Feed the Future Innovation Lab for the Reduction of Post-Harvest Loss

KANSAS STATE UNIVERSITY | IGP Institute
Department of Grain Science and Industry

FEED the FUTURE
The U.S. Government's Global Hunger and Food Security Initiative

USAID
FROM THE AMERICAN PEOPLE

Feed the Future IL RPHL -Ghana

Update and Year 2 Plans – Ghana Team

George Opit – Oklahoma State Univ., Project Lead
Sam McNeill – Univ. of Kentucky
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Shannon Washburn – KSU
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Irene Egyir – Univ. of Ghana
Kwabena Adu-Gyamfi – In-country logistics
Peter Evans Nsiah – Pens Food Bank

Feed the Future IL RPHL – Ghana

Five year timeline (2014 – 2018)

- Year 1
  - Conduct assessments of post-harvest systems in production regions with a focus on methods to reduce PHL
  - Identify areas where research is needed to reduce PHL of maize
  - Identify potential in-country partners

Feed the Future IL RPHL – Ghana

Five year timeline (2014 – 2018)

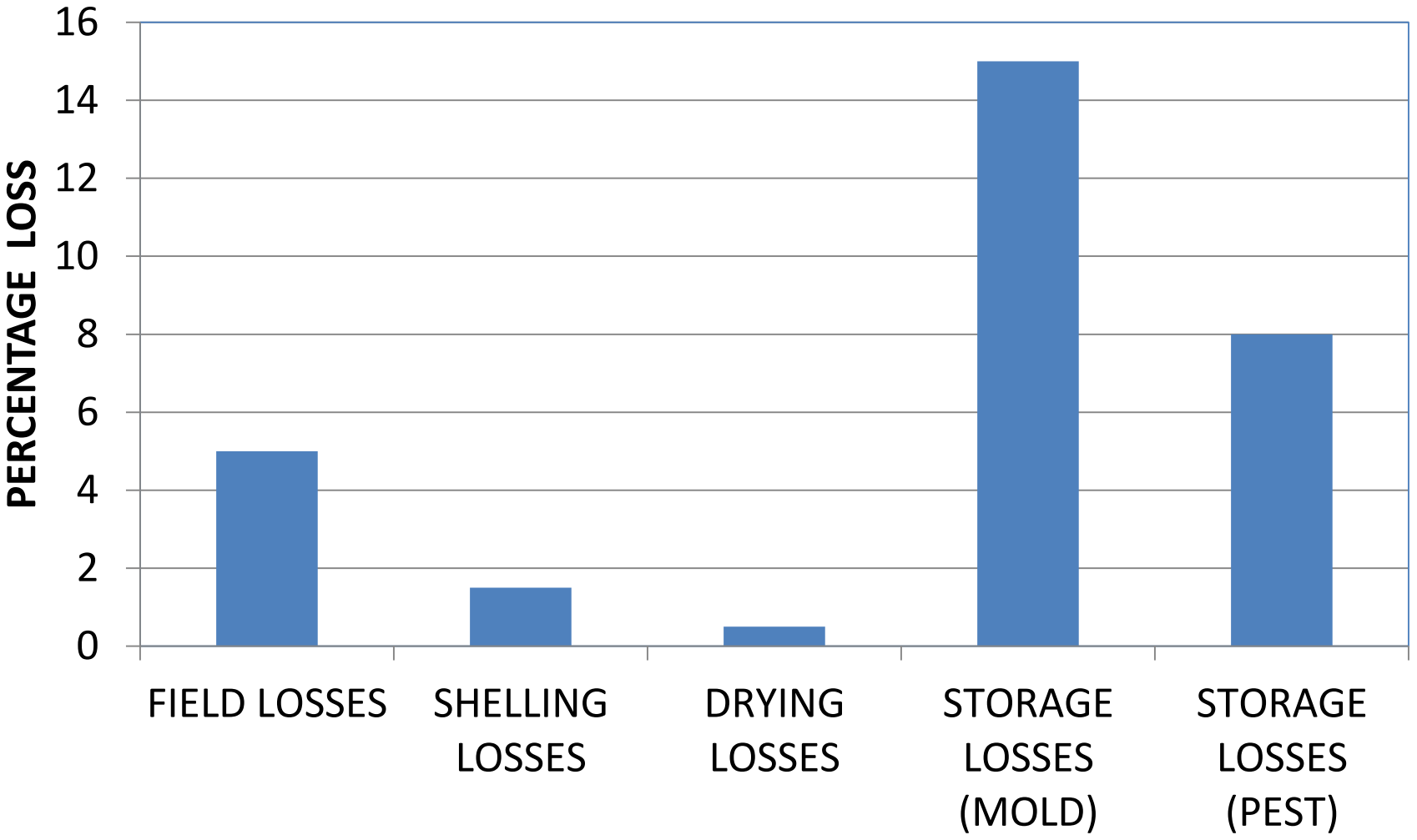
- Years 2 and 3
  - Conduct research on promising technologies and practices (pilot projects) (KNUST MS Students)
  - Cultivate relationships with in-country collaborators (ATT, RING, SPRING)

