

Cassava yield response to sources and rates of potassium in the forest–savanna transition zone of Ghana

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Abstract

The response of cassava yield to two sources of potassium (K) fertilizer—muriate of potash (KCl) and sulfate of potash (K_2SO_4) was studied on a savanna Ochrosol in the forest-savanna transition zone of Ghana. The crop received basal applications of 60 kg of nitrogen (N)/ha and 60 kg of phosphorus (P)/ha in a randomized complete block design with four replications. Levels of K were 0, 30, 60, 90 kg K/ha for the two sources. Results indicated that K fertilizer was necessary for achieving higher yields in cassava. The higher response of cassava to K was irrespective of the source. Although sulfate of potash generally produced higher figures than muriate, there were no significant differences between the two K sources. Mean responses to KCl treatments relative to control were 124% in stover and 84% in tuber weights. Responses to K_2SO_4 treatments were 128% in stover and 79% in tuber weights. Significant differences existed between the K treatments and the controls (including the NP treatment). Cassava did not show a significant response to NP treatments, likely to be due to the absence of K, confirming the importance of K in cassava nutrition. A minimum of 30 kg K/ha in the presence of N and P (i.e., 60–60–30 kg NPK/ha) was found to be enough to produce a significant response of cassava at the site with very low inherent soil fertility.

Key words: cassava, muriate of potash, sulfate of potash, forest-savanna transition, yield, Ghana.

Setting priorities: case study of IITA's root and tuber crops systems program

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Abstract

This report presents results from a priority setting exercise conducted on the strategic objectives and activities of the Root and Tuber Systems Program as a part of a process to develop strategic plans to guide the activities of IITA for the following 10 years. The scoring method was applied to rank activities and statistical tests were used to validate the ranking from the scoring method. Thirty-five Project members participated in data generation. The results indicate the proportion of each strategic objective between 18 and 22%. Within each strategic objective, the score of each activity relative to the maximum achievable score resulted in the ranking of activities. Statistical tests showed some activities to be significantly not different in ranking from others. There is a clear importance attached to activities of strategic objective 1, compared to those of the others. Activity 4 of strategic objective 1 emerged as a top activity among all the activities. The disciplines of scientists did not affect the scores significantly or the perceived importance of activities. It is advocated that priority setting is an iterative process that needs to be implemented continuously in various steps to improve the efficiency of the project operations.

Key words: priority setting, Root and Tuber Systems Project, IITA

Evaluation of some botanicals as an alternative to chemical fungicide in the rapid multiplication of cassava

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Abstract

The use of plant extracts (botanicals) such as standard neem, pepper fruit, *uziza* and ash as local substitutes or alternatives to chemical fungicides (Tecto-60E) in the rapid multiplication of cassava was studied for two years (2004 and 2005) in Nigeria. Percentage sprouting, sprouting vigour and percentage fungus soot were dependent on the treatments and were optimized in 2–node cassava stakes treated with standard neem extract. Standard neem extract and Tecto 60 (chemical fungicide) had similar, significant ($p = 0.05$) control over fungus soot. The significant growth differences among the treatments with the optimum at standard neem extract indicate the need to adopt neem extract as the best local plant extract as a substitute for or alternative to chemical fungicides using 2–node cassava technique in the rapid multiplication of cassava planting material.

Keyword: cassava, neem, botanicals, fungicides, Tecto–60

Exploring storage protocols for yam (*Dioscorea* spp.) pollen genebanking

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Abstract

Implementation of pollen genebanks allows the conservation of plant genetic resources at the haploid level, pollen genetic manipulations, scheduling of hybrid seed production, and improvement of breeding efficiency. To establish pollen storage protocols for various genotypes of West African yams, laboratory and field experiments were conducted on fresh pollen and pollen stored under various conditions at the Genetic Resources Unit International Institute of Tropical Agriculture Ibadan, Nigeria (IITA). The storage treatments examined were air-dried storage, freeze-drying followed by storage in liquid nitrogen, and hermetic cold storage without previous drying ("wet-cold" storage). Pollen maintained under dry conditions (dry-air and freeze-dried) maintained aceto-carmin stainability up to 400 days but drastically lost germination capacity, most notably under dry-air storage. But pollen samples maintained at "wet-cold" conditions under -80°C retained germination capacity after 2 years. Hand pollination with pollen of *D. rotundata* that was "wet-frozen" under -80°C for 365 days gave 69.5% fruit set and 50% fruit set after 730 days in storage. The results provide evidence to suggest recalcitrance of yam pollen grains in view of poor pollen survival with drying. Therefore, the "wet-cold" storage procedure appears to be the most promising method for the sustainable implementation of yam pollen genebanks. Pollen storage protocols for active and base collections were proposed, based on these findings.

