FORECASTING AND FOREWARNING OF MULBERRY DISEASES OF EASTERN AND NORTH–EASTERN INDIA

Introduction

Major foliar diseases of mulberry in the Eastern and North-eastern region of India are Powdery mildew (*Phyllactinia corylea*), leaf rust (*Peridiopsora mori*), bacterial leaf spot (*Xanthomonas campestris* pv. *mori*) and *Myrothecium* leaf spot (*Myrothecium roridum*), *Pseudocercospora* leaf spot (*Pseudocercospora mori*). Foliar diseases reduce 10-15% leaf yield and quality. Besides feeding of diseased leaf affects cocoon productivity and quality. This huge loss in leaf and cocoon productivity and quality can be minimized by taking up appropriate disease management practices in time by **FORECASTING AND FOREWARNING** of mulberry diseases of Eastern and North-eastern India.

Powdery mildew

Symptoms:

- **White powdery patches on the lower surface of the leaf.**

Leaf rust

Symptoms:

- Several small pin head shaped brown spot developed on the ventral surface of the leaf.
- Reddish brown spot observed on the upper surface of the leaf

Bacterial leaf spot

Symptoms:

- **Small water soaked spots developed on lower surface of leaf.**
- **The spots turns brown surrounded by yellow halo.**

Myrothecium Leaf spot

Symptoms:

- Small brown color spots appears on both surfaces of the leaf.
- Spots coalesces and produces bigger necrotic spots.

Pseudecercospora leaf spot

Symptoms:

- Small to medium size velvety brown to black spot on the lower surface of the leaf.

DISEASE CALENDER OF EASTERN AND NORTH-EASTERN INDIA

Month	PMLD	BLS	MLS	PLS	LR
January	Malda/ Agartala*		Murshidabad (MSD)		Malda
February	M.P.Raj/ Aizwal/MSD			Murshidabad (MSD)	Malda/ Koraput*/ Singhanpur
March	Aizwal				Koraput*/ Singhanpur
April	Imphal/ Aizwal		Malda/ Aizwal/ Dimapur/ Jorhat		Koraput*/ Dimapur/ Aizwal
May	Kalimpong/ Rangpoo/ Agartala	MSD/ Birbhum	MSD/Malda/ Dimapur/ Jorhat/ Agartala	Dimapur/ MSD	Koraput*/ Dimapur/ Jorhat
June	Kalimpong/ Rangpoo/ Aizwal	MSD*/ Birbhum*/ M.P. Raj	MSD/Malda/ Dimapur/ Aizwal/ Singhanpur/ Agartala	Murshidabad (MSD)	Koraput/ Dimapur/ Aizwal/ Singhanpur/ Imphal
July	Kalimpong/ Rangpoo	MSD*/ Malda/ Birbhum*/M.P. Raj	MSD/Malda/ Aizwal/ Singhanpur	Murshidabad (MSD)	Aizwal/ Singhanpur/ Imphal
August	Kalimpong/ Rangpoo/ Aizwal/ Ranchi/ Koraput/ Imphal	MSD*/ Malda/ Birbhum*/ M.P. Raj	MSD/Malda/ Aizwal/ Jorhat/ Singhanpur/ Kalimpong	MSD/Malda/ Aizwal/ M.P. Raj	Singhanpur/ Kalimpong/ Aizwal/ Koraput
September	Kalimpong/ Rangpoo/ Aizwal/ Ranchi/ Koraput/ Imphal/ Jorhat	MSD*/ Birbhum*	MSD/ Aizwal/ Singhanpur/ Dimapur/ Agartala/Koraput/Jorhat	MSD* / Aizwal	Singhanpur/ Kalimpong*/ Aizwal/ Koraput/Jorhat
October	Agartala/ Jorhat/ Imphal/ Dimapur*/ Rangpoo/ Aizwal/ Ranchi/ Koraput/ Kalimpong	MSD*/ Malda	MSD/ Malda*/ Dimapur*/ Agartala/ Imphal/ Jorhat/Koraput	Aizwal	Kalimpong*/ Aizwal/ Jorhat/ Koraput/ Dimapur*/ Imphal
November	Jorhat/MSD/ Kalimpong/ Dimapur*/ Ranchi/ Agatala/ Koraput/ Malda	Murshidabad (MSD)	MSD/ Malda*/ Dimapur*/ Imphal/ Jorhat	Malda	Kalimpong*/ Jorhat/ Koraput*/ Dimapur/ Malda/ Imphal
December	Agatala/ Koraput/MSD		MSD	Malda	Malda/ Koraput

* > ETL (MSD-Murshidabad district) PMLD=Powdery mildew / BLS = Bacterial leaf spot / MLS = *Myrothecium* leaf spot / PLS = *Pseudocercospora* leaf spot / LR = Leaf rust

Disease calendar of Eastern & North – Eastern India — For BLS

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Murshidabad												
Malda												
Birbhum												
M.P.Raj												

***BLS = Bacterial leaf spot**

Disease calendar of Eastern & North–Eastern India — For MLS

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Murshidabad												
Malda												
Kalimpong												
Koraput												
Jorhat												
Agartala												
Aizwal												
Dimapur												
Imphal												

***MLS = *Myrothecium* leaf spot**

Disease calendar of Eastern & North–Eastern India For PMLD

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Murshidabad												
Malda												
Kalimpong												
Ranchi												
Koraput												
Jorhat												
Agartala												
Aizwal												
Dimapur												
Imphal												
Rangpo												
M.P.Raj												

***PMLD = Powdery mildew**

Disease calendar of Eastern & North–Eastern India For PLS

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Murshidabad												
Malda												
Aizwal												
Dimapur												
M.P.Raj												

***PLS = *Pseudocercospora* leaf spot**

Disease calendar of Eastern & North–Eastern India	For LR

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Murshidabad												
Malda												
Kalimpong												
Ranchi												
Koraput												
Jorhat												
Agartala												
Aizwal												
Dimapur												
Imphal												

***LR = Leaf rust**

DISEASE IDENTIFIED LOCATION WISE
AND
FORECASTING MODEL (Regression equation)
When Severity is > ETL (Economic Threshold Level)