Feed the Future IL RPHL – Ghana

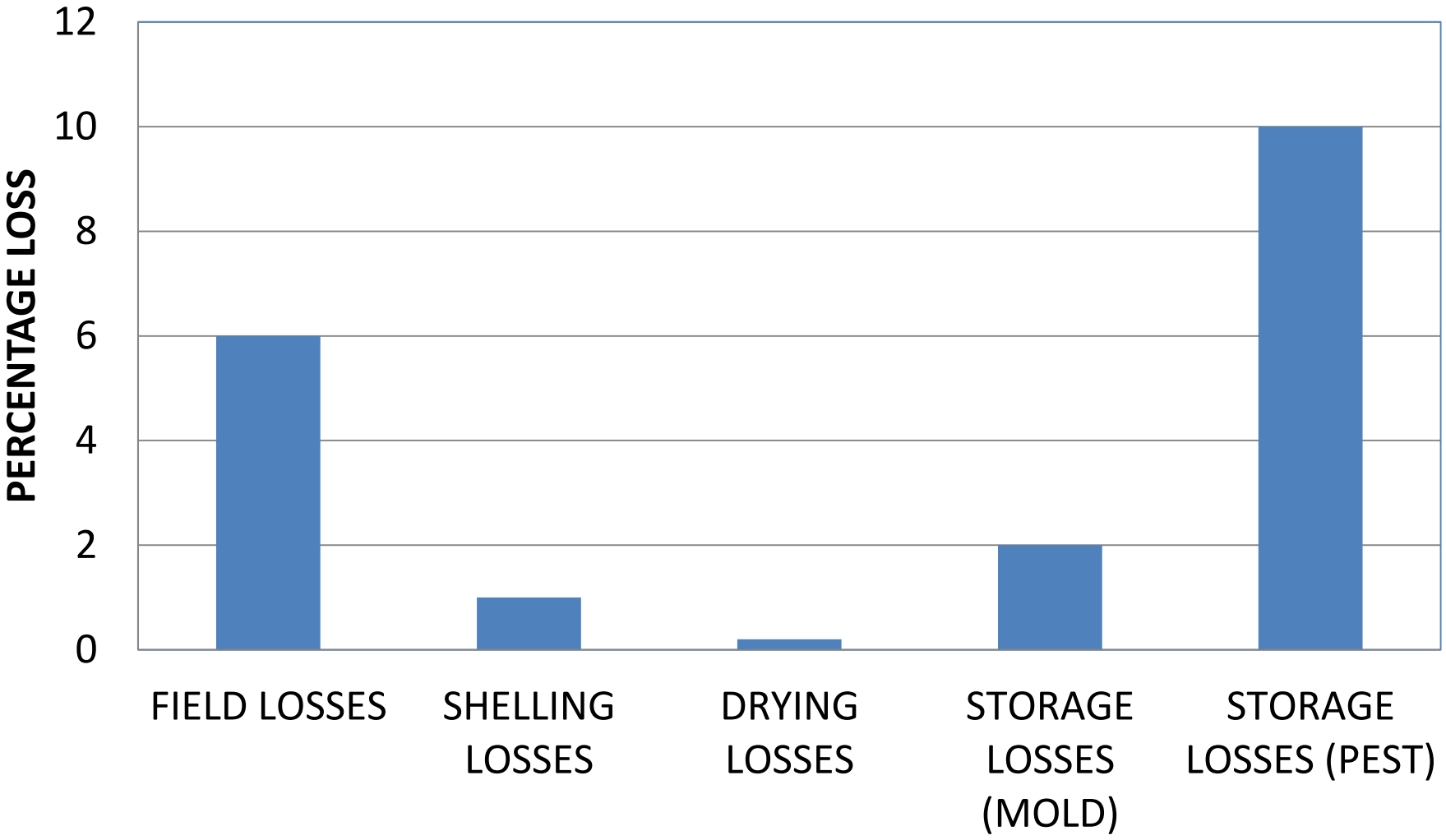
Five year timeline (2014 – 2018)

- Years 4 and 5
  - Conduct educational programs to share results of research and train extension leaders/other educators to reduce PHL of maize
  - Scale up research projects

PHL – Maize Middle Belt / Major Season



PHL – Maize Middle Belt / Minor Season



Equilibrium Moisture Content for Corn

Temp.	Relative Humidity, %							
C	20	30	40	50	60	70	80	90
21	6.9	8.4	9.9	11.3	12.8	14.4	16.4	19.4
27	6.5	8.0	9.4	10.8	12.3	14.0	16.0	18.8
32	6.1	7.7	9.1	10.5	11.9	13.5	15.5	18.4
38	5.8	7.3	8.7	10.1	11.5	13.1	15.1	17.9
43	5.5	7.0	8.4	9.7	11.2	12.8	14.7	17.6

Source: ASAE Data D245.4 / Average of two Prediction Eqns.

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Open solar drying


WELDING

Open solar drying

Solar ‘tent’ dryer

Greenhouse type dryer


BLACK BELT
POLYSACKS


POLYSACKS


GHANA GRAINS COUNCIL
CERTIFIED WAREHOUS
USAID
GT 1

Warehouse Storage

Warehouse Storage

USDA - ARS Moisture Meter

MS Entomology Projects

- James Kofi Danso
  - Evaluation of maize moisture content and aflatoxin levels from farms to warehouses
    - Measure MC at farms and markets
    - Track grain moisture during drying
    - Determine aflatoxin levels at farms, markets, and warehouses
    - Observe insects in plastic silos at FBOs for 4 months (minimum)

