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Semi-Arid Africa Agricultural Research and Development
Recherche et Développement Agricoles dans les Zones Semi-Arides de l'Afrique

Monitoring Tour Collaborative Striga Research and Control Program in Africa 2008

Funded by the Government of the Republic of Korea through the International Agricultural Research Institute (IARI) of Kyungpook National University and the African Union through SAFGRAD

About SAFGRAD

The Semi-Arid Food Grain Research and Development of the Scientific, Technical and Research Commission of the Organization of African Unity (OAU/STRC-SAFGRAD) was established in 1977 to advance agricultural research, development and natural resource management in the semi-arid ecology in more than 30 countries in sub-Saharan Africa.

For more than two decades OAU/STRC-SAFGRAD has mobilized scientific talents and resources of National Systems and those of International Agricultural Research Centres (IARC's) to enhance food security and sustainable agricultural development.

Ton contribute to Africa's food production increase and poverty alleviation challenges, SAFGRAD has revitalized and broadened its program scope to make small farm holdings more profitable. The four new niches of SAFGRAD include: first to promote linkage of agricultural production to small- and medium-scale industries and to enhance the transformation of agricultural produce into value-added products; second, diversify farm enterprises by integrating on-farm production systems to induce complementarities and synergies in the use of resources, generation of income and employment; third, promote demand-driven research and packaging of more productive technological options to increase agricultural production and productivity and fourth, to promote the development of agricultural production and productivity and to promote the development of agribusiness by exploiting both local and export markets.

The main thrusts of SAFGRAD's program are to:

i. Enhance agricultural research and development capabilities of member states through short- and long-term training;
ii. Facilitate addressing agricultural policy issues through conferences, workshops, symposia and governmental contacts;
iii. Promote the transfer, adoption and commercialization of agricultural technologies to generate income and employment in sub-Saharan Africa;
iv. Facilitate the industrial transformation and utilization of food grains into valuie-added products;
v. Promote productive agriculture and environmental conservation through an integrated farming systems;
vi. Build the knowledge base on semi-arid agriculture in SSA through its publications, specialized seminars etc.

Within the Scientific, Technical and Research Commission of OAU, SAFGRAD is governed by the Regional Technical Advisory Council comprising of representatives from various organizations.

EXECUTIVE SUMMARY

The 2008 monitoring tour which took place from 25th August to 3rd October covered five countries out of the countries that received funding for the year from SAFGRAD. Monitoring tour was carried out in Niger, Togo, Nigeria, Cameroon and Burkina Faso and was carried out by seven scientists and one expert in documentation ; Dr. Victor O. Adetimirin monitored Niger and Togo, Prof. S.T.O. Lagoke and Dr. U.O. Ouedraogo monitored northern Nigeria, Dr. Mahama Ouedraogo joined Dr. Charles The to monitor Cameroon while Mrs. Hadyatou Dantsey-Barry, Mr. Halidou Aboubakar and Mr. Youssoupha Mbengue monitored Burkina Faso.

Activities observed during the monitoring tour were similar to those observed in 2007 and included seed multiplication of legumes viz. soybean and cowpea to ensure sustainability of the legume-maize intercropping/rotation technology, seed multiplication of STR maize varieties, on-farm and on-station varietal trials, on-farm rotation and intercropping of STR maize varieties with legumes capable of stimulating suicidal germination of striga seeds, farmers' field school and farmers' field days.

Some of the problems identified in the countries monitored include late arrival of funds to implement the project and late arrival of seeds of STR maize. Major consequences of the latter were (i) the best land which ought to have been used for the trials were already used-up by farmers by the time the seeds for the trials arrived, and (ii) lateness in planting out the trials. The late arrival of seeds and its consequences reinforces the need for countries participating in the project to be self-sufficient in seed production. However, this is only possible with a strong plant breeding programme. Timeliness of release of funds has been a recurring problem in previous years, although this problem was not encountered in 2007. Practical solutions to this problem should be implemented, especially since many national programmes are usually not in a position to pre-fund the trials pending the time of receipt of funds for the trials from SAFGRAD.

The involvement of scientists from two countries that have recently joined the project in the monitoring tour is a major achievement of the 2008 monitoring tour exercise. Although this was proposed in 2007, the plan was not realised. It should be expected that Mrs Dantsey-Barry from Togo and Mr. Halidou Aboubakar from Niger, both of who monitored Burkina Faso would have taken some useful experiences back with them to their respective countries. Mrs Dantsey-Barry already expressed enthusiasm to collaborate with the Burkina Faso team, especially with respect to exchange of technologies that she observed show promise during the monitoring tour. This interaction among scientists is a welcome development and should be encouraged. In subsequent monitoring tours, SAFGRAD should ensure the participation of the two new of the three other countries that received funding from SAFGRAD in 2008 viz. Botswana and Sudan.

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INTRODUCTION

Striga spp. are parasitic weeds of important crops in Africa. Maize, sorghum, millet and rice are parasitized by *S. hermonthica*, *S. aspera*, *S. asiatica*, *S. forbesii*. Among these, *S. hermonthica* is the most widely and probably the species to target control measures at. *S. gesnerioides* parasitize cowpea. The exudates produced by cowpea and soybean are able to stimulate to germinate seeds of those species of the parasite that affect cereals. This property is central to the use of cowpea and soybean in intercropping and rotation systems with the objective of reducing the level of infestation of the parasites in fields used to produce cereals. The results of intercropping and rotation with these legumes are even more impressive when the cereals cultivated have some level of resistance and/or tolerance to the parasite. Maize is arguably the cereal for which resistance/tolerance to striga has been well demonstrated in recent years. The current project under the coordination of SAFGRAD deploys striga tolerant and resistant (STR) maize varieties in intercropping and rotation systems. The legumes used in the intercropping and rotation with maize provide additional benefit of soil fertility improvement through the enrichment of the soil with symbiotically-fixed nitrogen.

The deployment of striga control technologies in countries of West and Central Africa under the striga control program implemented by SAFGRAD incorporates monitoring tour, not only as a strategy to monitor the use of funds provided to participating countries to implement the project but also provides a platform to scientists from the countries to exchange ideas and learn from one another on the most effective strategies to combat the scourge of cereal crops in Africa. In recent times, the monitoring tour has been implemented by the two scientists serving as consultants to SAFRGRAD on the project –Drs. Charles The and Victor Adetimirin, together with other scientists from countries implementing the project.

The 2008 monitoring tour took place over a period of five weeks –from 25th August to 3rd October. The five weeks duration of the monitoring tour is due to the fact that time of crop establishment in the various countries differ and because of the need to have some of the scientists implementing the project to also participate in the monitoring tour. The monitoring tour for 2008 was to a large extent successful when compared to the 2007 exercise. However, not all the countries which received funding for the project for the year were monitored. In subsequent years it would be desirable to conduct monitoring tour in all the countries where the project is implemented especially since the monitoring tour, to date, accounts for the high level of success of the project achieved.

NIGER

25 – 30 August 2008

By

Dr. Victor Adetimirin

Dr. V.O. Adetimirin arrived Niamey late in the afternoon of Monday 25 August and was received at the airport by Dr. Fatouma Seyni. The team started out on the monitoring tour in the afternoon of Tuesday 26 August to allow Dr. Seyni to sort out the logistics of our trip to the trial sites. The monitoring tour team comprised of three viz. Dr. Fatouma Seyni, Mr. Halidou Aboubacar – the weed scientist in the team, and Dr. Victor Adetimirin. Mr. Soumana Souley, the plant breeder in the team was not available at the time of the visit. The first part of the tour was carried out to the Dosso Local Government Administrative Area comprising Dosso town, Gaya and some other small villages. The area is the wettest in Niger with rainfall reaching about 800 mm. The team arrived at Gaya (via Dosso) from Niamey at 9 pm, a journey of 300 km but which took over five hours due to poor state of the road. The team eventually proceeded to Mallanville in Benin Republic, a small town 7 km away from Gaya, to spend the night and returned to Gaya on 27 August from where it visited Tara, about 17 Km from Gaya. INER has a sub-station in Tara.

Initial Briefing on Activities Carried Out in Niger

Dr. Seyni complained of receiving seed late for the trials. After waiting endlessly for the maize seeds from Burkina Faso through SAFGRAD, Dr. Mintin Kudi finally came to the rescue and sent seeds of three maize varieties with some tolerance to striga. However the seeds arrived late. The seeds arrived after the 7th rain. Much later after the trials have been established, Dr. Seyni eventually received 10 kg of maize seeds from SAFGRAD. Also the fund sent for the trials arrived somewhat late, towards the end of May. The best time to send fund is the first week in May. This is because great uncertainty surrounds the commencement and regularity of the rains in Niger. Consequently, when adequate preparation is not made before the commencement of the rains, valuable part of the season is lost which usually has serious consequences for crop performance. The implication of these, particularly the late arrival of seeds was that it was not possible to get farmers to conduct the trials because farmers usually plant with the first or second rain. In some instances, farmers even plant before the commencement of the rains in anticipation, hence making sure that valuable time is saved. These constraints limited the activities for the project in Niger mainly to INER station and only two farmers, one in Sentier near Tara, and the other in Birnin N' Konni, a place where INER also has a station.

