

Pages 1-3

Scheduling of irrigation on sweet potato (*Ipomoea batatas* [L.] Lam)

G.O. Chukwu

ABSTRACT

Irrigation scheduling on sweet potato (*Ipomoea batatas* [L.] Lam), was determined by simple calculation method taking cognizance of irrigation methods (sprinkler and surface) and soil types (sandy, clay and loamy) in the southeastern Nigeria. Results indicated that gross irrigation depths were consistently higher in surface than sprinkler method by 30, 25 and 16.7%, respectively, in sandy, loamy and clay soils. Net irrigation depths were optimum in January and minimum in November. Sandy soils require more frequent but smaller application of water equivalent to 1.47 and 3.68% higher net irrigation depths per season, respectively, than loamy and clay soils for optimum production of sweet potato in the area.

Key words: irrigation scheduling, sweet potato, sprinkler, surface, soil type

Pages 3-6

Peeling rate of a manually-operated cassava (*Manihot esculenta* Crantz) peeling machine

I.N. Itodo

ABSTRACT

A manually-operated cassava (*Manihot esculenta* Crantz) peeling machine was designed and constructed. The objective of this work is to evaluate its performance by determining the peeling rate (quantity of cassava (kg) peeled per hour) and the quality of peel (thickness of root periderm and cortex removed). Experiments were undertaken to determine the manual peeling rate per person, the dimension of the cassava roots, thickness of root periderm and cortex, and the average weight of roots. The rate of peeling of the machine was evaluated and compared with the manual rate. The quality of peel of the machine was also evaluated by measuring the amount of root periderm and cortex removed. A performance evaluation of the machine showed that the machine had a peeling rate of 97 kg/hr which is an improvement over the experimentally determined manual rate of 48 kg/hr/person. The machine was capable of removing 42% of the periderm and cortex of the roots at 74% moisture content. It is recommended that the fibrous brushes used for peeling in the machine be replaced with metal brushes to ensure the complete removal of the root cortex, and thereby prevent cyanide poisoning when roots are processed and consumed as food.

Key words: peeling machine, cassava roots, peeling rate, cortex, periderm, fibrous brushes

Pages 7-11

The effect of population pressure and gender on farm labor use in the cassava producing zones of sub-Saharan Africa

C.I. Ezedinma

ABSTRACT

Several socio-economic factors can influence the allocation and control of farm labor resource in food crop production. One such factor is human population pressure. This paper describes the effect of population pressure on farm labor use in the cassava producing zones of sub-Saharan Africa (SSA). Data is based on village level information collected by the collaborative Study of cassava in Africa (COSCA). The COSCA was initially conducted in six African countries namely: Côte d'Ivoire, Ghana, Nigeria, Tanzania, Uganda, and Congo (ex-Zaire). These countries have a wide range of climatic and population density conditions and together produce over 70% of Africa's cassava. Results indicate that the substitution of family labor for hired labor in food crop production is enhanced by population pressure in the humid and sub humid cassava climatic zones. Use of labor by gender in some selected food crop enterprises is significantly influenced by population density. The paper, therefore, concludes that population pressure can influence the use of farm labor in food crop production in the cassava producing zones of SSA.

Key words: farm labor, gender, population pressure, cassava

Pages 11-13

Quality evaluation of gari from major producing areas of Delta and Edo States of Nigeria

U.J. Ukpabi & M. Dafe

ABSTRACT

Traditionally processed gari samples collected from five major gari producing areas of Delta and Edo States were analyzed for desired chemical, physical and organoleptic characteristics. The resultant 1.67-8.40 mg/kg cyanide and 0.83-1.50% fibre contents are within nutritionally accepted limits. Poor storability of some samples could be attributed to the percentage moisture range of 13.00-15.32%. In addition, 88.4-93.0% of the granular gari samples were found to have aggregate sizes above 0.25 mm and below 2 mm. Performed sensory evaluation test, however, showed that the gari samples from Okpevho, Aniocha, Ethiope, Ovia and Orhionwon were generally acceptable as food.