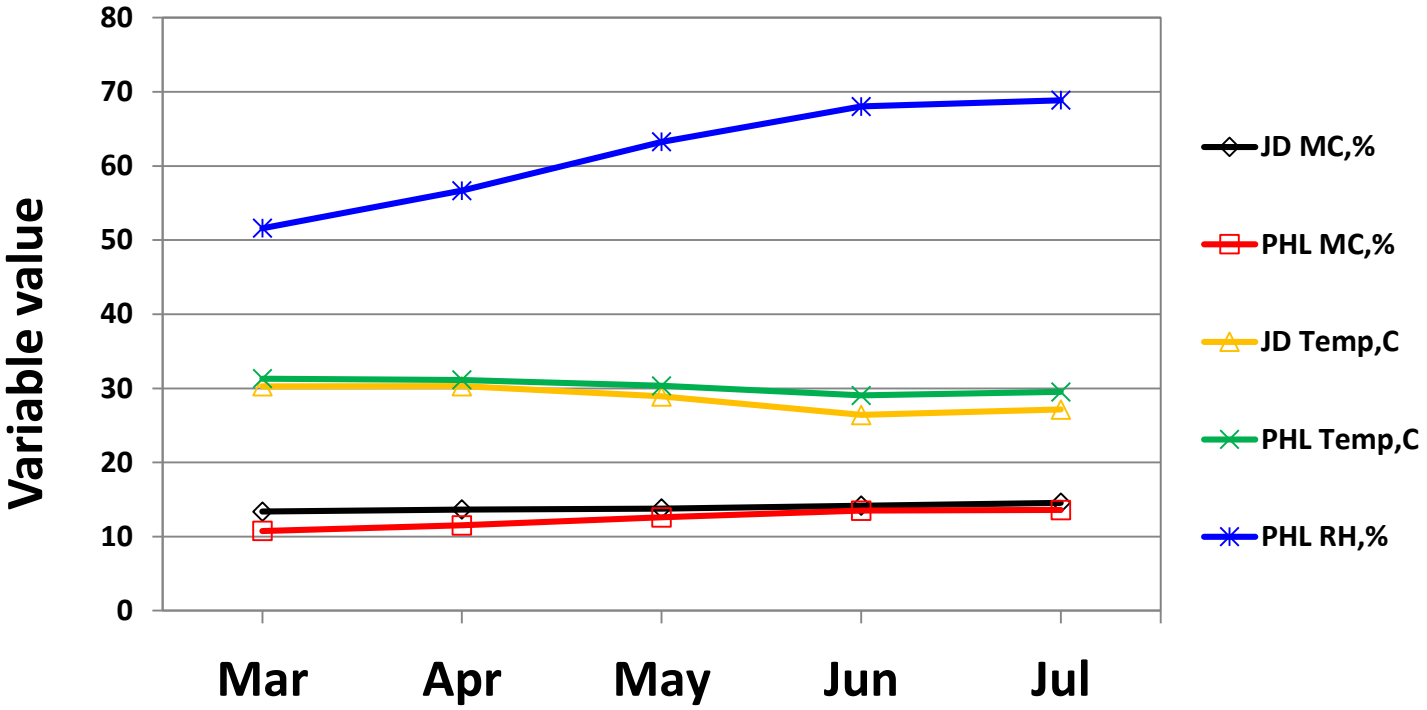
- Naomi Manu
  - Evaluation of stored-product insect populations along the maize value chain
    - Collect maize samples from farms and markets during the major and minor seasons and determine the number and species present
    - Measure stored-product insect infestation levels before and after solar drying
    - Determine insect levels during warehouse storage

Year 2 Activities

- Follow progress of MS students and advise as needed on various aspects of their study
- Paul and Sam trained students at KNUST to operate with the Solar Bubble Dryer and Romer mycotoxin analyzer
- Achint Sanghi and Isaac Addo tested the SBD in the Middle Belt Sep, Nov, and Dec
- Meet with Technology Research and Implementation Team (TRI) and Engagement and Advisory Team
- Cultivate opportunities to collaborate with other USAID-funded projects (Africa RISING, RING, SPRING, ATT)

