IARI Regional Station, Pusa (Bihar)

Disease Scenario in NEPZ (Jharkhand) with reference to Hybrid Rice

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Public-Private Partnership

Coming together is beginning

Keeping together is progress

Working together is success

Henry ford

Why and what is the need??

- Diminishing area
- Biotic & Abiotic stresses
- Increasing demand, decreasing supply
- Estimation of losses
- How to minimise it
- Eastern India- a ray of hope

Hybrid Rice

20-30% yield advantage

65% area in China

Area ~ 2mha ??

Methodology

- Survey in Identified areas
- Recording of Diseases
- Recording of other parameters
- Comparison

Most Widely Cultivated Rice Hybrids in India

1. PA 6444
2. PHB 71
3. PA 6201
4. KRH 2
5. Pusa RH 10
6. Sahyadri etc

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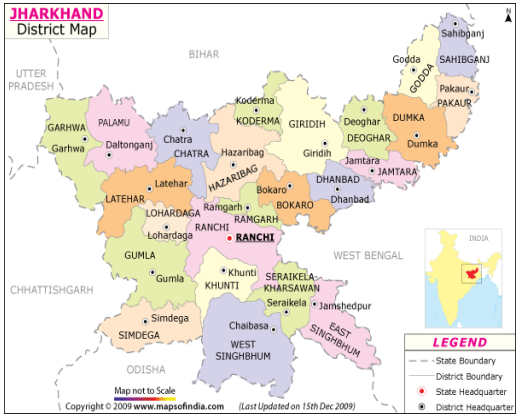

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Hybrid Rice Testing trials

Jharkhand


RANCHI
Jharkhand
JHARKHAND
District Map
BIHAR
UTTER PRADESH
CHHATTISHGARH
ODISHA
WEST BENGAL
Sahibganj
Godda
SAHIBGANJ
GODDA
Pakaur
PAKAUR
Koderma
KODERMA
GIRIDIH
Deoghar
DEOGHAR
DUMKA
Dumka
GARHWA
Garhwa
PALAMU
Daltonganj
Chatra
CHATRA
Hazaribag
Giridih
Jamtara
JAMTARA
HAZARIBAG
Latehar
LATEHAR
Bokaro
BOKARO
DHANBAD
Dhanbad
Ramgarh
RAMGARH
LOHARDAGA
Lohardaga
RANCHI
GUMLA
Gumla
Khunti
KHUNTI
SERAIKELA-KHARSAWAN
Seraikela
Jamshedpur
Simdega
SIMDEGA
Chaibasa
WEST SINGHBHUM
EAST SINGHBHUM
INDIA
LEGEND
State Boundary
District Boundary
State Headquarter
District Headquarter
Map not to Scale
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(Last Updated on 15th Dec 2009)

Survey (Ranchi)

4 Blocks

1.Kanke

2.Ratu

3.Mandar and

4.Namkom

Most prominent diseases in HR

1. False Smut

2. Blast

3. Brown spot

False Smut

Disease Scenario in Jharkhand (District – Ranchi)

Variety	Disease Incidence						
	BLB	False Smut	Brown spot	Sheath Blight	Blast	Grain types	Yield (q/ha)
	% leaf area damage	% Infected Florets	% leaf area damage	% Plant Area Damage	% leaf area damage		
PA 6444	1.2	12.3	3.5	Trace	4.2	M	67.4
Lallat	5.4	2.1	5.1	8.6	15.5	M	33.6

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Bihar

Survey

Bihar – Samastipur & Muzaffarpur

4 Blocks (Pusa, Morsand; Sakra, Musahari)

Prominent diseases:

1. **Brown Leaf spot**
2. **False smut**
3. **BLB**
4. **Sheath Rot**

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Brown spot symptoms

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Brown spot Infected Panicles

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Disease Scenario in Bihar (District – Samastipur & Muzaffarpur)

