



Centre d'Information et d'Échanges sur les Plantes de Couverture en Afrique
Center for Cover Crops Information and Seed Exchange in Africa

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An exchange implies that you give and receive something. CIEPCA wishes to continue to “give” information to all its subscribers and also to “receive” some information in return from each one of you. In order to improve the quality of this Newsletter, your comments and suggestions on both its format and its content would be most appreciated. Also, contributions to enrich the content are welcome so that information doesn’t flow only one way.

To show that cover crops (cc) are not only limited to *Mucuna*, soil fertility, and the control of weeds such as *Imperata cylindrica*, we have once again provided in this issue of our Newsletter abstracts of some papers dealing with promising herbaceous legume species that are still unknown to agriculturists and/or pastoralists. Isn’t that one of the reasons (multiple uses of cc not known) why cc are not being adopted? Yet, it is obvious that cc play a very significant role in agronomic aspects (organic matter, nitrogen fixation, erosion control, etc.).

It is hoped that the information contained in this issue of our Newsletter will be very useful to those involved in sustainable agriculture and in animal husbandry.

FORAGES AND ANIMAL FEEDING REPORTS

Evaluation of tropical pasture legumes for fodder banks in subhumid Nigeria. 1. Accessions of *Centrosema brasilianum*, *C. pascuorum*, *Chamaecrista rotundifolia*, and *Stylosanthes hamata*

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The potential of 5 forage legume accessions was assessed under cutting, as alternatives to *Stylosanthes hamata* cv. Verano for use in dry season pastures (fodder banks) in Nigeria. Measurements included dry matter yield, nutritive value (crude protein and phosphorus), seed production, drought tolerance and persistence. All accessions had good protein values and could be used to improve the quality of fodder, but their ability to compete with the native vegetation and consistently produce high yields differed.

Chamaecrista rotundifolia cv. Wynn performed well and could be used in fodder banks. Accessions of *Centrosema brasilianum* had poor seed production but warrant further research because of their outstanding ability to remain green and therefore more nutritious in the dry season. *Centrosema pascuorum* accessions yielded well initially but failed to persist.

All accessions showed a decline in the proportion of legume in the third season, supporting the recommendation to crop these areas to reduce grass infestation and exploit the benefits from the legume after 2-3 years.

(Reprinted from Tropical Grasslands, Volume 28, M. Peters, S.A. Tarawali and J. Alkämper, Evaluation of tropical pasture legumes for fodder banks in subhumid Nigeria. 1. Accessions of *Centrosema brasilianum*, *C. pascuorum*, *Chamaecrista rotundifolia* and *Stylosanthes hamata*. pages 65-73, © 1994, with permission from Tropical Grasslands Society)

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Five accessions, comprising *Aeschynomene histrix*, *Centrosema acutifolium*, *Centrosema pascuorum* and *Stylosanthes guianensis* together with *Stylosanthes hamata* cv. Verano were evaluated over 2 years for use in fodder banks in subhumid Nigeria.

The most promising accession was *A. histrix* I12463 with yields of more than 6 t/ha dry matter (DM) in the second growing season, good drought tolerance, ability to compete with the native vegetation and high nutritive value. *C. pascuorum* cv. Cavalcade and *C. acutifolium* cv. Vichada did not persist in competition with the native vegetation.

At the end of the wet season, crude protein concentrations (whole plant) ranged from 10-17 % DM and phosphorus concentrations from 0.08-0.19 % DM. *A. histrix* fell in the middle of the range. This species should be evaluated along with other promising accessions in pasture mixtures in the region.