Murshidabad	BLS, PLS
Malda	MLS
Birbhum	BLS
Kalimpong	LR
Rangpoo	Disease < ETL
Ranchi	Disease < ETL
Maheshpur Raj	Disease < ETL
Koraput	LR
Singanpur	Disease < ETL
Jorhat	Disease < ETL
Dimapur	PMLD, MLS, LR
Aizawl	Disease < ETL
Agartala	PMLD
Imphal	Disease < ETL

BLS = Bacterial Leaf Spot
PLS = Pseudocercospora leaf spot
LR = Leaf rust
MLS = Myrothecium leaf spot
PMLD = Powdery mildew

CORRELATION COEFFICIENT OF DIFFERENT DISEASE SEVERITY AND METEOROLOGICAL VARIABLES IN DIFFERENT LOCATIONS

AGARTALA					
Disease	Max RH	Min RH	Max Temp	Min Temp	RF
MLS	-0.485 *	-0.286 **	0.210	0.262 **	0.323 *
PMLD	0.099	0.098	-0.475*	-0.492*	-0.224
* 1% level of significance ** 5% level of significance					

AIZAWL					
Disease	Max RH	Min RH	Max Temp	Min Temp	RF
MLS	0.756*	0.748*	0.074	0.053	
lr	0.132	0.129	0.179	0.044	
PMLD	0.335**	0.357*	0.138	0.307**	
* 1% level of significance ** 5% level of significance					

KORAPUT					
Disease	Max RH	Min RH	Max Temp	Min Temp	RF
mls	0.226*	0.203*	-0.087	-0.08	0.107
pmld	0.191*	0.216*	-0.224*	-0.234*	-0.083
LR	0.084	0.074	0.011	-0.012	-0.059
* 1% level of significance ** 5% level of significance					

RANCHI					
Disease	Max RH	Min RH	Max Temp	Min Temp	RF
PMLD	0.130**	0.231*	0.043	0.190*	-0.041
* 1% level of significance ** 5% level of significance					

KALIMPONG					
Disease	Max RH	Min RH	Max Temp	Min Temp	RF
PMLD	0.102	0.131**	-0.033	-0.036	0.024
LR	0.222*	0.246*	0.078	0.084	0.024
YLR	0.038	0.060	-0.042	-0.063	-0.046
* 1% level of significance ** 5% level of significance					

MALDA

Disease	Max RH	Min RH	Max Temp	Min Temp	RF
BLS	0.215*	0.238*	0.164*	0.124**	0.239*
MLS	0.326*	0.362*	0.265*	0.357*	0.197*
PLS	0.245*	0.286*	0.217*	0.133**	0.257*
PMLD	-0.042	-0.099	-0.458	-0.486*	-0.161*
LR	0.053	-0.135**	-0.458*	-0.406*	-0.101

* 1% level of significance
** 5% level of significance

IMPHAL

Disease	Max RH	Min RH	Max Temp	Min Temp	RF
LR	0.287	0.052	0.171	0.409*	-0.245
PMLD	0.200	0.006	0.005	0.107	-0.074

* 1% level of significance
** 5% level of significance

MAHESHPUR RAJ

Disease	Max RH	Min RH	Max Temp	Min Temp	RF
PMLD	-0.124	-0.178	-0.063	-0.105	
BLS	0.231	0.296**	0.058	0.112	
PLS	-0.010	-0.023	-0.374	-0.375*	

* 1% level of significance
** 5% level of significance

DIMAPUR

Disease	Max RH	Min RH	Max Temp	Min Temp	RF
LR	-0.519**	-0.487**	-0.756*	-0.636*	0.138
MLS	0.447**	-0.386	-0.860*	-0.545**	0.014

* 1% level of significance
** 5% level of significance

MURSHIDABAD

Disease	Max RH	Min RH	Max Temp	Min Temp	RF
BLS	0.146**	0.493*	0.157**	0.393*	0.331*
MLS	0.024	0.026	0.113	0.215*	0.211*
PLS	0.087	0.015	0.035	0.049	-0.020
PMLD	0.071	-0.095	-0.039	-0.123**	-0.022
LR	-0.022	0.025	0.043	0.063	0.034

* 1% level of significance ** 5% level of significance

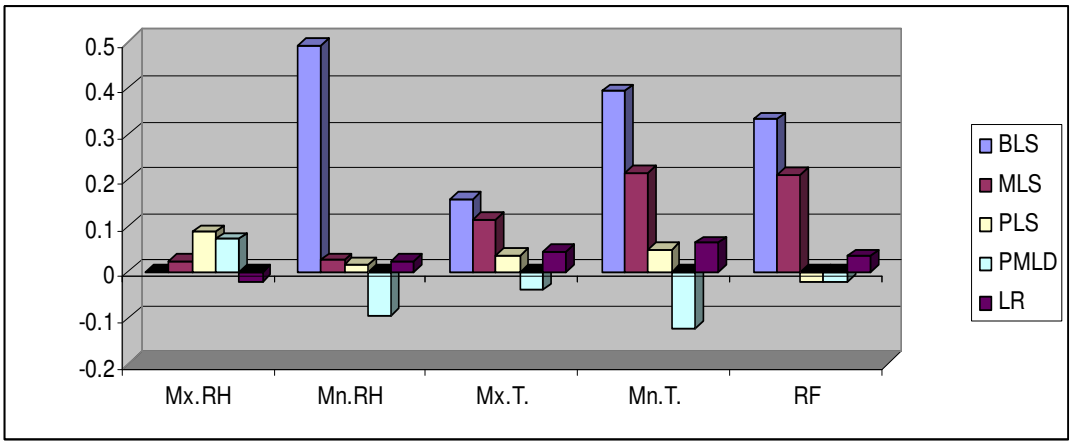
JORHAT					
Disease	Max RH	Min RH	Max Temp	Min Temp	RF
MLS	-0.109	0.244*	0.194*	0.181*	0.012
PMLD	0.025	0.193*	0.092	0.072	-0.046
LR	-0.029	0.201*	0.067	0.053	-0.073
* 1% level of significance ** 5% level of significance					

