



Studies on leaf curl disease infection pressure and fruit yield of tomato as influenced by mulching and different meteorological variables.

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Importance of the work

*Tomato is highly sensitive to pest and disease attack which reduce the productivity to a considerable extent.

**Growth, yield and disease incidence in tomato are affected by weather conditions.

***The onset and spread of disease greatly depends on the weather parameters during the growing periods.

****By altering the planting date and application of mulching over soil surface could alter crop microclimate which will be useful for maximum fruit yield and comparatively lesser leaf curl disease,

*****Leaf curl disease is an important disease of the crop in West Bengal.

MATERIALS AND METHODS

- ✓ Experiment was conducted at the Instructional Farm, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, New alluvial zone of West Bengal at $22^{\circ}56'$ N latitude, $88^{\circ}32'$ E longitude and at an altitude of 9.75 m above mean sea level.
- ✓ Season was winter season of 2007-08,
- ✓ The experimental treatments consisted of three types of mulching, viz. rice straw mulch, black plastic mulch and control (farmers' practice) and two dates of transplanting, viz. 23 November and 7 December in 2007 and laid out factorial randomized block design with three replications.

Objectives

To study the influence of mulching and transplanting dates on yield and disease of tomato (*Lycopersicon esculentum*)



Polythene mulch

Results and discussion

Fruit yield

- The highest fruit yield (370 q/ha) was obtained from 23 November, followed by 321.58 q /ha in 7th December.
- Due to application of mulch, fruit yields of tomato significantly increased. On an average, the fruit yield was highest (381.74 q/ha) under black polythene mulch, followed by 312.01 q/ha under without mulch condition.
- The interaction between dates of transplanting and mulching treatments in respect of total fruit yield (Table 1) was significant.

Fruit Weight

- ❑ Fruit weight was 54.98 g under 23 November planting and 45.27 g on 7 December.
- ❑ The interaction between dates of transplanting and mulching treatments in respect of average **fruit** weight (Table 1) was found to be significant at 5 % level of significance and the crop transplanted on 23 November and covered with black polythene mulch enabled to obtain the highest weight of fruit (59.67 g fruit ⁻¹).

Number of fruits /plant

- The crop transplanted on 23 November produced greater number of fruits/plant (55.5) than the crop transplanted on 7 December (47.7).
- On the other hand, the interaction between dates of transplanting and mulching treatments in respect of number of fruits/ plant (Table 1) appeared to be significant and the crop transplanted on 23 November and covered with black polythene mulch produced the highest number of fruits per plant (62.5 plant⁻¹).

Number of seeds/fruit

- It is evident that both varied dates of transplanting and mulching treatments significantly influenced the number of seeds per fruit.
- The crop transplanted on 23 November and covered with black polythene mulch produced the highest number of seeds per fruit (115 fruit/plant).

Table 2. Effect of mulching and dates of transplanting on yield and yield components of tomato

Treatments	Fruit Yield(Q/ha)	Average Wt. (g)/ fruit	No.fruits / plant	No.seeds /fruits
23 Nov(D1)	373.00	54.98	55.5	106.33
7 Dec(D2)	321.58	45.27	47.66	93.08
S.Em+ /-	1.04	0.06	0.11	0.07
C.D at 5%	3.22*	1.84*	1.91*	1.86*
Control(M0)	312.01	45.07	46.5	92.37
Rice Straw(M1)	348.12	49.47	51.5	99.87
Polythene(M2)	381.74	55.84	56.75	106.87
S.Em+ /-	1.27	0.08	0.14	0.09
C.D at 5%	3.16	0.20	0.35	0.24
D1xM0	329.6	50.09	49	97
D1xM1	374.05	55.2	55	107
D1xM2	415.35	59.67	62.5	115
D2xM0	294.42	40.05	44	87.75
D2xM1	322.19	43.75	48	92.75
D2xM2	348.14	52.02	51	98.75
S.Em+ /-	1.80	0.11	0.20	0.13
C.D at 5%	4.47	0.28	0.50	0.33

Effect of dates of planting and mulching on Leaf curl diseases incidence:

- ❑ The disease severity was, on an average, lesser in late transplanted crop (7 December) than in early transplanted crop (23 November).
- ❑ The crops grown under mulching had lesser disease severity than those grown under no mulch treatment.

