

# The changing population structure of Late Blight pathogen in India necessitates continued surveillance

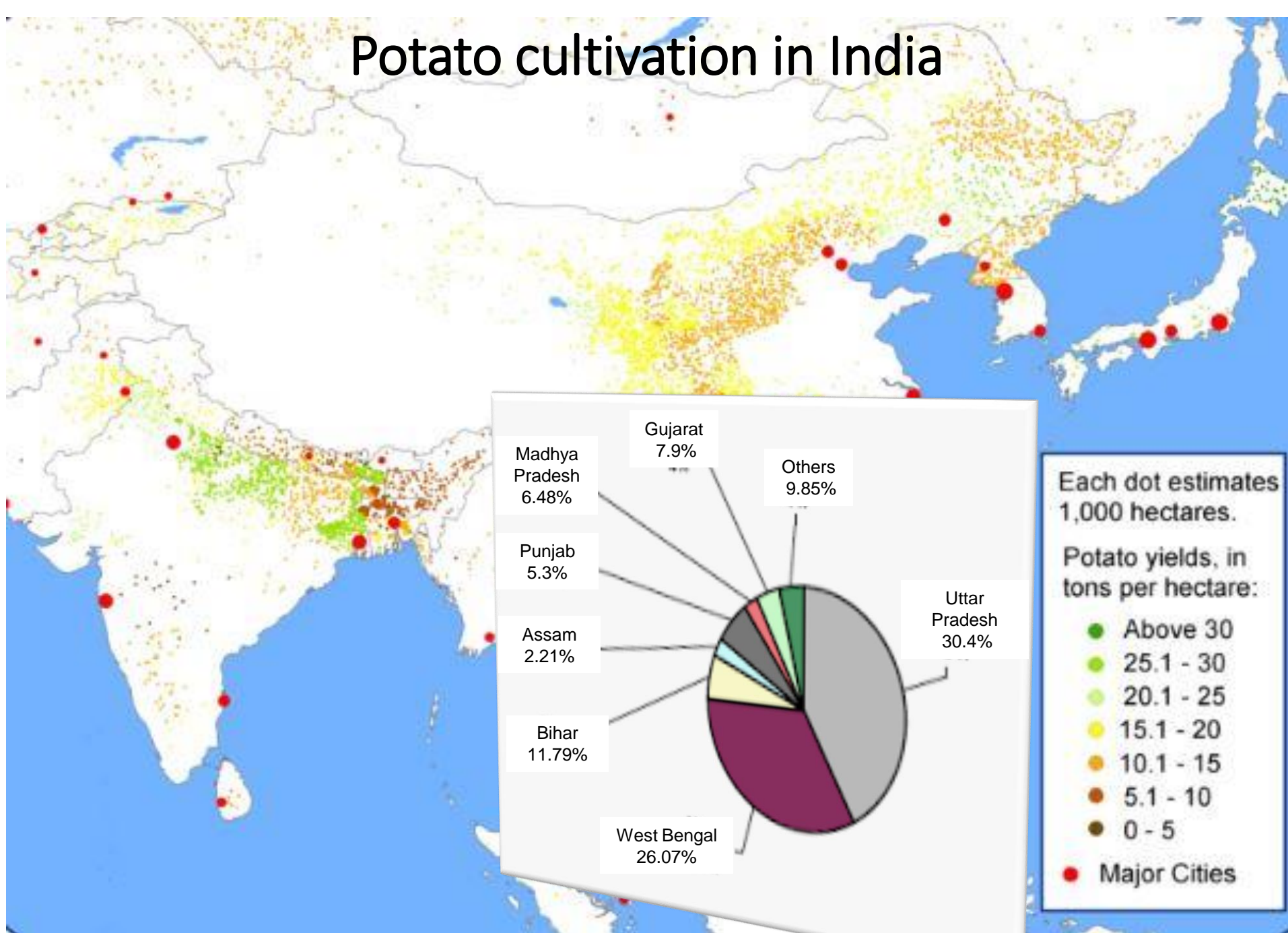
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Country coordinator (India), AsiaBlight  
&  
Professor & Head



