpea were planted 2 weeks before maize.

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In maize-groundnut combination the highest estimated gross monetory return was when groundnut was planted 4 weeks before maize and lowest when groundnut was planted 2 weeks before maize. When ground was planted either 2 weeks before maize or simultaneously with maize the monetory grain was reduced by 38% and 16% respectively compared with when groundnut was planted 4 weeks before maize,

Estimated gross monetory return was highest when cowpea was planted 2 weeks before maize and lowerst when cowpea was planted simultaneously with maize. When cowpea was planted either 4 weeks before maize or simultaneously with maize the monetory gain was reduced by 9% and 43% respectively of that when cowpea was planted 2 weeks before maize.

Soil moisture depletion in plots with sole crop was higher than in plots which were intercropped when groundnut/cowpea was planted simultaneously with maize.

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