RANGPOO					
Disease	Max RH	Min RH	Max Temp	Min Temp	RF
PMLD	0.458**	0.331	0.615*	0.597*	
* 1% level of significance					
** 5% level of significance					

BIRBHUM					
Disease	Max RH	Min RH	Max Temp	Min Temp	RF
BLS	0.204	0.111	0.192	0.333*	0.691*
MLS	-0.095	-0.079	0.136	0.102	-0.037
* 1% level of significance ** 5% level of significance					

Factors influencing disease out break in Eastern and North Eastern India

(1) Murshidabad (West Bengal)



Factors influencing the disease (Significant correlation)

Disease	Factors influencing disease
Bacterial Leaf Spot (BLS)	Maximum temperature, Minimum temperature, Maximum RH , Minimum RH and rainfall.
Myrothecium leaf spot (MLS)	Minimum temperature and rainfall
Powdery mildew (PMLD)	Minimum temperature *(Negative correlation)*

Disease severity > ETL	BLS , PLS

REGRESSION EQUATION (For BLS)
Developed disease forecasting model for BLS (*Bacterial leaf spot disease*) disease for Murshidabad district with accuracy and dependability
Validity of the model was tested. Predicted disease severity has been found closely associated with observed disease severity, when
coefficient of determination R2 = 0.516 ($P=1.79x\ 10^{-14}$)

- Y = 18.624 – 0.715 X1 + 0.850 X2 – 0.336 X3 + 0.360 X4 + 0.353 X5
  X1 = MxTm
- X2 = MnTm
- X3 = MxRH
- X4 = MnRH
  X5 = Rainfall

(When value of Y is >5, model will be exploited)
REGRESSION EQUATION (For PLS)
Developed disease forecasting model for PLS (Pseudocercospora leaf spot) disease for Murshidabad district with accuracy and dependability
Validity of the model was tested. Predicted disease severity has been found closely associated with observed disease severity, when

coefficient of determination R2 = 0.136 (P= 7.267x 10^{-8})

- Y = -9.246 – 0.142 X1 + 0.235 X2 + 0.165 X3 – 0.092 X4 – 0.002 X5
  X1 = MxTm
- X2 = MnTm
- X3 = MxRH
- X4 = MnRH
  X5 = Rainfall

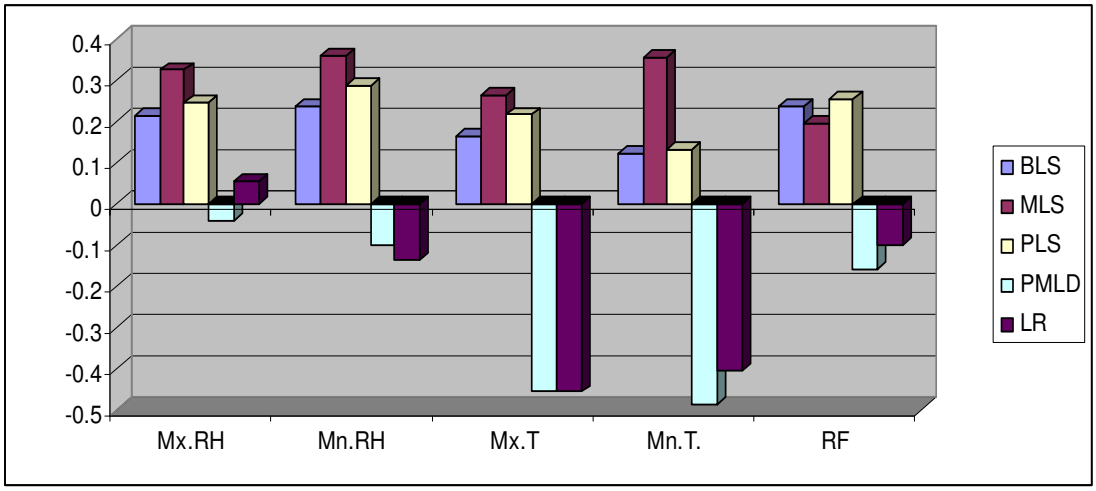
(When value of Y is >5, model will be exploited)

PROPHYLACTIC MEASURE

Forecasting model is to be exploited in order to device a precise spray schedule for its cost effective management - by application of

1) 0.1% Carbendazim for PLS
2) 0.01% Pusamycin / Plantomycin for BLS

(2) Malda (West Bengal)



Factors influencing the disease (Significant correlation)

Disease	Factors influencing disease
Bacterial Leaf Spot (BLS)	Maximum temperature, Minimum temperature, Maximum RH, Minimum RH and rainfall.
Myrothecium leaf spot (MLS)	Maximum temperature, Minimum temperature, Maximum RH, Minimum RH and rainfall.
PLS	Maximum temperature, Minimum temperature, Maximum RH, Minimum RH and rainfall.
Powdery mildew (PMLD)	Maximum temperature, Minimum temperature and rainfall. (*with negative correlation).*
Leaf rust (LR)	Maximum temperature, Minimum temperature and Minimum RH (*with negative correlation).*

Disease severity > ETL	MLS

REGRESSION EQUATION (For MLS)

Developed disease forecasting model for MLS (Myrothecium Leaf Spot) disease for Malda district with accuracy and dependability
Validity of the model was tested . Predicted disease severity has been found closely associated with observed disease severity, when
coefficient of determination R2 = 0.241 (P= 3.585×10^{-16})