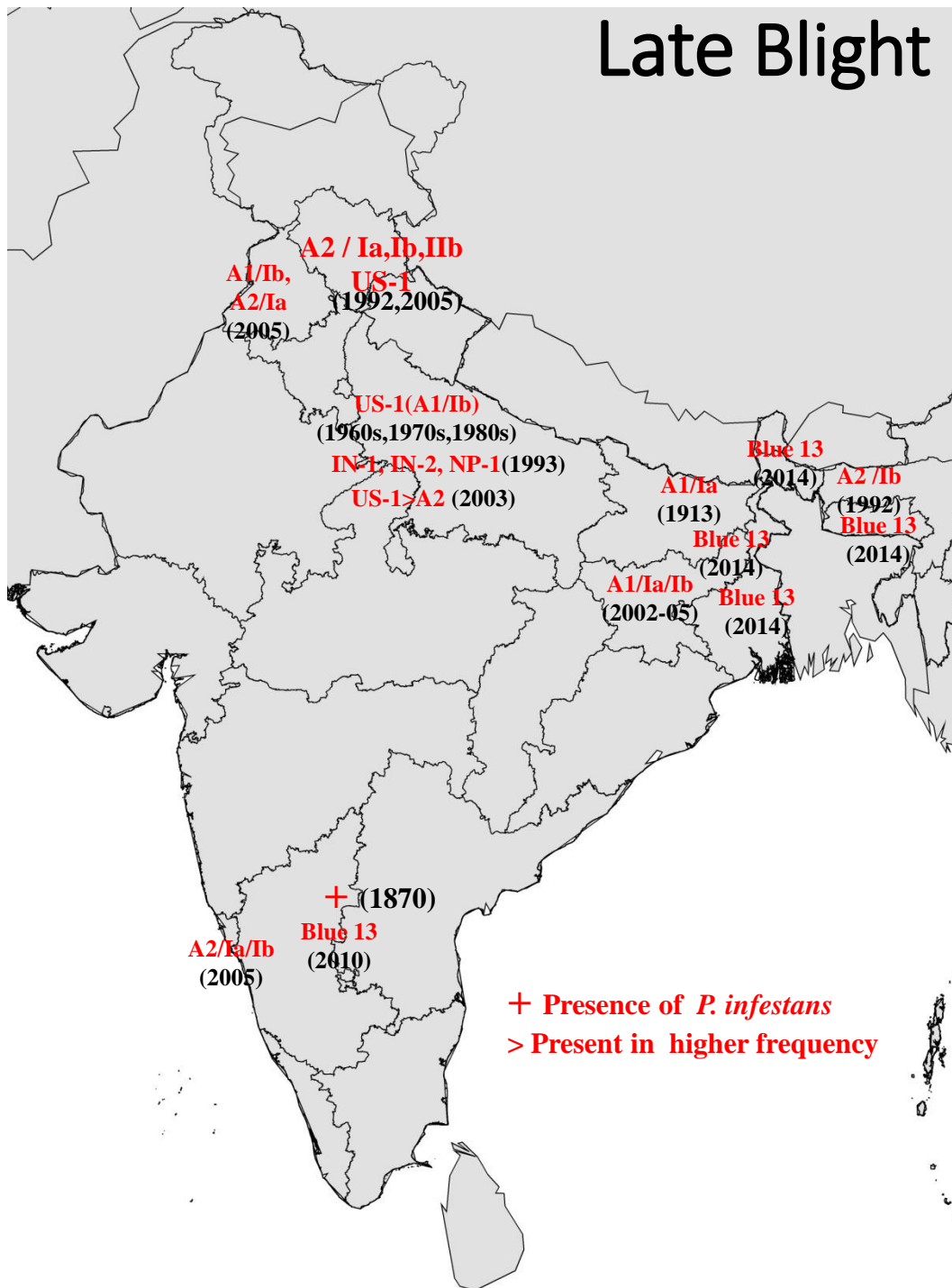
DEPARTMENT OF BOTANY  
WEST BENGAL STATE UNIVERSITY  
KOLKATA-700 126, W.B., INDIA