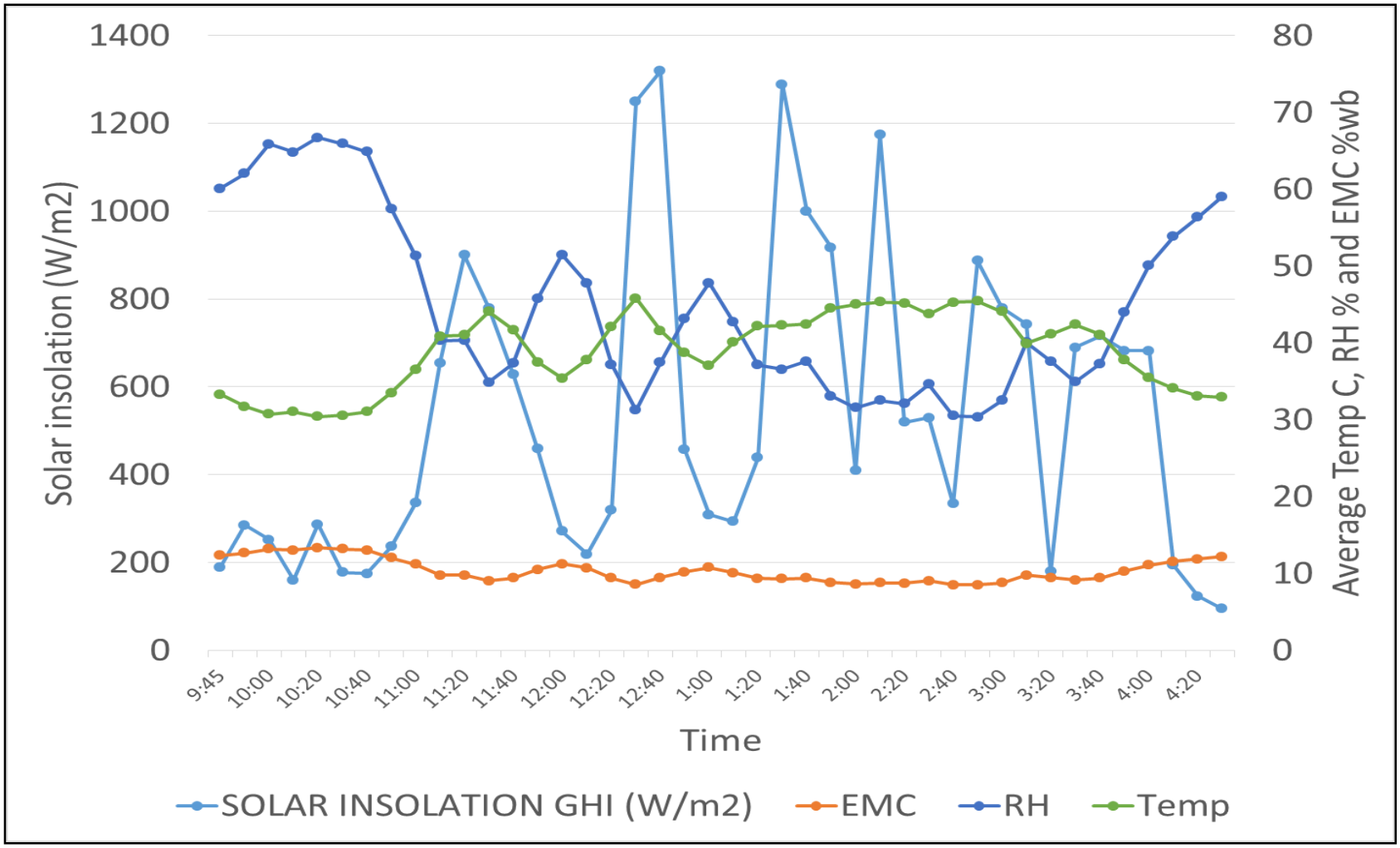

TOYOTA

Comparison of JD and PHL Meters



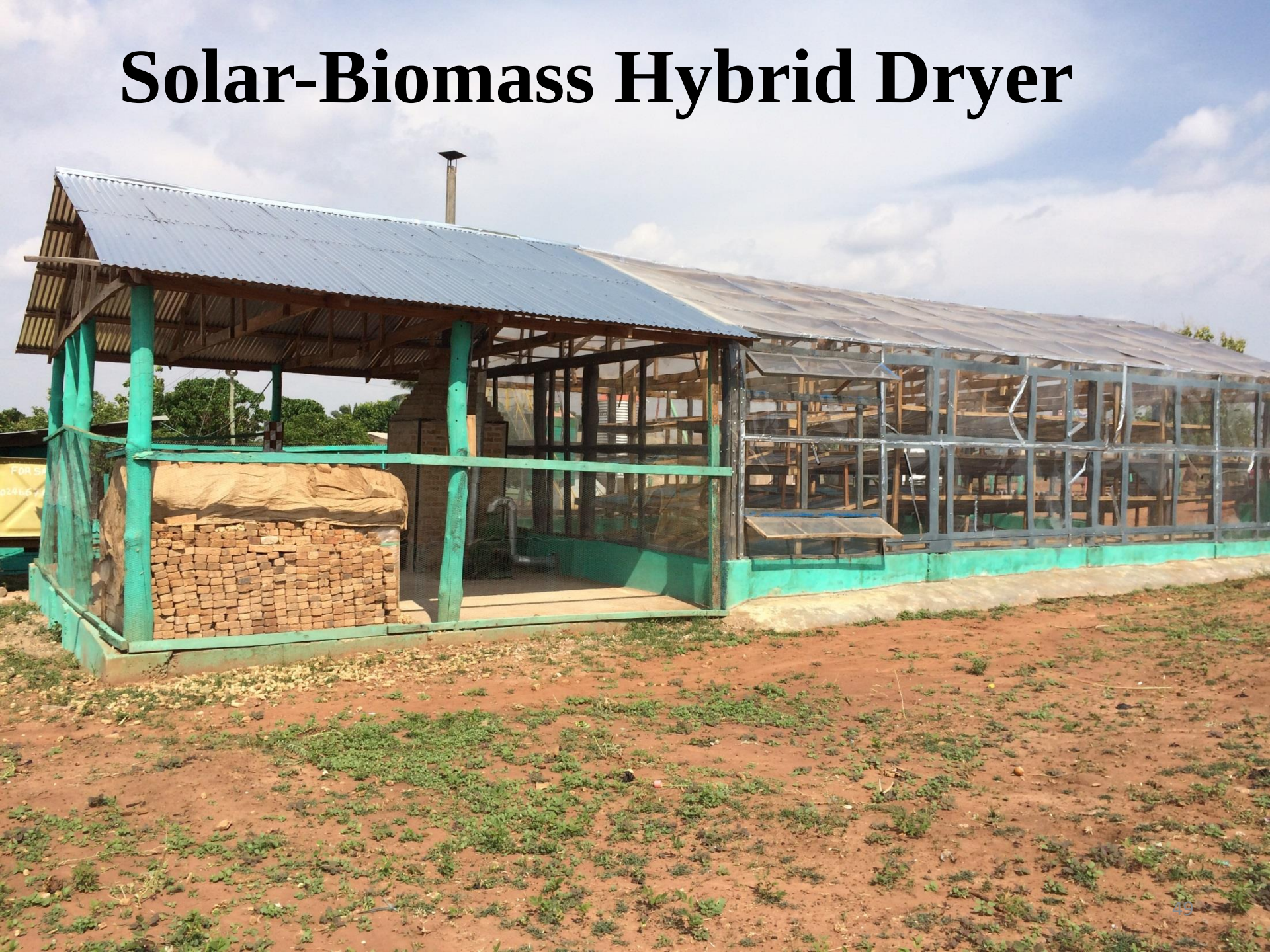
SBD for Grain Sorghum in Wenchi