Variety	Disease Incidence						
	BLB	False Smut	Sheath Rot	BLS	Stem Borer	Grain types	Yield (q/ha)
	% leaf area damage	% Infected Florets	% Affected Tiller	% leaf area damage	% White Heads		
PA 6444	5.4	6.3	2.2	12.5	2.9	M	69.7
RajendraMahsuri	16.4	2.4	5.7	20.6	3.8	F	37.8

Uttar Pradesh

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Survey

Western U.P- Bijnor Districtt

4 Blocks (Kotwali, Dhampur, Afjalgarh, Nazibabad)

Prominent diseases:

1. Bacterial Leaf Blight
2. False Smut
3. Sheath Rot
4. Sheath Blight

Bacterial leaf blight

Disease Scenario in Western U.P. (District – Bijnor)

Variety	Diseases Incidence						
	BLB	False Smut	Sheath Rot	Sheath Blight	Blast	Grain types	Yield (q/ha)
	% leaf area damage	% Infected Florets	% Affected Tiller	% Plant Area Damage	% leaf area damage		
PA 6444	20.4	14.3	4.2	6.5	trace	M	71.7
Sharbati	46.4	11.4	25.7	28.6	17.5	F	37.8

Why plant disease epidemiology?

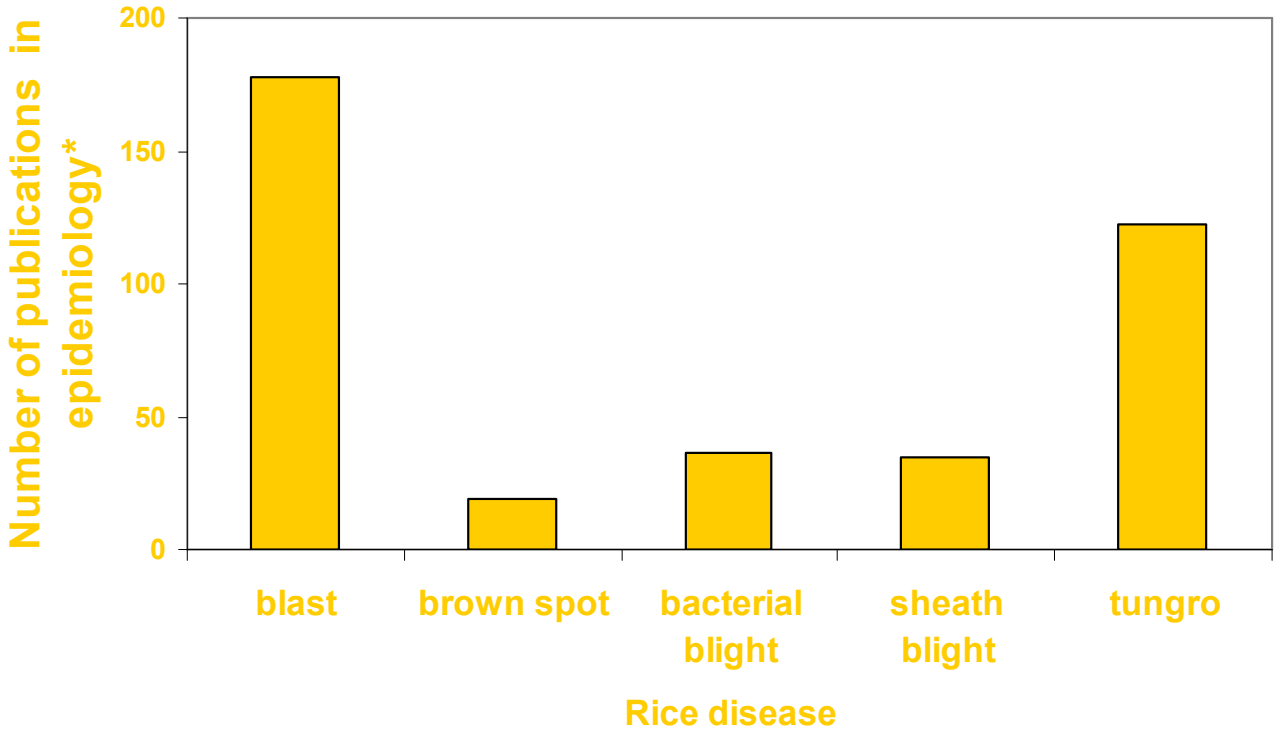
1. To predict epidemics which will inevitably occur (possibly new diseases) tomorrow.
2. Climate change labour resource, naturalresources, energy shortage.
3. New approaches are required for emerging diseases.