On-Farm Activities in Sentier, near Tara

Two activities were carried out on the farmland of one farmer in Sentier viz. cereal-legume rotation and varietal evaluation for resistance to striga. The trials were planted on 29 June 2008. Given the lateness of the arrival of the seeds, even the only farmer that participated in the trial offered a piece of land that is not very suitable for the trials. The piece of land was less than 15 meters from the River Niger. Although no water was visible on the surface of the land at the time of the visit, there was evidence that the piece of land has drainage problem and water table must

have been high for considerable period of time. The sandy nature of the soil must have also contributed to the problem observed. The rotation trial was carried out in three replicates and plot size was smaller than what had been used in other countries and considered standard. In general, replication is not considered necessary on farmers' fields since each participating farmers is usually considered a replicate for statistical analysis of collected data. However, this can be excused given that only one farmer participated in the project in this location. In each replication, the rotation trial consisted of four plots, two planted to two maize varieties - one STR and the local maize variety and the other two plots were planted to two different cowpea varieties. One of the cowpea varieties (TN121-80) is considered tolerant of *Striga gesnerioides* while the other is the farmers' local variety. The plot with the tolerant cowpea will be planted with the STR maize supplied by Dr. Kudi in 2009 while the plot containing the STR maize in 2008 will be planted to the tolerant cowpea variety in 2009. The plot with the local maize, which is actually improved but not resistant/tolerant to striga, will be planted to the local cowpea variety in 2009 while the plot planted to the local maize in 2008 will be planted to the local cowpea variety in 2009. Although cowpea performance was impressive, the performances of both the STR and the local maize were poor. This was not surprising given the limitations already mentioned with respect to the observation of standing surface water and the sandy nature of the soil. Also, some of the plots were shaded by Neem plant. Although some striga plants were observed on millet plots near the trial site, no striga was observed on maize plants on the trial plots. Again this may have been due to the high water table. Striga germination is poor in the latter situation, and in cases where water-logging occurs after germination, decomposition of the haustorium is known to occur. It was, however, observed that maize planted around the homestead in areas of higher elevation where the trial was carried out was somewhat impressive.

Information obtained showed that the maize variety observed to show good performance was obtained from Benin Republic. In addition to better drainage, maize performance must have been enhanced by manure, which is known to be used in substantial quantity in compound farms.

Visit to Birni n Konni (28 August, 2008)

The team visited the Institut National de la Recherche Agronomique du Niger (INER), Birni n Konni in the morning of 28 August, 2008. The Head of Station, Mr. Issaufou Salami, was away to Arusha, Tanzania for a four month course on vegetable production being conducted by the AVRDC. We, however, met with the Acting Head of Station Mr. Abu Kano. INER has about 40 ha of experimental field in Birni n Konni out which 25 ha, which is sandy, is used for rainy season planting. The remaining 15 ha has heavy soils and is usually cultivated under irrigation. Of the latter 15 ha, only 10 ha is used for food crops as 5 ha is used for tree collection. From this area up to Maradi, sorghum, millet, maize and cowpea are cultivated but sorghum is the most important crop. The station conducts regional striga trials on about 300 m^2 of land and has a striga breeding nursery of about 755m^2. The station also carries out seed multiplication of sorghum, millet and cowpea.

As part of the activities under the SAFGRAD project, both on-station and on-farm demonstration trials were planned but due to the lateness in the arrival of seeds, only one farmer could implement the trial. Initially the plan was to infest the plot to be used for the on-station trials with striga. However, given that the plots had been infested yearly for five years, Dr. Adetimirin

advised against artificial infestation. The residual striga seeds in the soil would still be able to attack the varieties to be demonstrated.

The only farmer who implemented the on-farm trial was Halidou Abubacar. One reason for this is the late arrival of funds for the project. The money for the project arrived in late May. The latest time to receive funds for the project to enable proper planning and project execution is the first week on May. Although I advised a minimum of 10 farmers for the on-farm demonstration trials around Birni n Konii, Dr. Seyni was of the view that getting 5 farmers to implement the project would be a feat. This raises questions on whether it is worthwhile to push maize in this area.

I visited Dr. Seyni's strip cropping trial for improved soil fertility. This technology being demonstrated here has potential for improving the agricultural productivity in Niger, especially in striga-infested areas

Dr. Fatouma Seyni proudly showing off plots of millet and cowpea. The crops in the plots will be rotated in 2008. This rotation has potential to improve soil fertility and reduce striga problems.

The INER team at the site of the on-station demonstration trials

The on-station trial of the striga control project of SAFGRAD involved two maize varieties viz. 99TZEEY-STR and CET-the local variety which is actually improved but susceptible to striga, and two cowpea varieties. Each plot was planted sole, and the crop in each of the plot will be rotated in 2009. The STR maize plot will be rotated with the striga-tolerant cowpea plot in 2000. The same will be done for the local maize and the local cowpea. The trial was established on 3 July 2008. Plot size was 7.2 m x 4.0 m. Only few striga plants were observed on the plots. Maize performance on the plots which had heavy soils was poor. The rainfall distribution after planting appears to hold the key too understanding the poor performance of the maize observed. Between 11 and 23 July, there was only 10 mm rainfall.

The second activity under the project carried out on-station was varietal trials involving 4 varieties Three of these varieties were obtained from Dr. Kudi Mintin in Nigeria while the fourth variety was the local. Each plot consisted of 4 rows each 6 m long. Thus plot size was 6.0 m x 1.8 m. There were four replications. Although the good management of the trials indicated good effort by the Niger programme, the drought definitely must have affected the performance of the trials. As at the time of the visit, the STR variety had fewer striga plants than the local.

The name of the farmer who implemented the on-farm trial is Ibrahim Sanda. The farmer used to plant maize but this was only during the dry season. The farmer had both the rotation trial and the varietal trial. Although the field was well kept, maize performance was poor. The farmer also attributed the poor performance of the maize to drought experienced after planting.

Constraints Encountered in Niger and Recommendations

The Republic of Niger is a very large country with a population of 13 million. Covering the extensive landmass of the humid southern part of the country therefore poses a great challenge, given that a lot of the fund for the project is expended on gasoline which cost about CFA 670 per litre. In addition to this is the poor road network in some places (between Dosso and Gaya, and after Dogon N'Doutchi on the Dosso-Birnin N'Konni/Maradi Road). Another limitation observed was a weak research-extension linkage. The weak linkage makes the task of enlisting participating farmers and educating them on the project to be the responsibility of the researchers. There seemed to be some problems of agreement between Dr. Seyni and the weed scientist collaborating with her on the project as the protocol she proposed was not implemented according to her proposal. It appears that the control of striga in Niger would have to focus on sorghum and millet which are the major crops extensively cultivated. If farmer-acceptable striga-resistant/tolerant sorghum and millet varieties are not immediately available, improvement in soil fertility through rotation and trap cropping would have to be pursued.

NIGER

30 August – 3 September 2008

By

Dr. Victor Adetimirin

Courtesy calls

The tour started on 1st September with visits to various officers responsible for agriculture in the northern part of Togo who are based in Dapaong. First was the visit to Mr. Dissirama Koussa, the Director in charge of the savanna region (Directeur de l'agriculture de l'elevage et de la peche) of the institute. Thereafter, visits were made to the offices of the Director of ICAT, Mr. Monoka Raymond Lare, and the Regional Director, Ministry of Agriculture, Mr. Idrissou Abdoulaye. After the exchange of pleasantries, Dr. Adetimirin intimated these stakeholders on the project being carried out by SAFGRAD in several countries of West Africa and beyond on striga control. They all assured of their collaboration and support.

