Page 16-------21

-Root crops for food security in sub-Saharan Africa

S.K. Hahn

Food production in sub-Saharan Africa has not kept up with population growth and the increasing pressure of population on the land has decreased the resource base and caused the farming environment to become vulnerable to unpredictable climatic changes. Thus, there will be more acute food deficits in the future unless the productivity of food crops, including root crops, is increased by at least 3% per annum. Root crops are capable of efficient production of low cost calories under marginal soil conditions. They are very tolerant of stresses and play important roles in the diversified farming systems in the region. As population pressure on the land increases, the importance of root crops has grown and hence they will play more vital roles in the region'-s food security. Experiences with root crops in the last two decades have shown that the productivity of root crops can be sustained and has substantially increased in certain countries with sound policy and improved technologies to keep up with population growth in sub-Saharan Africa.

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Root crops for food security in Africa

T. Sengooba

Food insecurity is a major problem in Africa largely caused by poverty, inadequate food production and ecological changes brought about by increasing population pressure. The food insecurity problem is often aggravated by political upheavals. As judged from their potential and actual yields, root crops including cassava, potato and yams have the potential to more than double their production in Africa and thus bring about food self sufficiency. The features of the root crops which favour their promotion for food security in Africa include: wide adaptability and acceptability in the region, low production costs and tolerance to adverse weather conditions. The improvement of processing and commercializing the products is paramount for root crops. It is a challenge to Research scientists and policy makers to make sure that root crops production is a cost effective venture.

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—Cassava plant protection in Africa

J.S. Yaninek

Cassava pest problems in Africa have changed dramatically over the last century. Rapidly expanding production and waves of exotic pests have created evolving cassava agroecosystems with changing production constraints. Cassava plant protection activities in Africa began with resistance breeding against African cassava mosaic virus. Cultural manipulations and biological control interventions were implemented later as devastating new pests invaded the continent. Sustainable plant protection strategies should integrate biological control, host plant resistance and cultural practices as needed based on an understanding of the key multi-trophic and multi-disciplinary interactions in the cassava agroecosystem. Knowledge of these key interactions provides the basis for determining production losses, developing appropriate interventions and evaluating subsequent impact. While little integration can be found in cassava pest management practices today, there is an increasing awareness of the value of this approach. Plant protection interventions developed and tested by teams of multi-disciplinary scientists with input from extension agents and farmers in an inter-disciplinary manner are most likely to succeed. A regional project to develop sustainable cassava plant protection in West Africa is presented as a model of appropriate cassava plant protection development.

Page 35------38

The role of women in root crop production for food security in Ghana

J.A.S. Haleegoah and E. Okai

Before the late 1970's initiatives to promote food security in Africa were primarily technical in nature. Failure to increase production and food security inevitably led to a re-examination of strategystrategies. A new orientation emerged in the late 1970's 1970's which emphasized the need to integrate technical aspects of development win with the social and economic dimensions which are crucial for their effective implementation. This approach to called for economic growth with equity and the participation of the people with the integration of women as a prerequisite for success. This is because women play a very important role in food crop production. They provide
60-80% of the labour for food production in Africa. It is impossible therefore not to consider the essential role of women when considering food security in Africa. They carry out the production, processing, and preparation of food as well as marketing. The methodology used for this paper is a secondary exploration 2of the role of women in root crop production m in Ghana. Secondary data was analysed and reported some of the results are that women are involved in land preparation, planting, weeding harvesting, processing, and marketing of root crops in Ghana. They are also involved in the production of root crops for home consumption. Female farmers, however, do not have access to much training, extension, and improved technology. Thus attention should now be focused on women in research, extension, and improved technology to help increase production and thus food security in Africa.

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A century of yam research in Nigeria: 1893-1992

M.O. Akoroda

Yam-related research conducted from 1893 ~~lo~~ to 1992 in Nigeria covered aspects of the botany, improvement, protection, production, utilization and socio economics. The scientific reports on these aspects have appeared in numerous publications scattered far from where the researchers, producers and users of the crop are found. This paper traces the major trends of information of this African crop, pin- pointing the gaps and grey areas of research that are yet to ~~he~~ be explored. In the coming decades, the tasks will be to assemble and synthesize available data into systematic modules that will permit modelling and simulation studies of the crop to better focus research and optimize the ever dwindling resources of national research systems in tropical Africa where most of the investigations on this crop are undertaken.

Page 44---------47

Development and Implementation of a potato seed programme in Cameroon

V.N. Fondong, C. Martin and F. Nkwenti

The IRA-CIP Project in Bambui, Cameroon is currently developing a seed potato production scheme for Cameroon. The initial material of the scheme is either *in vitro* plantlets from the Projects Tissue culture laboratory or mini tubers both of which are 'disease free'. The plantlets and mini tubers are planted on substrate and these provide mother plants. The latter provide both apical and multiple stem cuttings ~~ware~~ which are then transplanted on substrate to provide more cuttings. The third and/or fourth generation of cuttings transplanted to the field together with mini tubers to produce pre-basic seed that eventually produces basic seed. Preliminary results show that the transplant survival rate is very high, over 80% both in ~~these~~ the screen houses and on the field. Furthermore up to 11 tubers/cuttings are obtained in some varieties.

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Page47------49

Contribution of root and tuber crops to Uganda's food security: a nutritional perspective

J. Kikafunda

The paper examines ~~Uganda's~~ Uganda's consumption patterns of the major staples using the data from the Uganda National Household Budget Survey of 1989/90. The consumption of root and tuber crops of different municipalities and different regions is compared with that of cereals and cooking bananas (*Matooke*). The results show that root and tuber crops hold a significant position among ~~Uganda's~~ Uganda's staple foods and in some localities challenge the traditional cereals and *matooke*. The contribution of root and tuber crops to ~~Uganda's~~ Uganda's food security, particularly household food security, and the nutritional implications of these food items ~~are~~ are also discussed in the paper

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Page 56-------58

Improvement of sweet potato production in the Lake Zone of Tanzania

S.C. Jeremiah

Sweet potatoes an important crop in Tanzania and the government policy is encouraging research to increase production. The sweet potato research programme in the Lake zone carried out a survey of 153 farmers in 15 divisions in 3 districts in 1992. Sweet potato was found to be an important food crops, after cassava and maize, and the production, is increasing. Over 80 named varieties were recorded although some of these are~~s~~ surely duplicates. Tillage methods –ridges, mounds and beds as well as crop rotation system vary according to sub-region. The most important constraints are sweet potato weevils (*Cylas* sp), (~~*Brocyras*~~ *Brocyrus sp.*), sweet potato butterfly (*Acreae acerata*), sweet potato viruses and drought. Sweet potato is always grown for home consumption and for local market. In Ukerewe Island, some ~~fanners~~ farmers have specialized in commercial production for the market in Mwanza. In Kwimba district, storage roots are peeled, boiled, sliced and sun-dried. The resulting chips can be stored for up to four months.

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Present and future strategies for potato improvement in

Uganda for national food security

L.C. Sikka, R. Kakuhenzira, A.S. Bhagsari and F. Alacho

The paper reviews the importance of potato as a component of improved food systems. Major limiting factors for use of potato food in tropical climate are mainly of a scientific and technical nature. Current research on different aspects of potato in Uganda and elsewhere have far reaching effect in harnessing potato as a low cost nutritious food. New, high yielding photo-insensitive varieties, with in-built field resistance to late blight and tolerance to bacterial wilt have made it possible to obtain economically optimal yields, as evidenced by the results from extensive on station and on farm trials. Development of sustainable seed production systems which makes available reasonably priced seed has significantly improved potato yields. Research on true potato seed has shown promising application, especially in the areas where availability of clean seed is a remote possibility. Promising genetic material and cultural practices research results have made it possible to grow potato economically at lower elevations that would meet food substitution needs. The aforesaid technological advances should significantly contribute to increased potato production and meet the major challenge to overcome the chronic food shortage in Uganda.

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Attributes of cassava varieties desired by farmers in sub-Saharan Africa

F .I. Nweke, A.G.O. Dixon, R. Asiedu and S.A. Folayan

This paper which is based on information collected as part of Collaborative Study of Cassava in Africa (COSCA) provides information on cassava genotypes cultivated in sub-Saharan Africa. It shows that there is a high degree of turn over in the cassava genotypes cultivated. Farmers abandon the cultivation of genotypes which do not meet their needs, they introduce better genotypes into their cropping systems whenever such are available to them. The attributes which the farmers desire in the cassava genotypes are discussed. The performance of the presently cultivated genotypes, in terms of root yield, earliness, suitability for intercropping and postharvest qualities are assessed.

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The importance of cassava and production constraints in Malawi

R.F.N. Sauti, E.M.H. Khonje, G. Thaulo, M. Chibambo and G.M. Bulla

A survey conducted in 67 villages distributed throughout Malawi within the framework of the Collaborative Study of Cassava in Africa (COSCA) revealed that cassava was a very important food security crop in case of maize failure due to drought in Malawi and that cassava leaves are an important source of vegetable in all the villages. Nearly 30% of the villages reported cassava increase over the past 20 years. Population growth and drought are cited as the major causes of the increase. Women provide most of cassava production and processing labor at the household level. But hired labour is also important in cassava production. Both ‘‘sweet’’ and ‘‘bitter’’ cassava varieties are grown in Malawi, but sweet cassava is grown more than bitter cassava. Cassava is in most villages produced in intercrop with other staples. Cassava fresh roots are sold more widely than cassava processed products. Among constraints to cassava production are drought, poor soil, pests and diseases, extension neglect of women, government extension and marketing institutions neglect of cassava under the presumption that it is an inferior food crop to maize.