Table 2. Leaf curl disease percentage during different times of season

DAT	Disease severity							
	23 November(D1)				7 December (D2)			
	Control (M0)	Rice straw(M1)	Polythene (M2)	Mean	Control(M0)	Rice straw(M1)	Polythene (M2)	Mean
30	3.33	3.33	0.00	2.2	0.00	3.33	0.00	1.1
37	3.33	3.33	0.00	2.2	0.00	6.67	0.00	2.2
44	10.00	3.33	3.33	5.6	3.33	6.67	0.00	3.3
51	10	6.67	3.33	6.7	3.33	10.00	0.00	4.4
58	10	6.67	6.67	7.8	6.67	10.00	0.00	5.6
65	10	6.67	6.67	7.8	6.67	13.34	6.67	8.9
72	13.34	6.67	6.67	8.9	10.00	13.34	6.67	10.0
79	16.66	10	10.00	12.2	13.34	13.34	6.67	11.1
86	16.66	10	10.00	12.2	16.66	16.66	6.67	13.3
93	20	16.66	10.00	15.6	16.66	20.00	10.00	15.6
100	20	16.66	10.00	15.6	20.00	20.00	10.00	16.7
107	20	16.66	10.00	15.6	23.33	20.00	10.00	17.8
Mean	12.8	8.9	6.4	9.4	10.0	12.8	4.7	9.2