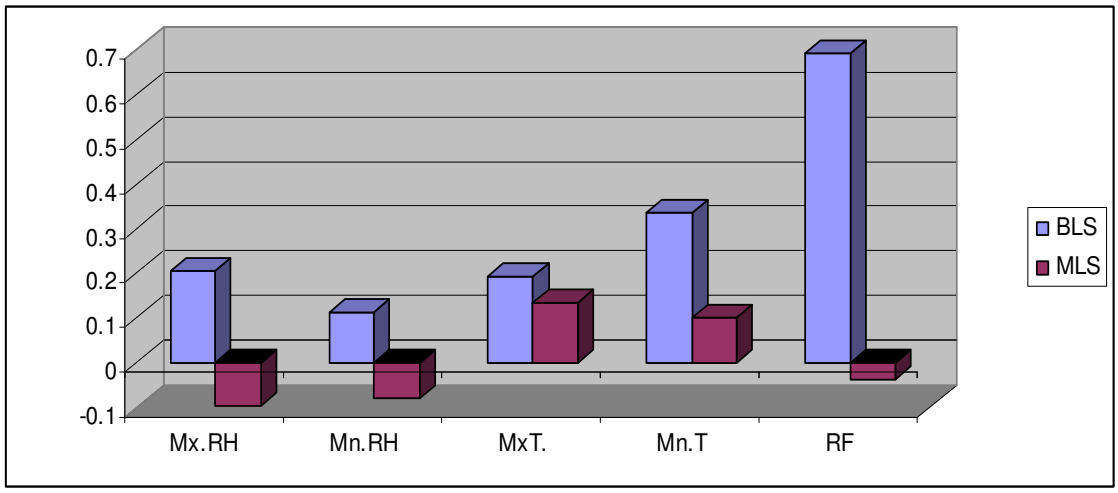
- Y = -6.941 + 0.049 X1 + 0.073 X2 – 0.043 X3 + 0.026 X4 + 0.009 X5
  X1 = MxTm
- X2 = MnTm
- X3 = MxRH
- X4 = MnRH
  X5 = Rainfall

(When value of Y is >5, model will be exploited)

PROPHYLACTIC MEASURE

Forecasting model is to be exploited in order to device a precise spray schedule for its cost effective management - by application of 0.1% Carbendazim for MLS

(3) Birbhum (West Bengal)



Factors influencing the disease (Significant correlation)

Disease	Factors influencing disease
Bacterial Leaf Spot (BLS)	Minimum temperature and rainfall.

Disease severity >ETL	BLS

REGRESSION EQUATION (For BLS)

Developed disease forecasting <u>model for BLS (Bacterial leaf Spot) for Birbhum district of West Bengal</u> with accuracy and dependability

Validity of the model was tested . Predicted disease severity has been found closely associated with observed disease severity, when

coefficient of determination R2 = 0.504 ($P= 2.44 \times 10^{-7}$)

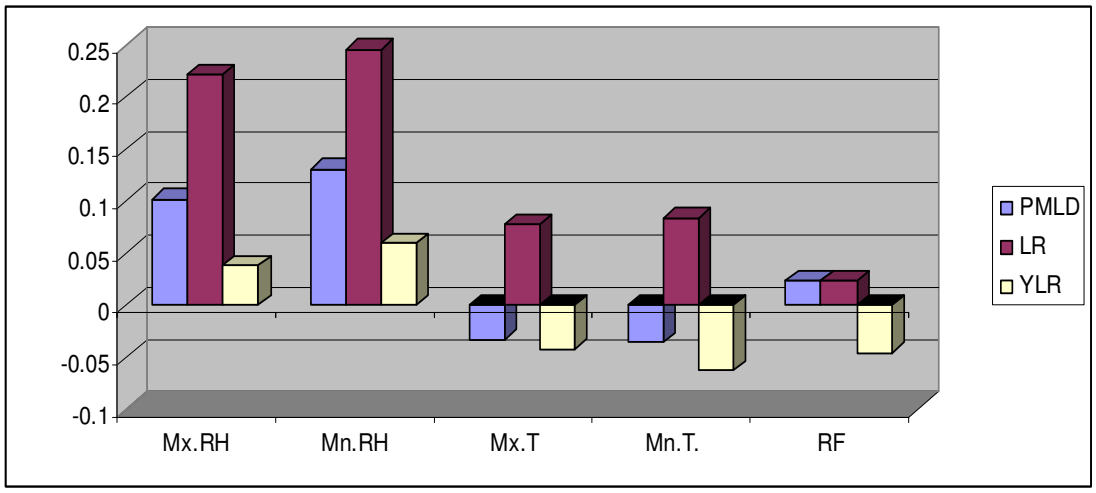
- $Y = 4.085 – 0.304\ X1 + 0.379\ X2 + 0.500\ X3 – 0.549\ X4 + 0.094\ X5$
  - X1 = MxTm
  - X2 = MnTm
  - X3 = MxRH
  - X4 = MnRH
  - X5 = Rainfall

(When value of Y is >5, model will be exploited)

PROPHYLACTIC MEASURE

Forecasting model is to be exploited in order to device a precise spray schedule for its cost effective management - by application of 0.01% Plantomycin / Pusamycin for BLS.

(4) Kalimpong (West Bengal)



Factors influencing the disease (Significant correlation)

Disease	Factors influencing disease
Powdery mildew (PMLD)	Minimum RH
Leaf rust (LR)	Maximum RH and Minimum RH .

Disease severity >ETL	LR

REGRESSION EQUATION (For LR)
Developed disease forecasting model for LR (Leaf rust) for Kalimpong of West Bengal with accuracy and dependability
Validity of the model was tested. Predicted disease severity has been found closely associated with observed disease severity, when
coefficient of determination R2 = 0.133 ($P = 3.036 \times 10^{-7}$)