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The state of cassava in Uganda

G.W. Otim-Nape, A. Bua and S. Zziwa

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Cassava was introduced in Uganda about the year 1862. Since then, its production has rapidly spread to all parts of the country and is reported to be increasing in most representative villages because of its tolerance of pests and diseases as well as of poor soil. Although cassava is produced with low inputs relative to some other crops, it is produced not only as a food security crop but as a cash crop. The paper is concluded by drawing implications for research.

Page 101--------105

Cyanide and cassava breeding

N.M.Mahungu, S.K. Hahn and H.R. Chheda

Cassava (*Manihot esculenta* Cranz) contains cyanogenic glucoside which leads to the release of hydrogen cyanide (HCN) after hydrolysis. A study carried out using six cassava populations revealed that the broad-sense heritability for HC-N was relatively low at 34.58 and 32.18% in roots and leaves respectively. Relationships between HCN in roots and leaves and twenty other cassava characters were examined. None of the characters was found significantly related to cyanide content in either leaf or root, except or a negative genotypic association between root HCN and plant height at harvest in some populations. Also a weak positive genotypic correlation (r = 0.20 and 0.26) between root yield and root HCN was found only in two populations while the same two traits had negative or no correlation in the other four population. It was concluded that the presence of HCN in cassava does not confer on the plants a useful survival or protective mechanism expect possibly to some wild animals. The study also indicated that in most breeding populations, it is possible to develop high yielding cassava genotypes with low cyanide content.

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Micropagation of cocoyam (xanthosoma sagittifolium (L) Schott) in Cameroon

S. Zok and L.M. Nyochembeng

Studies were conducted first to improve the establishment medium and secondly to induce multiple shoot formation for mass production of cocoyam (xanthosoma sagittifolium). The result showed that the addition of Isopentenyladenine at 1mg/I to the basal B5 liquid medium enhanced regeneration and plantlet establishment while multiple shoot formation was favoured by Benzylaminopurine at 10mg/I. Furthermore, the multiplication rate could be considerably increased and micropropagation process shortened when 4 weeks old plantlet were used to induce multiple shoot formation. These result confirmed earlier findings on the sequential application of growth hormones on organogenesis in cocoyam cultures. The importance of the result obtained for rapid propagation of this crop is also discussed.

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—Utilisation des paramétres de stabilité dans la sélection des ~~dones~~ clones de manioc pour le rendement en racine.

G.N. Maroya and A.G.O. Dixon

~~1.~~

Neuf clones améliorés dont sept introduits de ~~l'Institut~~ l'Institut International d'Agriculture Tropicale (IITA), deux de
la sélection nationale et un clone local, sont cultivé
s à travers quatre localités du Bé~~e~~nin pendant deux ans. Le
rendement moyen général en racines fraîches de ces dix clones à travers les huit environnments est de 18,176 T/ha. Les meilleurs clones pour le rendement en racine sont TMS 50395; BEN 86052 et TMS 30572 respectivemnet 25,147 T/ha; 23,692 T/ha et 22,623 T/ha. Le clone local (NIAOULI 84) a donné le plus faible rendement 10,478 T/ha. La différence de rendement entre clones est hautement significative de même que la différence entre les environnements. L'interaction génotype x environnement est aussi hautement significative et le coéfficient de variation est de 28, 76%. Trois différentes méthodes de stabilité: Finlay et Wilkinson (1963), Eberhart et Russel (1966), et ~~Shukia~~ Shukla (1972) ont été utilisées pour identifier les ~~génotypes~~genotypes stables. Ainsi selon Finlay et Wilkinson (1963), le clone le plus stable est TMS 91934 suivi de TMS 30001; pour les mêmes données la méthode de Eberhart et Russel (1966) a permi d'~~'~~identifier TMS 30572 A aprés quoi vent TMS 91934 alors que celle de ~~Shukia~~ Shukla (1972) permet de retenir TMS 30572 A comme le clone le plus stable suivi de TMS 4 (2) 1425. En considérant ensemble toutes ces trois méthodes de stabilité et à~~a~~ la production moyenne, le clone TMS 91934 est le plus stable suivi de TMS 4 (2) 1425. Cette é~~e~~tude nous montre que la stabilité~~y~~ ~~d'un~~ d'un génotype et sa performance moyenne ne vont pas toujours de pair et que

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~~l'utilisation~~ l'utilisation ~~d'une~~ d'une méthode de stabilité ~~n'est~~ n'est pas efficace pour la sélection.

Page 116------121

Evaluation of cassava genotypes for resistance to
— cassava green mite

R. Molo, B. Odongo, and G.W. Otim-Nape

Experiments were conducted at Namulonge Research Station and at an on N farm in Luwero district to evaluate local and improved cassava varieties for resistance to Cassava green mite (CGM) and to determine mechanism of resistance in selected clones. Ebwanatereka had lower leaf damage and significantly lower mite population ($P< 0.05$) than other genotypes in the first rains crop at Namulonge, but in the second ~~rams~~ rains crop, there were no significant differences in CGM populations among genotypes. At the on-farm there were no significant differences among genotypes in mite population, but there were significant differences in severity of leaf damage in Ebwanatereka and some improved TMS lines. Clones with high leaf pubescence had low leaf damage, although the correlation was weak ($r = -0.08$).

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Sweet potato germplasm evaluation and utilization in Uganda

R.O.M. Mwanga and B. Mateeka

The importance of sweet potato in the food security of Uganda is highlighted. The major sweet potatoes duction production constraints are outlined and the paper presents results of yield trials conducted in 1991 at Nakabango,Tororo and Namulonge to identify superior genotypes to be used directly as recommended varieties and as parents in polycross nurseries to generate breeding populations. Fresh root yields varied between 17 and 30 t/ha. Cultivars, Mpaeifumbiro, Kawogo, Wagabolige, Tanzania, Tororo 2 and 3, and entries 29 and 39 were superior and had both a moderate level of tolerance to viruses and high root yield.

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Introgression of ceara rubber (*Manihot glaziovii* -Muell-Arg) into cassava (*M. esculenta* Crantz): -a morphological and electrophoretic evidence

N.M.W. Wanyera, S.K. Hahn and M.E. Aken''Ova

A total of 89 population samples of three groups of *Manihot species, M.- esculenta*. *M. glazioii* and the putative hybrid species (Tree cassava) were examined for nine leaf characters and five enzyme systems to clarify the present status of morphological and molecular variation. Both morphological and electrophoretic data revealed that the three species are distinctly recognizable and have their own patterns of variation. The two data sets

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yielded similar results with respect to species characterization and detection and quantification of introgressive hybridization events. The results further revealed that introgression and gene ~~now~~ flow have ~~-~~probably had a significant evolutionary impact on the species in regions of the zone of contact. Tree cassava in all analyses was shown to be intermediate between *M.esculenta* and *M. glaziovii* and its occurrence is the result of natural hybridization.

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Potato {~~*Solarium*~~ *Solanum* *tuberosum*} germplasm evaluation and adaptation trials at mid-elevations in Embu, Kenya

J.W. Irungu[1] and H.M. Kidanemariam[2]

Evaluation and adaptation trials of potato clones from the International Potato Center (CIP) continued for the third consecutive season in the mid--altitude regions at Embu. A total of 12 clones were evaluated in replicated or advanced yield trials during the long and short rainy seasons of 1991. During the long rains of 1992, 10

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promising clones were selected and evaluated in a replicated trial. Another 186 clones were received from CIP and evaluated in a preliminary yield trial in single rows of 10 and 5 hills. The tuber yields, reactions to late blight and other important horticultural attributes of the clones were considered in the evaluation programme. Based on these selection criteria, there were several clones that have the potential for release as adaptable cultivars for the region.

Page 141------145
-Embryo culture of yams: germination and callus induction

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S.Y.C. Ng, M.A. Ngu and T.A.O. Ladeinde

The response of embryos of two yam species, *Dioscorea rotundata* Poir and *D. abyssinica* Hochst to six different culture media and two incubation conditions was studied. Plantlet formation rate was highest in half strength Murashige and Skoog medium for *D abyssinica* and in Nitsch and Nitsch medium for *D. rotundata.*The incubation conditions also affected the plantlet formation rate. Plantlets were successfully established in the

greenhouse. The effects of 2, 4 dichlorophenoxyl acetic acid (2, 4-D) on isolated embryos for callus formation were also studied. Callus formation was obtained at the concentrations of 9 to 90 µM 2, 4-D. In most treatments root formation was obtained from callus. Embryoid structure and plant regeneration were obtained at 18 µM 2, 4-D treatment in *D. rotundata*

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Effect on GA_3 on the in vitro growth and development of four potato (~~*Solarium*~~ *Solanum tuberosum* L.) genotypes.

V.N. Fondong, C. Martin and F.S. Nana

The effect of gibberellic acid (GA_3) on the *in vitro* development of 4 potato genotypes was studied. Results showed that GA_3 significantly increased the growth and node production of two of the genotypes - Bamira and CIP 381378.18. GA_3 also significantly increased the growth of Tubira though its absence significantly increased node production CIP 381382.-34 was indifferent to GA_3, both in growth and node production. Generally GA_3 reduced the bud dormancy of all 4 genotypes and thus caused a more uniform growth of plantlets.

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Distribution and disease recovery of African Cassava Mosaic Virus (ACMV) in stems of resistant- and susceptible cassava

T.E. Njock, G.I. Atiri, G. Thottappilly and S.K. Hahn

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The base section of the ACMV-susceptible clone 60506 recorded the highest disease incidence and ~~seventy~~severity relative to all other sections of the moderately resistant clone TMS 4(2)1425 and the resistant clone TMS 30001. However, in all clones, the base section recorded higher disease than either the top or middle sections. The highest frequency of diseased nodes was recorded from the base section of clone 60506. This frequency dropped consistently from the base, through the middle, to the top sections of each clone. Disease ceased to express on plants of the resistant clone TMS 30001 but persisted throughout on those of clones TMS 4(2)1425 and 60506. In EL1SA, evidence of restricted movement of virus occurred in clone TMS 30001 between nodes 1 and 10 but not in clones TMS 4(2)1425 and 60506.