(Reprinted from Tropical Grasslands, Volume 28, M. Peters, S.A. Tarawali and J. Alkämper, Evaluation of tropical pasture legumes for fodder banks in subhumid Nigeria. 2. Accessions of *Aeschynomene histrix*, *Centrosema acutifolium*, *C. pascuorum*, *Stylosanthes guianensis* and *S. hamata*. pages 74-79, © 1994, with permission from Tropical Grasslands Society)



Evaluation of *Chamaecrista rotundifolia* accessions as a fodder resource in subhumid Nigeria

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Chamaecrista rotundifolia cv. Wynn has been identified as a promising forest legume for use in subhumid Nigeria. To establish if other accessions of this species have potential in the region, 21 accessions were evaluated for flowering, seed production, dry matter production, disease and pest incidence, and drought tolerance. A number of later flowering accessions gave higher dry matter yields than cv. Wynn, although some (ILCA 15603 and 15604) showed susceptibility to anthracnose disease. One of the most promising accessions is ILCA 14167 which warrants further testing of nutritional qualities, palatability and potential in a pasture situation.

(Reprinted from Tropical Grasslands, Volume 29, S.A. Tarawali Evaluation of *Chamaecrista rotundifolia* accessions as it fodder resource in subhumid Nigeria, pages 129-133, © 1995, with permission from Tropical Grasslands)

The yield and persistence of selected forage legumes in subhumid and semiarid West Africa

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Trials were conducted at 7 sites in northern Nigeria to identify forage legumes as alternatives to *Stylosanthes hamata* cv. Verano. Initial screening of 46 accessions at each site led to the identification of the best 8 for each site. These were then tested for 4 years, the first 2 with careful management (weeding) followed by 2 years without weeding to determine persistence.

S. hamata grew well and persisted at almost all sites but it was possible to identify some other accessions with potential. *S. scabra* showed some promise for wetter subhumid areas such as Makurdi and Jos; *Chamaecrista rotundifolia* and *Centrosema brasilianum* performed well at semiarid sites (Bauchi and Rano). *Centrosema pascuorum* and *S. humilis* have potential for use in very dry semiarid areas such as Maiduguri where they may be used in a cut and conserve situation.

(Reprinted from Tropical Grasslands, Volume 28, S.A. Tarawali, The yield and persistence of selected forage legumes in subhumid and semiarid west Africa, pages 80-89, © 1994, with permission from Tropical Grasslands Society)

Dry season performance of four tropical pasture legumes in subhumid West Africa as influenced by superphosphate application and weed control

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The productivity and nutritive value of *Chamaecrista rotundifolia* cv. Wynn, *Centrosema pascuorum* cv. Cavalcade, *Stylosanthes guianensis* cv. Pucalipa and *S. hamata* cv. Verano as affected by single superphosphate fertilisation (SSP) and weed control were measured during the dry season in subhumid Nigeria. Wynn, when growing in competition with the native vegetation, had the highest dry matter yields. During the dry season, legume yields were more stable than those of the associated grasses and herbs. Fertilisation with SSP at low levels of available soil phosphorus increased legume productivity but native grasses and herbs did not respond to the fertiliser applied.

The nutritive value of all legume species was low for most of the dry season, with crude protein concentrations, in vitro dry matter digestibility, and phosphorus concentrations ranging between 5-7%, 40-50% and 0.02-0.05%, respectively. The decline of nutritive value during the dry season was largely a function of changes in leaf/stem/litter proportions. It is suggested that drought tolerance and capacity to retain leaf should receive more attention when evaluating forage species to be used in the dry season.

Despite these limitations, Wynn has potential to complement the widely used *Stylosanthes hamata* cv. Verano in drier subhumid West Africa. The other species tested could be successfully used in legume mixtures.

(Reprinted from Tropical Grasslands, Volume 31, M. Peters, S.A. Tarawali and J. Alkamper, Dry season performance of four tropical pasture legumes in subhumid West Africa as influenced by superphosphate application and weed control, pages 201-213, © 1997, with permission from Tropical Grasslands Society)

AGRONOMIC REPORTS ON COVER CROPS

Selecting potential annual-sown legumes for cover crops, trash lines, mulching material, green manure or short-fallow replacement in low-input systems in the East African Highlands: The example of S.W. Uganda

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Models are presented which can be used to examine the suitability of annual cover legumes, in terms of their maturity period, for their potential for incorporation into the hillside farming systems of the highland regions of sub-Saharan Africa. Sites in south-western Uganda, covering a range in elevations from 1600-2500 m and having a bimodal rainfall distribution, were used as an example. In such locations, it was evident that several of the short day "tropical" species tested were ill-adapted and would be unlikely to reach pod maturity within the time available in either of the available growing seasons, particularly at higher elevations. More temperate species, particularly *Vicia* spp., were better adapted but delays in sowing and increasing elevation severely restricted the potential choice of an appropriate species. The flexibility of the models as potential tools for scaling-up location-specific agronomic research trials is discussed.

