Pages 1-3

Effect of moisture content and temperature on the specific heat of yam and cocoyam.

B.E. Eje & G.O.I. Ezeike

ABSTRACT

The specific heat capacity of any tuber crop is an important thermal property that significantly influences the analysis of processing and storage systems as well as the determination of thermal rate processes. The specific heat of yam and cocoyam was determined at various levels of moisture content and temperature using a 5 by 5 factorial design in Completely Randomized Design (CRD). For both crops the specific heat increased with increase in moisture content and temperature but the incremental rate reduced at moisture content above 30%. A regression analysis performed on the generated data gave a functional relationship between the variables for yam and cocoyam.

Key words: specific heat capacity, cocoyam, moisture content, temperature, tuber crop

Pages 3-6

Investigations on the use of micro-tubers for seed yam multiplication in tropical Guinea savanna.

A.O. Nwankiti, L. Deadman & E. Ekefan

ABSTRACT

Seed yams (*Dioscorea* spp.) are planting materials used for field production of ware yams consumed as food. The seed yam production potential of 3 weight categories of micro-tubers were compared with the minisett technique using a 30 g weight sett, cut from mother tubers. Micro-tuber weights between (8-30 g) were as good as minisetts of 30 g wt in terms of average weight of tuber and seed yam production. Micro-tuber weights above 30 g produced plants superior to those from minisetts in all production attributes especially for weights up to 60 g and above. The importance and potential of micro-tubers in seed yam production are discussed.

Key words: micro-tubers, multiplication, Guinea savanna

Pages 7-10

Post harvest deterioration of yam (*Dioscorea* spp.) tuber in storage barn.

R.N. Okigbo & F.E.O. Ikediugwu

ABSTRACT

The relative susceptibility to postharvest rot of especially popular cultivars of white yam (*Dioscorea rotundata* Poir), in South West Nigeria was determined. Of the 3 cultivars of white yam "omi", "iyawo" and "ikale", and one of water yam (*D. alata* L.) investigated, the white yam cultivars had comparable percentage rot of 26.3% (omi), 28.7% (iyawo) and 32.9% (ikale) at the 6th month of storage. On the other hand, none of the water yam tubers showed rot during the same period of storage. The fungi responsible for the rot of the white yam cultivars were *Aspergillus niger* Van Tiegh, *Botrydiplodia theobromae* Pat, *Penicillium oxalium* Currie and Thom, *Rhizopus* spp. and *Rhizoctonia* spp. The establishment of *Rhizoctonia* spp. as a postharvest pathogen in Nigeria is discussed.

Key words: diseases, Rhizoctonia, storage, tuber rot

Pages 10-15

Gender and resource use efficiency in cassava-based farms in Akwa Ibom State, Nigeria

G.S. Umoh

ABSTRACT

This study investigated farm resource use efficiency, resource use pattern as well as the determinant of outputs in cassava-based farms. Findings reveal that both male and female farmers efficient in resource use; local farm implement are the common equipment used by farmers, and land and labour constitute the major cost items in farming. Land, fertilizer and planting materials are the determinants of output of male farmers while farm size, labour and planting materials significantly influence output of female farmers.

Key words: cassava, resource use, gender.

Pages 16-20

Moisture dependant physical properties of yam bean (*pachyrhizus erosus*) seeds

M.S. Sajeev, G.K. Rajesh, R. Kailappan & B. Vimala

ABSTRACT

The physical properties of yam bean seeds were determined at moisture contents ranging from 6.35% to 37.25% (wet basis). The average length, breadth and thickness varied from 10.12 to 11.33 mm, 8.88 to 9.74 mm and 4.18 to 4.98 mm, respectively as the moisture content increased from 6.35% to 37.25%. The bulk density decreased from 821 to 728 kgm^{-3}, true density decreased from 1211 to 1174 kgm^{-3} and porosity increased from 32.2% to 37.99% at the above range of moisture content. Angle of repose was increased exponentially with moisture content from 17.61° to 27.82° and static coefficient of friction increased linearly with moisture content. The coefficient of friction was maximum for mild steel (0.690) followed by galvanized iron (0.552), aluminium (0.542) and stainless steel (0.522). Crushing strength was highest when measured along the thickness (16.35 kg) followed by breadth wise (7.99 kg) and lengthwise (4.9 kg) and it decreased with increase in moisture content.