# Potato cultivation in India



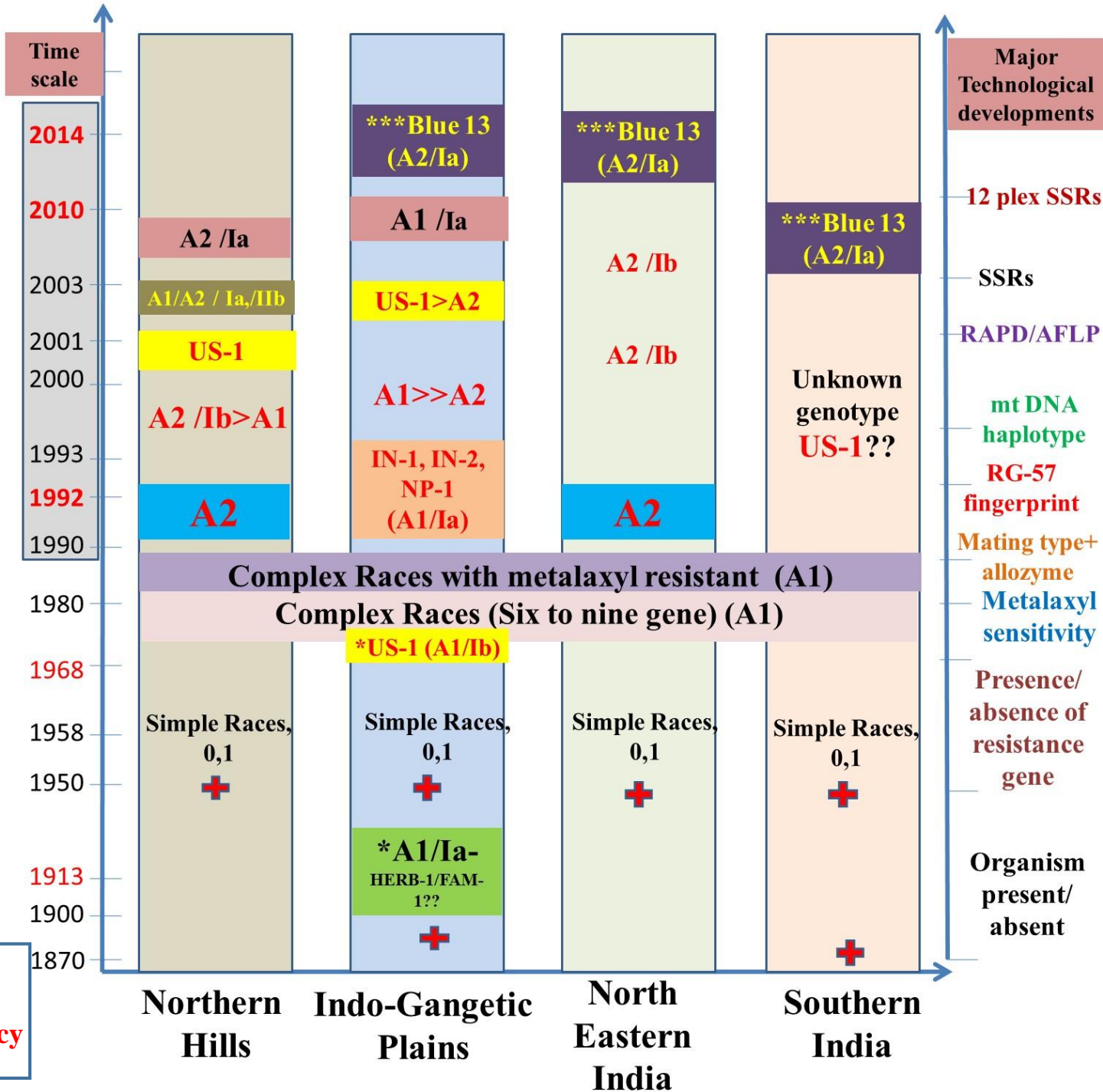
Regional distribution of potato cultivation in India (Modified from CIP, World Potato Atlas)