(Reprinted from Mountain Research and Development, Volume 19, no. 4, J.D.H. Keatinge, Qi, A., T.R. Wheeler, F. Musitwa, N.A.P. Franks, the late D. Kuribuza, R.H. Ellis and R.J. Summerfield, Selecting potential annual-sown legumes for cover crops, trash lines, mulching material, green manure or short-fallow replacement in low-input systems in the East African Highlands: The example of S.W. Uganda. pages 345-353, © 1999, with permission from Mountain Research and Development)

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Validation of a photothermal phenology model for predicting dates of flowering and maturity in legume cover crops using field observations

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Lack of information about the specific environmental adaptation of cover crop species remains a serious constraint in the efficient design of agronomic experiments examining options for more suitable and more sustainable management of hillside farming systems in the tropics. Predictive models of crop phenology for cover crop species exist but how robust these are for legume cover crop species is largely unproven. We determined the predictive ability of phenological models, derived from glasshouse studies and driven by temperature and photoperiod, across a diverse range of cover crop genotypes and tropical hillside environments. The models were designed to predict the duration from germination to first flowering, and from first flowering to first pod maturity. Seeds of eleven legume species of cover and/or green manure crops collected from different hillside locations worldwide were sown in two groups of nurseries (tropical short-day plants in early summer and sub-tropical long-day plants in early winter) at Kabale and Namulonge in Uganda, Godavari and Lumle in Nepal, Cochabamba in Bolivia, Zamorano in Honduras, and Valenca in Brazil. Dates of sowing, first flowering and first pod maturity were taken and daily temperature data were recorded at each site. Similar observations for the same genotypes were available from independent experiments conducted at Islamabad, Pakistan, Hattiban, Nepal and at three locations in Cyprus. Model predictions were compared with field observations. The proportion of variation accounted for in the period from sowing to first pod maturity was 88% and 89% for the short-day and the long-day groups of genotypes, respectively. Likewise, the average difference from sowing to pod maturity between the model predictions and the field observations was 6.3% and 7.9% for the combined short-day species and the combined long-day species, respectively. It is clear that the model predictions, for this dataset at least, are sufficiently robust to serve as a filter for determining the environmental suitability of germplasm.

(Reprinted from Biological Agriculture and Horticulture, Volume 17, A. Qi, J.D.H. Keatinge, T.R. Wheeler, I. Papastylianou, M. Subedi, P.B. Shah, F. Musitwa, E. Cespedes, C. Bening, R.H. Ellis and R.J. Summerfield, Validation of a photothermal phenology model for predicting dates of flowering and maturity in legume cover crops using field observations, Pages 349-365. © 2000, with permission from A B Academic Publishers).

Crotalaria (*C. ochroleuca* G. Don.) as a green manure in maize-bean cropping systems in Uganda