Key words: gari, quality evaluation, cassava, Nigeria

Pages 13-15

**Control of yam tuber (*Dioscorea rotundata*)
rot agent *Sclerotium rolfsii* with camwood
(*Baphia nitida* Lodd) sawdust extract**

B.O. Ejechi & M.E. Ilondu

ABSTRACT

Ethanollic extracts of camwood (*Baphia nitida* Lodd) inhibited the growth of yam-rot fungus (*Sclerotium rolfsii*) in yam, potato or cassava broth. Reduction in growth was extract concentration dependent with 5 mg extract/ml causing 100% inhibition of growth. Inhibitory concentrations were higher in broth supplemented with 1% (w/v) dextrose than in unsupplemented broth media. The germination of sclerotia was delayed for 2-4 days by extract concentrations of 1.0 to 2.0 mg/ml while it was completely inhibited at concentrations of 3 mg/ml and above. Deterioration (weight loss) of extract-treated yam slices was markedly reduced. Extracts of camwood sawdust may prove economically useful for the control of post-harvest yam tuber rot.

Key words: yam tuber rot, *Dioscorea*, *Sclerotium rolfsii*, camwood, *Baphia nitida*, sawdust

Pages 15-18

The physico-chemical properties of sweet potato (*Ipomoea batatas* L. Lam) root flour as affected by processing condition

C.I. Iwuoha & M.I. Nwakanma

ABSTRACT

Physico-chemical properties of flours were evaluated in relation to fermentation (26-28°C, 72 h), boiling (100°C, 10 min), and baking (165°C, 16.5 min) of sweet potato (SP) roots. Results obtained showed that processing conditions caused statistically significant differences in the means of boiling point ($p < 0.2$) and in others ($p > 0.05$). Boiling effected the greatest increases in majority of the PCPs: water absorption (136.81%), oil absorption (178.43%) swelling index (174.12%), cold-slurry dynamic viscosity (24.84%) and gelatinization point (45.97%) while baking and fermentation followed, gradually. Cold-water solubility, TSS was significantly ($p < 0.005$) hampered by the processing conditions. The overall results indicate the technical feasibility of producing SP flours with divers characteristics for application in food recipes/formulae.

Key words: sweet potato tuber, flour, baking, boiling, fermentation, processing, physico-chemical property

Pages 18-20

Flavoring properties of species on cassava fufu

D.E. Okwu

ABSTRACT

Locally produced cassava fufu has pungent odour which reduces its acceptability. The effects of the following spices: *Piper guineensis* (Uziza – UZ), *Myopias aethiopica* (Uda – UD), *Tetrapleura tetraptera* (Ughokiriyo – UH) and *Cymbopogon citratus* (Lemon grass – LM) on the organoleptic characteristics of locally produced cassava fufu were investigated. The results showed that the moisture content of LM, UZ, CN, UD, and UH were 48.1%, 40.40%, 39%, 38.78% and 34.30% respectively. This trend follows the rate of fermentation of the cassava tuber. All the spices improved the flavour of cassava fufu by eliminating the pungent odour and inhibited fungal growth and development.

Key words: cassava, fermentation, flavour, preservative, spice

Pages 20-23

The cassava price cycle: evidence from Western Congo (ex-Zaire)

Ir. F. Goossens

ABSTRACT

This article shows that the cassava retail market in Western Congo (ex-Zaire) during the period 1961-1988 was characterized by a price cycle with an average periodicity of 49 months and an amplitude of 47%. The duration coincides with 2 cultivation periods. The existence of the price cycle implies that market prices do guide farmers' production decisions and that price signals are transmitted from consumers to farmers. The price cycle is important in a price analysis, with its impact often being more important than that of the trend. Although the presence of a price cycle indicates some degree of price transmission and efficiency, more interpretation of results of market efficiency is difficult because of the total absence of efficiency standards.