# Late Blight populations in India



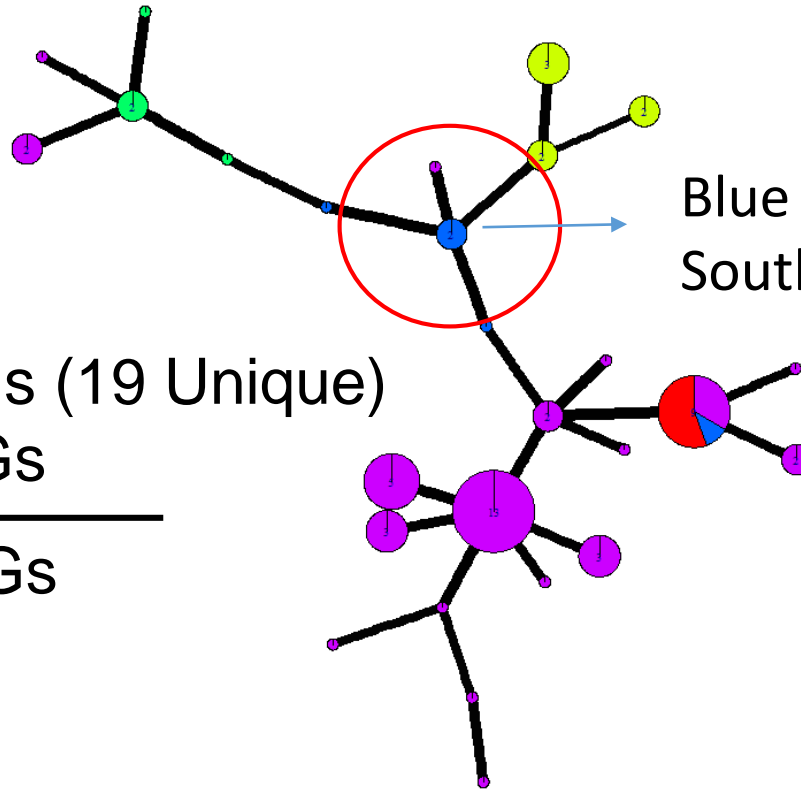
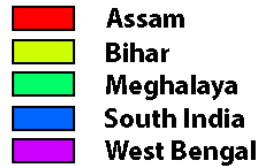
Year	Genotype	Locations
1913	<b>la</b> haplotype	Indo-gangetic plain region
1960s	* <b>A1 / Ib</b> ( US-1)	Indo- Gangetic plains
1993	<b>A1 / Ia</b> <b>IN1, IN2,</b> <b>NP-1</b>	Indo- Gangetic Plains (UP)
2000	US-1	Indo Gangetic Plains (UP)
2000-2005	<b>A2/Ib</b> <b>A2/Ia,</b> <b>A2/Iib</b> A1/Ia, A1/Ib	Northern India, Southern India, Indo Gangetic plains, North east India
2010	* <b>Blue 13,</b> <b>A2/Ia</b>	Southern India
2014	*Blue 13, A2/Ia	Indo Gangetic plains and north east India

# Coarse scale chronology of the changes of Late Blight populations in India



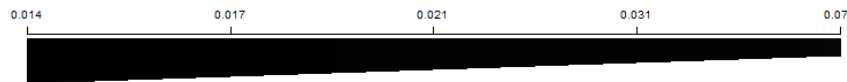
# Diversity of the Blue 13 populations in India

## POPULATIONS



Blue 13 population from South India (2010)

**Minimum spanning network (MSN) of multilocus blue\_13 genotypes from populations of 2009-10 & 2013-14 in India based on regions.**



DISTANCE

E& NE- 24 MLGs (19 Unique)  
South - 3 MLGs  

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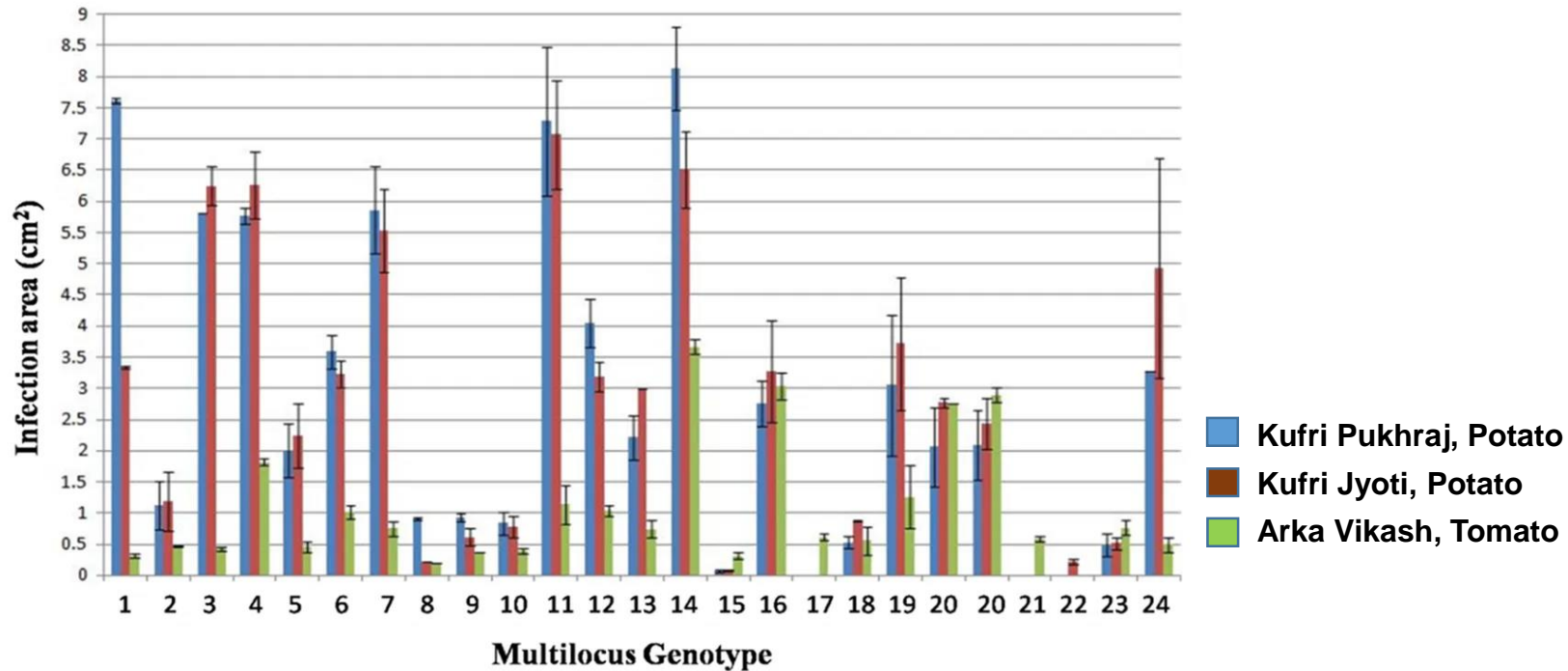
27 MLGs