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Crotalaria (*C. ochroleuca* G. Don.) used as a green manure may improve the productivity of maize-bean cropping systems in eastern Africa. To test this hypothesis, three field studies were conducted over three consecutive cropping seasons at Kawanda Agricultural Research Institute in Uganda. In the first season, *Crotalaria* biomass was produced in pure stands or in intercrop systems with either common beans (*Phaseolus vulgaris* L.) or maize (*Zea mays* L.) as companion crops. *Crotalaria* was sown at planting, and three weeks after planting the food crops. The biomass of early planted *Crotalaria* was mulched, that of late planted *Crotalaria* was incorporated into the soil at planting of the following crop. The first subsequent crop was maize, and the second was either beans (in two seasons) or maize (in one season). In the *Crotalaria* production season, mean yield losses of maize through intercropping with early or late sown *Crotalaria* were 40 and 22%, respectively; the corresponding values for beans were 45 and 14%. In the first cropping season after *Crotalaria* production, the increase in maize grain yield on account of *Crotalaria* averaged 39%; the best response (68% increase) to *Crotalaria* was obtained with early sown sole *Crotalaria* applied as mulch. Major differences in soil mineral nitrogen content among the treatments occurred at the six-leaf stage of maize only. In the second cropping season following *Crotalaria* production, the mean increases in seed yields of beans or maize, due to *Crotalaria*, were 23 and 19%, respectively, indicating a considerable residual effect of *Crotalaria* green manure. The decrease in bulk density, and the increase in water infiltration capacity of the soil suggest that the yield stimulation because of *Crotalaria* not only resulted from the increased nitrogen supply, but also from more favorable soil physical properties. Considering the competitive effect of *Crotalaria* with the food crops and the positive effect on yields of subsequent crops, two options are especially promising: incorporation of *Crotalaria* produced by relay intercropping with beans and mulching of early sown *Crotalaria* produced in pure stands.

(Reprinted from Field Crops Research, Volume 61, M. Fischler, C.S. Wortmann, B. Feil, *Crotalaria* (*C. ochroleuca* G. Don.) as a green manure in maize-bean cropping systems in Uganda, pages 97-107, © 1999, with permission from Elsevier Science)

¹ Now at CIAT

Farmers' adoptability of *Mucuna fallowing* and agroforestry technologies in the coastal savanna of Benin

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As technologies to counter soil fertility decline, alley farming with *Leucaena leucocephala* and *Gliricidia sepium*, annual short-season *Mucuna pruriens* var. *utilis* fallowing, and perennial *Acacia auriculiformis* fallowing have been tested. With alley farming, timely pruning is a critical element in farmers' capacity to match on-station yield levels: 55% of the farmers who delayed pruning suffered about 60% yield losses. Farmers are now comparing a new alley band concept, grouping trees in bands 20 m apart with five times less tree/crop competition. However, an improved planted fallow of *A. auriculiformis* to regenerate exhausted soils grew a great deal in popularity because of quick regeneration of yields and a profitable bonus of good quality firewood. *Mucuna*, which was grown by 15 farmers in 1987 for *Imperata* control, is now known by almost 100 000 farmers. The regular use for soil fertility enhancement is, however, hampered by the lack of known uses for *Mucuna* products. We developed recently a farmer-applicable detoxifying method for *Mucuna* seeds, allowing incorporation of protein-rich *Mucuna* flour into main staple dishes in Benin. We highlight the essential impact of farmer interaction on the course of experimentation, results and adoption.

(Reprinted from Agricultural Systems, Volume 56, No.3, M.N. Versteeg, F. Amadji, A. Eteka, A. Gogan and V. Koudokpon, Farmers' adoptability of *Mucuna* fallowing and agroforestry technologies in the coastal savanna of Benin, pages 269-287, © 1997, with permission from Elsevier Science)

OTHER REPORTS ON COVER CROPS

Anti-nutritional substances in legume seeds

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The nutritional value of legume seeds, particularly those derived from tropical species, invariably falls short of that which might be predicted from nutrient composition. This difference is generally attributed to the occurrence of a diverse range of natural compounds capable of precipitating deleterious effects in animals. These substances, arising principally from secondary metabolism in plants, are commonly referred to as anti-nutritional factors since they reduce food intake and nutrient utilization in animals. However, manifes-

tations of toxicity may also accompany the anti-nutritional effects. Thus a number of these compounds may be hepatotoxic, neurotoxic and even lethal.

Although anti-nutritional compounds are widely distributed in plants, it is generally acknowledged that tropical grain legumes contain a particularly diverse array of these substances. As with other plant species, the anti-nutritional components of tropical grain legume may be divided into two major categories: a heat-labile group comprising lectins and proteinase inhibitors which are sensitive to normal processing temperatures and a heat-stable group including, among many others, condensed tannins, non-protein amino acids and galactomannan gums. Compounds in the latter group are stable to standard processing temperatures. In essence, six major classes may be identified including: proteins, non-protein amino acids, carbohydrates, polyphenolic compounds, glycosides and alkaloids. However, it will be clear that phytates, present in many leguminous seeds of tropical origin, are not readily accommodated within this classification.