SBD for Grain Sorghum in Wenchi



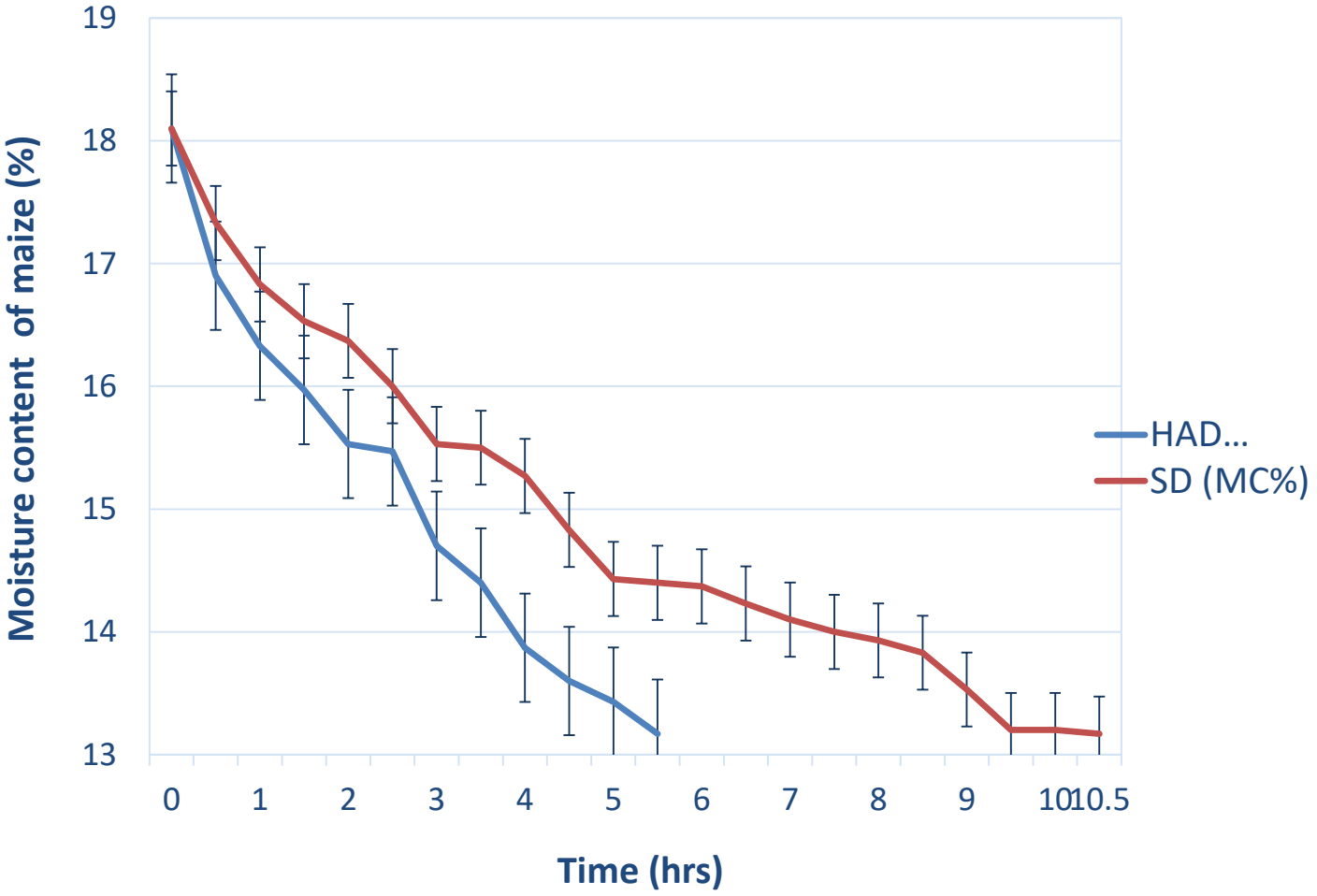
PHL-IL Poster presentations

Solar-Biomass Hybrid Dryer

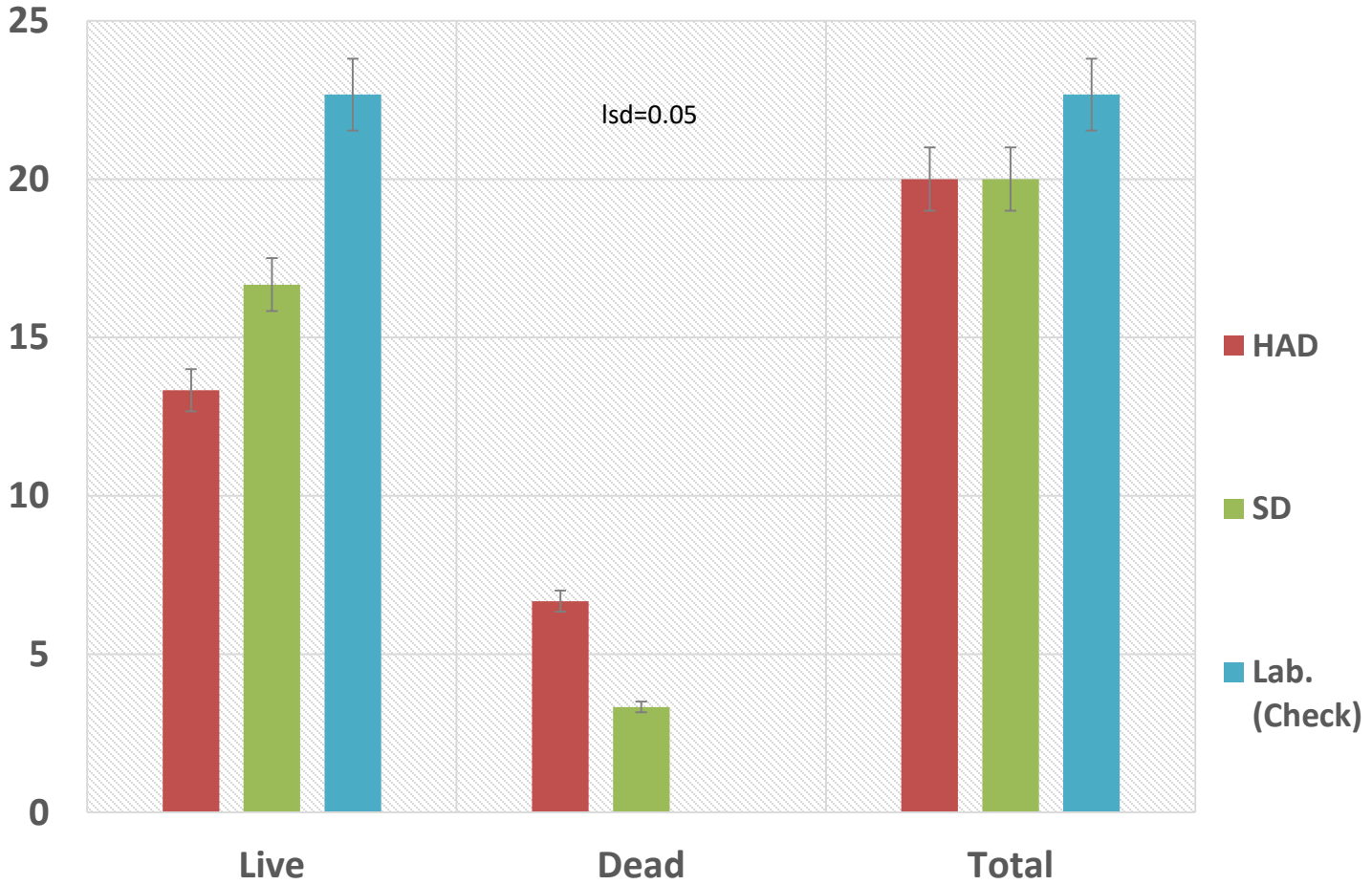