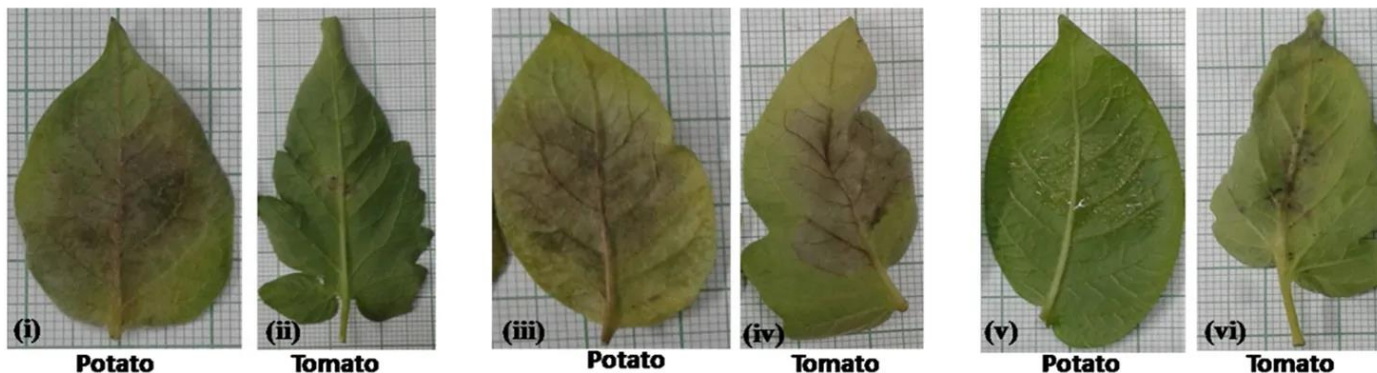
# Recent evidences of changes in population