The situation in practice is more complex since, more often than not, individual species of tropical pulses contain several anti-nutritional compounds from different groups, which adds to the difficulties with detoxification. Consequently, the identification of hierarchical order of potency of substances in a particular legume grain is fraught with difficulties.

(Reprinted from CAB International, Tropical legumes in animal nutrition, edited by J.P.F. D'Mello and C. Devendra, pages 135-137, © 1995, with kind permission from CAB International)

Adoption of improved fallows in West Africa: lessons from *Mucuna* and stylo case studies

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Traditional shifting cultivation systems can no longer be sustained in West Africa because of rapid increases in human and livestock populations. Short-duration, improved fallows are among the alternative land-management strategies that have evolved. This paper reviews how velvetbean or mucuna (*Mucuna pruriens*) and stylo (*Stylosanthes hamata* and *Stylosanthes guianensis*) management systems were developed and disseminated in West Africa. Mucuna was first

adopted by farmers in southwestern Benin between 1988 and 1992, and the number of testers of the innovation rose to 10 000 farmers throughout Benin by 1996. Suppression of spear grass (*Imperata cylindrica*) was perceived as the main benefit of mucuna fallows. The stylo technology was introduced in the late 1970s, and it was primarily targeted to livestock production in the subhumid monomodal rainfall zone. The uptake of stylo has been relatively slow and modest in West Africa in contrast to the faster rate of adoption of mucuna in southwestern Benin. Some of the contributory factors to the slower adoption of stylo than mucuna include rainfall regime, lack of motivation of livestock keepers, insecure land tenure, limited capability and facilities of extension staff, poor communication among scientists, and unsatisfactory establishment of the crop. Recommendations to increase the adoption of improved fallows include the use of a participatory approach in problem identification, expansion of the genetic base of cover crops for use in fallows, optimization of the multiple benefits of cover crops, management of the improved system, promotional strategies, and appropriate policies.

(Reprinted from *Agroforestry Systems*, Volume 47, G. Tarawali, V.M. Manyong, R.J. Carsky, P.V. Vissoh, P. Osei-Bonsu and M. Galiba, Adoption of improved fallows in West Africa: lessons from mucuna and stylo case studies, pages 93-122, © 1999, with permission from Kluwer Academic Publishers)

Manual on integrated soil management and conservation practices

FAO and IITA
FAO Land and Water Bulletin,
Viale delle Terme di Caracalla, 00100 Rome, Italy

Soil resources depletion is a widespread, direct threat to the sustainability of agricultural production. Dramatic changes in soil management concepts are needed to counter the threat. This manual proposes options for such changes, addressing a very broad variety of topics related to agricultural land management ranging from chemical and physical attributes of soils, soil management concepts, mechanization and tillage, mulching and green manure, erosion control and water resources management, to concepts of participative transfer of technologies. Traditional soil management concepts are analysed and suggestions made to consider more sustainable alternatives for a conservation-effective agriculture.

This manual is meant for both professors and students of universities, schools of agriculture and technical training centres, as well as for technicians involved in designing programmes, guidelines and policies related to the management and conservation of agricultural land. It has been put together with the objective of assisting actions by the diverse groups of human beings who intervene in the conservation of the natural resources, particularly soil and water resources and in the context of each continent, country, region or zone. It brings together a collection of concepts, experiences and practical suggestions that can be of immediate use for identifying prob-

lems and for formulating, executing and evaluating actions so as to benefit and to improve the productivity and conservation of soil and water resources.

This manual is based on the training course for soil management and conservation, focused particularly on efficient tillage methods for soil conservation, held at the International Institute of Tropical Agriculture (IITA) in Ibadan, Nigeria, from 21 April to 1 May 1997. It was jointly organized by IITA and FAO with the participation of specialists from both national and international organizations.