Drying Racks Filled in SBHD

Drying Maize in Ejura

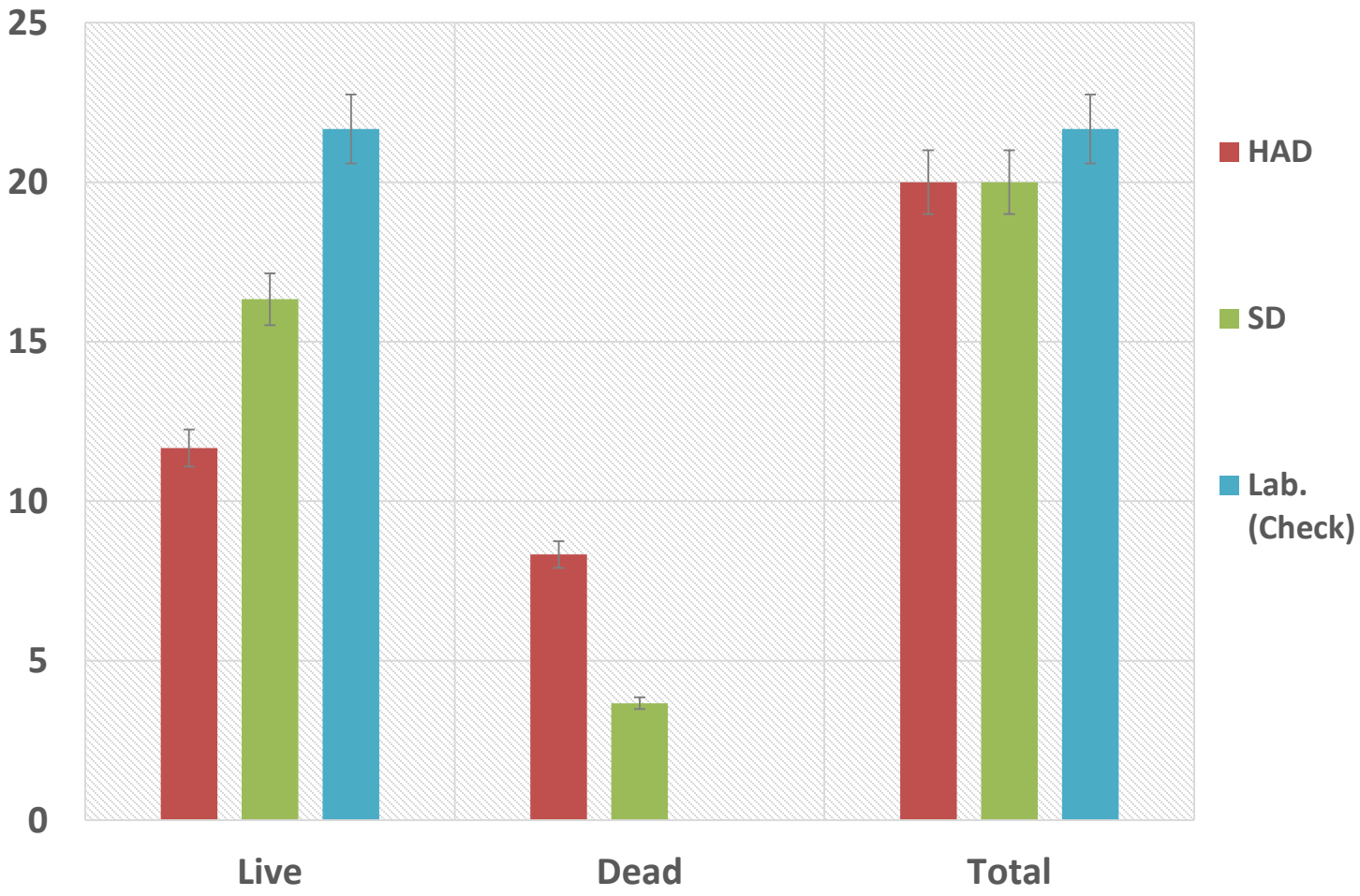


Insect Survival Data – *Sitophilus sp.*



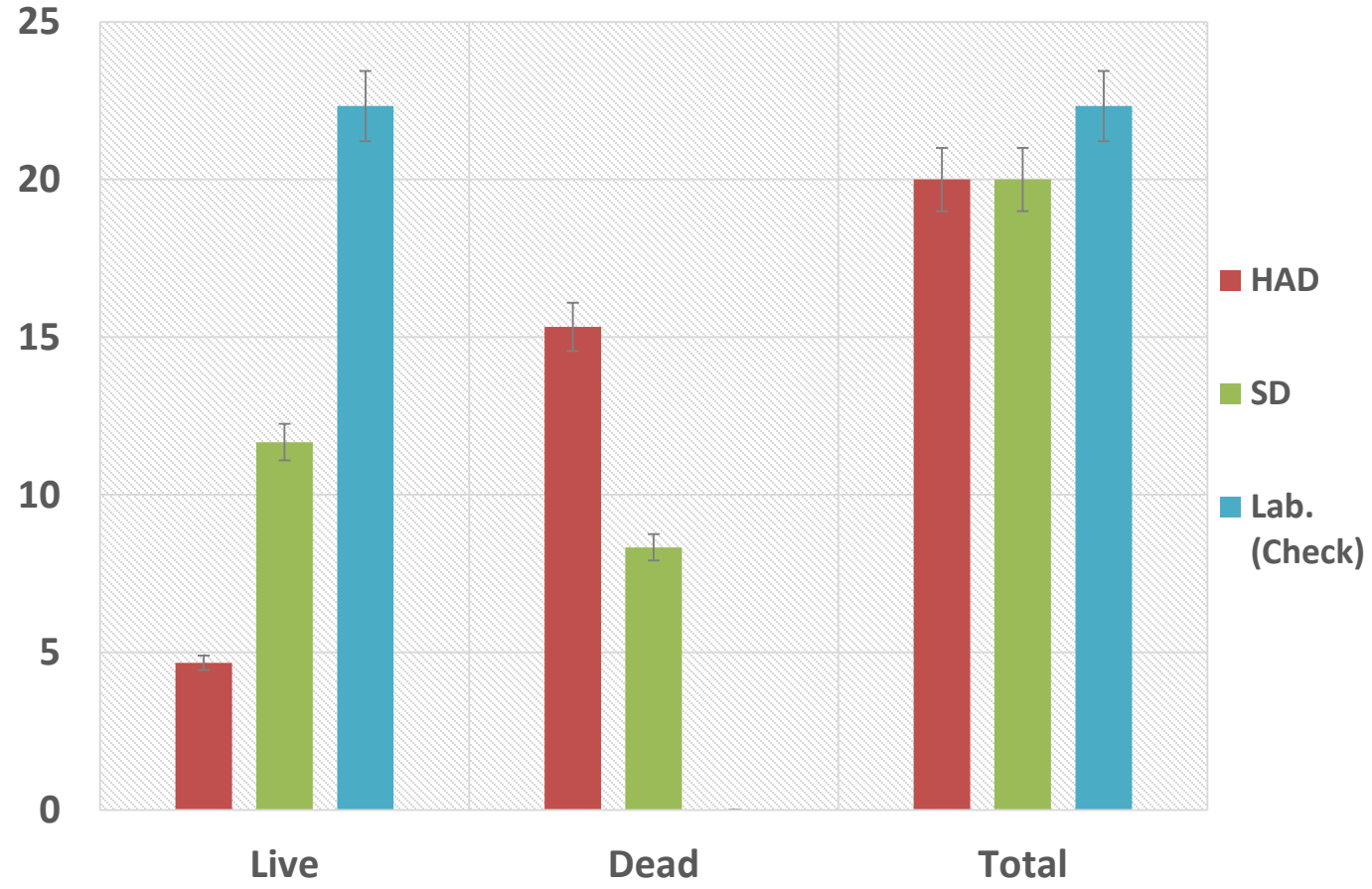