## Differences in aggressiveness on potato and tomato?

**A**

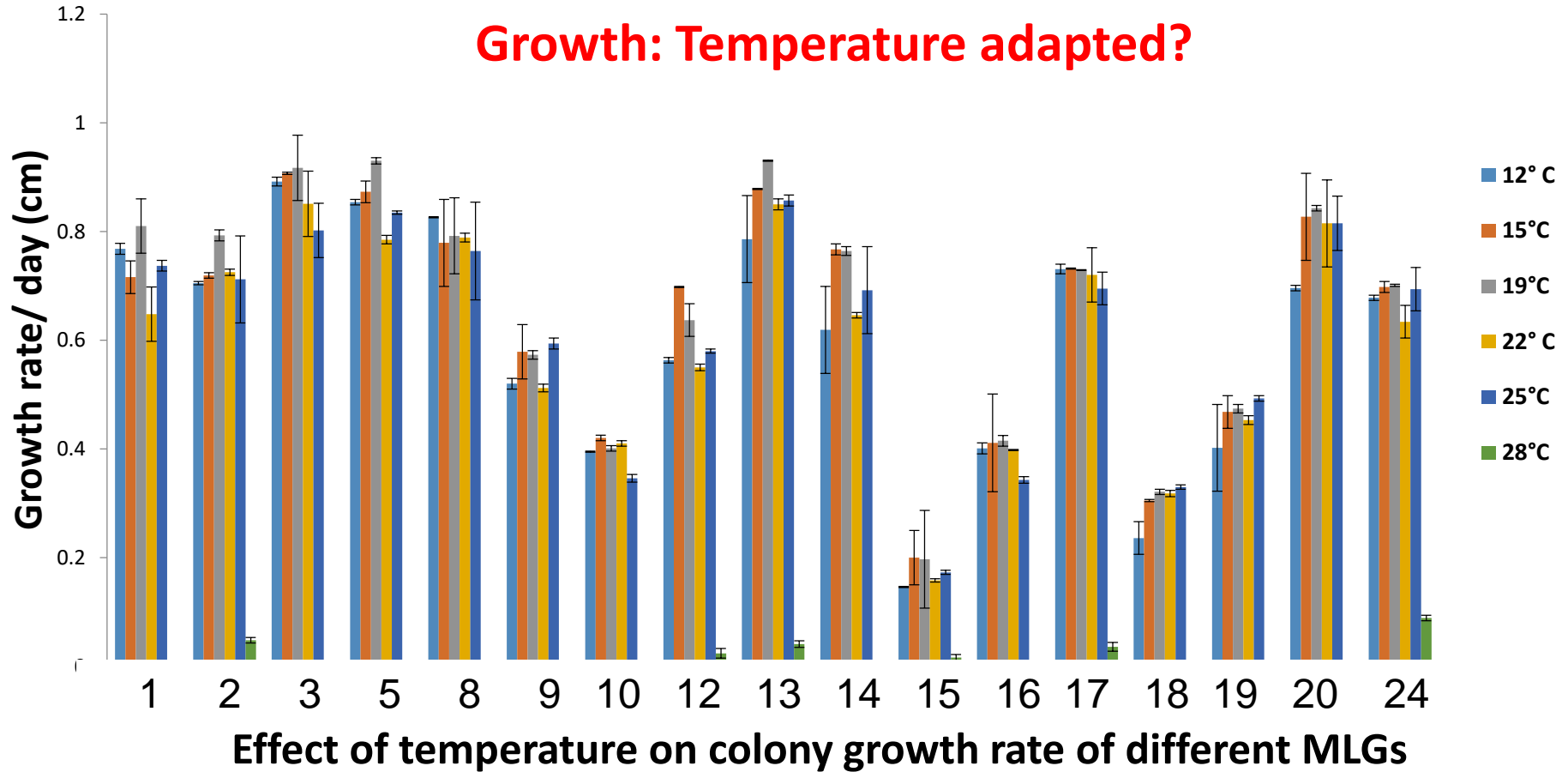


**B**



# Recent evidences of changes in population

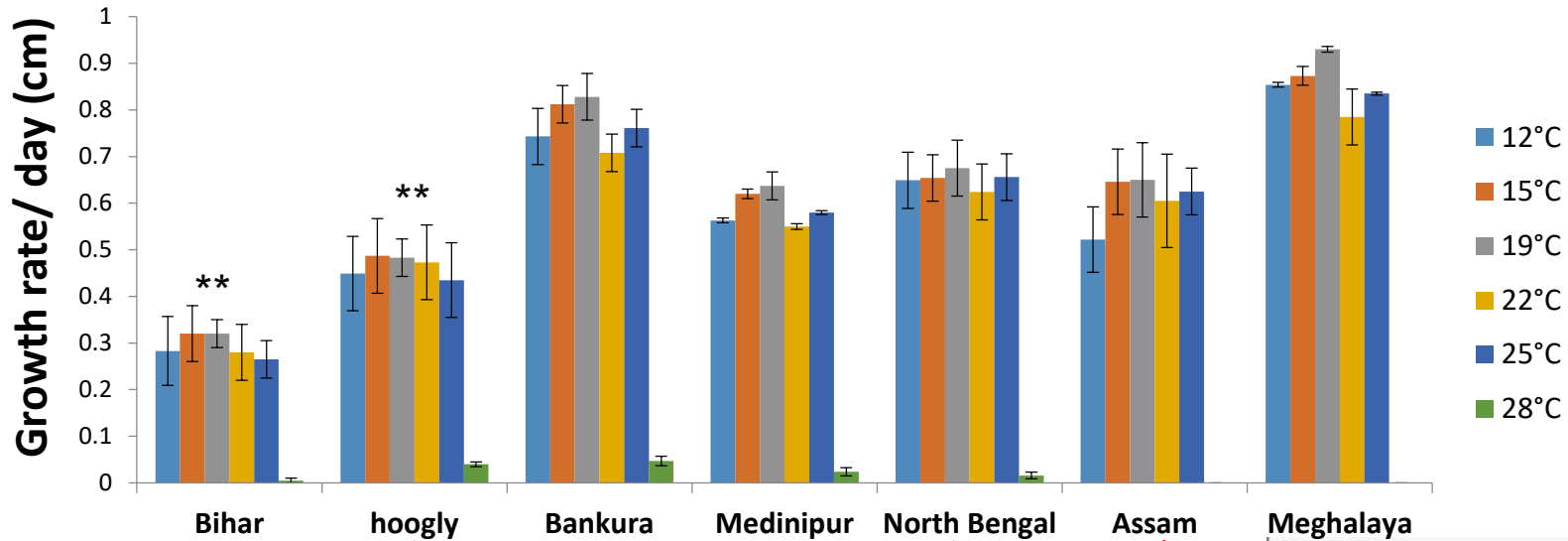
## Growth: Temperature adapted?



Variation in growth rate among MLGs were observed