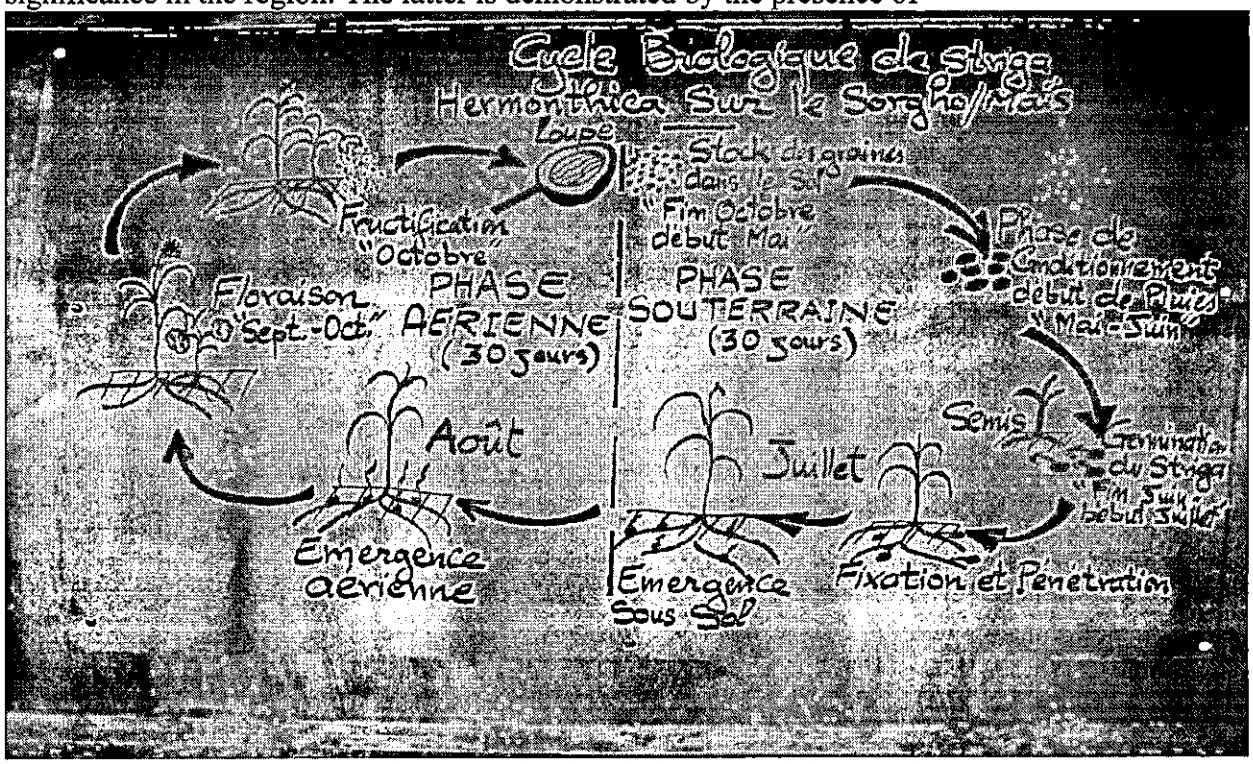
On-farm demonstration trials

The project activities in Togo were carried out in collaboration with the extension services in the country. Mr. Tchatakora coordinated the extension activities in the region. The field tour was carried with by a team including Ms. Barry, Mr. Dissirama, Mr. Tchatakora and Dr. Adetimirin. Maize and sorghum are the major cereals in the zone and these cereals are widely intercropped with legumes, especially cowpea. Consequently, unlike in Niger the cultivation of maize was not limited to compound farms. The soils are sandy and, in general, very poor. Profitable production of maize can hardly be done without the application of inorganic and organic fertilizers. Farmers in the regions are now encountering difficulties in this respect given the soaring cost of the commodity. One bag of fertilizer currently costs CFA 12,000. In all there are 10 on-farm demonstration trials in northern Togo.

The first village visited was Karikitite, and the arrived at the village at 9.50 am. The language spoken in Karikitite is Moba. The local name for striga in the village is Djem. The first activity in the village was the training of farmers on the life cycle and control methods of striga. Togo's strategy for controlling striga includes education of farmers. The training session started with a prayer after which a minute's silence was observed for the soul of one member of the group that died recently. Thereafter, the group broke into a song that has its lyrics woven around the striga problem, its control as well as the outcome. In its concluding part, the song says that with the knowledge they now have of the biology of striga and its control methods 'striga will not be able to destroy our millet and maize, and we will not have to travel looking for food in the dry season'. The training session was facilitated with carefully prepared charts showing the life cycle of striga from germination to seed dispersal. Members of the group were taken through the life cycle. At the end, one of the members was asked to take the group through the life cycle again. The training session on the life cycle of striga provided the necessary background information for control. In addition to fertilization with manure and inorganic fertilizer and use of legumes in

intercropping or rotation as control strategies, farmers were taught the usefulness of cotton in depleting the soil of striga seeds. Again after the training session of how cotton stimulates suicidal germination of striga seeds, one member in the group was asked to take the group through again as a way of ensuring understanding. Dr. Adetimirin asked the farmers if they are aware that there are maize varieties that can perform very well even when striga is found on them. Their response was that they have heard but have only encountered such a variety this year, a fall out of the activities of the project. Although there are 24 farmers in the group, only 16 were able to attend. From experience, successful training of farmers is always a reflection of the strength of the extension system.

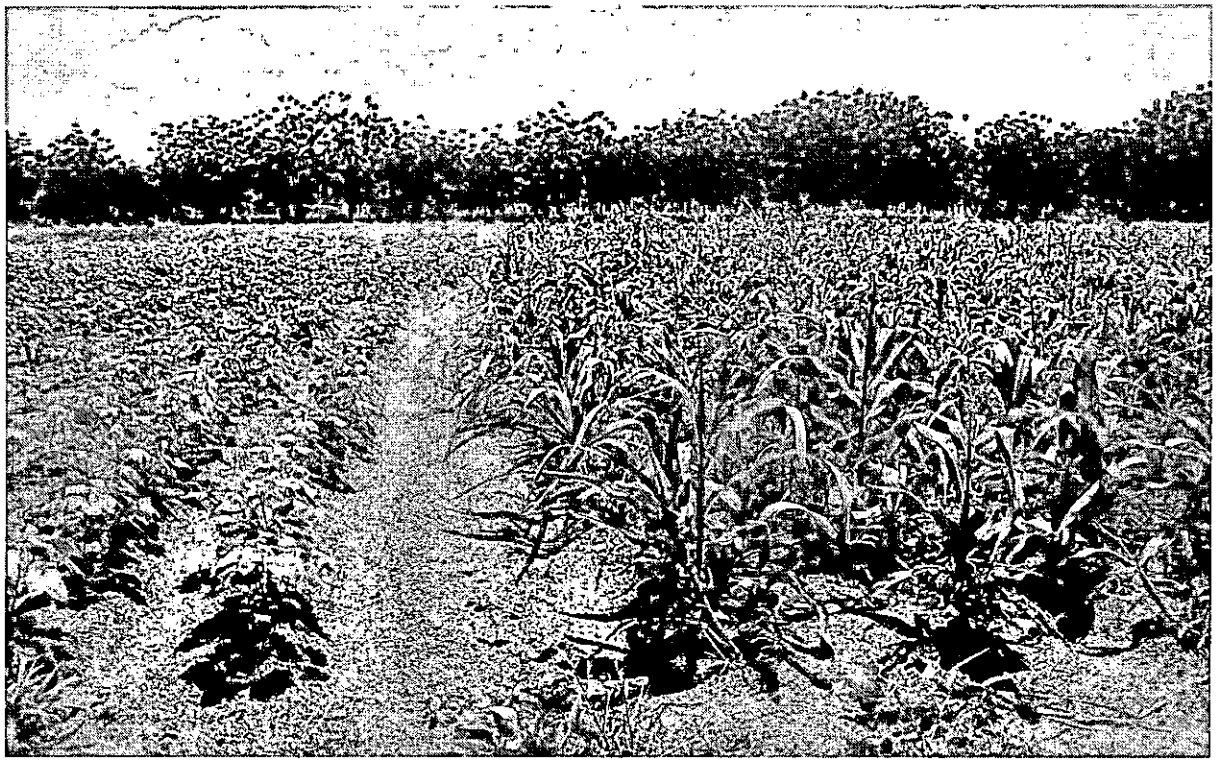
The first field visited in Karikitite after the training session had three plots, each 30 m x 20 m ($600m^2$).One plot had maize (Across 97 TZL Comp) intercropped with cowpea, the second plot had cotton while the third plot had farmers' practice. In the second year, maize and cowpea will be planted in the plot containing cotton this year while the plot containing maize and cowpea in 2008 will be planted to cotton in 2009. This system integrates rotation with intercropping. The integration of cotton in managing striga in northern Togo is desirable because of the crop's significance in the region. The latter is demonstrated by the presence of



Picture of chart showing the life-cycle of striga during the training session.

A cross section of participating farmers during the training session.

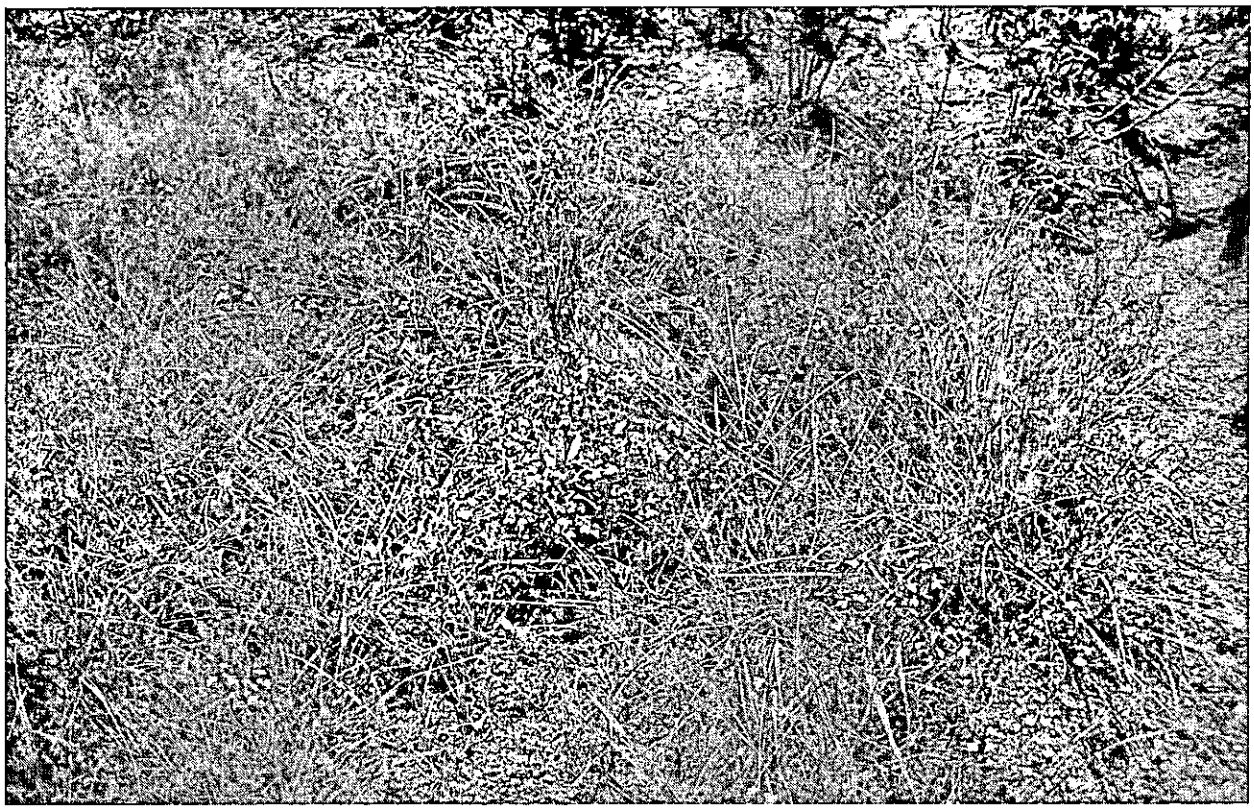
Site of the training session showing extension agent with participants.