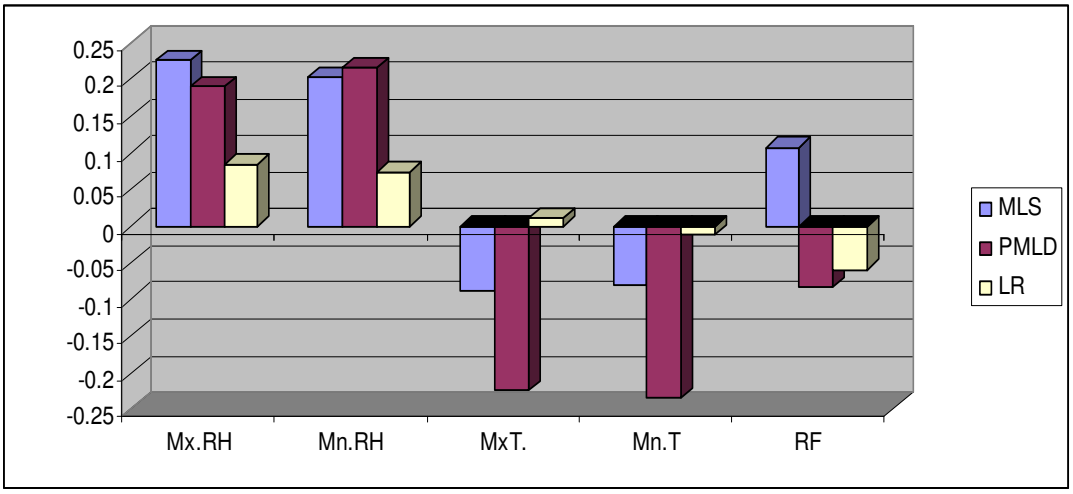
- Y = - 67.248 + 2.252 X1 – 2.678 X2 + 0.444 X3 + 0.219 X4 – 0.010 X5
  X1 = MxTm
- X2 = MnTm
- X3 = MxRH
- X4 = MnRH
  X5 = Rainfall

(When value of Y is >5, model will be exploited)

PROPHYLACTIC MEASURE

Forecasting model is to be exploited in order to device a precise spray schedule for its cost effective management - by application of 0.2 % Mancozeb for LR.

(5) Koraput (Orissa)



Factors influencing the disease (Significant correlation)

Disease	Factors influencing disease
Myrothecium leaf spot (MLS)	Maximum RH and Minimum RH
Powdery mildew (PMLD)	Maximum RH, Minimum RH; Maximum temperature and Minimum temperature (*with negative correlation).*

Disease severity >ETL	LR

REGRESSION EQUATION (For LR)
Developed disease forecasting model for LR (Leaf rust) for Koraput of Orissa with accuracy and dependability
Validity of the model was tested . Predicted disease severity has been found closely associated with observed disease severity, when coefficient of determination R2 = 0.291 (P= 3.39 x 10^{-9})

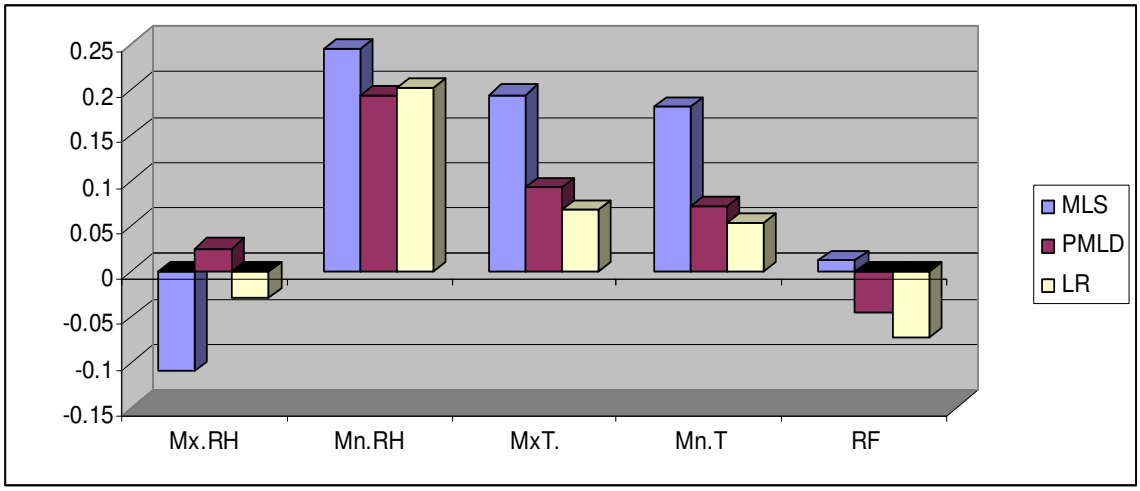
- Y = 5.494 + 0.011 X1 + 0.018 X2 – 0.042 X3 + 0.024 X4 + 0.070 X5
  X1 = MxTm
- X2 = MnTm
- X3 = MxRH
- X4 = MnRH
  X5 = Rainfall

(When value of Y is >5, model will be exploited)

PROPHYLACTIC MEASURE

Forecasting model is to be exploited in order to device a precise spray schedule for its cost effective management - by application of 0.2 % Mancozeb for LR.

(6) Jorhat (Assam):



Factors influencing the disease (Significant correlation)

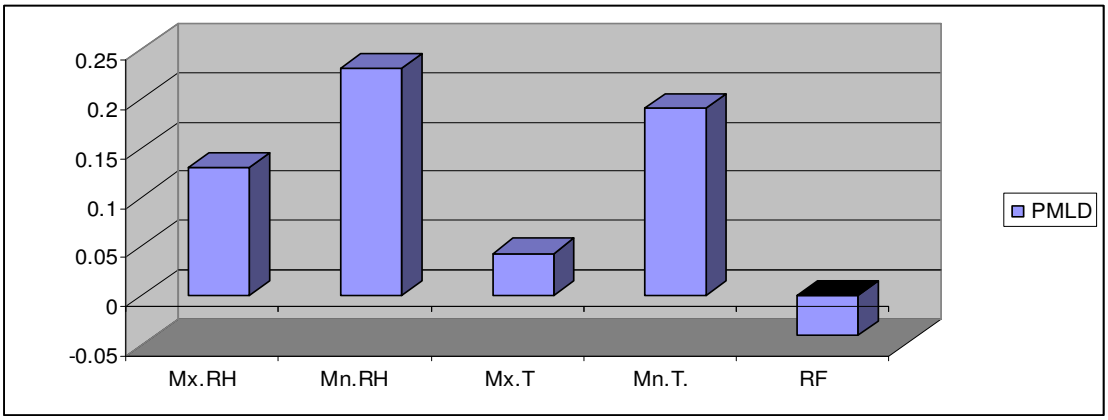
Disease	Factors influencing disease
Myrothecium leaf spot (MLS)	Minimum RH, Maximum temperature and Minimum temperature.
Powdery mildew (PMLD)	Minimum RH .
Leaf rust (LR)	Minimum RH .