Key words: bulk density, true density, porosity, angle of repose, static coefficient of friction, crushing strength

Pages 20-27

Developing fertilizer recommendations for white yam (*Dioscorea rotundata*) in central Ghana

M.M. Buri, R.N. Issaka & R.J. Carsky

ABSTRACT

Yam is a high potential crop in the savannah zone and exported nutrients contained in yam tubers must be replaced. To help guide suitable production, mineral fertilizer trials were conducted across the central yam-growing belt of Ghana with a view of identifying the most limiting nutrient elements and establishing economically justified fertilizer recommendation levels. Fresh tuber yields significantly responded to mineral fertilizer in all 9 combinations of years and sites. In 2000, the mean fresh tuber yield increase over the control (15.5 t/ha at 3 sites without fertilizer applied) was 27% with 15-15-20 kg/ha N-P_2O_5-K_2 O and 45% with 30-30-40 kg/ha N-P_2O_5-K_2O. A partial budget analysis showed that both 15-15-20kg/ha and 30-30-40 kg/ha N-P_2O_5-K_2O were economically justified by a marginal rate of return greater than 2. Soil analyses revealed that K was adequate at all sites. N was low at all sites except one, and P was adequate at all but one sites. In 2001, compared with complete (N-P-K) fertilization, plots without N;P_2 O_5 and/or K_2O applied had significant yield reductions of 7.4 t/ha, 6.2 t/ha and 4.2 t/ha, respectively, at 2 sites combined. In 2002, mean yield losses at 4 sites due to withholding individual nutrients were not significant while the addition of 45-45-60 kg/ha N-P_2O_5-K_2O resulted in a mean increase in tuber yield of 129%. Based on these results, 15-15-20kg/ha or 30-30-40 kg/ha N-P_2O_5-K_2O can be recommended in all of the agro-ecological zones of central Ghana.

Key words: mineral fertilizer, nutrient omission trial, partial budget, profit, tuber yield

Pages 28-31

Processing, microbiology and biochemical changes in the starch and sugar contents of sweet potato for poultry nutrition

K.A. Etchu & G.N. Egbunike

Summary

Sweet potato is one of the alternative substitutes for a more conventional energy source in poultry diet. Over the years its utilization has been low due to its sugary nature. This study was carried out to investigate 3 processing methods (grating, fermentation and slicing), microbial activity and identification of the specific microbes during the different days of fermentation, as well as the changes in the starch and sugar contents of the processed sweet potato to be used for poultry nutrition. Processing of the sweet potato showed a significant difference ($p<0.05$) in the moisture content with the grated form having the least (9.60%).Significant treatment effect ($p<0.05$) was also observed on the proximate composition of the products. For all the simple sugars analyzed, their concentrations reduced ($p<0.05$) with increasing number of days of fermentation. The grated form had the highest level (10.24 ± 0.31%) of total sugars and day three of fermentation had the least (4.90 ± 0.27%). Starch was highest (82.30 ± 0.28%) for the grated form and least (76.90 ± 0.16%) for day one of fermentation. *Lactobacillus* spp. and *Streptococcus lactis* were common for all the days. *Escherichia coli* was peculiar in day one, *Pseudomonas* spp. in day two and *Staphylococcus aureus* in day three of fermentation.

Key words: processing, microbiology, biochemistry, sweet potato, poultry nutrition

Pages 31-34

Integrated agronomic practices for cassava production: Effects of cultivar, stake weight and number of shoots as per stand on the growth and productivity of cassava

O.N. Eke-Okoro

ABSTRACT

The effect of combining three independent agronomic practices (use of stake weight, number of shoots per stand and improved cultivars) in cassava production were studied for 2 years (1999/2000 and 2000/2001) in Nigeria. Plant height, number of root and fresh root yield were affected by a combined use of agronomic practices irrespective of the combination used. Significant variations in plant height, number of root and fresh root yield existed between the main effect of individual agronomic practice and the combined effect of these practices. A combination of NR 8082 with 875 kg/ha stem weight and 3 shoots per stand produced the highest number of root and fresh root yield. The significant growth and yield differences among individual agronomic practices and their combinations indicate the need to adopt the use of combined agronomic practices for improving cassava yield.