Cotton plot (left) and maize cowpea intercrop. Crops in the two plots will be rotated in 2009.

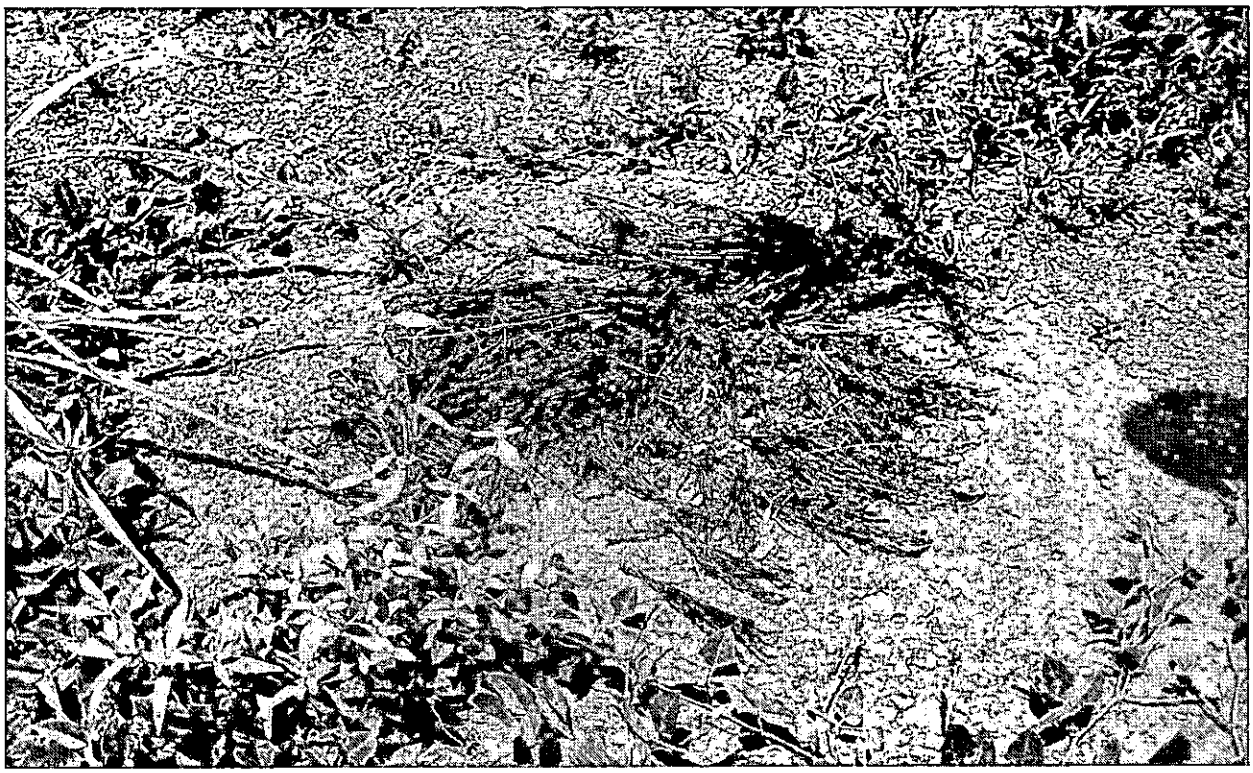
Striga gesnerioides on cowpea in northern Benin.

Striga hermonthica infestation (up and down) on maize in northern Togo



Striga hermonthica on grasses in northern Togo.

Collapsed bridge on the way to Talonna in northern Togo.



Farmers uproot and gather striga from farmland on one spot.

Heavily infested maize field in northern Togo.

a ginning factory in Dapaong. It is expected that the integration of legume intercropping and rotation with cotton has the potential to drastically deplete the striga seed bank of heavily infested soils while helping to improve soil fertility. In general, the maize did not perform well. Several reasons were adduced for this. First was the late planting. Planting of the trial in this location was carried out on 19 June 2008. Planting in this location is usually done before the end of May. The delay was due to problems with the remittance of funds for the project from SAFGRAD. After the funds arrived there was no rain for planting. Another consequence of the lateness was the fact that by the time the plots were being established organic manure could no longer be sourced.

The second field visited in Timbou was in Sefobe 2. Here planting was done even much later than at Kirikititi. Planting was done on 30 June. Cowpea density in this location was much lower than at Kirikititi, apparently due to attack by insects associated with late planting. The plots appeared very well maintained with maize still at flowering stage. The maize here is much better than what was observed at Kirikititi. NPK and urea were applied at recommended rates. Across 97 TZL Comp was better than the local maize. Given that maize is just flowering here the best time to visit is middle September. Although no striga was observed on the plot, the presence of striga infestation was indicated by some striga plants found on grasses adjoining plots used for the trial. Several fields were found in Sefobe 2 that had very severe infestation of striga. These fields should be ideal for the trials in 2009.

Farmers at the site of the on-farm demonstration trials.

On 2 September 2008, the first field visited was in Talonna. The field was previously abandoned due to striga problem. The farmer who donated his farm for the trial is Gbamiti LARE. The plots were established on 17 June 2008. In general, the plots were well maintained. Maize performance was, however, poor in this plot. Farmers usually give their worst plots for demonstration trials. The plot seems run down and manure would have to be used in large quantity if profitable crop production would be carried out on the plot. The plot containing the local check which is an improved but striga-susceptible variety appears somewhat better than that with Across 97.

The second field visited was in Kpegdjente. The plot was established on 4th July. Maize performance was also poor in this field. The reasons for poor performance would have to be ascertained. One possible reason was that it rained almost daily after planting. This is likely to have affected the crop's performance.

The third field visited was in Garo. The plots were established on 25 June 2008. Maize performance was better in this field. The cowpea on this field was already podding at the time of the visit. The general problem of poor soil persists and strategies for soil fertility management would have to be pursued.

The monitoring tour in Togo ended with a discussion session with farmers in Karikitite. The discussion had about 80 people in attendance.

Concluding Remarks on the Visit to Togo

In general, the trials in Togo were very well executed and the plots very well maintained. For a country in its first year of implementation of the project, Togo's performance is outstanding and the country would have to be commended. The farmers and general community were well-mobilised for striga control. The extension system in Togo is strong and is responsible for the high level of mobilization achieved. The project should take advantage of the high start-off point in Togo. Perhaps, it should be possible to partner with other organization and agencies that can come up with initiatives on soil fertility maintenance to leverage our efforts on striga control in the country.

NIGERIA

5 – 11 September 2008

By

Prof. S.T.O. Lagoke and Dr. U.O. Ouedraogo

The striga trials in Nigeria are coordinated by scientist in two institutions. The Institute of Agricultural Research (IAR) is responsible for coordinating the trials in the Northern Guinea Sand Sudan Savanna while the University of Agriculture, Abeokuta (UNAAB) is responsible for the trials in the Derived Savanna and the Southern Guinea Savanna. No funding was provided for activities in southern Nigeria in 2008. Consequently, striga control activities were implemented in northern Nigeria in this year. Monitoring tour was therefore carried out only in this area.

September 8, 2008
Gwarzo Local Government Area, Kano State (Sudan Agro ecological zone)
Reception

1. The team consisted of the two visiting scientists and the host scientists, Drs. J. Kudi and B. Tarfa. The team arrived at the headquarters of the LGA and was met by the Extension Agent in charge of the project, Mallam Yusuf Haruna, the Head of Department of Agriculture, Mallam Sanni Isaq and about 20 farmers led by Mallam Jibril Isah. The farmers, who had a training session on "Striga biology and control technology" on September 4, 2008, were given the task of counting striga plants on their demonstration plots and reporting the result during the interaction.
2. The group paid a courtesy call on the Chairman of the LGA, Alhaji Sanusi Mohammed and other councillors. The Chairman and the councillors were briefed on the genesis, current and past activities, achievement and the impact of the project by Prof. S.T.O Lagoke who acknowledged the support of the LGA in the implementation of the activities of the project. The Chairman welcomed the visiting team and gave assurance of the support of the Chairman and the LGA for an enhanced success in the combat of striga with improved farm productivity by farmers. He thanked the Korean Government, SAFGRAD/AU, IAR, the visiting scientists and all other resource persons involved in the laudable effort to combat striga and improve the productivity of farms in the LGA. He pledged his continued support for the project activity, through provision of necessary facilities for effective implementation and propagation of the results to farmers in the LGA.