Disease severity <ETL	NIL

PROPHYLACTIC MEASURE

Though severity is <ETL, incidence of MLS was recorded during April – May and August - November, PMLD during September - October and LR in May and September - November. Application of 0.1% carbendazim (25 - 30 days after pruning) is recommended for MLS and PMLD. If severity is more 2nd spray can be done 15 days after 1st spray. For LR application of 0.2% Mancozeb is recommended. There should be a gap of 10 days of 1st and 2nd spray of fungicide.

(7) Ranchi (Jharkhand) :



Factors influencing the disease (Significant correlation)

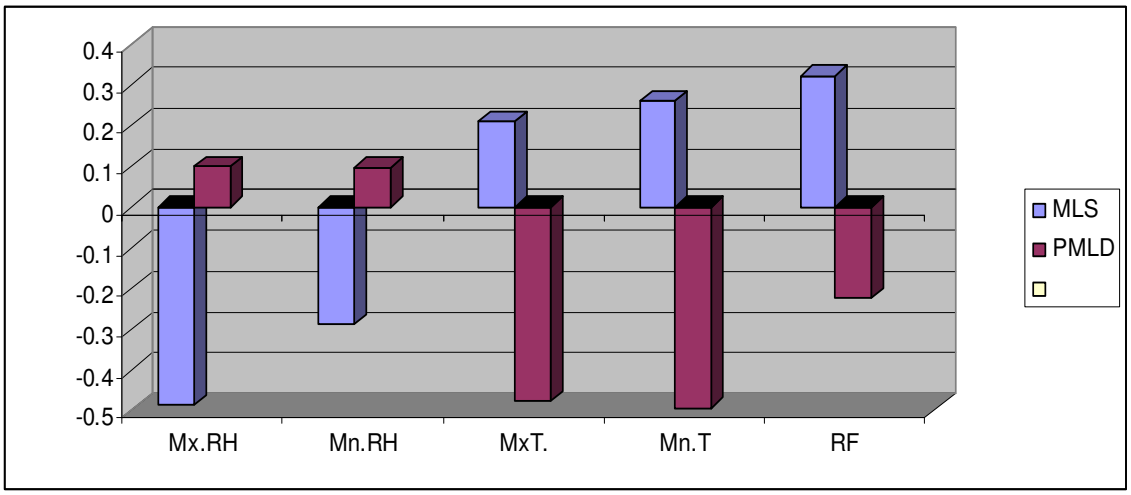
Disease	Factors influencing disease
Powdery mildew (PMLD)	Maximum RH, Minimum RH and Minimum temperature.

Disease severity >ETL	NIL

PROPHYLACTIC MEASURE

Though severity is <ETL incidence of PMLD was recorded during August to November and application of 0.1% carbendazim (25 - 30 days after pruning) is recommended for PMLD. If severity is more 2nd spray can be done 15 days after 1st spray.

(8) Agartala (Tripura) :



Factors influencing the disease (Significant correlation)

Disease	Factors influencing disease
Myrothecium leaf spot (MLS)	Minimum temperature, rainfall ; Maximum RH and Minimum RH (Negative correlation).
Powdery Mildew (PMLD)	Maximum temperature and Minimum temperature (Negative correlation).

Disease severity >ETL	PMLD

REGRESSION EQUATION (For PMLD)
Developed disease forecasting <u>model for PMLD (Powdery mildew) for Agartala (Tripura)</u>
Validity of the model was tested . when,
coefficient of determination R2 = 0.299 ($P= 4.135 \times 10^{-4}$)

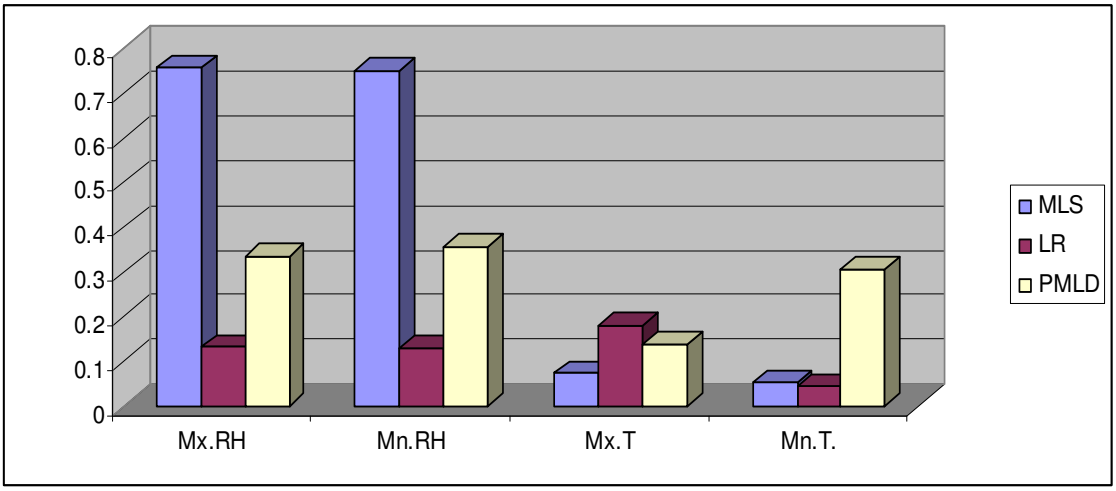
- Y = 42.301 + 0.211 X1 -1.636 X2 – 0.510 X3 + 0.542 X4 - 0.540 X5
  X1 = MxTm
- X2 = MnTm
- X3 = MxRH
- X4 = MnRH
  X5 = Rainfall

(When value of Y is >5, model will be exploited)

PROPHYLACTIC MEASURE

Forecasting model is to be exploited in order to device a precise spray schedule for its cost effective management - by application of 0.1 % Carbendazim for PMLD.

