



Pigeon Peas Case Study

**BAM-FX™ Treatment Results in Resistance to Fungal Infections in Pigeon Peas
India, April 2017**

Introduction

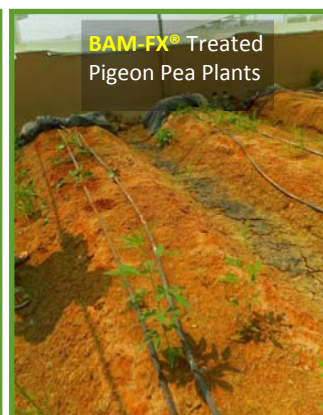
Pigeonpea [*Cajanus cajan* (L.) Millsp.] is a perennial member of the family leguminosae. It is a multi-purpose species and is extensively used as food grain and green manure crop for soil fertility amelioration in local cropping systems. Other common names are “**Red gram, Congo pea, Gungo pea, Gunga pea, and No-eye pea**”. It is an important grain legume crop of rain-field agriculture in the tropics and subtropics. Compared with other grain legumes, pigeonpea ranks only sixth in area and production, but it is used in more diverse ways than others. Many fungal diseases, involving 45 pathogens, are known; the most serious is wilt disease (*Fusarium udum*),. This fungus enters the plant through the roots and may persist in soilborne stubble for a long time. Rotation with tobacco and intercropping with sorghum is said to decrease the wilt problem. Fungi reported from seeds of Peageon pea are *Alternaria sp.*, *Aspergillus sp.*, *Colletotrichum lagenarium*, *Coleophoma empetri*, *Fusarium equiseti*, *Macrophomina phaseolina*, *Myrothecium roridum*, *Rhizoctonia solani*, *Rhizopus sp.*, and *Sclerotium rolfsii*.



Fungal infected **Control** Pigeon Pea plants



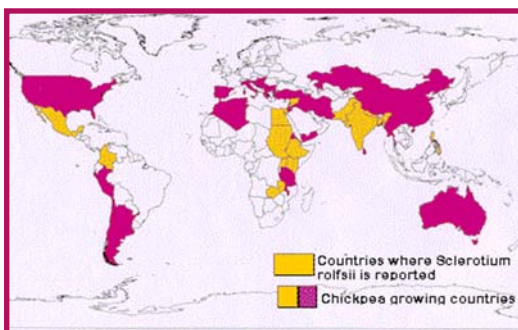
BAM-FX® treated Pigeon Pea seeds survive and grow



Experimental Approach

Collar Rot

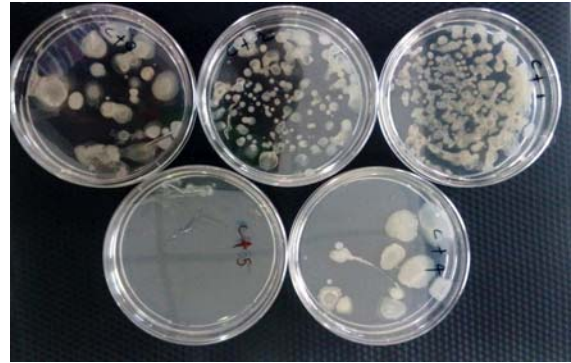
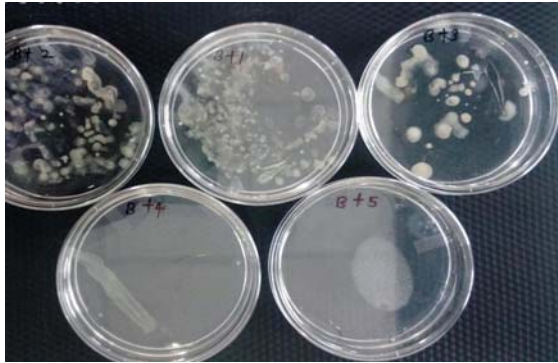
This disease is present in about 14 countries. The pathogen attacks about 100 crop species including vegetables, ornamentals and horticultural crops.



Observations

Untreated control showed root rot disease in 98% of cases while the treated seeds showed only infection in only 0.025% (10 out of 100 plants).

The pathogens were isolated and identified as *Aspergillus* sp, by DNA sequencing.



Significance

Treatment of seeds with **BAM-FX** for a short period (3 hours) resulted in resistance to fungal infection for the entire crop cycle.

Current Activities

We are currently investigating the gene expression associated with **BAM-FX** induced biotic resistance. Initial results show at least three new proteins expressed in **BAM-FX** treated seedlings.

These studies were performed by Nurture Earth Pvt. Ltd, Aurangabad, India

Additional Notes on BAM-FX Induced Biotic Resistance

BAM-FX treatment has been shown to induce resistance to fungal infestation in grape vine in a study conducted in collaboration with Pengali Vine and Grape Authorities in China

Effect of BAM FX[®] Spraying on Pigeon Peas

Market rate 66 (US\$/100kg) - Date: Feb. 1, 2017

Plot #	Treated/ Untreated	Yield (kg)	Yield Improvement	Plot size (in acres)	Market rate (per kg)	
I	BAM-FX treated	350	16.67%	0.75	\$ 0.66	
I	Untreated	300		0.75	\$ 0.66	
II	BAM-FX treated	110	6.80%	0.5	\$ 0.66	
II	Untreated	103		0.5	\$ 0.66	
III	BAM-FX treated	107	12.63%	0.5		
III	Untreated	95		0.5		
Total	BAM-FX Treated	567		1.75	\$ 0.66	\$374.22
Total	Untreated	498		1.75	\$ 0.66	\$328.68
	Average Yield Improvement		14%		\$ 0.66	\$45.54
Notes:						
No pre-flowering spray						
Only two sprays post flowering and pre-harvest applied						
Prescribed qty. of BAM-FX to be used in liters/acre for all three sprays				0.443	0.77525	
Actual qty. of BAM-FX used in liters/acre for two sprays				0.2924	0.511665	
Purchase Price of Customer (US\$/liter)				\$15.38		
Cost of area covered by BAM-FX trial						\$7.87
Labor charges for spraying @ 50 hrs./acre for 2 sprays						\$2.77
Total Cost						\$10.63
Additional Revenue						\$45.54
Additional Cost						\$10.63
Net benefit						\$34.91
Benefit vs. Cost						328.23%