Interaction with farmers

1. **Presentation**

During the interaction with farmers there was a short comment on the methodology adopted for the training and its objectives by the Extension Agent. Mallam Jubril Isa, one of the farmers, discussed the extension messages of the training which were:

a. Remove striga before flowering to prevent seed production and reduce the soil seed bank

b. Burn residue of crop on striga infested fields since it may enhance striga control through heating of soil or/and burning of striga seeds.
c. Remove all weeds and shrubs before planting
d. Harrow fields to control other weeds including possible hosts of striga and provide a conducive seed bed for vigorous crop growth and enhanced crop tolerance to striga
e. Apply adequate and good farm manure especially those with ash. It should be well composted to kill weed seeds.
f. Apply urea as top dressing at 6 WAP as a follow up to initial application of NPK at 2-3 weeks after sowing.
g. Use tolerant maize variety obtained from reliable sources.
h. Use crop rotation practice. Plant crops like soyabean and groundnut which are trap crops which deceive striga seeds to germinate but are not attacked.
i. Soyabean variety should be the type that effectively stimulate striga seed germination e.g. TGX 1448-2E

2. **Discussion**

During the discussion, the basis for the extension messages were further explained.

a. Farmers were aware of the possibility of groundnut behaving like soyabean but would prefer the latter because
   I. They derive higher income from it.
   II. The crop is less susceptible to another important parasitic weed, *Alectra vogelii* than groundnut. Gwarzo used to be a major groundnut producing area.
b. The need to burn removed striga plants outside the field to ensure that hidden pods or flowers do not mature and produce seeds was emphasized
c. The need to remove crop stubbles and late infesting weeds was also emphasized since these could serve as hosts to striga

3. **Assessment of Task**

Results observed on twelve farmers' fields were presented by another farmer. Only one farm among those planted with tolerant maize variety had striga
Acr 97TZL Comp. 1-w had five (5nos) plants of striga. The plots planted with local varieties had between 0 to 606 striga plants.

Field Trip

Out of the twenty farmers, eight were in the second year of rotation. Seven farmers' fields located 1 to 10km apart.

1. **FARMER: JIBRIL ISAH**

The demonstration plot was well laid out and well-managed. In spite of the earthening up that had been done, striga was still present on the local variety. The farmer confirmed that the seed of the local variety was purchased from the market. High crop reaction score was observed on the local variety which exhibited symptom of firing, chlorosis of leaves and small cob size compared with the improved variety. Farmer was able to score maize plant for reaction to striga very well when requested.

2. **FARMER: BABA MIKAILU**
High crop reaction score was also observed on the local variety with symptoms of leaf firing and yellowing and small cob size.

3. **FARMER: ISA ABDUMUMINI**
The soil at the location was sandy loam. The demonstration was in its second year. No striga was found on the plot planted with the improved STR maize after soyabean rotation. Some striga plants were observed on the plots with improved variety for two consecutive years while more striga was observed on the local variety. However, in spite of the striga present, all the plots were healthy. This can be attributed to the application of heavy dose of manure and fertilizer because of the sandy nature of the soil.

4. **FARMER: MALLAM BALA**
This is a homestead or compound farm into which a lot of waste had been dumped. No striga was observed on all the plots. striga was however observed on adjacent sorghum and dauro millet farms.

5. **FARMER: MALLAM ADAMU GANGARIYA**
The soil on the farm is sandy loam and had low striga infestation. No striga was observed on the local variety. There were indications of goat grazing and pilfering of the maize cobs.

6. **FARMER: GAMBO YUSUF**
No serious striga infestation was observed on the well laid out plots.

7. **FARMER: HASSAN YUSUF**
Some striga plants were observed on the local variety which exhibited chlorosis/yellowing while the improved variety was very green.

Generally, the enthusiasm of the farmers was reflected in the management of the demonstration plots as well as their participation in field trips in spite of the fact that they were fasting. Farmers have largely been integrated into the project through the training methodology. The methodology used for various operations was Farmer Field School (FFS) and participatory training on Biology and control of striga as well as observation of the demonstration plots.

September 9, 2008

DUTSE GAYA, KAJURU LGA, KADUNA STATE
This location is in the Northern Guinea Savanna. The group on arrival paid a courtesy call on the District Head (Hakimi) Salakin Adama. Mr. John Maji Kwaso is also a participating farmer in the project. He was highly appreciative of the project which is in the second year in the district. He believes that from observation in the field, the project would go a long way to provide a solution to striga problem and improve agricultural productivity in the local government. He promised to provide necessary logistics and cooperate with Kaduna Agricultural Development Project to publicise the project and

ensure the participation of other districts within the LGA. While waiting for the other guests/stakeholders for a formal reception, it was decided to commence the field visits with the farmers, extension agents, agricultural officers and HOD Agriculture.

1. **FARMER: JOHN MAJI KWASO**

The farm is in the first year of cropping. The difference between the improved STR variety and the local variety was apparent with respect to striga infestation and crop reaction despite the closeness of the farm to the Hakimi's compound. More striga were present on the local variety than the improved STR. The local variety also had reaction score of 4. The cobs of the improved STR maize were bigger and the plant vigorous. The soyabean also exhibited vigorous growth, covering the ground effectively, thus reducing weed problem. The farmer would prefer soyabean to groundnut in rotation because of higher susceptibility of the latter to *Alectra vogelii*, a major parasitic weed problem on legume in the district. Some crops of groundnut with heavy *Alectra* infestation were also observed on adjacent farms.

2. **FARMER: STEPHEN GARBA**

Striga was also observed on the farm with the improved STR variety exhibiting crop reaction score of 4 while the local variety had 7. The plots would need more fertilizer. Fertilizer rates may need to be increased above the recommended rate while the TZL syn STR-W should be used at this location to combat striga problem which is more virulent than at Gwarzo. The soyabean was vigorous

3. **FARMER: GARBA TANKO**

a. *Seed Multiplication*

The farm is about 0.5ha. The seed farm has some weeds including striga. The crop also exhibited some stress. The farmer was advised to weed the crop which was at the grain filling stage.

b. *Demonstration*

The demonstration is in the second year. High level of striga parasitism with respect to infestation and the reaction of the crop was observed on the farm. The local variety had a crop reaction score of 8 while the improved STR variety which followed soyabean rotation had 3.

4. **FARMER: ANGO BAHAGO**

The demonstration is in the second year. The farmer however planted the local variety on the plots with soyabean rotation and planted soyabean on the plots that had the local variety in the previous year. The improved STR maize was planted for two consecutive years on the same plot. The level of parasitism observed on the plots with the local maize variety was similar to that of improved STR variety. Both had similar score of 3.

The observation implied improved performance of local variety as a result of the preceding soyabean rotation. Farmers were however advised to note the benefit of the soyabean trap crop but not to rely on it for good yield. They should combine the method with striga tolerant variety, adequate and timely fertilizer application as well as good crop sanitation through prompt and adequate weed control.

5. **FARMER: HABAKU**

The demonstration is in the second year. The improved variety had a score of 2 while the farmer's local variety had 5.

Generally, striga parasitism was higher at the location than was observed at Gwargo in the Sudan agroecology. The location is actually at the boundary of the Northern Guinea and Southern Guinea savannas. Earlier reports have indicated variation in the virulence of striga ecotypes of Nigeria savanna following the order Southern Guinea> Northern Guinea> Sudan, even when evaluated in a controlled screenhouse experiment.

Previous reports in this project for the Southern Guinea savanna have indicated better crop performance with TZL Comp. Syn – Y and TZL Comp. Syn – W than Acr 97 TZL Comp 1-W in the Southern Guinea and Northern Guinea savannas.

It was agreed that arrangements be made for the supply of seeds of the varieties in 2009.

Reception

An open-air reception under canopy was organised to welcome and interact with the team. About 200 people including 20 women were present at the reception. The Representatives of the Chairmen of the LGA and Programme Manager KADP, five District Heads, Head of Department of Agriculture, Leaders of the farmers and women farmers in the LGA as well as Secretary of ECWA church, the Agricultural Extension Officer of the LGA and Media section of KADP were present during the Programme.

September 9, 2008

KAFANCHAN LGA

The demonstrations are currently conducted on 20 farms consisting of 8 old and 12 new ones at two locations. The team visited 8 farms at Mallagun -one of the locations. Night fall and rain made visits to farms in the other location impossible. The two locations are about 20 kilometers apart, while farms at Mallagun are between 0.25 and 5km apart. After a short reception involving the introduction of both men and women farmers, the Extension Agent, Pastor Anthony led the team to the farms.

1. **FARMER: DAUDA UFUWAI**

The farm is located about 5km to the Extension Agent's house/office. The demonstration plots were sited on fertile sandy loam soils. Low growing grasses including *Eragrostis* spp., *Setaria* spp., *Cynodon* spp. and some broadleaves like *Aspilia africana* were observed at the site. The farm was not well managed. Weed management was poor on the farm and this further imposed stress on the maize crop and increased vulnerability of the latter to striga parasitism. The soyabean plot was also weedy. Striga shoot counts on the plots were 160 and 27 for the local variety and Acr 97 TZL Comp 1-W (STR variety), respectively. The corresponding crop reaction scores were 7 and 5, respectively with the STR variety having big cobs. The farmer was advised to keep the plot clean since the stress did not allowed the STR variety to exhibit its maximum potential. He was, however, still impressed by the better performance of the STR variety compared with the local variety.

2. **FARMER: DANLADI AUDU**

The demonstration is in the second year. The farmer used the seed obtained from the hybrid maize planted in the previous year as the local variety. The farm was weeded late which resulted in poor performance of the improved variety which had a crop reaction score of 8 compared with 4 for the farmer's variety. The soyabean on the farm however exhibited good growth.