(9) Aizwal (Mizoram) :



Factors influencing the disease (Significant correlation)

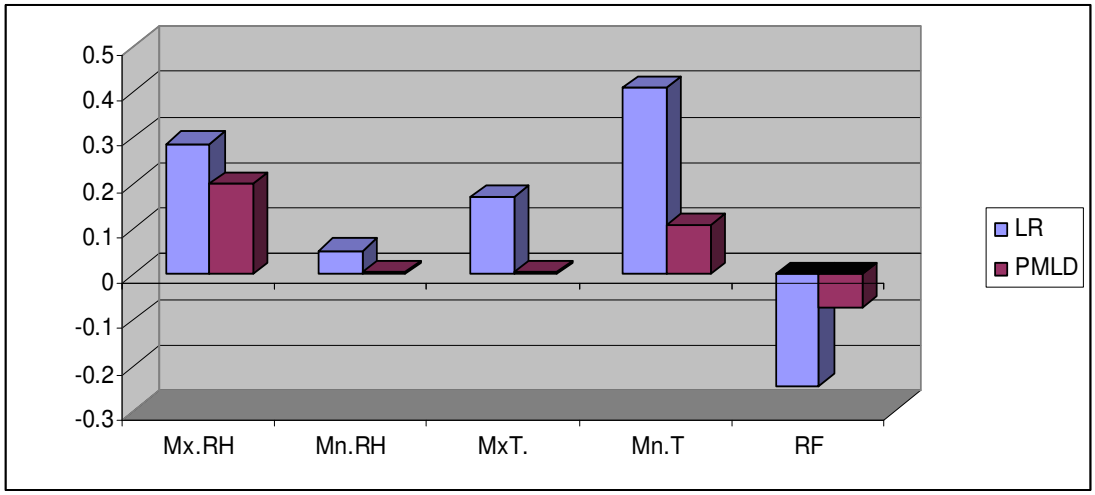
Disease	Factors influencing disease
Myrothecium Leaf Spot (MLS)	Maximum RH and Minimum RH.
Powdery mildew (PMLD)	Maximum RH, Minimum RH and Minimum temperature.

Disease severity >ETL	NIL

PROPHYLACTIC MEASURE

Though severity is <ETL incidence of MLS was recorded during April and June to September, PMLD during February – April, , June,and August to October, and LR during April and June to October, moreover application of 0.1% Carbendazim (25 - 30 days after pruning) is recommended for MLS and PMLD. If severity is more 2nd spray can be done 15 days after 1st spray. For LR application of 0.2% Mancozeb is recommended. There should have a gap of 10 days fro application of 1st and 2nd fungicide

(10) Imphal (Manipur) :



Factors influencing the disease (Significant correlation)

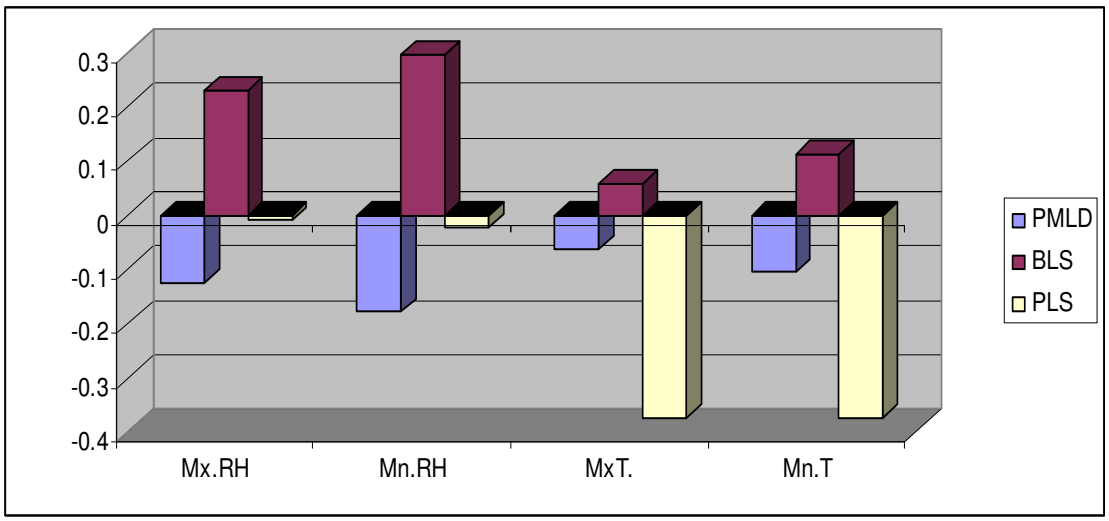
Disease	Factors influencing disease
Leaf rust (LR)	Minimum temperature.

Disease severity >ETL	NIL

PROPHYLACTIC MEASURE

Though severity is <ETL Leaf rust was recorded during June - July and October - November. Application of 0.2% Mancozeb is recommended (25-30 days after pruning). There should be a gap for 10 days of 1st and 2nd spraying of fungicide.

(11) M.P.Raj (Jharkhand):



Factors influencing the disease (Significant correlation)

Disease	Factors influencing disease
Bacterial Leaf Spot (BLS)	Minimum RH.
Pseudocercospora leaf spot (PLS)	Minimum temperature (Negative correlation).