Mean number of *Sitophilus* sp. after drying.

Insect Survival Data – *Tribolium sp.*



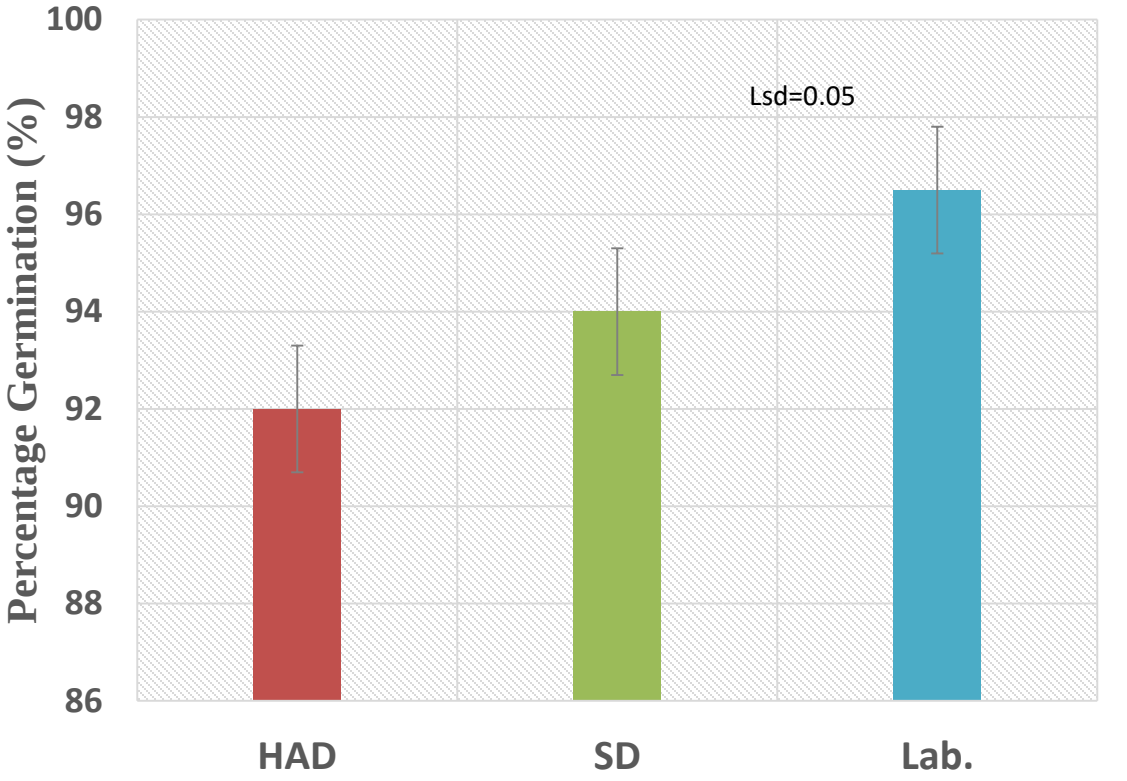
Mean number of *Tribolium* sp. after drying.