Key words: agronomic practices, cassava, cultivar

Pages 34-40

Effets des précédentes plantes de couverture sur la production de l ‘igname en zone de savane au Bénin et au Togo

P.K. Sodjadan, A.M. Toukourou, R.J. Carsky et P. Vernier

Résumé

L'igname (*Dioscorea* spp.), est généralement cultivée sur défriche de jachère longue pour bénéficier de niveau élevé de fertilité de sol mais l'augmentation de la pression démographique entraîne une la reduction générale de la durée des jachères. Dans le but de la mattre au point des systèmes de production durables à base d'igname des essais ont été menés respectivement à Gobé au centre du Bénin et à Laouno et Tchébébé au centre du Togo en vue d'évaluer l'effet des Jachères Légumineuses des *Asechynomene histrix, Mucuna pruriens* et *Pueraria phaseoloides* sur l'amélioration du rendement de l'igname. La quantité de biomasse aérienne sèche la plus élevée a été produite généralement par le *Mucuna* qui a réalisé l'accumulation biologique d'azote la plus élevée de l'ordre de 91 à 120 kg/ha. Sur tout les essais, le précédent jachère de *Mucuna* a augmenté de 3,2 t / ha (50%), en moyenne le rendement de tubercules frais d'igname Des accroissements hautement significatifs ont été enregistrés à Laouno en 2002 sur des parcellcs de deux ans de jachère (2,7 t / ha), et al Tchebebe après un an de Jachères (4,0 t / ha).Dans ces cas le précédent jachère de *Mucuna* a été économiquement rentable avec des taux marginaux de rentabilité supérieur à 100%. La pratique de la jachère plantée de *Mucuna* Pourrait se substituer à la pratique de la jachére de longue durée en vue d'intensifier l'exploitation des terres pour la production de l'igname.

Mots clés: Légumineuse de couverture, jachère améliorée, igname, Rendement, savanes humides

Pages 41-48

Growth and dry matter partitioning in cassava intercropped with upland rice in Sierra Leone

A. Jalloh & M.T. Dahniya

ABSTRACT

Cassava (*Manihot esculenta* Crantz) and rice (*Oryza sativa* L.) are 2 major staples in the world. Both crops are grown in mixtures on the uplands of many countries in West Africa and some countries in South America and Asia where cassava is rapidly becoming a food security crop. Intercropping regime is one of the major factors influencing the productivity of the cassava/rice intercropping system. The objective of this experiment was to determine the effect of the time of introducing rice into cassava on the growth and dry matter partitioning in cassava which influences the productivity of the crop. Cassava was therefore planted simultaneously with rice, and rice was also introduced into 2-, 4-, 6-, and 8-week-old cassava on the upland experimental farm of the Institute of Agricultural Research in Sierra Leone during the 1990/91 and 1993/94 cropping seasons. Five cassava plant samples were taken at two monthly intervals from 2 to 12 months after planting (MAP).Cassava planted simultaneously with rice was shaded by intercropped rice until rice harvest, leading to a relatively greater diversion of total dry matter (TDM) into the stem than the roots during the first 4 months after planting. Introducing rice 2 weeks and later after planting cassava led to the cassava canopy being above the rice and so no shading by rice. Sole cassava and cassava that was 4 or 8 weeks old before introducing rice had greater proportion of TDM in the roots than all other parts from 4 MAP until at final harvest. Growth rate and yield of cassava increased while rice grain yield decreased as the time of introducing rice into cassava was delayed. The results of this study reveal that planting regime for cassava/rice intercropping will depend on the relative importance of cassava and rice to the farmer for food and market. When more cassava is desired, rice has to be introduced at or later than 4 weeks after planting (WAP) cassava, while in the case of greater need for rice, introduction of rice should not be delayed beyond 2 WAP cassava.