Key words: Yams, pollen genebank, preservation protocols

Effects of ten plant extracts on mycelial growth and conidial production of four fungi associated with yam tuber rot

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Abstract

The effects of extracts from ten plant species on the mycelial growth and conidial production of four major fungi associated with yam tuber rot were investigated. Extracts of *Allium sativum*, *Ocimum gratissimum*, *Cassia alata*, *Azadiracta indica*, and *Hibiscus rosa-sinensis* were found to be effective in reducing mycelial growth as well as conidial production at varying degrees *in vitro*. Their incorporation into plant protection programs will be a good complement in integrated crop disease management.

Key words: Plant extracts, mycelial growth, fungi and yam rot

Analytical steps to a multi-trait selection index for rapid participatory appraisal of cassava varieties for release to farmers

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Abstract

The Integrated Cassava Project of the International Institute of Tropical Agriculture conducted on-farm, demonstrational, and multilocational trials in 2003/2004 and 2004/2005. From these trials nine new elite genotypes were released to farmers. These trials required working with a lot of stakeholders including farmers and government agencies. Data on several trait variables were obtained from the field trials. This paper presents the last stage in a national breeding program, and the logic behind a decision to release or not release new varieties. It also shows how to arrive at a choice of traits and how to derive appropriate weights in a simulation model.

Keywords: Cassava, Selection index; Mosaic disease; Participatory selection; Variety release

Distribution of yam anthracnose disease in Nigeria

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Abstract

Yam anthracnose disease, characterized by leaf necrosis and shoot die-back, is a major constraint to the cultivation of yam, especially water yam (*Dioscorea alata* Linn.) . Studies were conducted on the distribution of the disease in the major yam growing zones in Nigeria. Yam anthracnose disease was found to be widely distributed in 148 farmers' fields in three agroecologies. The incidence was 52.2% in the southern Guinea savanna, 51.3% in the forest/savanna transition, and 40.3% in the humid forest, with *D. alata* having the highest severity score followed by *D. rotundata*. *Colletotrichum gloeosporioides* (Penz) was the pathogen most commonly associated with the symptoms of anthracnose based on isolations from leaf samples collected from the farmers' fields. *Fusarium* spp., *Rhizotonia solani* (Kuhn), *Botryodiplodia theobromae* (Pat), and *Macrophomina phaseolina* (Tassi) were also isolated from the infected yam leaves.

Keywords: Yam, *Dioscorea* species, anthracnose, yam diseases

Empirical estimation of demand function and elasticities for seed yam in southern Nigeria

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Abstract

This study was conducted to assess the influence of economic variables on the value of seed yam demanded in Southern Nigeria using demand function analyses. A cross sectional data was collected from 150 seed yam farmers spread across three major yam producing States in 2006 using the multi-stage random sampling technique. Results show that education and income were negatively related to value of seed yam demanded in Ebonyi State. Price of seed yam had a negative relationship and significant at 5.0% level while farm size and fertilizer were directly related to value of seed yam demanded at 1.0% level. In Delta State, education and farmer experience were negatively related to seed yam demand and these were significant at 1.0%. Variable inputs were negatively related and significant at 5.0% level while income and farm size were directly related to the value of seed yam demanded and significant at 1.0% and 10.0% levels. In Cross River State, age, education, labour, and farm size had a direct relationship with seed yam demand at 1.0% level. Fertilizer and variable inputs were negatively related to seed yam demand at 5.0% level of probability. The elasticity of demand for seed yam to farm size was positive for Ebonyi State but inelastic for Cross River and Delta. The elasticities of demand for education in Cross River (0.78), Delta (1.20), and Ebonyi(-0.41). The elasticity for labour in Cross River State was 0.13. Own-price elasticities were -0.170 (Delta), -0.440 (Ebonyi), and 0.054 (Cross River). The cross price elasticities for seed yam with respect to the price of major substitutes in the three States were all positive. The income elasticities of demand for seed yam are positive for Delta and Cross River but negative for Ebonyi. There is a need therefore for policies aimed at encouraging farmers to increase cultivation of seed yams, and improving farmers' access to fertilizer and other inputs. Farmers should be exposed through extension services to the benefit of seed yam enterprise for increased commercialization.