The publication serves as a guide that will allow technicians and farmers to jointly discover ways to solve the problems and the limitations posed by land degradation in Latin America and Africa. Participatory action by technicians and farmers will be the basis for success in benefiting these regions. It is hoped that the manual will help to attain the ultimate objective, which is to improve the productivity of the soils and water in a rapid and efficient manner.

(Reprinted from *FAO and Water Bulletin*, no.8, FAO and IITA, Manual on integrated soil management and conservation practices, pp. 215, © 2000, with permission from FAO).

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ANNOUNCEMENTS

Seminar on Fallows in Tropical Africa

The International Seminar on Fallows in Tropical Africa was held in Dakar, Senegal, from 12–to 16 April 1999. The themes of the meeting were:

- Fallows and agrarian systems
- Cropping systems with short-term fallows
- Fallows and fertility
- Fallows and soil biology
- Vegetation of fallows and postcultural succession
- The products of traditional fallows
- Forage production in traditional and improved fallows
- Tree-improved fallows
- Live fences
- Rehabilitation of degraded fallows

While the proceedings of this seminar are being prepared the paper abstracts are available in English and French on the Internet at

<http://www.ird.sn/act-rech/ur4/jachere/>

Web Site for the Cover Crops Workshop held in October 1999 in Cotonou

The regional workshop entitled “*Progress and constraints to cover crops adoption and seed availability in West Africa*” was held in Cotonou in October 1999. The full papers presented at the meeting are posted on the Internet at <http://www.cgiar.org/spipm/news/ccropmtg/ccrwkmen.html>

The proceedings, are being published by IITA and will be back from the printers shortly. The Management of Organic Inputs for Soil of the Tropics (MOIST) group at Cornell University (USA) contributed a large part of the funds for printing the book and is gratefully acknowledged.

One copy of the book can be obtained free of charge by African researchers/extension workers and researchers based in Africa by writing to CIEPCA (please see the address on the last page of this bulletin). The book can be ordered by non-Africans by writing to the Distribution Unit, IITA, PMB 5320, Ibadan, Nigeria. International Mailing address: c/o L.W. Lambourn and Co., Carolyn House, 26 Dingwall Road, Croydon, Surrey, CR9 3EE, England. Fax: +234 2 2412221.

Honduras workshop and a proposal for research : Increasing *Mucuna*'s potential as a food and feed crop

Among the dozens of well-known green manure and cover crops species, the plant that has received the most attention in the past decade among farmers, extension workers, and researchers has been mucuna (*Mucuna pruriens*). However, the efforts of the past decade have exposed the major challenge in introducing mucuna to smallholder farmers: its current limited use as a food and feed. A first concerted step towards improving mucuna's food and feed potential was provided by the organization of the workshop “Mucuna as Food and Feed: Current Uses and the Way Forward.” This workshop was held in Tegucigalpa, Honduras, from 26 to 29 April 2000, with funding from the Rockefeller Foundation. It was organized by three organizations that have worked over the years on issues related to mucuna: CIDICCO (International Center for Information on Cover Crops; located in Honduras), CIEPCA, and Judson College (in Illinois, USA, which has acted as a resource center for many research and development organizations to determine L-dopa levels in mucuna beans and products developed from it). This interdisciplinary, small workshop brought together those with field-level development experience on mucuna with a group of scientists from diverse disciplines, ranging from toxicology, industrial processing, and plant breeding to food and animal sciences. Workshop proceedings are currently being edited.

After the workshop, CIEPCA has led the production of a proposal for research on “Increasing *Mucuna*'s Potential as a Food and Feed Crop” that has been submitted to the

Rockefeller Foundation. This proposal brings together a number of scientists working in different regions and institutions, including INRAB (Institut National des Recherches Agricoles du Bénin), University of Zimbabwe (Zimbabwe), KARI (Kenya Agricultural Research Institute), and Michael Okpara University of Agriculture (Nigeria). The proposal has now been submitted to the Rockefeller Foundation by CIEPCA-IITA. We will keep CIEPCA members informed of its progress.