Pertinent questions

1. Why do some diseases take off, whereas others do not?
2. Why do some strains, races, or pathotypes die out, some coexist, and others come to dominate pathogen populations?
3. How does the inherent variability associated with epidemics translate into risk?
4. Given that new infections occur at the small scale but epidemics are manifest at the large scale, how can we scale from individual to population behavior?
5. How can this information be used to identify control methods?
6. How can this information be used to optimize the efficient deployment and durability of control methods?
7. How does the way we grow and protect our crops or manage our natural and seminatural environment affect these outcomes?

Ref: Gilligan & van den Bosch, 2008. Annu. Rev. Phytopathol. 246:385-418.

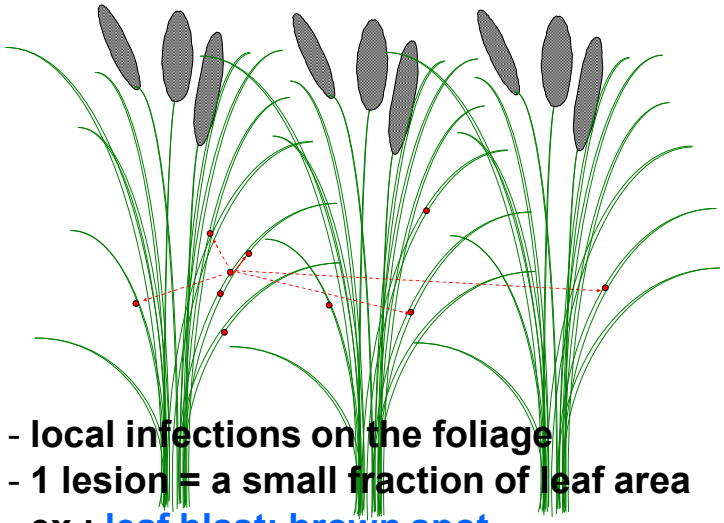
Diversity of rice diseases



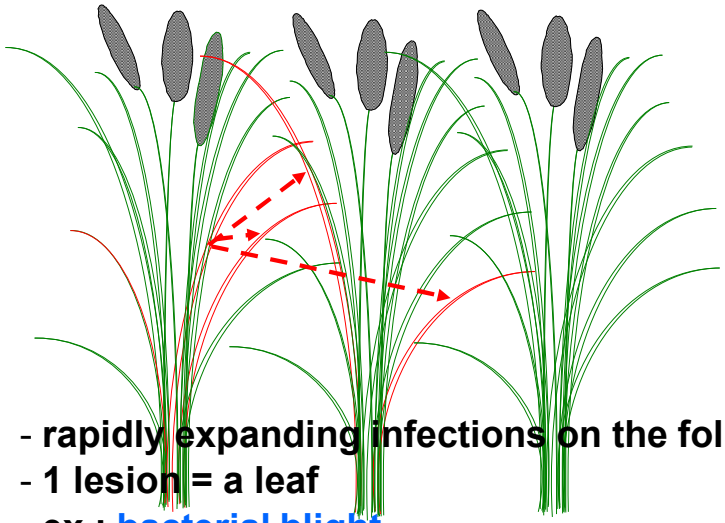
* Journal articles, books, and book chapters in CAB Abstracts (1973- current)