3. **FARMER: ISAAC ALAU**

The demonstration which is in the first year had inadequate weed management. Striga shoot count on the improved STR and farmers' varieties were 27 and 37, respectively whereas the corresponding crop reaction scores were 4 and 5 indicating higher vulnerability of the farmer's variety to striga parasitism.

4. **FARMER: TOM YASHIM**

This farmer, who is highly enlightened, is a retired Senior Civil Servant who also has livestock and fish farms. He used herbicides around the farm. It was obvious that the second weeding must have been delayed. The plots still appeared weedy although the crop appeared vigorous with big cobs, especially on the improved STR varieties. Crop reaction scores were 3 and 4 for the STR and farmer's varieties, respectively.

5. **FARMER: EMMANUEL ALAU**

(i) Multiplication of soyabean seed

Although the farmer claimed that he had 0.5ha of soyabean multiplication plots, half of this was either weedy or had poor stand count as a result of poultry picking of planted seeds.

(ii) Demonstration

The plots were weedy. The farmer used Oba Super 1 as his variety. In spite of the situation, reaction scores were 6 and 7 for Acr 97 TZL Comp. 1-W and Oba Super 1, respectively.

Meeting

At the meeting attended by nineteen people including two women, the problem of poor management of the farms was highlighted. The farmers attributed the problem to distance of the farms to their residence but apologised and promised to make amends.

It was also observed that striga was more aggressive and virulent at the location compared with other locations. Special attention would therefore be devoted to the management. Suggestions included the basal use of organic manure and inorganic fertilizer not later than two weeks after planting. Suggested inorganic fertilizer rate is 120kg N- 60kg P_2O_5 -60kg K_2O and timely weed control including use of pre-emergence herbicide.

The farmers expressed gratitude to the Korean Government, SAFGRAD/AU, IAR and the visiting team for the special attention given to striga problem at their location and

promised to cooperate in future activities towards providing appropriate solution to the problem.

September 10, 2008

KAJURU LGA

Demonstration

The demonstration was visited on the day of the team's departure. It was sited on the Kafanchan Kaduna road axis between the turn off to Dutse Gaya and Kaduna. The Demonstration which is in the first year was well managed. Inspite of crop reaction score of 4 by the improved variety, the cobs were very big. The local variety which had a score of 5 had smaller cobs that were less filled. Since it was raining and the farmer could not be contacted, he was not around during the visit. The farm was supposed to have been visited the previous day but for the tight schedule the team had.

GWARZO LGA

Demonstration

The demonstrations and training were well conducted and addressed the needs of the farmers in respect of solution to the striga problem in maize production. The interest and performance of the Extension arm of the Gwargo LGA and the relevant staff are also commendable. The enthusiasm of the farmers to participate in the project activities for a sustainable solution to striga problem was apparent during the visit. The adequately fertilized tolerant maize variety complimented by trap cropping and good weed management practice was evident to the farmers. Consequently it is recommended that the plot planted with soyabean in the first year of demonstration be divided into two halves. One half should be planted with STR maize while the other half should be planted to the local maize variety. It was further recommended that Acr 97 TZL Comp. 1-W be replaced by TZL Comp. Syn–W which has exhibited more tolerance with respect to striga emergence, crop reaction to striga and productivity. The variety is also more acceptable to farmers because of better storability than Acr 97 TZL Comp. 1-W. Prof. Lagoke has been requested to assist in procuring the variety from IITA.

Community Seed Multiplication

i. Production of seeds of relevant trap crop and STR maize variety should commence. Foundation seed should be procurred from the relevant institutions and multiplied for farmers as certified seed, taking the necessary precautions. The use of irrigation facilities to produce the seed during the dry season may be expedient. Otherwise, isolated plots during the wet season may be useful. Farmers and farmer cooperative society may be given a short training on seed production.
ii. The continued use of Farmer Field School (FFS) approach will facilitate effective knowledge delivery, skill acquisition, improved striga management appraisal and appreciation as well as sustainable rapid technology adoption.

iii. Campaign for striga control should involve not only farmers but traditional leaders, the legislative arms of the LGA and Extension officers. Adequate sensitization on the adverse effect of striga on crop productivity and the need to pull out striga plants before flowering on any farm will be necessary. It should be treated as an environmental issue that should be legislated against. Two days of each year may be set aside before general flowering of striga for a district-wide striga control.

In view of the indicated problem of *Alectra* indicated there is the need to access information on tolerant soyabean varieties for use as trap crop. It was noted that the farmers who traditionally used to be groundnut farmers have indicated preference for soyabean because of higher derivable income and less problem with *Alectra*.

DUTSE GAYA

The level of management of demonstration plots was very high. The soyabean seed multiplication plot was well managed and reliable yield is expected from the exercise. The S. *hermonthica* and *A. vogelii* at the location were apparently more virulent than those of Gwarzo. It was impressive that all the eight farmers involved in the project in 2007 are currently participating in the project and 12 more have been added. It is recommended that 1. The diffusion of soyabean rotation with STR maize variety technology should commence 2. Striga eradication campaign involving other villages commence as part of the project activities in 2009 3. The project be extended to other districts in the Local Government 4. Alectra-tolerant soyabean variety with high productivity be identified 5. The plots that were planted with soyabean in the first year be splitted into two and each half be planted with local and STR maize variety to confirm the effectiveness of soybean trap crop

MALLANGWU

i. The farmers at the location need to improve on the crop management practices including prompt and adequate application of fertilizer and weed control.
ii. There is the need to conduct training for the farmers in the location.
iii. The use of 25cm spacing by farmers result in the use of more seeds and tedious than 50cm spacing thinned down to 2plants/stand. More time and labour is required for side dressing fertilizer application to each stand with 25cm spacing with 50cm.
In addition, the 50cm spacing has been observed to result in lower Striga incidence than 25cm and it is being practised at various *Striga* endemic locations

IAR

The scientists of IAR, Samaru deserve commendation for the good job done in spite of the absence of late Dr. I. Kureh. They actually rose up to the challenge and performed creditably. It is however obvious that they were not able to cover the middle belt which is being covered from UNAAB. The Middle Belt still deserves the attention that it has been having from the project. Dr. Kundi has also complained that the amount allocated to IAR, Samaru from the project was inadequate.

CAMEROON

20 – 28 September 2008

By

Dr. Mahama Ouedraogo and Dr. Charles The

The monitoring tour team members viz. Dr Mahama Ouedraogo, SAFGRAD Acting Director, and Dr The, now Maize Breeder at the West Africa Center for Crop Improvement, University of Ghana, Legon arrived Douala, Cameroon at on September 20, 2008 at 08h00, and proceeded to Yaounde by bus, where they arrived at 14h30.

MEETING WITH IRAD DIRECTOR

On 21st September, 2008, the team met with the Director of IRAD (Institut of agronomic research for development), Dr Simon ZOK. SAFGRAD vision and the objectives of SAFGRAD's striga control activities were presented Dr Mahama Ouedraogo. He indicated that Cameroon is one of the lead centers in striga research in Africa, and that Dr The has been a resource person for the network. He informed IRAD's Director that the striga project was co-funded by the Korean government through Kyungpook National University and the African Union through SAFGRAD (Semi Arid Food and Grain Legume Research for Development).The main objective of the striga network coordinated by SAFGRAD was to promote at farmers' level striga control measures that have the potential to reduce damage to food crops, particularly maize. These measures include striga tolerant varieties, STR maize/legumes rotation, and trap cropping with crops such as cowpea, soybean, groundnut, and cotton. Dr Mahama, pointed out that he had always enjoyed carrying out monitoring striga activities in Cameroon where infestation by the parasite is most of the time very high and researchers very dedicated. He mentionned his past visit to Gatougel (100 km from Garoua), were most of the farmers adopted IRAD's striga control measures, and particularly the STR maize cultivar Advanced NCRE STR .Dr Mahama expressed the need to replace Dr The , who has been the country representative for more than 15years,now at WACCI .

Dr Simon ZOK, the IRAD Director welcomed Dr Mahama Ouedraogo to Cameroon and expressed appreciation to SAFGRAD for the continued support and the confidence reposed on IRAD for striga research and control activities. He indicated that at the regional level, IRAD will maintain its leadership with the help of Dr The, and that IRAD will endeavour to get striga control activities conducted satisfactorily in Cameroon. He indicated that he was counting on Dr The to propose his replacement. IRAD Director wished the team a good stay and a successful monitoring tour of SAFGRAD activities in Cameroon.

TRIP TO GAROUA

The monitoring tour members travelled to GAROUA on September 22,2008, where they were met by Mr. Alphonse Youri, the IRAD researcher in charge of SAFGRAD trials. The team payed a courtesy visit to Mr. Celestin Klasou, the Regional Administrator of Research in the Northern Guinea savannah, and former IRAD Garoua Chief of Station. The new IRAD Garoua Chief of Station Dr Aboubakar Dandjouma welcomed the group at IRAD Garoua, Bokle Station. He indicated that SAFGRAD's trials were well-appreciated by farmers, and this was indicated by the demand for seeds of STR varieties from the station. He indicated that trials to be visited were planned and partially executed by Dr The. He emphasized that striga is a major production constraint on maize and on sorghum in the zone. These crops are the main source of food and income for people of the zone. He thanked SAFGRAD for the organization's continued support in combating striga and wished the team a successful monitoring tour. Finally, he expressed the wish to be informed of the team's findings.