Key words: cassava cycle, cassava, price cycle, DR Congo (ex-Zaire)

Pages 23-27

Technology transfer strategies: the case of sustainable cassava plant protection in Cameroon

B. Bakia, J.T. Ambe & B. James

ABSTRACT

Agricultural technologies once developed can be useful if they reach their end users. Usually, the task of transferring these technologies in Cameroon is undertaken by both government and NGO structures. The ecologically Sustainable Cassava Plant Protection (ESCaPP) Project Cameroon in its endeavour to reach cassava farmers with sustainable cassava plant protection practices, like biological control of major pests, sanitation of plant materials, seedbed preparation, and planting methods, used the above structures. ESCaPP Cameroon started off with training assessment study at the levels of researchers, extension trainer/agents and farmers. A training curriculum was developed with modules reflecting the map needs of the extension agents and farmers. The project also organized series of training courses for researchers and extension staff drawn from the Ministry of Agriculture (MINAGRI) and collaborating NGOs across agroecological zones in Cameroon: Highland savannah, Humid forest, Semi-humid forest and Guinea savanna. However, two technology transfer approaches were used by MINAGRI and NGOs. While MINAGRI practiced the World Bank Training and Visit (T&V) system of extension trainers training sub-extension trainers to train field extension workers, who finally train farmers, the NGOs trained extension trainers engaged in direct farmer trainings. Results show that as many as 6653 farmers in Cameroon were reached with sustainable cassava plant protection skills through both methods within a year with a set up mechanism to continue with much trainings and being backstopped by ESCaPP project scientists through a training co-ordinator. Although the MINAGRI approach was hindered by bureaucratic delays, the NGOs' approach greatly complemented ESCaPP Cameroon primary task of reaching the end users with sustainable skills.

Key words: technology transfer, strategies, cassava, plant protection, Cameroon

Pages 28-29

Effect of greening on the performance and maceration of cocoyam corm slices by cell-wall-degrading enzymes

B.A. Onuegbu & K. Zuofa

ABSTRACT

Greenings of cocoyam corm cultivars (Edeuhie, Edeocha, Cocoindia and Edewachukwu) in diffused (sub-dued) sunlight and its effects on maceration by rot pathogens of cocoyams and on performance of cocoyams were assessed. Greenness delayed maceration and therefore delayed rot in all the cultivars, the differences between greened and normal corm slices of the cultivars, Edeuhie and Edeocha, being significant. The differences observed in the other cultivars, Edeocha and Edewachukwu were not significant. Greenness was said to be a defense mechanism of the corms against rot pathogens and holds a promise for the delay of rots of cocoyam corms for future planting. The results on the growth and growth components of greened and normal corms showed no significant differences. In general, greenness of cocoyam corms was found to be ideal in delaying rots and increasing performance.

Key words: greening, maceration, cocoyam, corm, cell-wall-degrading enzymes

Pages 30-33

Effects of substitution of maize by sweet potato root meal and pelleting of diet on the performance of growing rabbits

O.A. Abu & O.O. Tewe

ABSTRACT

Performance, nutrient digestibilities and carcass characteristics of growing rabbits fed pelleted and unpelleted diets in which maize was replaced by dehydrated sweet potato tuber meal (SPM) at 0, 25, 50, 75 and 100% levels were evaluated. Fifty, 6-7 weeks old crossbred rabbits averaging 650.3 g were allotted to five treatments in 5×2 factorial experimental design. The trial lasted 70 days. Rabbits fed maize-based pelleted rations consumed more feed and performed better ($P < 0.05$) than those fed unpelleted diets for all levels. However, those fed all-maize pelleted diet gained 1160.0 g while those fed pelleted diet in which 50% maize was replaced by sweet potato tuber meal (SPM) gained 947.5 g, without significant differences ($P > 0.05$) in performance when compared with rabbits fed diets in 25% maize was replaced by SPM. Feed conversion ratio of the rabbits increased as the level of SPM in the diet increased for all the diets with rabbits on pelleted diets being more superior. A 40% mortality due to respiratory distress was recorded when rabbits were fed unpelleted 100% replacement of maize by SPM. Increasing the levels of SPM in the diet appeared to decrease fat deposition in the carcass.