S. Savary et.al 2008

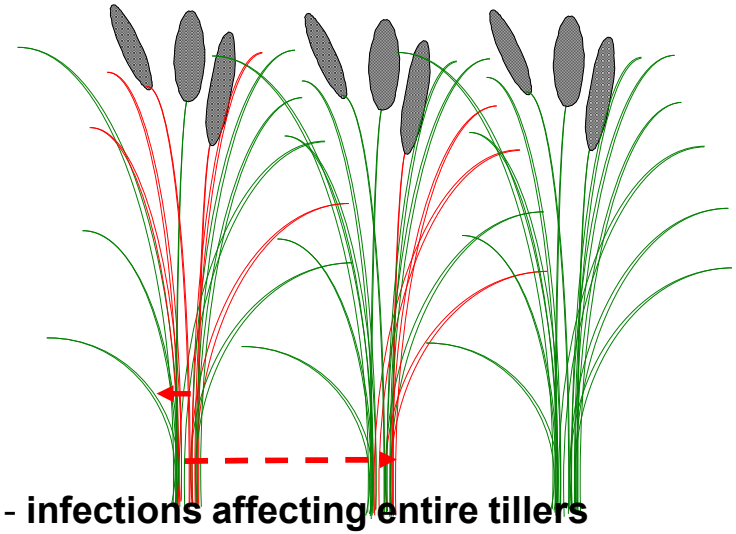
Spatial scales of plant disease epidemics



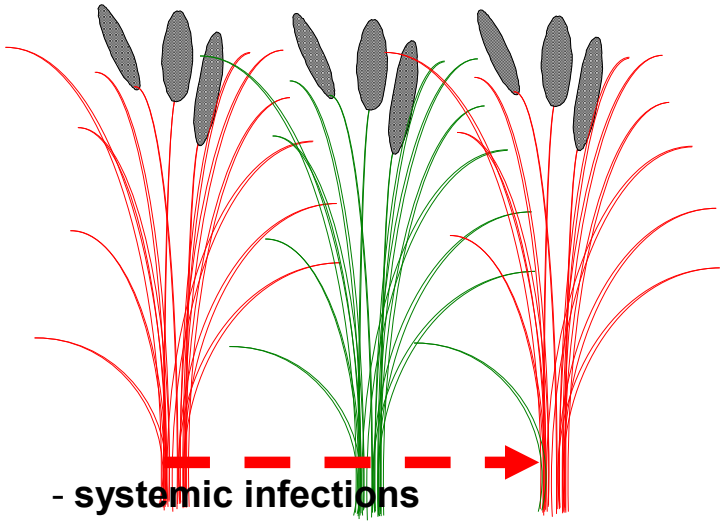
- local infections on the foliage
- 1 lesion = a small fraction of leaf area
- ex.: leaf blast; brown spot



- rapidly expanding infections on the foliage
- 1 lesion = a leaf
- ex.: bacterial blight



- infections affecting entire tillers
- 1 lesion = a tiller
- ex.: sheath blight



- systemic infections
- 1 lesion = a plant
- ex.: tungro

S. Savary et.al

Limitations

1. Yield advantage far less than expected.
2. Inconsistency in yield performance.
3. Less acceptable cooking quality.
4. Lack of productive hybrids for medium late and late conditions.
5. Lesser price for hybrid rice.
6. Threats to native biodiversity.
7. Hybrids to respond at low inputs lacking.

Future thrusts

1. Basic studies are required for emerging diseases.
2. Good Cooking quality parameters.
3. Higher subsidies to small and marginal farmers.
4. Research on hybrids responding to low inputs.

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Young Scientist fast track project

"Development of diagnostics for detection of *Bipolaris oryzae* in India by molecular markers and its eco friendly management".

DST, Govt Of India

3 years

Rs 21 lakhs only

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Co- authors

&

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What the caterpillar calls the end

the butterfly calls the beginning

Thanks for the patient hearing