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Field performance of tissue-culture derived cocoyam (*Xanthosoma sagittifolium* (L) Schott)

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L. Nyochembeng, S. Zok and X. Ndzana

In older to respond to questions raised about field adaptability of tissue-culture derived cocoyam, a study was conducted where they were compared to non-tissue culture cocoyam. It was noted that throughout the vegetative cycle, the tissue-culture plants performed better than the non-tissue-culture plants in terms of plant vigor and average leaf number. In general the tissue-culture plants (TC) acclimatized in the greenhouse, produced significantly more suckers than the non-tissue-culture (NTC) plants, regardless of the period within the growing season. The average number of cormels/plant varied from 6.6 to 12.4 in the trial and TC plants acclimatized for 2 months (h_1) yielded higher than the other TC and NTC plants. The total weight of cormels and corms of the h_1 plants was 31t/ha which significantly outscored those of other treatments. This suggests the importance of the acclimatization process in preparing the TC derived plantlets for field conditions.

Page 157-------160

—Manipulations of BAP and agar concentrations for rapid clonal propagation of *Dioscorea alata* shoot cultures

A.Y. Alhassan

Rapid shoot multiplication studies were conducted with four agar gel strengths (0.2, 0.4, 0.6 and 0.8%) as media supports in MS medium. Cytokinin, benzylaminopurine (BAP) (at 0.44, 1.1, 2.2, 3.3 and 6.6 µM) supplementations were tested for their effects on further lateral shoot development. Agar strengths at 0.2 and 0.4% supported higher shoot multiplication levels (15 shoots/culture) than the 0.8% Control. Proliferation of uniform-sized yam shoots was accomplished by a cytokinin pulse treatment approach, i.e. cytokinin was present in alternative subculture cycles lasting five weeks. These results suggest that greater numbers of yam shoots would be available for microtuber induction for either germplasm distribution or subsequent field production of yam seed tubers.

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The effect of relative time of interplanting ~~Centre~~ Centro with cassava on tuber yield

P. Lusembo, E N. Saiiti, J.S. Magerwa and C.O. Ebong

Manihot esculenta (cassava) was planted with *Centrosema pubesens* (Centro) to determine the potential of a cassava -Centro intercropping system in providing tubers and forage legume seed in a small holder farming system in Uganda. Centro was planted at the same time as planting cassava, then 2 and 4 months afterwards, at a spacing of 1 m x 1 m. The two intercrops gave optimum yield of tubers (50 tons/ha) and forage seed (~~9S2~~ 982 kg/ha) when they were planted at the same time There was no significant difference in total cassava tuber yield between cassava grown with Centro and cassava grown alone. However, ~~Centre~~ Centro significantly increased the amount of unmarketable tubers (P<0.5). It was concluded that a cassava-Centro cropping system can provide both tubers for home consumption and forage seed for a cash income.

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Effect of plant spacings and planting times on the performance of a cassava-bean intercropping system

V.K. Baguma

An experiment on a cassava--bean mixed cropping system was conducted to assess the productivity of the system under different population spacings and times of planting of the bean crop (*Phaseolus vulgaris*). The results showed that the highest bean yield of 1151.5 kg ha^{-1} was achieved at a cassava/bean intercrop spacing of 1m x lm/50 cm x 20 cm ~~hut~~ but this also gave the lowest cassava yield of 36.12 t/ha.The lowest grain yield of 522.42 kg/ha resulted from an intercrop spacing of 1m x lm/100 cm x 10 cm with beans planted 7 days later. The highest cassava yield of 49.-94 t/ha was obtained at an intercrop spacing of 1.5m x I m/75 cm x 10cm. This also gave the highest combined yield with a monetary value of 2,544,200 shs/ha. The significance of these results in terms of yield and monetary value is discussed.

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Effect of plant population on the performance of cassava in Sierra Leone

M.T. Dahniya and A. Jalloh

An improved cassava variety 80/40 and a local one, Cocoa, were each planted at four populations (6666, 10000, 13333 and 16666 plants/ha) in 19S9 and 1990 at the experimental station of the Institute of Agricultural Research (IAR) at Njala in Siena Leone. The aim of the experiment was to identify the cassava population that would produce optimum tuberous root yield. During both growing seasons, planting at 1666 plants/ha produced the highest tuberous root yield for each of the varieties. The number of plants/ha was an important factor influencing tuberous root yield. Plant height, branching height, stem girth, canopy width and number of leaves per plant did not vary with plant population. Variety 80/40 significantly out-yielded cocoa during both seasons.

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The influence of spatial adjustment of cassava stands from the oil palm on inflorescence development of the palm

A. Okpala-Jose

A study was started in 1990 in which Odongbo (erect) and TMS 30572 (profusely branching) varieties of cassava were planted 0.80-m, 1.30-m, 1.80m, 2.30-m, and 2.80-m away from oil palm stands in the field Floral development of the palms was assessed in the early years. Flowering commenced significantly earlier with palms where cassava was planted 2.80-m away compared to sole oil palm. A similar trend was observed in the number of male and female inflorescences produced as well as the sex ratio. Calculated correlation coefficients between palm to cassava distances and the ~~Power~~ flower parameters are 0.73, 0.91, and 0.57 for the number of male inflorescences, number of female inflorescences and sex ratio respectively with TMS 30572. Observed trends were attributed to the degree of shade spread by cassava canopies over the palms. Suggestion is put forward for the assessment of fresh fruit bunch yield of the palms before final a recommendation on palm cassava spatial arrangement can be made.

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Cassava variety and fertilizer on-farm trials in Sierra Leone

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M.T. Lahai, A.B. Gbani, M.J. Tucker, M.T. Dahniya, J.B. George, P. James, J.I. John, T.R.A. Winnebah,G.S. Banya, A.R. Tarawalli, C.O. Williams and V. Jalloh

Cassava ranks second as the most important food crop after rice in Sierra Leone, both tubers and leaves being consumed. Variety and fertilizer trials were conducted with this crop in several farms in various parts of the country using a randomized complete block design with each farm serving as a replicate. The variety trials showed that on the average Rocass 1 and Clone 80/40 (improved varieties) gave 46% and 110% higher tuber yields than the local variety, respectively. In the fertilizer trials, the average tuber yield of Clone 80/40 was increased by 36% and that of the local variety by 27% when they were fertilized. However, Clone 80/40 gave about 120% and 105% higher tuber yields respectively than the local variety under fertilization and non-fertilization conditions. The high yielding abilities of the improved varieties appeared to be associated with their tolerance to mosaic disease and weed suppression characteristics due to higher leaf production. The cooking quality and taste of tubers and leaves of the improved varieties, especially Clone 80/40, were to a large extent comparable to the local varieties. Since these are the most important qualities, if poor, that militate against the adoption of improved varieties, it appears that the two improved varieties have a high potential of being adopted by farmers.

Page 181-----184

Performance of three potato (~~*Solarium*~~ *Solanum* *tuberosum* L.) genotypes in relation to plant population and applied nitrogen in a lowland area of Uganda

P. Elobu and D.S.O. Osiru

Performance of three potato (*Solanum tuberosum* L.) genotypes i.e. Piratini, caxamarca and LT9, grown at 60x30 cm or 75x30 cm and subjected to three nitrogen levels i.e. o, 50 and 100 kg of urea/ha was evaluated in 1991 and 1992 at the Makerere University Agricultural Research Institute (MUARIK), Uganda. Genotypes differed significantly (P≤0.05) in leaf area index and harvest index, 60 days after planting; and in number of tubers per plant, average tuber weight and fresh tuber yield at harvest time, 100 days after planting. Fresh tuber yields of Piratini, Caxamarca and LT9 were 21.6, 7.7 and 25.2 t/ha respectively in 1991 and 11.5, 5, 9 and 19.~~-~~6 ~~1~~t/ha respectively in 1992. Yields obtained from nitrogen treatments averaged over all genotypes were 16.0, 19.3 and 1.90 t/ha for 0, 50 and 100kg of urea/ha respectively in 1991 and 10.4, 12.5 and 14.1 t/ha respectively in 1992. Spacing of 60x30 cm and 75x30 cm gave average yields of 21.7 and 14.6 t/ha respectively in 1991, and 13.4 and 11.3 respectively in 1992.

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In-ground storability studies of four popular sweet potato (*Ipomoea batatas* L.) varieties

C.O. ~~P'Obwoya~~ P'Obwoya and R.O.M. Mwanga

Studies to investigate the effect of prolonged in-ground post-maturity storability of sweet potato (*Ipomoea batatas* L.) storage roots were conducted in field experiments between 1990 and 1992 at Namulonge Research Station, Uganda. Results showed that yields varied significantly across seasons. Optimum yields were obtained at 8, 10, 10 and 8 months after planting (Map) for Tanzania (TZ), Tororo (Tl), Kawogo (KA), and Kyebandula (Ky) varieties, respectively with Tl out-yielding the rest in the first planting. However, yield performance was very poor in the second planting. Tuber quality varied among varieties but declined with time. Highly susceptible varieties were invaded as at early as 6 MAP. There was a positive but non-significant correlation between rainfall amount and levels of weevil infestation. The weevil population build up is dynamic and varied according to season, place, soil and age of the crop. Therefore, unless the crop is grown for piecemeal harvesting, it is risky to prolong post maturity in-ground storage beyond an optimum harvesting date for any sweet potato variety.