Key words: rabbits, sweet potato root meal, nutrient digestibility, carcass characteristics

Pages 34-38

Effects of weather change and planting sett on growth and productivity of cassava in south-eastern Nigeria

O.N. Eke-Okoro, O.U. Okereke & J.E. Okeke

ABSTRACT

The effects of weather change and planting sett from different portions of stem (top, middle and base) of three cassava cultivars were investigated in south-eastern Nigeria in 1992/93 and 1993/94 cropping seasons. Leaf area index (LAI), crop growth rate (CGR) and fresh root yield differed among the seasons and were dependent on the portion of the stem planted. The maximum LAI obtained during the 2 seasons ranged from 2.8 to 3.3 and was obtained by the middle portion of the cassava stem. The optimum CGR obtained during the two seasons ranged from 41 to 55 g/m²/week and was obtained by the middle portion of the cassava stem. The highest fresh root yield of 26.1 and 29.6 t/ha were obtained by the middle portion in 1992/93 and 1993/94, respectively. The cassava cultivar TMS 30572 and NR 8083 recorded the highest LAI than TMS 91934. Significant varietal differences in CGR were recorded among cultivars with NR 8083 being superior. The combined analysis of variance for fresh root yield showed significant ($p = 0.05$) mean squares for stem portions, seasons (years), and cultivar x season interaction indicating that the yield of the planting setts (stems portion) responded differently relative, to each other in different years. Higher LAI (3.3), CGR (55 g/m²/week) and fresh root yield (29.6 t/ha) were obtained in 1993/94 than in 1992/93.

Key words: *Manihot esculenta*, leaf area index, crop growth rate, stem portions, growth analysis

Pages 38-40

Comparative efficacy of thermotherapy and chemotherapy of control of root-knot nematodes, *Meloidogyne* spp. in yam tubers

B. Fawole & O.S. Osunlola

ABSTRACT

Studies were carried out to compare the effectiveness of hot water immersion (30 minutes at 45°C, 50°C or 55°C); 0-ethyl S,S-dipropylphosphorodithioate (MOCAP) dip (30 minutes at 5,000; 10,000 or 20,000 µg/l) or 1, 2-dibromo-3 chloropropane (NEMAGON) dip (30 minutes at 12.5; 625 or 1250 µg/l) in the disinfestations of root-knot nematode-galled white yam, *Dioscorea rotundata* tubers. All treatments were significantly better than the control in reducing the number of nematodes in infested tubers. No second-stage juvenile of *Meloidogyne* was extracted from peels of tubers treated with Mocap (10,000 and 20,000 µg/l), Nemagon (625 and 1250 µg/l) and hot water (55°C) 24 hours after treating the tubers. In a bioassay in which peels from the treated tubers were used to inoculate tomato seedlings, no galls developed after five weeks on plants inoculated with peels from Mocap (20,000 µg/l), Nemagon (1250 µg/l) and hot water (55°C). Although the nematicides were more effective in denematizing yam tubers, hot water immersion for 30 minutes at 50°C may be a preferable control option for practical, ecological and economic reasons.