No significant differences in growth rate was observed for each MLGs on a wide range of temperatures 12- 25°C (P value > 0.05).

# Growth rate: Temperature adapted?



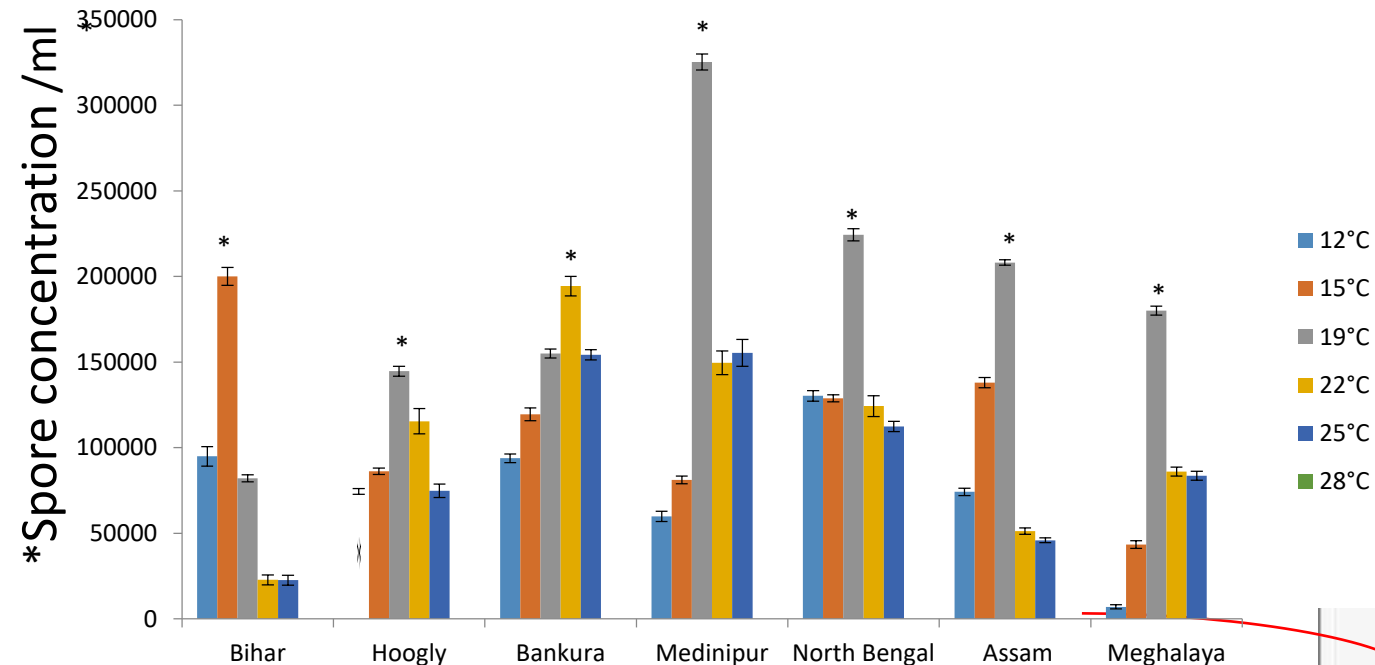
Significant differences in growth rate in different geographical regions has been observed