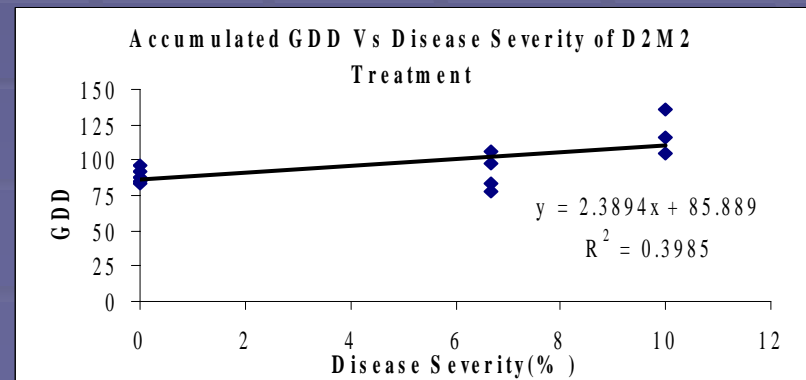
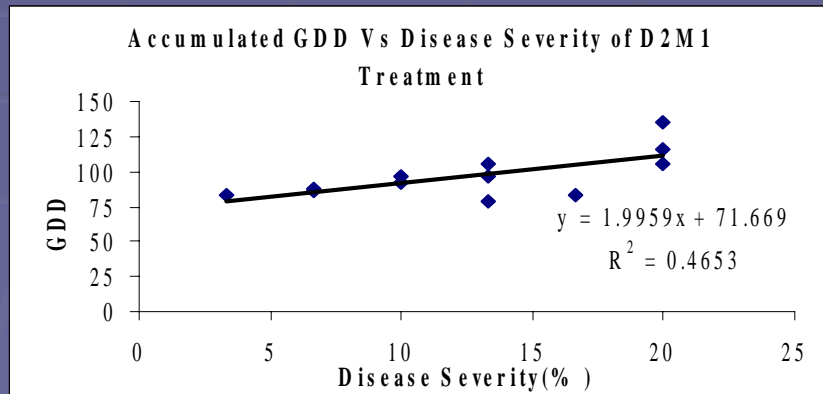
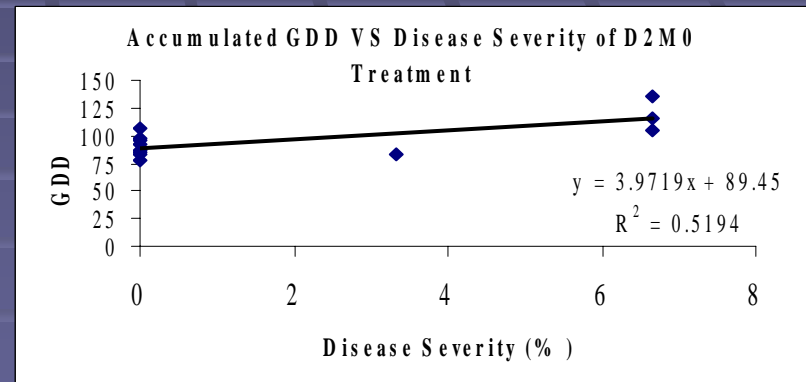
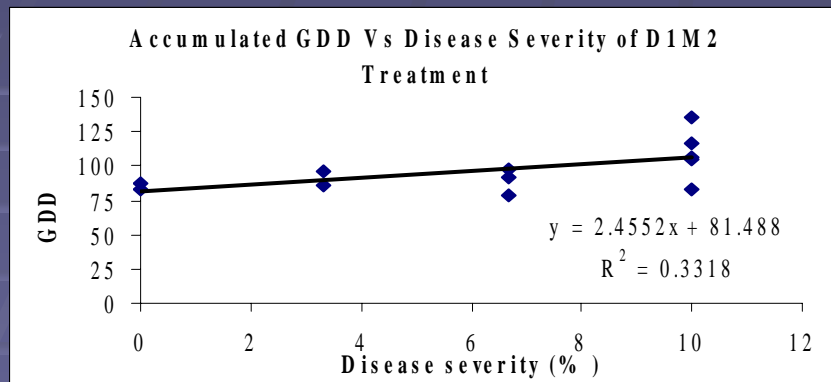
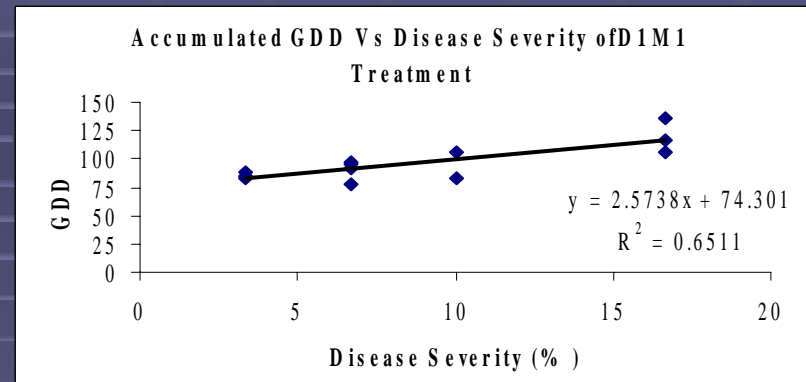
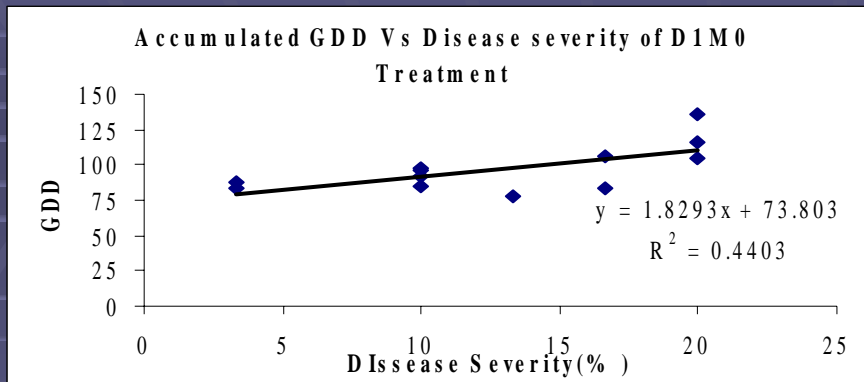


Severe infestation of leaf curl disease

Relationships between Growing degree days and percent disease severity of leaf curl in tomato :

- ❑ Relationships between GDD and leaf curl disease severity revealed that GDD accounted for 33 to 65 % variation in total leaf curl disease severity %.
- ❑ In case of crops grown under first date of planting (23 November) , values of coefficient of determination (R^2) varied from 0.33 to 0.65, whereas in case of crops grown under second date of transplanting (7th December) the R^2 values ranged from 0.39 to 0.52.
- ❑ Thus consideration of GDD seems to be a useful tool to explain leaf curl disease severity in tomato crop.

Fig. 2. Relationship between disease severity (%) of leaf curl and growing degree days (GDD) in tomato.



Conclusion:

- It is concluded that higher production of tomato can be obtained when the crop is transplanted on 23 November and grown with plastic mulch in the New Alluvial Zone of West Bengal.
- Larger yield and yield components in crops using black plastic mulch were associated with higher soil temperature and GDD and lesser canopy temperature and leaf curl disease severity.

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