Key words: root-knot nematodes, yam, thermotherapy, chemotherapy

Pages 40-43

Microbial deterioration of potato tubers (*Solanum tuberosum* L.) in Nigeria

A.C. Amadioha & V.A. Adisa

ABSTRACT

Seven fungi and a bacterium were isolated and identified as pathogenic organisms of two cultivars of potato (*Solanum tuberosum* L.) in Nigeria. *Rhizopus oryzae*, *R. stolonifer* and *Erwinia* sp. caused soft rot whereas *Aspergillus niger*, *Fusarium solani*, *F. oxysporum* and *Penicillium digitatum* were established as dry rot pathogens and *Rhizoctonia bataticola* was associated with black rot of stored potato tubers. *R. oryzae* and *R. stolonifer* were the most frequently encountered rot-causing organisms of potato tuber in storage. Temperature (30-35°C) and relative humidity (52-100%) favoured rot development on both cultivars. The extent of decay varied with the fungus, the potato cultivar, the temperature and relative humidity. The cultivar Irish Cobbler was more susceptible to the microbial attack than the cultivar Red Pontiac.

Key words: bacterium, black rot, dry rot, soft rot, fungi, *Solanum tuberosum*

Pages 44-48

Effect of seed weight on yield determinants, yield components and intra-plot variability in yield of yams (*Dioscorea* spp.)

O.O. Okoli, M.U. Opara & C.O. Anyoha

ABSTRACT

Three experiments were conducted at the National Root Crops Research Institute farm in Umudike for three years to investigate the influence of seed size on earliness of sprouting and survival till harvest and the consequence of these on yield and yield components of yams. Also examined were the effect of seed size on multiplication ratio, intra-plot yield ranges and stand yield variability. Results obtained showed that larger seeds sprouted earlier and had higher percentage sprouting and survival till harvest making higher total yield. Smaller seeds however, had higher multiplication ratios and lower intra-plot variability. There was greater variability in the average tuber yield than tuber number per plot. The use of the smallest seed size that would give early and high sprouting rate, high percentage survival till harvest and low variability quotient both for economic production of yams and the need for experiments to estimate effects in yam clones are discussed.

Key words: yams, yield determinants, intra-plot variability

Pages 48-53

Root crops production and development in a rural community in southwest Cameroon: the BONAVADA experience

J.M. Ngeve

ABSTRACT

Farmers' reactions on root crop production and management constraints were investigated for eleven months in 1997 from a participatory rural appraisal survey with 2,548 root crops farmers in nine villages of the Bokova-Bonakanda-Bova Area Development Association (BONAVADA) community in Fako Division of Cameroon. The objective was to identify factors which deter enhancement of the production of these crops in the area. The results indicated that the most important root crops grown in the area are cocoyams and yams. Cassava and sweet potato are also grown but to a limited extent. Contrary to the negative views held about the natives that they are lazy and unenterprising, much agricultural activity is going on in the area. Men are seriously involved in the cultivation of yams (in addition to plantains, coffee and oil palm) whereas women have specialized in cocoyams, cassava and sweet potato (in addition to leafy vegetables and spices). The main field problem of cocoyam is the root rot disease for which no resistant or improved varieties are available. For yams, the main biotic constraints are birds, the yam beetle, and tuber rots, as well as high cost of setts, and increased labour costs in procuring stakes. Cassava and sweet potato are new introductions in the area, the bulk of the production done by non-natives. The field problems of cassava are soil fertility depletion, *Armillaria* root rot and cassava mosaic disease. For sweet potato, field problems as perceived by farmers are weevils and the limited processing to which the crop can be subjected. Other issues regarding agricultural production and development in this community are discussed.

Key words: BONAVADA, root crops, innovations, rural communities, Cameroon

Pages 54-57

Comparative evaluation of five legume species for soil fertility improvement, weed suppression and component crop yield in cassava/legume intercrops

O.N. Eke-Okoro, J.E.G. Ikeorgu & E.O.A, Okorochoa

ABSTRACT

The contributions of five legumes: groundnut (*Arachis hypogea*), soybean (*Glycine max*), cowpea (*Vigna unguiculata*), bambara (*Vigna subterranea*) and local “akidi” cowpea (*Vigna* spp.) to soil fertility improvement, weed suppression and component crop yields in cassava/legume intercrop were compared in southern Nigeria. Nitrogen and organic matter contribution to the soil by the legumes, based on the mean from two seasons were in the following order: groundnut > soybean > “akidi” > cowpea > bambara. Akidi intercropped with cassava significantly ($P = 0.05$) kept weed pressure lower than the other cropping systems. Intercropping cassava with groundnut significantly ($P = 0.05$) produced the highest fresh root yield (13.6 t/ha). Land equivalent ratio followed the same trend during two cropping seasons of this trial.

