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SENEGAL TRIP REPORT (May 24 - June 7, 1981)

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Senegal is one of the Sahel countries severely affected by food shortages during the 70's. Since then attention has focussed on some possible alternatives to maintain grain supplies (such as pearl millet) during unfavorable periods. Among these, improvement of village storage systems have received attention, along with creating reserve grain stocks. Efforts have been devoted to learning more about the storage systems of small farmers, who store more than 70% of the country's grain. Recently we went to Senegal to observe village storage practices from the northern area (border of Senegal and Mauritania) to the southern region (Casamance). Grain samples were collected to determine the species of insects present in the village storage and the extent of the infestations.

Itinerary

May 26	Met with Mr. Kenneth Steinke, grain storage adviser to CAA Commissariat a l aide Alimentaire). Went to the American Embassy to change money and for Dr. Kossou to arrange for a U.S. visa. We then left for the north to observe village storage of millet. Mr. Steike furnished the car.
May 27	Drove to Podor where we picked up an official associated with the food aid program, who took us to villages to observe storage, to collect millet samples and insects.
May 28	Drove to Ngourane, where village storages were observed and samples were collected. Returned to Dakar.
May 29	At Fouloum we met with Jim Bleau, Peace Corps Volunteer, who arranged for us to sample millet in storage in that village.
May 30	Saturday. Spent part of the day evaluating samples in the hotel room.
May 31	Visited the Goree Island.
June 1	Drove to Thies, were we met Ed Small of the Catholic Relief Service (CRS). He took us to Ndiayene Sirakh to look at a CRS silo facility. Could only observe an empty cell. The cells are similar to those of CRS silo facilities in Rwanda. Observed two village storages, also. Visited the French agricultural research station at Bambey. The research there includes agronomy, animal research, and crop protection. They are doing preliminary research on the ability of Trogoderma granarium to infest millet in the head. Their results so far indicated that it cannot. Discussions with an entomologist at the Tropical Stored Products Centre, who had worked in Mali, indicated otherwise. Stopped at Khelcome where Jeff Patton and wife, Peace Corps Volunteers are working. They arranged for us to observe stored millet in the village.
June 2	Visited the village, Maleme Thieureigne, where Mickey Levitan is the Peace Corps Volunteer. Observed "basket-type" storages and mud block type. At Nema Tamba, Tim McMain, Peace Corps Volunteer, arranged for us to observe storages constructed of blocks and of sticks reinforced with mud. Stopped at Koungheul to visit a CAA warehouse which held millet.

June 3 — Karen Keithline, P.C. Volunteer, arranged for us to look at bag storage in "her" village, Sediou Koussy I. This village has converted to threshing millet, and storing it in bags rather than in heads. Men from Guinea come at harvest time and thresh it for the villagers on shares.

June 4 — At the Centre de Protection des Vegetaux training center to evaluate samples, identify insects and tabulate them.

June 5 — At USAID Agriculture Office, met Director John Balis. Discussed our experiences and the agriculture projects in the area. Discussed possibility of cooperative research on Trogoderma granarium in Senegal at the Centre de Protection des Vegetaux. There are no controlled environment rooms, however.

Went to CAA to visit with Mr. Douda Niane, CAA Manager (Coordinator), but he was not in.

Visited with Dr. John Gruwell, Project Manager for the regional project on Crop Protection. While in his office, Mbaye N'Doye (Bambey research station) came and we discussed the possibility of cooperating with the Bambey station. Bambey has controlled RH/temperature rooms. Gruwell suggested that a proposal should be routed through him, should we desire to submit one.

June 6 — Visited with Mr. Daouda Niane, CAA manager and technical director. Dr. Kossou, Mr. Steinke and Mr. Niane's assistant discussed (in French) several items, including the progress toward getting the trainers' program started in September (the trainers who participated in the trainers' grain storage course conducted by KSU last year). In the afternoon, we worked in the hotel on organizing information collected on the trip.

We met the CAA employees who were to come to the KSU Grain Storage and Marketing short course.

June 7 — Dr. Mills left for vacation in England and Scotland until July 1. Dr. Kossou left the following day.

So that we could observe storage in different parts of Senegal, considerable time was spent traveling, at times on poor roads. The disadvantage of this was that it limited the numbers of observations we could make. Millet storage was observed in eight villages as well as in two CAA warehouses. There were villages where we had been told there was millet, but found only sorghum. Some people there call sorghum "millet". Due to recent droughts there was relatively little millet in storage.

Of the 22 storages observed and sampled, the following insects (or evidence of them) were found:

Insect	Number of storages
Tribolium castaneum	5
T. confusum	2
Corcyra cephalonica	5(4)*
Sitotroga cerealella	1(2)
Attagenus spp.	(3)
Tenebroides mauritanicus	1
Rhysopertha dominica	1
Oryzaephilus surinamensis	1
Trogoderma sp.	1
Psocids	1
No insects found	5

*Parentheses indicate that only evidence of the specie was found.

In the CRS facility in Ndiayeme Sirakh, no insects were observed in an empty cell inspected. Since the cells containing grain were hermetically sealed, we did not want to open them and admit air to them.

A CAA warehouse at Koungheul was inspected and *Trogoderma* sp., *Tribolium* sp., and moths (Probably *Corcyra cephalonica*) were found. The vial containing the collected insects was lost, so positive identifications were not made.

The CAA warehouse at Koukenae was infested with *Cryptolestes* sp., *Tribolium castaneum*, *Corcyra cephalonica*, and *Oryzaephilus surinamensis*.

Summary

The most common type of village storage was the "wicker", or basket-type container or crib supported off the ground by poles. Usually it was used for storage of heads, though rarely for threshed millet. Size varied, but typically were about 2 meters in diameter and 2 meters high. Most were constructed of interwoven sticks, but some were of millet stalks. There were also storage structures constructed of mud plastered on a stick framework, and others were of mud blocks.

Most villagers stored milled as heads, with the women threshing and pounding it as needed for food. There was some threshed millet in bags which was stored in the house or in a small permanent block building of some sort. All of the villagers in Sediou Koussy I have recently begun to store millet in bags. Men from Guinea come to thresh the grain "on shares". This relieves the women of this village of the daily threshing.

In general, insects could be found in millet storage, but usually the damage was not severe. Dr. Kossou, however, in discussions with the villagers, learned that at times insect problems are severe in the village storage.

In majority of cases no chemicals were used, although in one storage a "derivative" of DDT was used on the grain; also, HCH was used on the inside and outside of an empty crib before it was filled, and used directly on the grain rarely. In some cribs a layer of sand and fine residue from threshing was placed in the bottom of the crib. Villagers said this served as a barrier to rodents and insects.

The heads were sometimes neatly stacked within the cribs, and in other cases they were crushed by tamping with a pole. The crushing permits packing

more grain in the crib, and the villagers believe that the crushed millet is more difficult for insects to penetrate.

Although there was less millet in storage than normal due to droughts, and we spent considerable time traveling, we were able to observe and learn about millet storage over a wide area of Senegal.

We acknowledge the assistance of Mr. Kenneth Steinke, grain storage adviser for CAA, and other personnel of CAA. Except for gasoline, our transportation was provided by Mr. Steinke. The contacts Mr. Steinke made with the Peace Corps Volunteers were invaluable in providing us access to the villages and to the villagers. We developed much respect for the volunteers who live in the villages and work with the people there.