CCROPNET trials, current state and next stage

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The West Africa Cover Crops Network (CCROPNET, coordinated by IITA) was established in April 1999 by researchers and extension workers, with the main aim of promoting agricultural research and development through the use of the Internet. Following the installation of this internet-based forum, a trial involving 2 *Mucuna* varieties and a natural fallow commenced in about 30 sites in 8 West African countries. The objective of the experiment was to determine the effectiveness of cover crops in controlling weeds, improving soil fertility, and providing livestock feed. Development of the experimental design for this trial, subsequent discussions, and reporting were aided by many researchers having direct access to e-mail. Some were connected to the Internet for the first time during the year of the experiment using limited USAID funds.

The first phase of the agronomic trial has been completed and most of the participants reported their findings to the network through e-mail for those connected (60%) and by 'snail mail' for those who are not (40%). Twenty-four out of the expected 30 reports have been received. There is a tremendous variation in the quality of reports and the data sets. Generally, participants who had access to e-mail forwarded more complete reports than the non-connectees. A couple of trials got burnt by bush fires just before harvest and another was wiped out by disease. Despite these setbacks, the general pattern of the results is that *Mucuna* species effectively controlled weeds in most of the sites. Some collaborators reported that animals, especially small ruminants, were seen grazing these cover crops in the experimental plots, indicating the potential of this material as a livestock feed.

The second phase of the agronomic trial which was meant to evaluate the contribution of *Mucuna* to soil fertility improvement commenced in most sites in June 2000. According to

one of the interim reports by a collaborator in Nigeria, both *Mucuna utilis* and *M. cochinchinensis* supported higher grain yield of maize than the natural fallow. Similar verbal reports have been made to me by other participants. This appears to confirm the soil replenishment potential of *Mucuna*.

A manuscript entitled 'Comparative evaluation of two *Mucuna* accessions as cover crops under different agroecologies in West Africa' is currently in preparation for submission to the African Crop Science Journal. The final synthesis report involving all the trials conducted in the region and the CCROPNET website are nearing completion.

The next stage of our networking efforts could involve several scenarios, which will be decided by the participants. On the agronomic side, researchers could test a wider range of cover crops or explore novel integrated nutrient management interventions such as the use of organic and inorganic fertilizers for soil improvement. Alternatively since funding is a problem especially for the agronomic trial, participants could just share their cover crop activities in their stations with network members. On the e-mail connectivity aspect, attempts will continue to be made to connect new members to e-mail and provide more reliable services to participants as and when funds are available.

TropSCORE consortium and website

A consortium of partners interested in information exchange on tropical soil management has been initiated. The group, called Tropical Soil Cover and Organic Resources Exchange, consists of the following partners:

- CIDICCO, a cover crops clearinghouse of worldwide interest but focussing on Latin America, based in Honduras since 1989
- CIEPCA, a cover crops information and seed exchange center for Africa, based in Benin (at IITA) since 1997.
- ECHO, a Christian organization that facilitates information and seed exchange on many tropical crops including herbaceous cover crops
- MOIST, a group focussing on information exchange for management of organic inputs for soils of the tropics, based at Cornell University in Ithaca, New York.

TropSCORE has established a gateway website at:

http://ppathw3.cals.cornell.edu/mba_project/moist/TropSCORE.html

The website is an international clearinghouse and search engine for TropSCORE Internet resources on soil cover, organic inputs and tropical soil management. Using next-generation technology, the Gateway is being developed in conjunction with Cornell University's Mann Agricultural Library and designed to link into the Agricultural Network Information Center (AgNIC), a national alliance of US land-grant university libraries.

Other databases on the Internet

Missouri Botanical Garden – TROPICOS

This site provides access to the Missouri Botanical Garden's VAST (VAScular Tropicos) nomenclatural database and associated authority files.

<http://mobot.mobot.org/Pick/Search/pick.html>

International Legume Database and Information Service (ILDIS)

This site provides access to the **ILDIS** World Database of Legumes <http://www.ildis.org>

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