# Recent evidences of changes in population

## Sporulation: Temperature adapted?

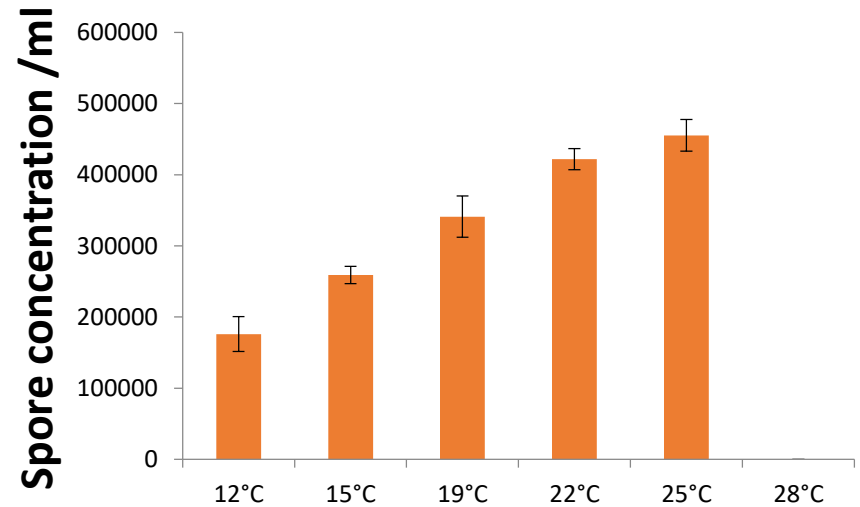
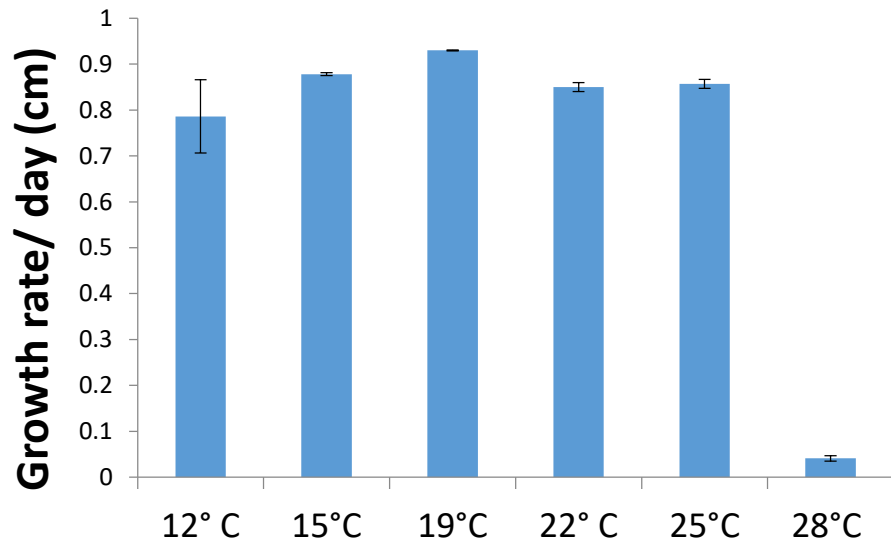


West Bengal



\*Spores was harvested in 5 ml of distilled water after 7 days of incubation at 6 different temperatures

# MLG-13: Spores harvested increased at higher temperature



# Possible implications of these changes of LB blue\_13 populations in India

# Higher diversity and geographical sub structuring leads to greater adaptability and/or fitness to local conditions.

# Differences of aggressiveness on potato and tomato have an effect on disease outbreaks.

# Local adaptations to higher temperature for mycelium growth allows the ability of growth across a wide temp. range (12- 25°C) which in turn increases window period for infection for potato grown during winter in the tropical plains.

# Enhanced temp. range for sporulation till 25°C increases the epidemic potential.

# Efforts being made to detect population changes

# Extramural competitive Government sponsored funding for surveillance of late blight populations (3 years)

# Inking of MoU with industry for scouting and sampling



Intended to supplement AsiaBlight's efforts in India and help in the transition from a coarse to a fine scale LB population map for this region



谢谢  
Thank You