

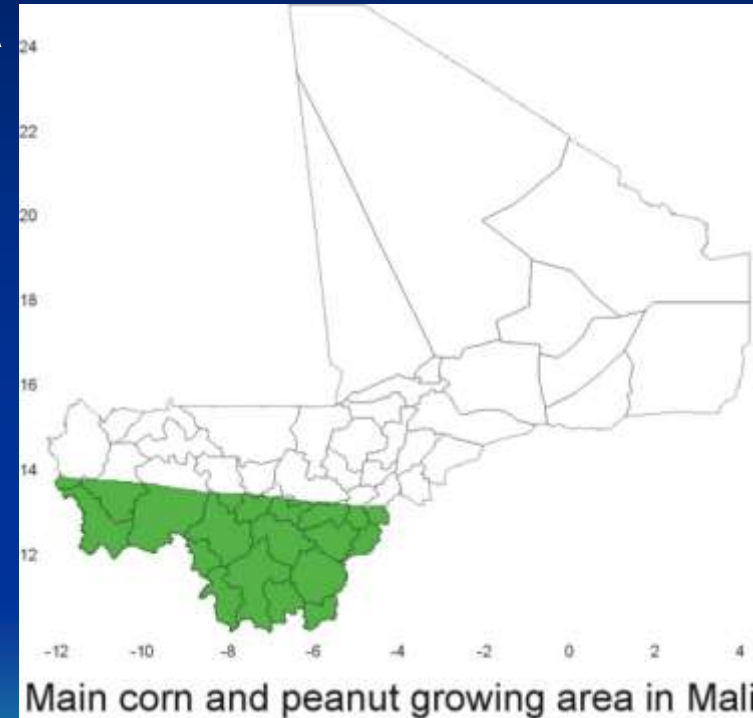
# **AFLATOXIN RESEARCH IN MALI**

**B. Diarra and O. Kodio**



# Peanut production and areas in Mali

- The peanut (500mm to 1200 mm)
- Cultivated area (ha): 320 240 ha (2008)
- Production (t): 380 000 tones (2008)
- Yield : 1.187 ton /ha
- **Average daily consumption:** 320g/person for 97% of the population (DNSI, 2006)
- Products: grains, butter, oil; flour, paste



# Some production & trade constraints

- Increased contamination by mycotoxines - pre- and post harvest traditional storages before marketing
- Aflatoxins levels can exceed 300ppb while allowable rations in international markets are 20ppb (USA) and 4 (2 ppb for peanuts meant for direct consumption) in European markets.
- Low revenues of peanut growing farmers due to the rejection of African's peanut stocks because of high contamination levels
- The prevailing of liver cancer in the area due to the consumption of contaminated peanut



# Partners in Aflatoxin research

Since 1982,

- ICRISAT groundnut program
- The Peanut CRSP
- CIRAD
- ISRA
- DPP-EAN
- and CERRAS
- ...



# Identification of Peanut varieties resistant to *Aspergillus flavus*

- 420 peanut varieties tested:
  - 8 varieties were tolerant to A Flavus



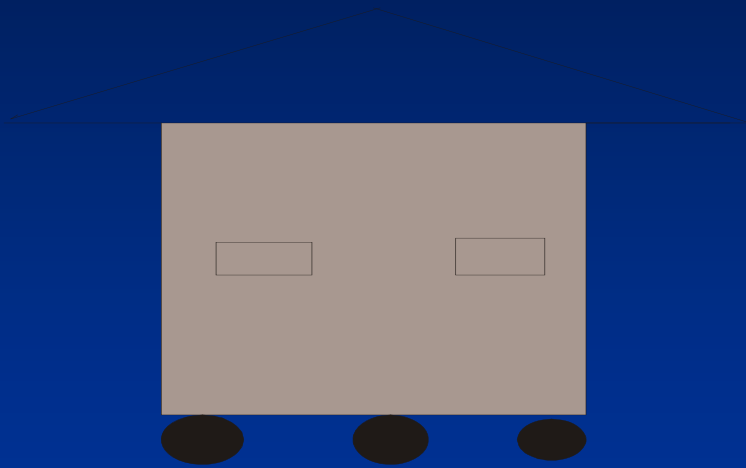
# Biological control of *A. flavus*: Research on actinomycetes (inhibitors of *Aspergillus flavus* of growth)

1240 colonies of pure actinomycetes isolated of which 9 strains of pure actinomycetes inhibits *Aspergillus flavus* growth