ACTIVITIES PLANNED

The summary of striga research and control activities conducted in 2008 was given by Mr Alphonse Youri. Activities were conducted in two agr- ecological zones viz. Northern Guinea Savannah, and Sudan-Sahelian zone.

In the Sudan-Sahelian zone, a total of 242 trials were conducted which comprised: 6 varietal demonstration trials, 16 rotation demonstration trials, 20 seed multiplication plots, and 200 diffusion trials.Trials were conducted in 6 villages namely: Bougaye (63 trials), Toulom (58 trials), Guidiguiss (9 trials), Tokombere (55trials), and Mora (57 trials). The variety demonstration trials included: Cam Inb STR, Advanced NCRE STR, K9351 STR, an extra early entry 2000: Syn Wec , and CMS 9015 as check. In this zone, rain started late, and was erratic until 14th August 2008.

In the northern guinea savannah, a total of 308 trials were conducted, and comprised: 10 variety demonstration trials, 10 rotation demonstration trials, 35 seed multiplication trials, 251 diffusion trials and 2 demonstration plots. STR cultivars tested included: STR –Y, Cam inb STR, Advanced NCRE STR, K9351 STR, and CMS 8501 as Check. Seven villages were used for the demonstration trials, namely: Dadjam, Mayo dadi, Djalingo, Sanguere Paul, Bame, Sakdje, and Mayo-bocki. Trials were planted between 20th July and 4th August 2008.

ACTIVITIES VISITED

DJALINGO STATION

Djalingo Station of IRAD is 25 km from Garoua, the provincial capital. At this site, a demonstration plot of 15 varieties was planted. The varieties demonstrated included:
5 STR maize cultivars : STR-Y; Cam Inb STR; K9051; Advanced NCRE STR and
6 Non -STR cultivars: CMS 8501 (renamed THE Charles by the Minister of Scientific research), CMS 8704, CMS 8806, CMS 9015, CMS 2019 and TZEE-SR.

All varieties demonstrated exhibited good performance. This plot which was planted on striga-free plot was aimed at showing the potential of all available cultivars available at the station. The other components of the maize breeding section namely: variety trials, breeding nursery, breeder and foundation seed plots, were shown but could not be visited, because of time constraint.

FARMER'S FIELDS
VILLAGE: DJALINGO

This village, which has a big farming population, is the meeting point of many communities. Two trials were visited: (i) a demonstration plot planted on a highly infested striga field and a maize/cowpea rotation trial. The two trials were planted only 53 days before the visit and maize was at the beginning of anthesis. Very few emerged striga plants were visible, but the striga symptoms were observable on the leave, indicating more infestation to be expected in about 10 days. The owner of the field works as a casual labourer in IRAD maize section. He indicated that although he joined the programme late, he was confident that from the 11 varieties demonstrated, he will be able to choose one or two for subsequent cultivation. He indicated that he also have 1ha of seed multiplication about 5 km away and would like the team to visit that plot also. The variety being multiplied was CMS 8501 because it is widely cultivated but it is susceptible to striga. The rotation trial included :one plot of STR maize (Advanced NCRE STR), one plot of cowpea; and one plot of local CMS 8501. Plot size was bigger than expected, and no striga plants were observed.

MAYO DADI VILLAGE
Farmer's name: MBEREBE

Two trials were visited in this village. The first was a variety trial while the second was a seed multiplication plot of an STR variety: Cam Inbred STR.

The variety trial consisted of 3 varieties: 2 STR cultivars and the local CMS 8501.The two STR varieties were Cam Inb STR and Advanced NCRE STR. Total plot size was 22.5m x 20m. No striga plants were observed at the time of the visit. The farmer indicated that the year before, the plot was planted to cowpea and that he was practicing a yearly rotation involving maize and cowpea. He also indicated that last year the cowpea was provided by IRAD, and had red seed coat which is not the preference of consumers in the village. All the varieties tested had very good plant stand.

The maize seed multiplication plot was 1.5 ha. Although the field was heavily infested with striga, most of the ears were filled with grains. The farmer explained that he knew that the plot was heavily infested, but was hoping that the new variety given to him will give a striga-free plot. He indicated that although the field had many striga plants, he would still have more than the expected harvest. The farmer was advised to (i) keep as seed, kernels from ears harvested on standing plants, (ii) make sure that harvested ears are stored out of the striga-infested field, and (iii) ensure that short and lodged plants are harvested for consumption.

BAME VILLAGE

Farmer's name: MASSAI

In this village, a rotation trial was converted to intercropping trial by the farmer. The STR maize was Advanced NCRE STR. The trial was already at the maturity stage but striga infestation and damages were not observed to be severe. The farmer indicated that the previous year the plot was planted to CMS 8501 and although the plot was heavily infested, he obtained a good harvest. In 2008, he moved the CMS 8501 to another location which was flooded by water for 10 days and no grain yield could be expected. The trial had some cowpea in between rows of Advance NCRE.

BURKINA FASO

1ST – 3RD OCTOBER 2008

By

Mrs Hadyatou Dantsey-Barry, Mr Halidou Aboubakar and Mr. Youssoupha Mbengue

The monitoring tour to Burkina Faso provided scientists from Niger and Togo, whose countries just joined the project in 2008, to share the experiences of Burkina which had been involved in the project for several years.

Wednesday, 1st October, 2008

The team arrived in Fada N'Gourma, 220 km away from Ouagadougou on 1st October. The team headed for the Eastern CREA, where Dr Oumar Ouédraogo, in his capacity as the Director of CREA and local representative of the project, made a brief presentation, after his welcome address. He mentioned the two types of activities that are being carried out on two sites and which are in their second year :

(i) improved striga-susceptible local maize variety and one *Striga gesnerioides* resistant cowpea variety which can also stimulate suicidal germination of *S. hermonthica* seeds. The trial carried out under the form of a Farmer Field School involved about fifteen farmer learners pér site

(ii) the training of seed growers for the production of cowpea trap crop :

The rationale behind the second activity is that farmers were not familiar with cultivating cowpea and that they needed to learn how to grow the trap crop false hosts they may need when the project is completed.

Village: Kouaré 1

In line with the presentation made by the local project officer, the team found out two types of activities :

- the farmer school field attended by a dozen farmers who, in spite of their Ramadan celebration were eager to welcome us. That field includes three 500 m^2 (25m x 20m) large plots with the folllowing :

1 maize plot planted to TZ STR

1 plot planted to *Striga gesnerioides* resistant cowpea (KVX 61-1) and trap crop for *S. hermonthica.*

1 plot planted to local maize susceptible to striga

The plots received the treatments above in the first year, with rotation between the treatments in the first two plots in the second year – the year being reported.

- Seeds of two varieties of cowpea were each multiplied on 0.25 ha The cowpea varieties were *S. gesnerioides* resistant KVX 61-1 and *S. gesnerioides*-tolerant KVX 396 4-5-2 D. These two cowpea varieties induce suicidal germination of *S. hermonthica*.

Observations

The team noted that the maize was sown rather late (July 29th) and the explanation given was that seeds came in late from the project. Following the discussion that took place with the farmers, it was noted that they had acquired a good knowledge of the production techniques of the various crops, and effects of *S.hermonthica* and *S. gesnerioides* on crops but not much was known about the life cycle of the parasite.

The farmers showed appreciation of the importance of crop rotation involving resistant varieties as no striga was found in any of the two test plots after just two years of rotation, while the control plot was infested.

Maize yield may not be very promising because the soil was waterlogged. However, the cowpea plants showed good performance.

Village: Kouaré II

The same technologies as in Kouare I were demonstrated in the village with the same plant varieties and on plots of similar size. the same land areas. The team was welcomed there again by a dozen of interested farmers.

Observations

The trial was established on 24th July, which is late compared to local practice for the same reason given for planting late in Kouare I. As in Kouare I, the farmers are well-experienced in farming techniques but have limited knowledge in on the reproductive method and life cycle of striga. In contrast to Kouare I, no striga parasite was observed in Kouaré II. The farmer stated that he had to leave the field lying fallow because of *S. hermonthica* on millet.

Striga infestation was likely to have been inhibited by this year's heavy rainfall.

Thursday, 2nd October 2008

The team arrived Leo in the SISSILI Province, 165 km south of Ouagadougou on 2nd October.

The meeting point was the Head Office of the Provincial Federation of the Sissili Professional Farmers (FEPPASI) where the monitoring tour team was joined by a team of INERA scientists coming from the Faracoba CREA. The latter team included Dr Sanou Jacob, National Coordinator of the SAFGRAD project and also maize breeder and Director of CREA, Mr Zouré Grégoire, a phytopathologist and Mrs Bounkoungou Saïda and Paré Pascal, an agronomist and a technician, respectively.

FEPPASI, a farmer organisation, was established in 1998 and officially recognized in 2003 by Decree 2003-101/MATD/PSSL/HC of 24th March, 2003. It currently includes five Unions at the

level of the "Departements" such as Boura, Biéha, Léo, To and Sily and is 12,500 members strong.

The chairman of FEPPASI was on a foreign trip at the time of the tour. The team was therefore received by the Manager/Accountant of FEPPASI, Mr Diasso Hamidou and the Farm Advisor, Mr Korogho Mahamoudou with whom the team was able to discuss. Before the team left for the site, Dr Sanou briefed the visiting team on the activities carried out jointly by his team and the Federation in the area, namely:

(i) 10 trials with Farmers Field School. Each trial consisted of three plots with the first two plants planted to STR maize and a legume while the third plot was planted to the local maize. In this instance, however, soybean was used in some plots while cowpea was used in others. The crops in the first two plots are rotated every year.