Insect Survival Data – *Cryptolestes sp.*

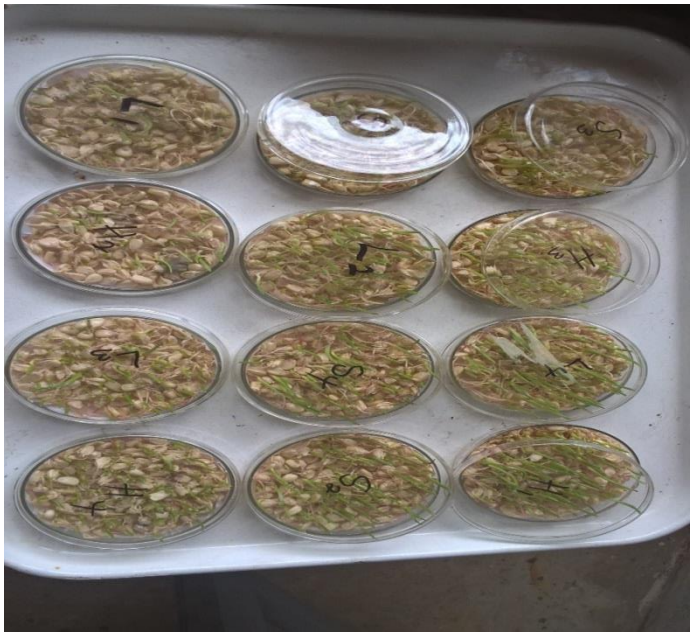


Mean number of *Cryptolestes sp.* after drying.

Germination data



Mean percentage germination of maize (4 reps).



Data sheets for drying tests

	Sampling	USDA sensor			JD		
Time	Location	Temp.	RH, %	MC1, %	MC2, %	Observations	Initials
10:30	Inlet	30.1	62.5				
	2.0	30.8	82.2	16.1	16.8		
	7.0	32.1	78.0	15.1	18.1		
	12.0	32.3	86.2	17.1	20.6		
	17.0	31.5	82.0	16.0	19.8		
	22.0	32.6	86.8	17.3	17.5		
	Outlet	30.6	74.5				
11:30	Inlet	36.1	47.1				
	2.0	44.3	32.2	10.4	17.6		
	7.0	49.1	55.2	15.0	19.5		
	12.0	37.8	86.2	17.3	20.0		
	17.0	38.2	78.7	16.0	20.6		
	22.0	32.6	81.0	17.3	17.5		
	Outlet	41.7	41.2				

Data sheets for storage studies

Grain monitoring data for Ghana. **GPS**

Town: Ejura Latitude: 7.3928 N

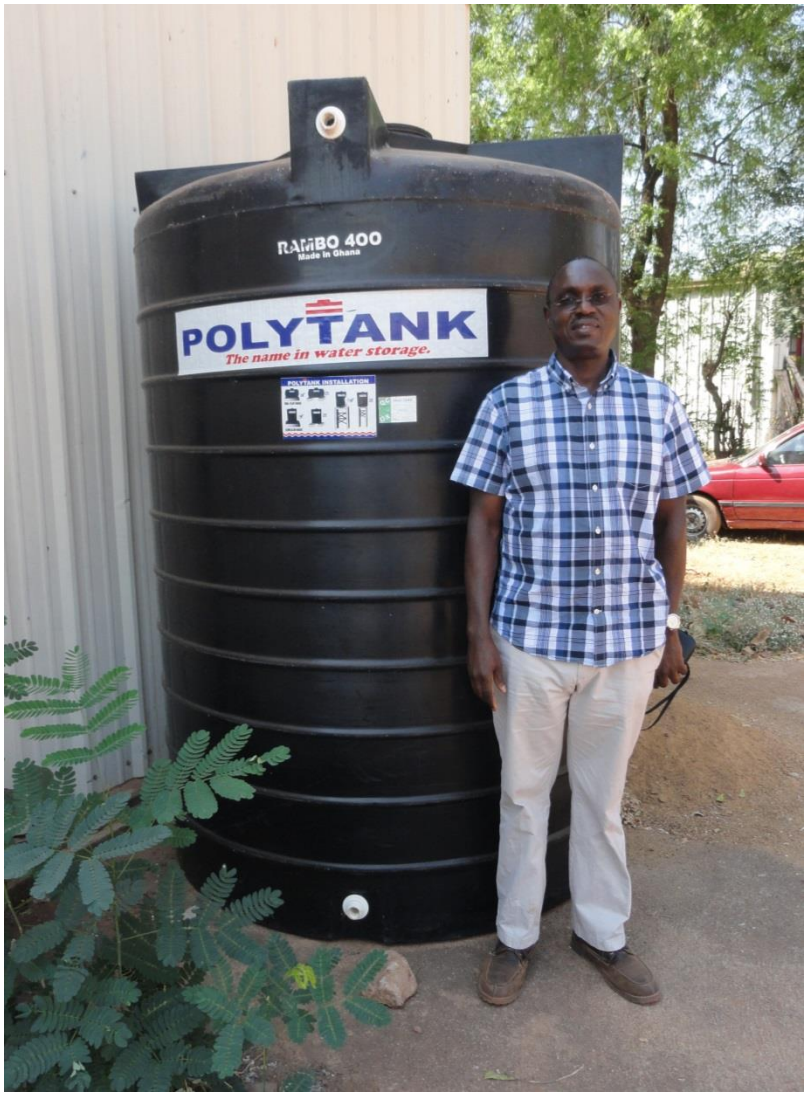
Storage: Bags in warehouse Longitude: 1.3833 W

Date	Location	Grain	Temp.	RH, %	MC1, %	MC2, %	Insects	Moulds	Off odor	Discolored	Broken kernels	Foreign material	Other grains	Observations	Initials
19-Jun-15	Mbanaa	Wht Maz	31.8	63.1	12.6	13.7					x	x			
19-Jun-15	Asubuoso	Wht Maz	31.7	62.6	12.1	13.0	x				x	x		LGB - watch closely next time.	
19-Jun-15	Nokware Asa	Wht Maz	31.9	62.8	11.6	12.5					x	x			

Grab Samples from 2 Locations

PICS triple layer poly bag

Storage Tanks/Bins




PHL-IL/PENS SILOS
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