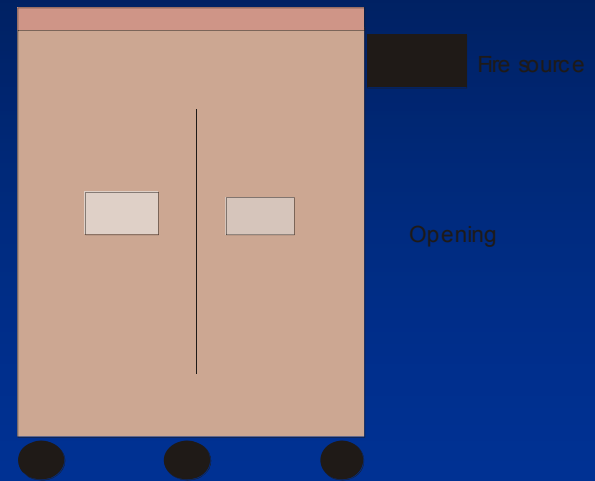


# Images of traditional granaries, 99 et 00

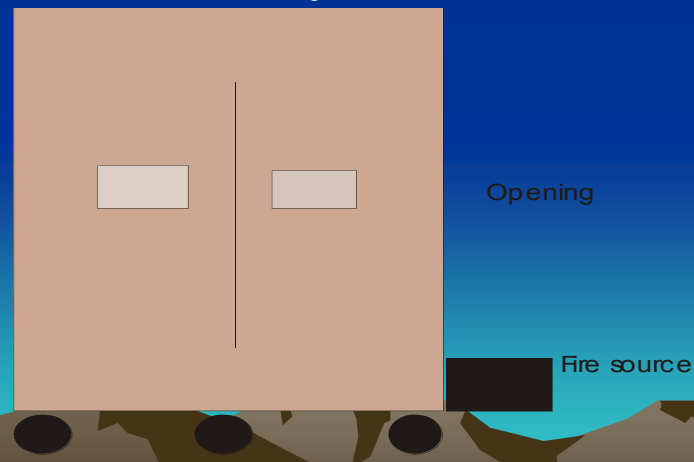
Traditional granary



Granary 99



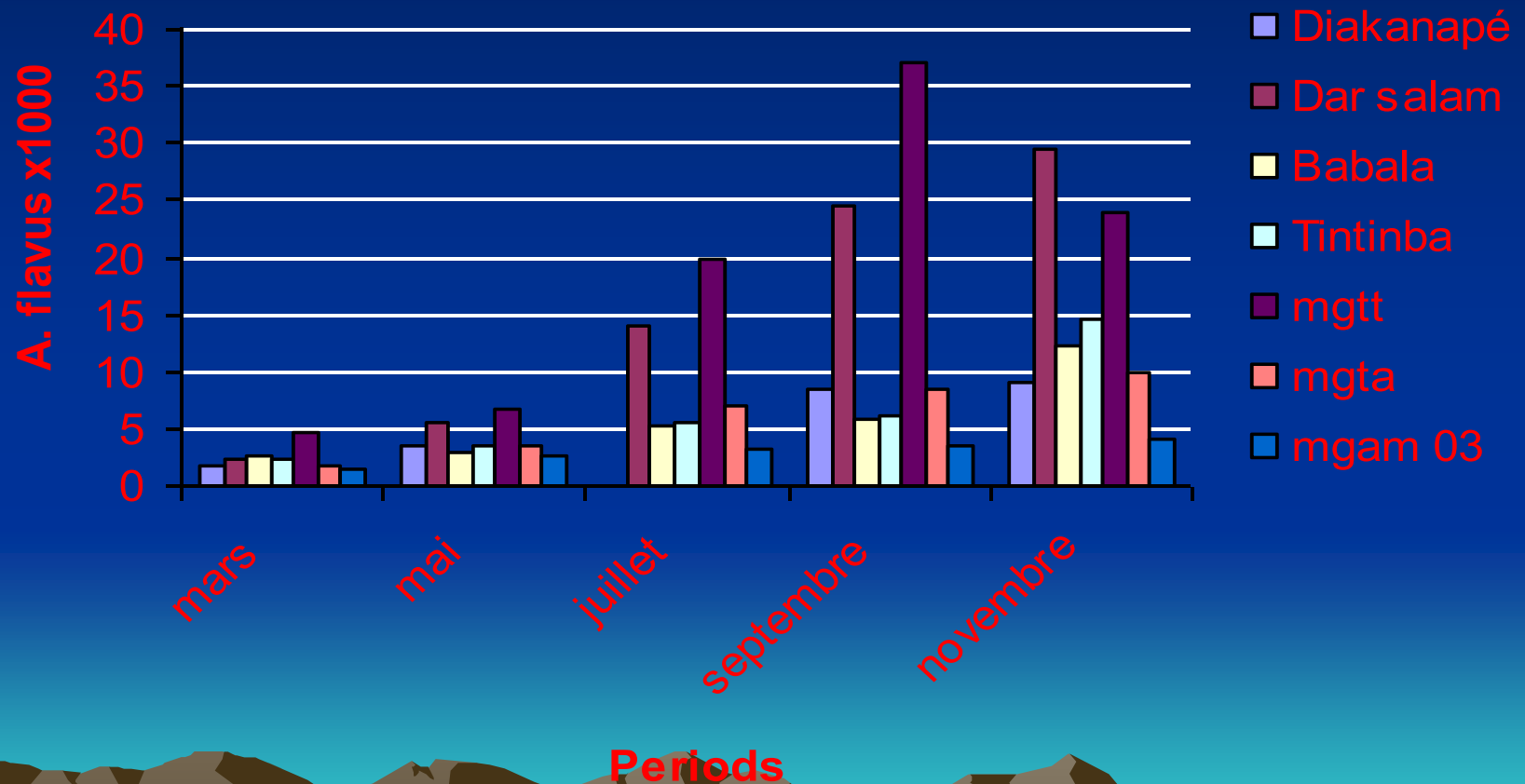
Granary 00



# Improvement of traditional storage methods



# Levels of *A. flavus* in improved and traditional granaries



# Modeling the contamination by aflatoxin to enable the prediction for early warning and mitigate the aflatoxin damages impact on traditional stored peanut trading.

- USA: [Keith Ingram], Gerrit Hoogenboom, University of Georgia:
- Mali: Bamory Diarra, Siriba Dioni Institut d'Economie Rurale, Bamako
- Benin: Bonaventure C. Ahohuendo, University of Abomey-Calavi, Cotonou



# Systems Research to Assess Risk of Preharvest Aflatoxin Contamination and to Develop Technologies to Reduce Aflatoxin Contamination

- Mali: Bamory Diarra, Siriba Dioni Institut d'Economie Rurale, Bamako
  - Benin: Bonaventure C. Ahohuendo, University of Abomey-Calavi, Cotonou
  - USA: [Keith Ingram], Vijendra Boken and Gerrit Hoogenboom, University of Georgia
- 

# Aflatoxin free Peanut-based Recovery and Functional Food: on-going

- Principal investigator (IP) : R Phillips
- J Chen, University of Georgia-GA Co-IP
- D Nakimugwe, University of Makerere-Ouganda Co-IP
- F Saalia, University of Ghana Legon-Ghana Co-IP
- B Diarra Institut d'Economie Rurale Mali Co-IP



# PVS-Kolokani (10 farmers)

Variety	Range (ppb)	Mean (ppb)
<b>ICG 6101</b>	<b>0.22 - 1.15</b>	<b>0.86</b>