(ii) Seed production involving :
0.25 ha of cowpea

0.25 ha of soja

0.50 ha of TZ STR maize

0.50 ha of local maize

(iii) 10 varietal trials involving 13 varieties

Two sites were visited in Leo.

Village: Nadion

In Nadion, two trials were visited :

(i) One varietal trial involving two maize varieties: Barka (new drought and Striga tolerant variety) and the farmer's variety (Hope)

(ii) One crop rotation striga trial comprising of three large plots including :
One maize plot planted to TZ STR

One cowpea plot planted to KVX 61-1

One plot planted to the local maize variety 'Massongo' which served as control

Observations

The team interviewed the owner of the field and his brother.

Planting took place on 15th July. The delay was alleged to be the result of seeds not being available on time.

While farmers were quite knowledgeable about production techniques, they did not demonstrate similar knowledge about the life cycle of striga. No striga plants were observed on plants in the trial. The farmer had planted the most heavily infested part of his field to millet before maize seeds for the trials arrived.

Village: Mouna

The team observed two types of activities. The activities were implemented by the Farming Advisor of FEPPASI:

(i) Seed production consisting of
One hectare of maize variety of EV6

One hectare of cowpea variety KVX 61-1

(ii) Varietal demonstration of 13 maize varieties, each on 7 rows.

The farm Advisor had planned to take us the team to a field heavily infested with striga where he plans to establish the trial the following year. This could not be accommodated because of the constraints of time.

Foe each of the visits to Fada NGourma and Léo, members of the team briefly explained to the farmers present and the facilitators of the project, the biology of striga, the stimulation of the seeds of the parasite to germinate by true and false hosts and how knowledge of these hosts can be deployed in the management of striga. The team also emphasized the need to implement an integrated striga control strategy, which must include measures to prevent seed setting by the parasite.

Friday, 3rd October 2008

Morning: Visit to the Kamboïnsé Research and Training Centre

The purpose of the visit was to learn about the available research infrastructure available in the laboratory headed by Dr Oumar Ouédraogo. In spite of the day being set asice for medical check-up for INERA staff, the two technicians assisting Dr Ouédraogo, waited to receive the team. The team was able to visit three striga control related trials which are:

1. Biological control of *S. hermonthica* trial with false host leguminous plant identified by farmers: *Polygala rarifolia.* The trial was set up in a greenhouse and includes 24 treatments.

2. Efficacy trial of extracts from various parts (roots, stems, leaves and inflorescences) of *P. rarifolia* to stimulate suicidal germination of striga seeds. *Polygala* seeds are edible like sesame.

3. Screening of cowpea varieties to identify resistance genes and determine their ability to stimulate suicidal germination (serve as false host) of *S. gesnerioides.* The experiment, which includes 30 varieties from INERA, was conducted in a culture environment with moisture, light and temperature control.

Visit was also made to the laboratory documentation section where slides and posters are produced.

Afternoon : Courtesy call on the Director General of INERA.

At the time of the visit, the Director General was busy with preparation for the visit of the Prime Minister. The team was therefore received by Dr François Lompo, Deputy Director in charge of

Programmes. Following the exchange of pleasantries, the Communication Officer went ahead to brief the Deputy Director the purpose of the visit by the team. The Depuy Director-General emphasized the need for regular and formal exchanges between national and international research institutions. After thanking Director Lompo for finding the time to receive the team in spite of his busy schedule, the team left for the AU/SAFGRAD Headquarters.

At AU/SAFGRAD Headquarters, the team was received by Dr. Mahama Ouedraogo, Acting Director General in charge of Research and Programmes. Members of the team briefed Dr. Ouedraogo on the monitoring tour. The Acting Director thanked the team for the excellent work done in the short time available and expressed the hope that Togo and Niger's subsequent trials would benefit from the experiences gained during the tour.

CONCLUSIONS

The monitoring tour carried out in Burkina Faso from 1st to 3rd October 2008 provided the team, especially members from Togo and Niger with the strategies being employed in Burkina Faso in the integrated control of striga. The trials conducted in Eastern (Fada NGourma) and Southern (Léo) zones for the second consecutive year should provide convincing evidence of the importance of false host leguminous plants (such as the KVX61-1 cow-pea variety) in rotation with cereals (maize) in striga control..

Many of the trials were planted late and on plots that were not severely infested with striga. This does not make for great contrast between the plots with STR maize in rotation with cowpea and farmers' plots that have been sown with susceptible maize in the second year.

The general observation was that apart from cowpea, the maize plants in the trials were not impressive for a number of reason viz. late planting, high rainfall and planting in lowland with water-logging problems.

Burkina Faso has in store several integrated striga control techniques – the results of previous and current research.

A number of technicians and farmers have benefited from the techniques especially under Project TCP/RAF/3008 titled "Sustainable Integrated Striga control" that was carried out in 2005 and 2006 in six countries in the sub-region, including Burkina Faso. That project focussed on the training of trainers who were later on used as facilitators with farmers organized in Field Schools. The training included aspects of biology of striga, various striga control methods, the role of false hosts, the use of resistant or tolerant varieties, the importance of integrated control as well as other aspects of integrated management for production and protection (IMPP).

RECOMMENDATIONS

The Integrated Striga Control Project under SAFGRAD provides the opportunity for sharing experiences among scientists and ultimately farmers in participating countries. This is expected to fast-track the control of striga in the region.

Knowledge of the biology of striga and an understanding of the action of false hosts and importance of sustainable and integrated control will allow our technicians and farmers better appreciate the various possibilities for controlling striga.

The following are recommended to sustain the success already achieved:

- retraining of trainers before commencement of the next growing season
- training of farmers
- timely establishment of trials

It is the desire of Togo to collaborate with Burkina Faso with the support of UA-SAFGRAD, especially in the exchange of valuable genetic resources of crops with resistance to striga and legumes which are not only resistant to *S. gesnerioides* but capable of serving as false hosts for *S. hermonthica.*

CONCLUSIONS

The monitoring tour for the 2008 Collaborative Striga Research and Control Program in Africa which was implemented in five countries was successful to a large extent without any serious hitch as encountered in 2007. The monitoring tour covered Niger, Togo, Cameroon, Nigeria and Burkina Faso and involved scientists from several countries, in addition to the consultants for the project. It was confirmed during the monitoring tour of 2008 that striga remains a major production constraint to food crop production in the region.

Activities observed during the monitoring tour included on-station demonstration trials, on-farm trials involving rotation and intercropping and varietal testing, multiplication of seeds of STR maize varieties and seeds of legumes for rotation and intercropping with cereals, Farmers' Field Schools (FFS), and farmers' field days. Level of infestation of striga in the countries visited was quite varied; it was particularly high in northern Togo. Considerable differences among countries were observed in the strength of the research-extension linkage. For the two countries that have recently joined the project, it was considered excellent for Togo and weak for Niger. A strong research-extension linkage is crucial for the success of the project. Extension agents help to select farmers and suitable land for the project and communicate the technologies that are effective and cheap for the control of striga to farmers. The assurance given by the local government structure in northern Nigeria for continued support for the project is encouraging and may count for the successful implementation of the project in subsequent years. In many countries, better performance for STR maize varieties was observed compared to the farmers' varieties. In Togo, farmers encountered STR maize varieties that have the ability to given good yield under striga for the very first time. It does appear that striga control strategies in Niger would have to focus on sorghum and millet, given the greater importance of these crops in the country, but with emphasis on strategies that deplete the soil of striga seeds.

It was very apparent, especially in Togo and Niger that fertility was a major problem for crop production activities. Striga problem is aggravated under conditions of poor soil fertility. In the absence of cheap fertilizers for crop production, cheap alternatives for soil fertility improvement will have to be vigorously pursued, although the integration of legumes in the control of striga achieves this in part. The problem of timely remittance of funds for the project which was adequately addressed in 2007, reoccurred with Niger, perhaps due to the fact that the country just joined the project and structure for money transfer for the country was not yet well set up. Timely receipt of funds well ahead of planting is important for successful implementation of trials.

There is the need to train more researchers and technicians in striga research for sustainability. The successful conduct of the trials in northern by the new team handling the project after the passing away of Dr. Kureh is worth commending. The retirement of Dr. The from the Cameroon national programme also underscores the need to employ new hands and train them so that the striga control initiative is not truncated. A major achievement of the project that was observed during the monitoring tour was the fostering of cooperation among countries to control striga. The latter is expected to ultimately help regional integration.

LIST OF COUNTRIES AND INSITUTIONS COVERED DURING THE MONITOURING TOUR OF THE KOREAN GOVERNMENT/SAFGRAD FUNDED ON-FARM DEMONSTRATION OF STRIGA CONTROL TECHNOLOGIES IN 2008

Country	Collaborating Institutions	Team Leader
Burkina Faso	Institut de l'Environnement et de Recherches Agricoles (INERA) 03 BP. 8645 Ouagadougou 03	Dr. Jacob Sanou
Cameroon	Institut de la Recherche Agricole pour le Développement IRAD, Yaoundé	Dr. Charles The
Togo	ITRA, Togo	Mrs Hadyatou Dantsey-Barry
Niger	INRAN	Dr. Fatouma Seyni Mr. Halidou Aboubacar
Nigeria	Institute of Agricultural Research Ahmadu Bello University, Zaria	Dr. J. Kudi Dr. B. Tarfa

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Monitoring Tour Collaborative Striga Research and Control Program in Africa

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