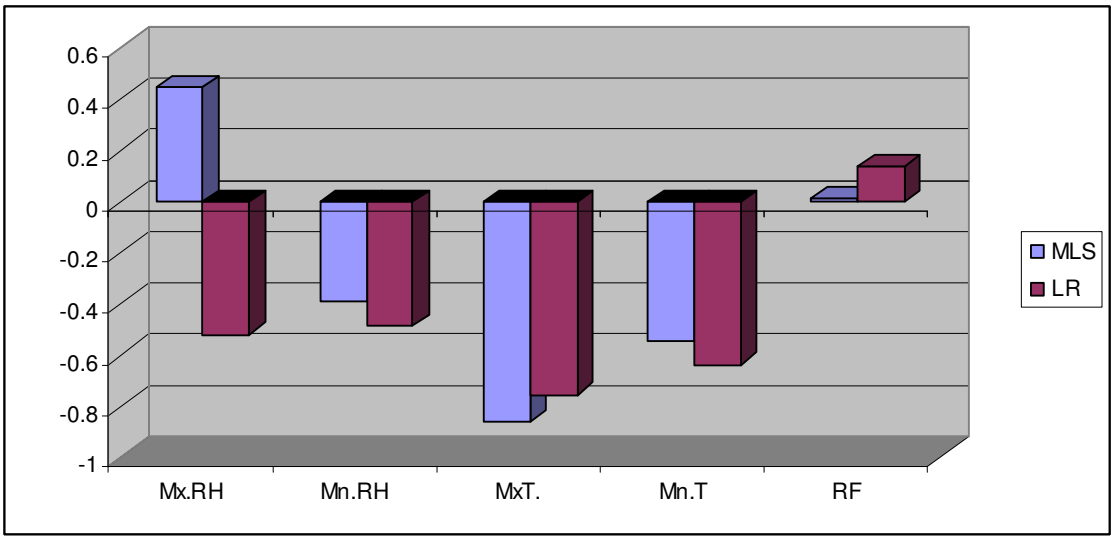
Disease severity >ETL	NIL

PROPHYLACTIC MEASURE

Though severity is <ETL, incidence of PMLD was recorded in February, incidence of BLS was recorded from June – August, PLS was recorded in August.

Application of 0.1% carbendazim (30 days after pruning) is recommended for PMLD & PLS and 0.01% Plantomycin / Pusamycin for BLS. If severity is more 2nd spray can be done 15 days after 1st spray.

(12) Dimapur (Nagaland) :



Factors influencing the disease (Significant correlation)

Disease	Factors influencing disease
Leaf rust (LR)	Maximum RH,Minimum RH, Maximum temperature and Minimum temperature (Negative correlation).
Myrothecium leaf spot (MLS)	Maximum RH ; Maximum and Minimum temperature (Negative correlation).

Disease severity > ETL	PMLD, MLS, LR

REGRESSION EQUATION (For PMLD)
Developed disease forecasting model for PMLD (Powdery mildew) for Dimapur (Nagaland)
Validity of the model was tested. when,
coefficient of determination R2 = 0.335 (P= 9.25×10^{-5})

- Y = -40.746 + 0.086 X1 + 0.506 X2 – 1.116 X3 + 1.543 X4 - 0.025 X5
  X1 = MxTm
- X2 = MnTm
- X3 = MxRH
- X4 = MnRH
  X5 = Rainfall

(When value of Y is >5, model will be exploited)

REGRESSION EQUATION (For MLS)
Developed disease forecasting model for MLS (Myrothecium Leaf Spot) for Dimapur (Nagaland)
Validity of the model was tested . when,
coefficient of determination R2 = 0.292 (P= 5.29×10^{-4})

- Y = -41.641 – 0.002 X1 – 0.574 X2 – 0.590 X3 + 1.056 X4 - 0.020 X5
  X1 = MxTm
- X2 = MnTm
- X3 = MxRH
- X4 = MnRH
  X5 = Rainfall

(When value of Y is >5, model will be exploited)

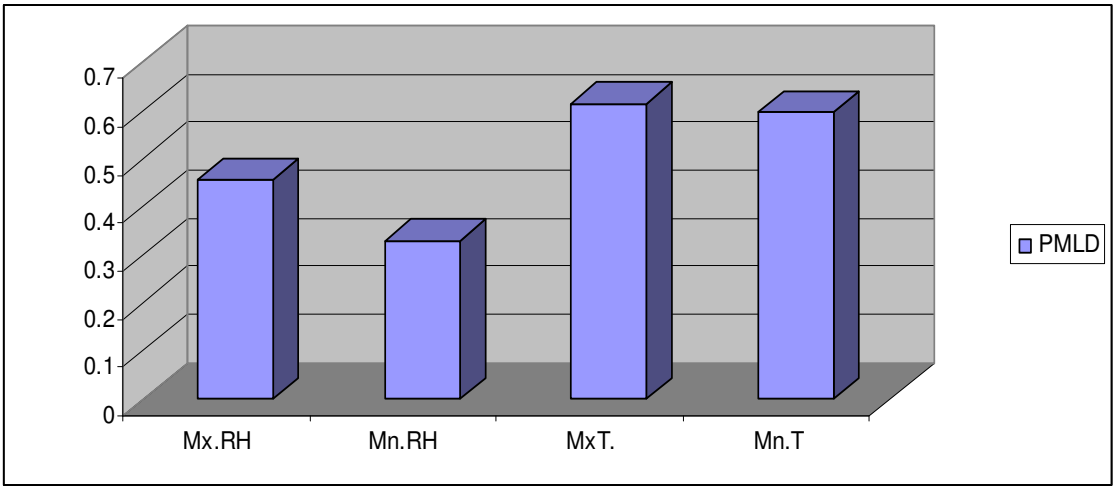
REGRESSION EQUATION (For LR)
Developed disease forecasting model for LR (Leaf rust) for Dimapur (Nagaland)
Validity of the model was tested . when,
coefficient of determination R2 = 0.255 (P= 2.175 x 10^{-3})

- Y = - 34.899 – 0.012 X1 + 0.492 X2 – 0.420 X3 + 0.807 X4 - 0.013 X5
  X1 = MxTm
- X2 = MnTm
- X3 = MxRH
- X4 = MnRH
  X5 = Rainfall

(When value of Y is >5, model will be exploited

PROPHYLACTIC MEASURE
Forecasting model is to be exploited in order to device a precise spray schedule for its cost effective management - by application of 0.1 % carbendazim for PMLD and MLS And 0.2% Mancozeb for LR.

(13) Rangpo (Sikim):



Factors influencing the disease (Significant correlation)

Disease	Factors influencing disease
Powdery mildew (PMLD)	Maximum temperature, Minimum temperature and Maximum RH.

Disease severity >ETL	NIL

PROPHYLACTIC MEASURE
Though severity is <ETL incidence of PMLD was recorded from May to October, application of 0.1% carbendazim (30 days after pruning) is recommended. If severity is more 2nd spray can be done 15 days after 1st spray.