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Productivity of cassava under different land preparation methods on the upland in Sierra Leone

A.A.Jalloh and M.T. Dahniya

On an upland gravelly soil in Sierra Leone, a study was carried out during the 1989/90 and 1990/91 cropping seasons to determine the effect of three land preparation methods (ridges, mound and flat) on the productivity of Cocoa, a local cassava variety and 80/40 an improved one. During the 1989/90 season, method of land preparation did not affect tuberous root yield and its components, while during the 1990/90 season,; tuberous root yield was significantly lower on the flat than on the mound and ridge.- At both 4 and 8 months after planting, plants on the flat were significantly shorter than those on ridge and mound during the 1990/91 season, but by the time of harvest, all plants were of similar height.- During the 1989/90 cropping season land preparation did not influence weed infestation, while at both 3 and 5 months after planting during the 1990/91 season, flat and ridge had the highest and lowest weed infestations respectively. During both seasons, 80/40 out-yielded Cocoa while Cocoa was taller than 80/40 at all times. Cassava variety did not influence weed infestation.

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The effect of nitrogen fertilizer split application on flowering, berry number and size in true potato –(*Solanum tuberosum* L.) seed production

D.M. Maingi, J.O. Nyabundi and H.M. Kidanemariam

The lack of healthy planting material is a major constraint to increased potato production in Kenya. Only about 1 per cent of the national demand for seed is met through the seed production scheme. Many farmers therefore use low quality seed, recycled over many generations leading to low yields, maintenance and spread of viral and bacterial wilt disease. The use of seed tubers derived from True Potato Seeds (TPS) offers an alternative method for the propagation of the potato. In order to take advantage of this technology, the economical production of large quantities of good quality TPS is essential. Studies carried out during two seasons in 1987 and 1988 indicated that flowering, berry numbers and size and hence TPS yields were influenced by season and by split applications of Nitrogen fertilizer. Split applications of 112.5 kgN/ha at planting, and at flowering, led to a 25 per cent increase in flowering and up to 100 per cent increase in the number of berries produced. The number of large sized berries and tuber yields were also increased significantly by the same treatment.

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Variation in ~~farmers'~~ farmers' cassava yield in on-farm trials in the southern sub-humid forest region of Cameroon

J.M. Ngeve

One local and two unproved cassava clones were used in each of 2 sets of on-farm experiments, one set in the Center Province and the other in the South Province of Cameroon, to determine their performance under ~~farmers'~~ farmers' conditions of mixed cropping. In the South Province, clone 8034 performed best and produced twice the yields of the locals in most locations, whereas in the Centre Province, clone 8061 yielded best. In Nkoemvone where land was newly opened after 8 ~~years'~~ years' fallow, on-farm yields (30.4 t/ha) were twice those obtained in each of the other locations and most farmers weeded their cassava farms only once, and at most twice. The major crops seen commonly grown with cassava were groundnuts, cocoyams, plantains, melon (egusi) and leafy vegetables. Maize and groundnut yields were depressed by improved cassava but not by the local cassava varieties. Comparison on on-station and on-farm cassava yields showed that improved cassava clones suffered no yield reduction when intercropped on-farm whereas the local cassava yields were almost halved on- farm. Implications of these results on future on-farm cassava studies are discussed.

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Improved cassava for inland valley agro-ecosystems

I.J. Ekanayake, A.G.O. Dixon, R. Asiedu and A-M.N. Izac

A substantial impact on African agriculture can be made through research on crop improvement for the extensive inland valley agro-ecosystems (IVS) extending from the humid forest to the savanna zones in sub-Saharan Africa. Systematic surveys of farmers have shown that cassava is a favoured upland crop for the IVS. Screening of cassava for IVS adaptation in the sub Saharan Africa is a continued activity at IITA Preliminary results indicate that elite clones TMS 85/00025 (15.9t/ha), TMS63397 (13.-3 t/ha) and TMS 84/00003 (12.6t/ha) superceded the yield levels of local checks during a 6-month growing period. A scheme for the improvement of cassava targeted for IVS is described. In addition, for cassava and other upland crops to be suitable crop components in this highly fragile agro-ecosystem, attention has to be given to a combination of improved genotypes with appropriate water control, weed control and fertility management. Research at IITA to date has attempted to address these short and long term production constraints

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Seasons, weather, and changes in root crop dominance in mbe Cameroon

M.O Akoroda, O. Amadou, R.E Mbahe1 and Terje Øen

Farmers of Meb subdivision of northern Cameroon complained of unreliable rainfall leading to poor yam crops. This paper examined rainfall variability during 1996-1988 and how the fall in dominance of the yam crop was complemented by diversified cropping and increased production of maize and cassava that are short and long duration so as to reduce the risks of yam crop failure due to bad weather.

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Exploratory study of the ~~farmers'~~ farmers' view point on the production of sweet potato in the southern highlands of Tanzania

R.O.F. Mwanbene, C.M.A. Mwakyembe and C.M. Mayona

The study was carried out in three ecological zones of the Southern Highlands of Tanzania: Zone 1 of humid Coffee/banana of Rungwe and East Ileje, Zone 2 of dry plateau of Mufindi and zone 3 of dry rift valleys of Usangu plains and Songwe. Although sweet potato was found in all these zones as a traditional crop and played an important role in their farming systems, modern technology was completely lacking: no improved varieties, no use of fertilizers, no control of pests and diseases and no post harvest processing for food diversification. The study found that biological and environmental factors were listed as the most serious production constraints. Almost all fanners interviewed reported problems of diseases and pests and problems of adverse environments such as declining soil productivity. Lack of improved varieties and post harvest problems such as storage, processing and marketing were listed as the next most important constraints. More than 50 cultivars of sweet potato were recorded in the study and the influence of tribal migration from Northern Tanzania was noted to be very important with respect to variety introductions.

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Sweet potato in the farming and food systems of Uganda

B. Bashaasha, R.O.M. Mwanga, C. Ocitti P'Obwoya and P.T. Ewell

Sweet potato is grown extensively in Uganda and this paper presents baseline information on their production and utilization. Cluster sampling was used to interview a total of 419 farmers from September 1989 through March 1992. Sweet potato is cultivated mainly by illiterate women as full time farmers on less than one acre. Mounds are used mainly with beans as an intercrop. Sweet potato comes early in the rotation. Fertiliser and pesticide usage is uncommon. Many varieties are cultivated with farmers providing their own planting material. The mean length for a planting vine is 33 cm. Piece-meal harvest is commonest. Storage is inside the house for an average of four days. One quarter or less of the ~~Held~~ field is sold in the local market. Head-loading is the commonest form of transport. Production is constrained by drought, lack of planting materials high cost of labour and/or transport. Minimum contact with extension staff was reported.

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Intercropping maize with cassava and its effects on food security for low resource farmers under drought conditions

W.T. Gondwe and R.N. Sauti

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Seven cassava (*Manihot esculenta* Crantz) genotypes were intercropped with maize (*Zea mays* L.) hybrid variety MH 18 to evaluate their suitability for intercropping expressed in yield of both crops and effect of intercropping on food security in 1990/91 rainy season. Both crops were planted at 90 cm apart interspaced on the same ridges spaced at 90 cm apart. Four maize seeds were planted per station and after emergence, seedlings were thinned to three plants per hill and one 30 cm cassava cutting was planted per hill. Phosphate (P_20_5) and nitrogen (N) were applied to maize at 60 kg ha-^{1} and 40 kgha-^{1}, respectively. Yield of maize was not affected by intercropping with cassava while the yields of all cassava genotypes were significantly reduced by intercropping. The reduction in cassava yields ranged from 52% to 73%. There were compatibility differences among cassava genotypes with maize because the highest yielding varieties under monoculture were not the highest yielding genotypes when intercropped with maize. Intercropping provided better food security than growing maize alone because it spread consumption over a longer time than maize grown alone. However, the highest income was obtained from monoculture cassava because of high yield per hectare.

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Managing cassava in a triple cropping system involving maize/cassava/cowpea

J.N. Asafu-Agyei

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The benefit of inclusion of a food legume as a third crop in the normal maize-cassava intercrop system cannot be over-emphasized. Apart from the advantage of yield of another crop, advantages will include soil improvement, erosion control and weed smothering. An experiment was planted at Fumesua, Ghana, in 1991 to determine how to manage cassava in such a triple system to avoid excessive shading of interplanted cowpea during the second rainy season. Treatments in the first rainy season were: maize variety (early and full season), maize density (20,000 and 40,000 density plants/ha), cassava variety (TMS 91934 and Ankra) and cassava density (10,000 and 20,000 plants/ha). Treatments in the second rainy season were: time of stripping of cassava leaves after interplanting cowpea (14, 28, 42 days and no stripping of cassava leaves), cassava variety (TMS 91934 and Ankra) and cassava density (10,000 and 20,000 plants/ha). Results showed the negligible effect of leaf stripping on some cassava yield components. Cowpea sown under TMS 91934 gave significantly higher yields. Cowpea yields were not affected by time of leaf stripping of cassava. The high cassava density gave higher yields in TMS 91934 but not in Ankra. Within this density, yield of cassava at 28 days was highest (8045 kg/ha dry root yield) followed by the no stripping leaf treatment (6423 kg/ha). It appears stripping allowed a fresh cluster of leaves to grow in TMS 91934 promoting higher yields. However, stripping depressed cassava yields at the other times, suggesting that the prevailing conditions of moisture at the time of leaf stripping might be the deciding factor influencing cassava yield.

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Maize-cassava intercropping: nitrogen, spatial arrangement, maize variety and time of planting effects on maize and cassava productivity in relation to food security.