Keywords: Seed yam, *Dioscorea* species, yam demand function, Agroenterprise

Varietal response of seven new hybrid yam varieties to minituber production using the microsett Technique

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Abstract

A 2-year study at the National Root Crops Research Institute Umudike in 2005 and 2006 evaluated the performance of seven new hybrid yam varieties in minituber production using the recently developed microsett technique. One hundred 8g microsetts were cut from each of seven hybrid yam varieties as well as a local best (control). These were treated with a fungicide/insecticide mixture, cured overnight, and planted in randomly allocated plots in nursery chambers. The trial was laid out in RCBD design with three replicates. The microsetts were spaced 20cm x 10cm in the nursery to give a population of 500,000 plants/ha. Basal application of NPK at 200kg/ha was carried out at 12 WAP by the broadcast method and weeds were removed by hand pulling before fertilizer application. Five out of the seven hybrid yam were promising in terms of mean minituber yield/stand, minituber yield/ha, and sproutability at 4.6, and 8 WAP. The order of superiority was TDr 89/02461> TDr 89/02665> TDr 89/02677> TDr 89/01213> TDr 89/02565. These produced minituber sizes that ranged from 104g (TDr 89/02565) to 155g (TDr 89/02461); the mean size from the local best, Obioturugo, was 93g. TDr 89/02461 (6.7t/ha), TDr 89/02665 (5.9t/ha), TDr 89/02677 (5.7t/ha), and TDr 89/01213 (5.2t/ha) gave the significantly highest minituber yields/ha, the poorest yielder (1.3t/ha) was TDr 89/01438. These results have serious implications for seed yam production using the newly developed minituber technique.

Keywords: Yam, *Dioscorea* species, minituber production, seed yam, microsett technique

Analysis of acceleration, deceleration and stagnation in output, land area, and yield of sweetpotato [*Ipomoea batatas* (L.) Lam] in Nigeria, 1961-2007

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Abstract

The study investigated the trends in the production, yield, and land area devoted to sweetpotato, the fourth-ranking root and tuber crop in Nigeria, at different periods between 1961 and 2007. It also estimated the compound growth rates and tested the hypotheses of the existence of acceleration or deceleration or stagnation in the growth of the variables. Secondary data collected from the FAO Statistical database were used for the study. Data were analyzed using descriptive tools and regression of trend equations in time variables. Also, annual compound growths were calculated while the existence of acceleration, deceleration, or stagnation was verified by estimating quadratic equations in time trend variables. Results revealed that while the trends in both output and area devoted to sweetpotato were increasing, that of yield was decreasing. A statistically significant positive association ($r = 0.99$; $p < 0.01$) was found between output and area while statistically significant negative associations existed between output and yield ($r = -0.71$; $p < 0.01$) and area and yield ($r = -0.72$; $p < 0.01$). Estimated trend equations for the 1961-2007 aggregate data revealed statistically significant increases or growths for output and area but a statistically significant decrease for yield. Compound growth rates for the aggregate data were calculated to be 7.86% for output, 11.52% for land area, and -3.28% for yield. When acceleration, deceleration, or stagnation was assessed, results also revealed the existence of a statistically significant acceleration for output ($p < 0.01$) and land area ($p < 0.01$) but a significant deceleration for yield ($p < 0.05$). The conclusion drawn from the study is that the growth recorded in output during the study period was mainly accounted for by an increase in land area rather than an increase in the yield of sweetpotato. Conscious investments in innovations, funding of research for development and the dissemination of appropriate technologies, the development of rural infrastructures, and guaranteed access to production inputs and appropriate marketing channels for farmers would, among other things, be used to promote the yield and production of sweetpotato in Nigeria.

Key words: *Ipomoea batatas*, production, land area, yield, acceleration, deceleration, stagnation, growth, Nigeria.