Key words: competition, light, planting regime, total dry matter, rice, cassava

Pages 48-53

Influence of NPK fertilizer on tuber yield and yield components of new hybrid yam varieties in south western Nigeria

G.O. Agbaje, A.A. Adegbite, G.A. Oluwatosin & T.A. Akinlosotu

ABSTRACT

Inorganic fertilizer (NPK 20-10-10) was applied at the rates of 0, 200, 400 and 600 $kgha^{-1}$ respectively to three newly released hybrid yam (TDr 89/02665, TDr 89/02565 and TDr 89/02677) varieties across rainforest and savanna ecologies in south western Nigeria. The experiment was carried out for 2 years (2000 and 2001) at the 4 experimental stations of the Institute of Agricultural Research and Training, Obafemi Awolowo University, Nigeria which are of different soil types viz: Kanhaplic Haplustalf (USDA) in Ibadan, Typic Troposament in Ilora, Rhodic Kandiudalf in Orin-Ekiti and Rhodic Kandiudult in Ikenne. Data on the influence of inorganic fertilizer on yam tuber yield and on the incidence and severity of nematode pests were collected and analyzed. The results showed that hybrid yams do not respond to fertilizer application in Orin and Ilora soils with total N (0.63%-1.60%) and exchangeable K (0.29-0.62 $cmolkg^{-1}$). The soils at Ikenne and Ibadan with total N (0.60%-0.80%) and exchangeable K (0.45-0.74 $cmolkg^{-1}$) only responded to fertilizer when planting was done late. The optimum fertilizer (NPK 20-10-10) required for the late season planting was 200 $kgha^{-1}$ in Ibadan and 400 $kgha^{-1}$ in Ikenne. The additional fertilizer was required for rapid vegetative development due to the shorter growth cycle in late planting. The incidence and severity of nematode pests on yam tubers were not influenced by inorganic fertilizer but the ratings were higher in the sandy soils of Ilora than in the clay loamy soil of Orin. The soils have adequate K but soil N and P are low. The hybrid yam varieties showed tolerance to low soil nutrients status when planted early, but in late planting, additional fertilizer will be required for optimum yield.

Key words: fertilizer, tuber yield, yam

Pages 53-58

Expanding Guinea yam (Dioscorea spp.) production in Uganda: Results of a short survey in Luweero district

D.L. Coyne, C. Kajumba & R. Asiedu

ABSTRACT

Over recent years, pests and disease epidemics have affected the reliability of the main food crops in Uganda. Attempts to improve crop diversity therefore, and reduce reliance on the key staple crops, have included the promotion of yam (*Dioscorea* spp.) through the introduction of improved cultivars (cvs), breeder's lines and seed populations of *Dioscorea rotundata* by the International Institute of Tropical Agriculture (IITA) in coordination with the National Agricultural Research Organisation of Uganda. Selections from the introduced germplasm, made on-station in collaboration with farmers, were multiplied and given to interested farmers in selected districts in the country for further multiplication and testing in comparison with local yam cvs. The current study assessed the extent of the uptake of the introduced germplasm in one district (Luweero), their acceptance by farmers and farmer perception of future yam production. The selections from the introduced germplasm were well accepted and all farmers who received them have continued to produce them. Farmers who did not receive them have since adopted them. The previously most preferred cv, kyetutumula a *Dioscorea cayenensis*, remains the most preferred, essentially due to its taste. The introduced germplasm were in general well liked, depending on the clone, but farmers are less willing to increase their investment in expansion of them due to variability between clones, including taste. A main reason for not expanding production of either the introductions or other cvs, however, is the lack of (healthy) planting material and information regarding the introductions. Farmers are willing and intend to expand production of yam in Luweero. There is need however, for increased supply of healthy planting material and training in yam production techniques. Farmers and extension agents are already requesting material and aid, in order to counteract losses from the current epidemic of banana bacteria wilt disease.

Key word: carbohydrate staple crops, clean planting material, *Dioscorea alata, Dioscorea cayenensis, Dioscorea rotundata*, seed yam, training