R.B.Jones, N.E.Nyirenda, B.N.C.Msiska, J.D.T.Kumwenda, V.H. Kabambe and R.F.N. Sauti

The maize-cassava intercropping system is important in Malawi to maintain food security. An experiment was conducted to determine the effects of nitrogen (0 and 40 kg N ha-1), spatial arrangement (maize and cassava interplanted in the same row and alternate rows), maize variety (hybrid and composite/unimproved maize) and time of planting cassava in maize (cassava planted with maize, three weeks and six weeks later) on maize and cassava productivity. Nitrogen increased intercropped maize yield, but slightly depressed intercropped cassava yield. Planting maize and cassava in the same row reduced maize yield in some seasons and increased it in others. Cassava yield was reduced in both seasons by planting in the same row with maize. Three and six week delays in planting cassava increased maize yield, but decreased cassava yield. The use of hybrid maize increased maize yield but had little effect on cassava yield. Data from this study indicate that improved management of maize (nitrogen fertilizer and hybrid seed) increased intercropped maize yield but had little effect on the productivity of intercropped cassava.

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On-farm evaluation of the effects of three contrasting maize varieties on the productivity of cassava/maize intercrop in S.E. Nigeria.

J.E.G. Ikeorgu and A.W. lloka

This paper reports the effects of three maize varieties on maize/cassava intercrop Productivity as well as farmers' reaction and choice of maize varieties. Three contrasting maize varieties: ~~TXSR~~TZSR-Y (full season), population 49SR (medium maturity) and TZESR (early maturity) were intercropped with two improved cassava cultivars: TMS 30572 and TNS 30555 both ~~in~~ in on-station and on-farm locations in 1989 and 1990, respectively. Results show that cassava root yield under the early maturing maize was higher than under the late maturing maize but did not differ from that under the medium maturing variety in on-station and on-farm location. Maize yields however followed a reverse trend, being highest with ~~T7SR~~TZSR-Y and lowest in TZESR

(2.21 and 1.36), in on-station and on-farm. This suggests that the yield depression in cassava caused by full season maize varieties is eventually compensated for in maize ~~gram~~ grain yield.

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A descriptive analysis of root and tuber crop based food cropping systems with particular reference to cocoyam (*Xanthosoma sagittifolium* L. Schott) in Cameroon

A. Nnoung A. Mbassa, E.T. Acquah, C. Mboua and W.E. Nganje.

The food cropping systems in the South West and North West Provinces of Cameroon are basically mixed cropping systems dominated by crops like cassava, corn, cocoyam (*macabo* and taro), yam, plantain and sweet potato. The average age of farmers in the South West was 42 years and 39.5 years in the North West. The active group constituting the major labour force accounted for 73.3% and 80.5% respectively for the South West and North West. The position of *macabo* in the root crop system is that of a major crop with 86.8% of the farmers in the South West and 91% in the North West growing the crop. The crop is grown for both market and household consumption with female labour dominating the work force. The average percentage land allocated to the crop was higher in the South West (0.34 ha) than in the North West (0.23 ha). Cocoyam root rot disease is a major constraint on cocoyam production. Thus there is a need to emphasize research on a variety of cocoyam tolerant/resistant to root rot disease. It is suggested that technologies for increasing production, and training, should be geared towards women farmers.

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Contraintes phytopathologiques à~~a~~ la production de
-l’~~'~~igname (*Dioscorea* spp.) en Cô~~o~~te ~~d'Ivoire~~d’Ivoire

~~**Coward**~~

P. Zohouri, S. Digbeu et R. Dumont

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Pendant les enquêtes réalisées de 1988 à 1991, plusieurs échantillons de matériel végétal malade ont été prélevés dans différentes zones de culture de ~~1'igname~~ l’igname en Côte ~~divoire~~d’Ivoire. Les analyses en laboratoire de ces é~~e~~chantillons ont révélé~~eveig~~ plus de 40 champignons ~~panni~~ parmi lesquels *Colletotrichum* sp. et de *Cercospora* sp. semblent être les principaux pathogénes de *D. alata*. Ces observations préliminaires ont été confirmées au cours de la campagne culturale de 1991, lorsque 72 cultivars de cette espéce ~~d'igname~~ d’igname ont été évalués à la
Station IDESSA de Bouaké. Les niveaux ~~d'attaques~~ d’attaques de ces deux champignons majeurs ont varié sensi-blement selon les cultivars et des correlations negatives ont été observées entre les rendements et les dégâts foliaires. Ces résultats sont analogues à ceux des essais fongicides réalisés de 1980 à 1991, qui suggérent que divers traitements avec Ie Benlate, Ie Dithane et ~~Ie~~ le Rovral, appliqués ~~seui~~ seul ou en combinaison, procurent un bon niveau de protection. Dans l’ensemble, nous observons une réduction maximale des dégâts foliaires de
~~1'ordre~~ l’ordre de 34.8, 62.1 et 33.2% dans les parcelles traitées et, par conséquent, un gain de rendement de 30.0,

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92.8 et 54.1%, respectivement en 1989, 1990 et 1991.

During surveys conducted from 1988 - 1991, several samples of diseased material were collected from different yam cultivated areas in Côte ~~d'Ivoire~~d'Ivoire. Laboratory analysis of these samples revealed more than 40
fungi among which *Colletotrichum* sp. and *Cercospora* sp. seemed to be the main pathogens found on *D.alata*. These initial observations were confirmed in 1991 croping season, when 72 cultivars of this yam species were evaluated at the IDESSA Station of Bouaké.

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The levels of attacks by these two major fungi varied appreciably with the cultivars and negative corelations were observed between yields and foliar damage. These results were similar to those of fungicide trials conducted from 1989 -1991, which suggests that various treatments involving Benlate, Dithane and Rovral, applied alone or in combination, provided a good level of protection. On the overall, we observed a highest level of damage reduction of 34.8, 62.1 and 33.2% in treated plots and, consequently, an increase of tuber yield of 30.0, 92.8 and 54.1%, respectively in 1989, 1990 and 1991.

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Evaluation of sweet potato clones for resistance to sweet potato weevils (Cylas spp.)

S.A. Kokorom, R. Molo and J. Ogwang

An experiment to study the resistance of sweet potato to sweet potato weevils was conducted at Makerere University Farm, Kabanyolo from June to December, 1988. Sixty clones were planted for evaluation in the first rains and they were kept weedfree. During the vegetative stage, some parameters were measured to assess the growth rate. At maturity, weevil damage was assessed through analysis of the tubers in terms of number of punctures, number of blemishes and the depth of blemishes into the tuber flesh. The results showed that clones whose tubers were red skinned with white flesh were susceptible, while small, long-stemmed tubers with very few leaves or heavily branching were resistant to weevils.

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Relative resistances of some sweet potato cultivars to sweet potao weevil (*Cylas* spp.) clear wing moth (*Synanthedon* sp.) and striped weevil (*Alcicdodes* sp.) in central Kenya

M. Gethi and H.M. Kidanemariam

Ten selected sweet potato cultivars with good levels of vine and root yield were evaluated in 1991 and 1992 for their relative resistance/tolerance to sweet potato weevil, *Cylas* spp., clear wing moth, *Synanthedon* sp. and

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striped weevil *Alcidodes* sp. Resistance rating was based on external and internal damage to the crowns and roots and infestation of larvae, pupae and adults. Results indicated significant differences in damage (scores) and infestation levels between treatments. Similarly, all cultivars over both season differed widely in the Overall Resistance-Susceptibility Index (ORSI). During the long rains of 1991, some cultivars had a higher mean index than the susceptible check (KEMB 10), while others showed lower ORSI over the entire experiment. The data indicated that resistance/susceptibility ratings in terms of damage and infestation levels differed markedly from season to season depending on the parameters being used.

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Effect of time of harvesting on the yield and pest incidence of two sweet potato varieties in the forest zone of Ghana

A. Missah and A.F.K. Kissiedu

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Two sweet potato varieties, TIS 84/0320 (exotic) and Local Red (local) were planted in the minor season at Fumesua in the forest zone of Ghana and harvested at monthly intervals from 3 to 6 months after planting (MAP) to determine the best time to harvest these varieties for yield and to escape serious pest damage. Yield results showed a significant decrease in biomass as a result of decreasing vine yield, but no significant differences were observed in fresh tuber yield during the test period. Harvest index significantly increased with time. Dry matter content peaked at 5 MAP. Tuber damage due to millipedes and nematodes as well as vine infestation by *Alcidodes* sp. did not vary significantly with time of harvest. However, tuber infestation by the sweet potato weevil, *Cylas* spp. rose from a rather low level of 1.14% in TIS 84/0320 and 5.46% in Local Red at 3 MAP to 66% and 91% in TIS 84/0320 and Local Red, respectively at 6 MAP. Tuber rotting and sprouting became pronounced at 6 MAP.

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Research on African Cassava Mosaic Virus: the need for international collaboration

J.M. Thresh, D. Fargette and J. Mukiibi

There are so few virologists and vector entomologists in Sub-Saharan Africa that National Programmes can seldom mount major research projects on African cassava mosaic gemini virus (ACMV) and its whitefly vector *Bemisia tabaci* .The lack of information on control strategies is one of the reasons why the virus is so prevalent and causes such serious losses. An international collaborative approach, as mounted against the cassava mealybug, (*Phenacoccus manihoti*) would have obvious advantages in making the most effective use of the facilities and expertise available. Such approach is long overdue and some of the main issues to be addressed are: the importance of ACMV in different agro-ecological zones; -the existence of biotypes of *B. tabaci* that are restricted to cassava; rates of virus spread by whitefly vectors; the availability of ACMV-resistant and ACMV-free planting material; socio economic studies of the attitude of farmers to such planting materials and to rogueing; and modelling vector populations, virus spread and the impact of control measures. The information on these topics now being obtained in Uganda and the methods being developed will be widely applicable elsewhere.