<b>ICG 7</b>	<b>0.02 - 0.96</b>	<b>0.36</b>
ICG 6222	0.51- 4.27	1.86
ICGV 88274	1.64 - 11.29	5.87
ICGV 92093	2.17 - 12.45	6.71
55-437	0.06 - 2.45	1.02
<b>Fleur 11</b>	<b>70.89 - 118.18</b>	<b>92.49</b>
LSD	1.920	

# Aflatoxin (ppb) levels on different agronomic practices -Kolokani

Treatment/variety	55-437	JL24
<b>Lime 50 JAS</b>	<b>1.90</b>	<b>52.34</b>
2.5 t/ha of manure	2.07	64.06
2.5 t/ha of crop residues	3.28	126.59
Lime + crop residues	2.76	79.53
Manure + crop residues	4.20	90.64
<b>Farmer practice</b>	<b>6.21</b>	<b>190.84</b>
ES	1.220	

# Drying techniques



**Traditional**



**Improved method**



## Effect of drying on the level of aflatoxin (ppb) contamination - Kayes

Farmer	55-437			47-10		
	Trad	<b>Imp</b>	Red. %	Trad	<b>Imp</b>	Red %
Madou	11.65	<b>8.96</b>	23	79.52	<b>28.31</b>	64
Hassan	6.03	<b>3.25</b>	46	74.48	<b>27.01</b>	64
Bourama	10.32	<b>5.21</b>	50	71.31	<b>20.02</b>	72
Savado	8.08	<b>3.03</b>	63	60.08	<b>18.01</b>	70
Coumb	9.90	<b>2.32</b>	77	59.62	<b>15.73</b>	74
Kande	8.01	<b>1.67</b>	79	44.86	<b>14.28</b>	68
Seydou	5.78	<b>0.31</b>	95	12.32	<b>1.96</b>	84
Yaya	5.70	<b>2.17</b>	62	58.01	<b>21.53</b>	63

# Evolution of the level of Aflatoxin contamination of peanut in function of the time of pod removal after harvesting

Treatment	Aflatoxin (ppb) level			
	55-437	J11	JL24	Fleur 11
0 week	4.48	3.57	90.57	117.72
1 week	6.27	5.71	152.41	199.51
2 weeks	7.41	6.12	244.43	295.23

Thank You Very Much  
( A Ni Tché )