Key words: legume, intercrop, weed suppression, soil fertility

Pages 57-62

Distribution and symptom expression of cassava brown streak disease in southern Tanzania

R.J. Hillocks, M.D. Raya & J.M. Thresh

ABSTRACT

Cassava brown streak disease (CBSD) is the most important biotic constraint production in southern Tanzania. The main source of losses is the associated symptom of root necrosis which makes the crop unmarketable and in severe cases, unconsumable. Although the disease is known to be caused by a virus-like agent which is sap and graft-transmissible, the exact aetiology is unknown. Natural spread has been observed but this has not been quantified and the vector is unknown. Our surveys have shown that in southern Tanzania, CBSD incidence (29%) is higher than that of Cassava Mosaic Virus (CMV) (15%). The incidence of CBSD is highest close to the coast, exceeding 70% in many fields. Mean disease incidence is around 27% in the mid altitude areas (200-500 m), falling to 7% at 500-700 m. Two whitefly species were found on the upper leaves of cassava at most of the locations surveyed. *Bemisia tabaci* was more widespread than *Bemisia afer*. At altitudes above 100 m *B. afer* populations were usually less than 25% that of *B. tabaci*. However, at the coast, *B. afer* was the predominant species. Different cassava varieties were grown in different areas and low disease incidence was not necessarily linked to their relative sensitivity to CBSV. Variation in sensitivity was however apparent among local varieties with one showing little or no root necrosis although displaying clear foliar symptoms of CBSD. These findings are discussed in relation to possible control measures.

Key words: cassava, viruses, whitefly, Tanzania, cassava brown streak disease, cassava mosaic disease, *Bemisia tabaci*, *Bemisia afer*

Pages 62-67

La fabrication de cossettes à partir d'ignames *Dioscorea alata*: influence de la variété et du type de cossette sur le séchage, la conservation et les qualités organoleptiques

P. Vernier, R.A. Dossou et P. Letourmy

Résumé

Ces essais ont pour objet d'évaluer l'intérêt, pour la fabrication de cossette, de la variété Florido (*D. alata*), en cours de vulgarisation au Bénin et qui présente une grande facilité de culture. On compare le comportement, pendant le séchage et la conservation, de cossettes qui étaient la combinaison de trois variétés: Omoya, du groupe des kokoro (*D. cayenensis-D. rotundata*), variété appréciée au Bénin pour la transformation en cossettes, Boniyorou, une des *D. alata* les plus utilisées pour les cossettes au Nord-Bénin et Florido, deux types de découpe (traditionnelles et découpées avec un éminceur mécanique) et deux niveaux de protection insecticide (avec et sans). La vitesse de séchage est influencée par la variété et le type de cossette. Le taux d'attaque des insectes durant le stockage est influencé par la variété (les *alata* sont plus attaquées), le type de cossettes (les émincées sont moins attaquées) et la protection insecticide. Un test sensoriel avec de l'amala (pâte de cossette) complétait le dispositif. L'effet variété est significatif pour les quatre critères d'évaluation (couleur, toucher, goût, odeur). Il interagit avec la protection pour la couleur et l'odeur. Le type de cossette n'a d'influence (positive) que sur le goût. L'essai a montré que Florido permet de produire des cossettes très acceptables avec un bon rendement. L'émincage semble également intéressant car il limite les attaques d'insecte et reste globalement neutre voire positif pour les qualités organoleptiques.

Mots-clés: *Dioscorea*, igname, cossette, variété, transformation après récolte, conservation, analyse sensorielle, Bénin