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Quantification of resistance to African Cassava Mosaic Virus (ACMV) in IITA-improved, mosaic-resistant cassava breeding materials

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H.W. Rossel, C.M. Changa and G.I. Atiri

By determining primary incidence of cassava mosaic in shoots developing on sprouting cuttings, as well as by determining re-infection rates in healthy shoots and degree of growing away from infection ~~in~~ in diseased shoots it could be established that ACMV ~~in~~ in new, improved, ACMV-resistant genotypes developed at IITA,occurs at variable, though usually low incidence. Low disease incidence is the result of the typically restricted systemic distribution of the causal virus within infected plants, such incidence also being dependent on natural infection pressure of the virus. By determining primary infection incidence on shoots developing on sprouting cuttings, particularly when latter is determined under vector-proof conditions, in a screenhouse, as well as by assessment of shoot-tip mosaic disease incidence on field-grown plants, good estimates may be obtained of comparative levels of cassava resistance to ACMV relevant to prevailing field conditions.

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Etat phytosanitaire de la palate douce et sélection pour la résistance aux maladies virales au Rwanda

Ndamage Géorges

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Trois techniques ont été utilisées pour tester ~~Ie~~ le comportement de la palate douce vis- à-vis des maladies virales: ~~1'inoculation~~ l'inoculation mécanique par greffage, ~~1'induction~~ l'induction du stress par la coupe des clones de la collection et
1'-observation du comportement des repousses, les tests sérologiques. Ce criblage pour la résistance à la virose a été ~~ré~~réalisé~~e~~ pour 374 clones de la collection, L'évaluation aussi bien des parents que de la descendance a permis d'estimer Ie niveau de résistance. Une enquête en milieu réel sur les maladies a permis de recueillir les avis des paysans sur la résistance variétale connue sur une longue période. Ainsi la combmaison de toutes ces techniques a permis ~~d'indiquer~~ d'indiquer les variétes résistantes.

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~~Farmers'~~ Farmers' cultural practices and their effect on pest control in sweet potato In south Nyanza, Kenya

N.E.J.M. Smit, P.T. Ewell and ~~O~~O.E.V. Magenya

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Cultural control is presently the most promising component of an Integrated~~.~~ Pest Management strategy for sweet potato grown by subsistence farmers. In South Nyanza, ~~Kenya's~~ Kenya's principal sweet potato growing district, a survey was carried to determine effects of ~~farmers'~~ farmers' cultural practices on pest control. The most important insect pest ~~is~~ are sweet potato weevils (*Cylas* spp.). Conclusions and recommendations out of the survey results are that, IPM researchers and extensionists need to concentrate on some cultural practices, especially avoidance of adjacent planting and crop sanitation. The life cycle and behaviour of the insects should be explained to the farmers, so that they better understand their mode of dispersal.

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Distribution and severity of yam anthracnose in Nigeria

C.N. Akem and R. Asiedu

Yam anthracnose, caused by *Colletotrichum gloeosporioides* occurred in 92% of 956 yam fields surveyed for the disease in Nigeria in 1992. The disease was found in all 4 regions of the country in which yam production is concentrated. Mean disease severity (DS) based on a rating scale ranging from 0(no disease, no spots on leaves) to 5(blighted conditions, whole plants dying or already dead) was 2.3. Disease severity was greatly influenced by the cropping systems of the fields. Fields in which yam was grown as an intercrop with other crops (77%), had a higher mean DS than those in which it was grown as a sole crop. Fields in which yam was staked (52%), had an overall lower mean DS than those in which it was grown nonstaked.There was good correlation between the percentage of Fields affected by anthracnose and mean DS in affected fields in each region.Yam hectarage in the four regions did not correlate with either percentage of fields affected by anthracnose or mean DS. The disease was prevalent on all 4 yam species widely cultivated in Nigeria.

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Effectiveness of the polyethylene plastic mulch as a control measure against sweet potato weevils. (*Cylas* spp. Coleoptera: Curculionidea)

K.M. Lema, D.S.O. Osiru and S.K. Hahn

A study was conducted in southwestern Nigeria to evaluate the effectiveness of the polyethylene plastic mulch (PPM) in controlling sweet potato weevils (SPW), Cylas spp. The weevils are the most destructive insect pests of sweet potato, *Ipomoea batatas* (L.) Lam. in Africa. White and black PPM were tested with bare soil as a control using two sweet potato varieties, Tib 4 and TIS 2534. The general trend over two cropping seasons indicated that PPM reduced SPW damage although the results did not indicate any statistically significant differences between the seasons. In the second season SPW damage levels were higher and 15.0- 23 8% and 28.8-40% of the storage roots were unmarketable in the plastic mulched plots, respectively for TIS 2534 and Tib 4. While for non-mulched plots 30.0% and 56.3% SPW damage levels were 30.0% and 56.3% for Tis 2534 and Tib 4 respectively. Abundance of SPW in the storage roots were not significantly affected by the use of the PPM. Plastic mulch increased root yields for Tib 4, but not for TIS 2534.

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Effect of African cassava mosaic virus disease on
— local and introduced cassava cultivars ~~In~~ in western highlands of Cameroon

C.M. Tankou and S.N. Lyonga

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Four cultivars of cassava (Manihot esculenta) were evaluated after planting based on the presence and absence of the African cassava mosaic virus disease. As a result of the disease, there was a general reduction in all the parameters measured at 7 and 18 months after planting. However, though the introduced varieties showed significant differences (P: 0.05) for storage root variables at 18 months after planting, the local cultivar showed no significant differences. Chlorophyll a was more correlated with storage root weight than the other chlorophyll components.

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A new chromogen for the assay of cyanogens –in cassava products

A.J.A.M. Essers, R.M. Bosveld, van der Gift and A.G.J. Voragen

The enzyme assay for cyanogens in cassava as developed by Cooke (1978) and ~~O'Brien~~ O'Brien et al. (1991) was modified with a more acceptable colour reagent. ~~Isomcotinate~~Isonicotinate/1, 3-dimethyl barbiturate as reagent in the Konig reaction had the advantages of being faster, cheaper, less toxic, not releasing disgusting toxic vapours, and having a longer storability compared with the so far applied pyridine/pyrazolone colour reagent. Storability of the reagent was at least 12 days. Readings could be taken after 6 up to 36 min incubation time. Calibration curves were linear up to the absorbance of 1.8 at least.

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Detoxification of cassava through heap-fermentation in Uganda.

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S. Essers, C. Ebong, R. van derGrift, W. Otim-Nape, R. Nout

Detoxification of cassava by the Alur tribe in Uganda is via a stage of solid substrate fermentation. Processing was monitored in six rural households and repeated in quadruplicate at a laboratory site, comparing it to sun-drying. Resulting samples were analyzed for moisture, cyanogen levels, pH and microflora. Twenty-Five fermented flour samples from rural households were analyzed for cyanogenic potential and tested for mutagenicity and cytotoxicity by the Ames test. Ten samples were tested for the presence of a-flatoxins by HPTLC. The heap fermentation monitored in the village reduced the cynogenic potential of cassava from 412 + 142 to 20 ± 14 mg CN eq./kg cassava dry wt. Heap-fermentation contributed significantly in reducing cyanogen levels, but did not always result in innocuous levels of cyanogens. Dominant mycelial growth was from the fungi *Neurospora sitophila*, *Geotrichum candidwn and Rhizopus oryzae*. No muta-genicity, cytotoxicity nor aflatoxins could be detected in the flours. We found no contra-indication for applying this method to detoxify cassava.

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Post-harvest losses during harvesting, transporting and marketing of sweet potato in Kenya

R.W. Gatumbi, A.W. Kihurani and L.G. Skoglund

A survey was carried out in three wholesale markets in Nairobi-Kenya, to determine sweet potato losses during harvesting transporting and marketing. The survey took three months. May to July 1992. It involved interviewing 60 sweet potato sellers/or farmers. Sweet potatoes are harvested with hoes, pangas or sharpened sticks and harvesting is done by farmers and their families or hired workers. Harvested tubers are packed gunny bags and later transported to Nairobi city markets by public or private vehicles. Tubers are sold by heap or ~~in~~ in twenty kilogram tins. About ninety percent of the sale is retail. Out of 3,200 tubers collated, 12.6 percent were unsold and was loss. The losses were due to mechanical damages, diseases and weevils.

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Biochemistry and utilization of sweet potato (*Ipomoea batatas*) for animal feeding: –implications for food security in Africa

0.0. Tewe

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Forty-nine varieties of sweet potato tubers, vines and leaves were obtained from the International Institute for Tropical Agriculture (IITA), Ibadan, Nigeria. Chemical analysis revealed high levels of carbohydrates in roots. Leaves and vines contained appreciable levels of crude protein, fibre and minerals. Some varieties contained crude protein of up to 8.60% in tubers. Total sugar was 3.68 - 10.40 gm/l00g DM. Thus selection can be made for low sugar varieties desired in animal feeds. Good growth performance was observed in broilers, layers, pigs and sheep when sweet potato partially replaced maize in their rations. Potentials of sweet potato for food security in Africa are highlighted and strategies recommended for (overcoming constraints in surmounting factors limiting) the use of sweet potato in livestock feeds.

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A study on the quality of cassava pellets produced with a machine fabricated in Nigeria

—P.S.N. Onyekwere, U.J. Ukpabi and L.S.O. Ene

A modified classroom chalk machine fabricated by PRODA (Nigeria) was assessed for cassava pellet production. With pulverized fermented peeled roots of sweet cassava, the machine could produce pellets measuring 2 cm (length) by 1 cm (diameter) at a capacity of 0.26 ~~t~~t/h. Nutrient levels for the press extruded pellets were 1.35 mg/kg cyanide, 8.5% moisture, 2 .10% crude protein, 0 .25% fat, 2.42% crude fibre and 85.38% total carbohydrates, while for the screw extruded pellets, and 2.02 mg/kg cyanide, 8.0% moisture, 2.10% crude protein, 0.15% fat, 1.67% crude fibre and 86.02% total carbohydrates.

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Effect of substituting wheat flour with dehydrated uncooked potato flour on rheological properties of dough and baking quality of bread

J.N. Kabira and J.K. lmungjlmungi

Dehydrated uncooked potato flour was blended by weight with commercial wheat Hour flour at 5%, 10% 15% and
20% levels of substitution. The flour mixtures were evaluated for rheological properties of dough and baking quality of bread. Potato Hour flour weakened the dough but increased water absorption by the Hour flour as well as loaf weight. Breads from all flour blends were less crumbly than regular wheat bread. Sensory evaluate indicated that consumer-acceptable breads can be made with up to 20% of dehydrated uncooked potato flour .Use of the dehydrated potato flour in bread making would be advantageous due to increased nutritional value, higher bread yield and reduced rate of staling.

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The cyanogenic potential of cassava

M. Bokanga

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Cyanogenesis, the ability to produce hydrogen cyanide (HCN), is common to over 2000 plant species. In cassava, two cyanogenic glucosides, linamarin and lotaustralin, are produced in the leaves and stored inside vacuoles. Linamarase, an enzyme capable of hydrolyzing the glucosides, is also produced by the plant, but is stored ~~in~~ in the cell wall. The ~~hydrolysis~~hydrolysis of the glucosides and the release of HCN only occurs when plant tissues are damaged, e.g. during processing. Once produced, HCN evaporates. The term cyanogenic potential rather than HCN content should be used to express the concentration of cyanogenic glucosides and their breakdown products. Although the synthesis of linamarin and lotaustralin occurs only in the leaves the two compounds are found in all plant tissues. There is no correlation between the cyanogenic potential of the roots and the cyanogenic potential of the leaves. There is a wide variation in the root cyanogenic potential. The variation is greater between roots of the same plant than between different plants of the same variety. A sampling scheme of 4 plants per plot in 4 replications is recommended when assessing the cyanogenic potential of a variety in field trials. Water stress increases the cyanogenic potential in cassava. There is a strong environmental effect on the expression of ~~cassava's~~ cassava's cyanogenic potential, but the genotype-environment interaction is very weak.

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Cassava in the production of bread and bakery products

P. Omoaka and M. Bokanga

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A significant proportion of wheat flour can be replaced by cassava flour m the making of bread with little changes in the quality of bread. This paper shows that it is possible to make bread without using wheat flour. Soybean flour can also be mixed with cassava flour to increase the protein content of the baked products. Recipes for making breads, cakes and biscuits from cassava
flour and bread from cassava starch are presented. Sensory evaluation tests show that all baked cassava products are highly acceptable to consumers.

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Case studies in cassava processing and -cyanogen elimination

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Z. Bainbridge

A review of case studies in village level cassava processing by sun-drying and fermentation in Africa has been used to identify the principles influential in the efficient elimination of cyanogens from cassava based food. Consumption of cyanogens due to insufficient processing of cassava is avoidable. Using information obtained from processing studies and the Collaborative Study of Cassava in Africa (COSCA), NRI-is initiating a collaborative case study in Southern Tanzania to develop dissemination materials, specifically for raising the awareness of cassava consumers to alternative processing methods and means of rendering derived foods safe to consume.

Page 348-----353

Leaf protein analysis of ten cocoyam *Xanthosoma sagittifoiium* (L.) Schott and *Colocasia esculenta* (L.) Schott genotypes

A. Agueguia, C.A. Fatokun and S.K.Hahn

Morphological descriptions for the purpose of identifying and establishing distinctness of cultivars within a species can pose problems if slight genetic differences exist between them. The influence of the environment on these morphological attributes may not expose the distinctness. Distinctness of genotypes should however be established and preserved where necessary, ~~hiectrophorelic~~ Electrophorelic protein analysis of 10 cocoyam genotypes indicated differences in their band patterns. Protein stainings were carried out using freeze dried young unfolded leaves. Tube gel electrophoresis gave consistent results between four accessions of Colocasia esculenta and six of *Xanthosoma sagittifolium*. Relatively high electrophoretic similarities were observed among most of the cocoyam genotypes. The similarity index method was used to demonstrate electrophoretic relationships among different genotypes under study. Application of numerical taxonomic methods in

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electrophoretic studies of leaf proteins may be valuable for elucidating relationships among the taxa of *Colocasia esculenta* and *Xanthosoma sagittifolium*

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Forage value of cassava in the Lake Crescent region –of Uganda

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C. Ebong, Y. Baguma and P. Lusembo

Two experiments were undertaken to examine the effects of stripping frequency and time of initiation of defoliation on plant height, number of roots per plant, root yield per ha and commulative leaf yield per ha in 4 varieties of cassava. Another experiment was done to assess forage yield potential of the 4 varieties under cutting management. Results in experiment 1 showed that plant height at maturity did not differ significantly by variety. Root number, root yield per ha and top biomass was lower in Bukalasa 11 than in TMS 30786, TMS 30395 and Ebwanateraka. Frequency of defoliation significantly reduced plant height at maturity, top biomass,

number of roots and root yield per ha. Cummulative leaf yield was not affected by stripping frequency. Results of experiment 2 showed that numbers of roots per plant and root yield were reduced by stripping frequency but foliage biomass was not affected. Initiation of defoliation at 270 days after planting did not affect root number per plant and root yield per ha. It was concluded that the frequency of defoliation had no effect on root yield, but the optimum time of initiating defoliation needed to be determined. Results in experiment 3 showed that forage biomass potential of TMS 30786 and 30395 were similar and significantly higher than forage biomass yield in Ebwanateraka and Bukalasa 11. It was concluded that the optimum biomass was obtained from cutting management but effects on root yield and the optimum cutting height needs to be determined.

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–Storage of fresh cassava tuber in plant-based storage media

N.M. Silim, C. Ebong and J. Ssemwanga

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The potential of four plant based storage media to preserve fresh cassava were investigated. These were contained in either wooden box unlined or lined with polythene sheets. For storage duration of three weeks wet sawdust m unlined boxes gave significantly better tuber preservation with low levels of microbial growth and streaking and a higher degree of freshness of the tubers. This was followed by wet wood

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shavings. Wet straw and wet coffee husks gave poorer overall preservation with significantly higher levels of fungal and bacterial growth. The dry storage media gave poor preservation in all cases except coffee husk. Undamaged tubers preserved better than damaged tubers. In all the above however, tuber streaking were significant. For storage duration of three weeks in the lined wet wood shavings and sawdust, excellent preservation were obtained. External microbial growths were not seen, streaking was greatly minimized and freshness was maintained. In storage of over three weeks, rotting of tubers was the single factor responsible for the rapid deterioration. Use of sawdust and wood shavings contained in polythene lined boxes as storage media for fresh cassava storage would be an ideal method in open market situations commonly found in Uganda and where post-harvest losses are very high.

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~~Seasonally~~ Seasonality of sweet potato prices in Kampala, Uganda

B. Bashaasha

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The study recognizes the importance of sweet potato in the food systems of Uganda and the influence of market prices on urban consumption. The main objective was to sort out repetitive seasonal or intra-annual variations in sweet potato prices and arrive at some behavioral inferences and conclusions. Secondary time series data

extending for the last three and a half years was gathered and used to compute trend, 12 months moving averages, seasonal and cyclical indices. A trend value of 2.679 was obtained. The seasonal index series indicates a consistent repetitive pattern while the cyclical index closely resembles the characteristic sine-wave with no consistent yearly pattern. The discrepancy between the average and grand seasonal index series was very small. The seasonal pattern in the index series was found to be statistically significant at least at 30% level. The period from September to February was found to have monthly grand seasonal index values that are higher than the average value of the time series over the period of analysis. The rest of the months had lower values with June having the minimum. It is likely that price increases are influenced by a combination of factors such as harvest season, prices of substitute commodities and national budget announcements.

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Ten practical points related to food security

N. McNamara and S. Morse

Ten practical points related to food security are discussed based on 22 years experience of the Diocesan Development Services (DDS), an organization working with resource-poor fanners in Kogi State Nigeria. The points cover issues such as creating awareness of the need for food security, the importance of crop storage,

cropping system diversity, introducing new varieties and the need for an integrated approach. The authors conclude by highlighting some general questions relating to the role of technology and the requirements for food security and continuity.

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The attitude of farmers towards the yam minisett – technology in Imo State of Nigeria

C.C. Asiabaka

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The study focused on the perception and attitude of ~~fanners~~ farmers in Imo State, of Nigeria, towards yam minisett technology. .Nineteen attitude statements were used to elicit ~~farmers'~~ farmers' attitude towards the technology. The problem census research tool was also used to augment the use of questionnaires. Findings indicate that respondents had a positive attitude towards the technology. The farmers perceived that late delivery of farm inputs scarcity of fertilizers, input subsidy and Small Plot Adoption Technique (SPAT) strongly influenced their attitude towards the technology. The study concluded that these farmers had a positive attitude towards yam minisett technology within the Imo State Agricultural Development Project (IADP).

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The cassava biotechnology network and African agricultural research and development programmes

A.M. Thro, W. Roca and R. Asiedu~~1~~

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In modern biological research, cassava has been an orphan crop, because most advances have taken place in developed countries where cassava is not grown. In order for cassava to profit from biotechnology, efforts around the world must be pooled, integrating developing countries into the process. The Cassava Biotechnology Network fosters developments which are environmentally acceptable and promote the well being of small-scale ~~fanners~~ farmers within sustainable cassava production systems. The network will merge the experience of CIAT, IITA, national programmes, and advanced research organizations. It will serve as a forum of exchange for the development of new proposals and increased awareness of biotechnology issues. The network will also play a role in catalyzing and monitoring the direction of biotechnology research towards developing country priorities, and in facilitating the transfer of technology to national programmes and other developing country organizations.

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The possibilities of biotechnology for increasing household production of cassava for food security in —Africa: the case of the North-West Cameroon

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W.E. Nganje, E.T. Acquah, A. Nnoung and J.C. Mboua

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Cassava is almost entirely produced by households in Africa. In Cameroon, production is experiencing a constant decline in both yield and land area under cultivation. There are indications that, in the near future, the satisfactory demand presently enjoyed in Cameroon may not be met. Some of the factors responsible for this decline have been discussed in this paper. Possibilities for alleviating these constraints under the aegis of biotechnology have equally been examined. Cross sectional primary data from a formal survey of 211 farmers were collected for the study. Descriptive and multiple regression analyses were used to document important findings on: the function estimated, using the Cobb-Douglas production function model, was found to be very significant. Sixty one percent variation of the output was caused by planting materials, when all other variables were held constant. The sum of elasticities was equal to 1.004. A t-test showed that this value was not significantly different from one. This implies that cassava production has constant return to scale. There are indications that, if yields can be doubled through tissue culture technology (as indicated in ROTREP 1991 annual report), the efficiencies of other factors such as land and labour will increase with a subsequent increase in the productivity of cassava.

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G. Ndamage et J. Mulindangabo

La recherche sur les Plantes à Racines et Tubercules à I'ISAR a mis au point de nombreuses technologies parmi lesquelles 6 variétés de manioc et 8 variétés de ~~palate~~ patate douce qui ont été multipliées à grande échelle et diffusées par les Services Agricoles Ministére de ~~1'Agriculture~~1'Agriculture. La technique de multiplication rapide, la gestion des champs permanents de multiplication, la formation des vulgarisateurs et des paysans ont permis la diffusion ~~d'une~~ d'une énorme quantité de matériel de plantation et 1~~'~~'adoption ~~d'autres~~ d'autres technologies dévéloppées.

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Contribution du PRONAM à la ~~vulgarisation~~vulgarization des techniques améliorées de la production du manioc au Bandundu et au Bas-Zaïre, 1980-1988

T. Mutombo, D.A.FIorini, S.J. Pandey, C. Burn, W. Fiebig, V.K. Belawaku et K.Kamizelo

Avant la création du PRONAM, la faible production du manioc au Bandundu et au Bas-Zaïre posait des problémes alimentaires et économiques. Les variétés à haut réndement, adaptées aux environnements divers, et résistantes aux maladies et insectes économiques faisaient défaut. La formation traditionnelle des agents de vulgarisation des organismes du développement agricole était inadequate à un encadrement technique efficace des paysans. Pour augmenter la production du manioc, les paysans se dépensaient à accroître les superficies sur les sols pauvres principalement réservés au manioc. Malgré les superficies élargies, les rendements étaient faibles par rapport au besoins d'autoconsonunation et du revenu du paysan. Depuis 1980, Ie PRONAM a entrepris une collaboration avec les organismes du développement et Ie service étatique de ~~1'agriculture~~ l'agriculture pour faire parvenir aux paysans les résultats de sa recherche sur la production du manioc. Le PRONAM a formé 201 vulgarisateurs de ses collaborateurs et 190 paysans encadrés par ces collaborateurs. Entre 1980 et 1989, plus de 2.862.000 mètres de boutures améliorees étaient distribués ou vendus par le PRONAM dont la plupart avait passée chez les paysans par le canal des collaborateurs. Cette approche a contribué à une meilleure liaison entre la recherche et les paysans à travers des vulgarisateurs dont la compétence technique est désormais amélioree.

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An integrated multiple strategy for the transfer of root crop technology to farmers

J.A. Otoo, R.F.N. Sauti, M.N. Alvarez, P. Meya, W. Gondwe and M. Chibambo

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On-farm trials were carried out in the 1990/91 growing season in Malawi to popularize improved sweet potato varieties which were released by the Malawi National Varietal Release Committee in 1986. The adoption of these varieties by farmers was very poor when monitored two months after harvesting the trials, though the improved varieties were superior in yield and good in taste quality compared to the local varieties. A multiple strategy which integrates on-farm trials with a number of activities such as field day/training workshops, demonstrations, multiplication and distribution of planting materials, involvement of many farmers in harvesting the trials, involvement of the press and radio, and the ~~NGO's~~ NGO's was initiated to create greater awareness about the improved varieties to promote adoption. The strategy was also to help disseminate to farmers the technology for multiplication of sweet potato planting materials to ensure a reliable supply to the farmers. Extension workers and ~~fanners~~ farmers rated the strategy as successful; over 1800 farmers collected vines of the improved varieties to establish nurseries for the production of planting materials for the next growing season

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La promotion du manioc: une expéerience du Centre de Formation et de Recherche Coopéératives "IWACU"

E. Narumansi

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Créé en 1982, Ie Centre IWACU est une association sans but lucratif qui vise 1'autopromotion l'autopromotion du monde rural à travers des activités de formation, d'appuid'appui-conseil, de recherche et structuration en faveur des associations de base. En 1989, Ie le Centre IWACU, en collaboration avec Ie le Ministére de 1'Agriculture1'Agriculture, a démarré un programme d'appui d'appui à la valorisation des produits agricoles et alimentaires. Des études préliminaires avaient révélé 1'existence l'existence de deux problémes qui se posent aprés la récolte des produits vivriers, enparticulier Ie le manioc. II s'agit s'agit du faible niveau de transformation et de la conservation difficile.L'expérimentation L'expérimentation préalable de nouveaux produits àa base de manioc à connu des réactions positives de la part de la population. Les zones d'action d'action sont choisies en fonction de la production de manioc, tandis que Ie public-cible est constitué de groupements paysans, d'artisansd'artisans, d'agents d'agents d'encadrementd'encadrement, de restaurateurs et de commercants privés. Aujourd'huiAujourd'hui, plus de 10.000 personnes ont été formées par Ie le Centre IWACU en procédés de transformation du manioc et fabrication des outils. Les nouveaux produits (gari, produits pâtissiers, produits à base de racines frafches et à base de feuilles) sont largement diffusés. Le gari est vendu en ville dans les marchés et magasins d'alimentationd'alimentation. Sexploitation L'exploitation des moyens audio-visuels ont permis la sensibilisation de la population à1'utilisarion à1'utilisarion des nouveaux produits de manioc. La collaboration avec des institutions de recherche telles que 1'ISAR l'ISAR (Rwanda) et 1'IITA (Nigéria) permet de poursuivre la recherche sur les produits et les outils sur le plan de la qualité et de la performance. Une prospection de la transformation d'autres d'autres tubercules (patate douce,
pomme de terre) fait actuellement 1'objet l'objet du programme tout en renforcant la filiére manioc.

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An integrated network approach in root crops research.

M.N. Alvarez

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The nature of the mission of the East and Southern Africa Root Crops Research Network, required it to maintain an interdisciplinary approach to deal with the diversity of root crop problems. The viable scientific and technical force enabled it to respond to emergency problems and new challenges with appropriate action. At a time when there is an increase in competition for funding, the multidisciplinary research approach on a regional level was helpful in attracting support. The network has forged linkages with several organizations, institutions and departments of Agriculture on a regional level and has been catalytical in bringing cassava to the attention of policy makers and donors. Factors which contributed to the effectiveness of the network are examined.

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Collaboration between CIP and NARS on potato and sweet potato research and technology transfer in Africa

P.T. Ewell and S. Nganga

The International Potato Center (CIP) is a scientific research institution which collaborates with the NARS and other institutions to enhance the role of potato and sweet potato in the food systems of Africa. The core of our operation is an interdisciplinary team of international scientists. We work closely with national programmes in the areas of collaborative research, training, the distribution of information, and institution support.

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–Impact des variétés amé1iorées du programme national manioc (PRONAM) sur la production du manioc au Zaïre.

D. Ndombo, M. Bidiaka, K. Kassongo, N.M. Mahungu -et M.Kankolongo

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Le manioc est ~~1'une~~ l'une des plus importantes des cultures vivriéres au Zaïre. Le programme d'amélioration de
cette culture a été réactivé par la création du Programme National Manioc (PRONAM) en 1974 afin ~~d'accroître~~ d'accroître la production. Pour cela, PRONAM ~~s'était~~ s'était fixé comme objectifs essentiels le développement des cultivars a ~~haul~~ haut rendement stable, résistants aux principales maladies et pestes, adaptes aux différentes zones agro-écologiques et associations, et dont les produits Finis ont des caractéristiques organoleptiques acceptées
par les consommateurs. ~~L'introduction~~ L'introduction de ces nouvelles variétés dans les systémes culturaux paysans a engendré une augmentation substantielle de la production du manioc et du revenu global de ~~l'agriculteur~~l'agriculteur.

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Kenya Root Crops Research

J.N. Kabira

In Kenya, the major root and tuber crops are Irish potato, cassava and sweet potato. Yams and cocoyams are also receiving attention due to the need to provide clean planting materials to farmers. Our collaborators in the improvement of these crops include CIP, CIAT, IITA, IIBC and the regional networks ESARRN and PRAPACE. The main areas of research are: agronomy, crop protection, germplasm, seed improvement, post-harvest technology, and socio-economics.

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