

SEASONAL VARIATION IN WHITE FLY POPULATION AND ITS INFLUENCE ON THE YELLOW VEIN MOSAIC AND PRODUCTIVITY IN PUMPKIN (*CUCURBITA MOSCHATA* POIR)

P. Latha and T. R. Gopalakrishnan

College of Horticulture, Vellanikkara 680 654, Trichur, India

Abstract : When pumpkin (*Cucurbita moschata* Poir) was sown at bimonthly interval at the College of Horticulture, Vellanikkara, incidence of yellow vein mosaic disease and population of white fly, vector of the disease, were maximum during summer. White fly population was positively correlated with temperature and negatively with rainfall and relative humidity. Rainfed crops sown in the month of May was free from yellow vein mosaic disease, due to reduction in vector population during the cropping season.

Key words: Pumpkin, white fly, yellow vein mosaic.

INTRODUCTION

Vegetables like bittergourd, cowpea, pumpkin, cucumber and bhindi are facing serious threat due to the severe incidence of mosaic disease. Warm humid tropical climate is highly conducive for the multiplication and spread of the insect vector, white fly (*Bemisia tabaci* Genn). Since the development of mosaic resistant varieties is a time consuming and difficult task, combating the disease by reducing insect vector population by adjusting time of sowing deserves proper attention. In the present paper an attempt is made to study the seasonal occurrence of above factors and their effect on productivity in pumpkin.

MATERIALS AND METHODS

The studies were conducted at the College of Horticulture, Kerala Agricultural University, Vellanikkara during 1991-92. The high yielding and adaptable pumpkin variety 'Ambili' was sown at bimonthly interval starting from March, 1991. As practised by the traditional farmers of Kerala, an additional sowing was also done in October, making the treatments seven.

The experiment was laid out in RBD with four replications. The cultural operations were done as per the recommended practice (KAU, 1993). Number of adult white flies was counted at fortnightly intervals in the early morning when they were less active. Ten random

leaves/plant were considered for counting white fly population. Incidence of mosaic symptoms, i.e., yellow network of veins and veinlets, were recorded as and when the symptoms appeared.

RESULTS AND DISCUSSION

Significant differences in the population of white flies were noticed in pumpkin sown in different months (Table 1). The white fly population was minimum in plants raised in the month of May (2.2) closely followed by that of July (3.67) and was maximum in January sown crop (11.62) which was on par with March sowing (10.64). The build-up of white fly population was more in the summer months of March and April 1992 and April and May, 1991 (15.8, 19.5, 15.15 and 14.23 respectively). Temperature was maximum during these months. The maximum temperature (range:35.1 C-36.9°C) and minimum temperature (range:22.8 C-25.5 C) were relatively higher in the summer months of March-May and in these months the white fly population loads were also higher. White fly population was minimum during June, July and August (1.88, 1.95 and 2.71 respectively) which coincided with low temperature (25.9 C to 26.8°C). The maximum temperature was also low during these months (29.9 C-29.7 C). White fly population showed significant positive correlation with maximum temperature ($r = 0.94^*$) and monthly mean temperature ($r = 0.60^*$).

Table I. Correlation between white fly and weather parameters

Month	White fly population/plant	Maximum temperature, °C	Minimum temperature, °C	Mean temperature, °C	Relative humidity, %	Rainfall, mm
April 1991	15.15	35.6	24.5	30.1	68	83.8
May "	14.23	35.1	25.5	30.3	70	56.1
June "	1.88	29.7	23.8	28.8	88	993.1
July "	1.95	29.1	22.8	26.0	86	975.6
August "	2.71	29.0	22.7	25.9	87	533.3
September "	3.46	31.5	23.6	27.6	78	61.5
October "	6.16	30.9	23.2	27.1	82	281.7
November "	8.75	31.5	23.0	27.3	75	191.3
December "	10.99	31.9	21.7	26.6	64	0.02
January 1992	9.08	32.6	20.9	26.5	53	0
February "	9.78	34.5	21.8	28.2	65	0
March "	15.8	36.9	22.8	29.9	61	0
April "	19.5	36.3	24.4	30.4	65	0
Correlation coefficient with whitefly population		+0.94*	+0.15	+0.60*	-0.77*	-0.74*

*Significant at 5% level

Considerable reduction in white fly population during the monsoon months of June, July and August was observed. Relative humidity and rainfall were also maximum during these months. White fly population had significant negative correlation with relative humidity and rainfall during the study.

High temperature, low relative humidity and low rainfall will be the obvious reason for heavy build-up of white flies during March, April and May resulting in heavy incidence of yellow vein mosaic in January sown crop (65%) and March sown crop (51.57%). Negative correlation between yellow vein mosaic and relative humidity; and positive correlation between mosaic disease, white fly population and temperature were earlier observed by

Chelliah *et al.* (1975) and Keshwal and Jain (1983) in bhindi.

Pumpkin sown during the month of May was completely free from yellow vein mosaic (Table 2). The crop sown in July had only a low incidence of disease (15%). The white fly population was also comparatively less during these cropping periods which may be the reason for low mosaic incidence. Heavy rainfall during June, July and August and high relative humidity resulting in low temperature might have caused a sizable reduction in the white fly population. Suppression of white fly population by heavy rainfall was earlier reported by Reddy *et al.* (1989) in cotton. The mosaic symptoms appeared 28 days after sowing in January sown crop whereas it

Table 2. Effects of different time of sowing on mosaic incidence, yield and economic characters in pumpkin

Month of sowing	YVM incidence, %	Yield/ plant, kg	Average fruit weight, kg	Hundred seed weight, g	Days to female flower anthesis	Days to first fruit set	Length of vine, m
March	51.67	-	-	-	-	-	-
May	0.00	5.14	2.91	13.90	58.30	76.31	4.97
July	15.00	6.80	3.58	13.84	51.49	55.31	5.95
September	38.33	6.83	3.16	11.13	49.48	53.25	4.06
October	30.00	7.06	3.14	13.40	48.78	52.20	5.80
November	50.00	4.95	2.73	10.55	47.16	55.04	2.69
January	65.00	2.28	1.68	10.50	56.53	62.96	1.79
CD (0.05)	4.44	3.12	0.81	2.58	4.77	6.54	0.88

YVM * Yellow vein mosaic

appeared very late in the crop sown in the month of July. The white fly population was found minimum in the early vegetative phase which gradually increased proportionate to the growth and spread of plants.

Yield and contributing characters were influenced by change in time of sowing. All the characters were significantly affected by change in the time of sowing. Fruit yield was maximum in October sowing (7.06 kg) closely followed by September sowing (6.83 kg) July sowing (6.80 kg) and May sowing (5.11 kg) ranging the productivity marginally from 14.12 to 15.6 t ha⁻¹. In other crops yield was considerably low. The average fruit weight was maximum for crops sown in July (3.58 kg) followed by September and October sown crops. Pumpkin sown during May took more days for flowering and fruit set.

The warm humid climate prevailing in Kerala is highly conducive for the spread of viral diseases and this is quite evident from the severe mosaic incidence in bhindi, bittergourd, pumpkin, cucumber and cowpea during summer in Kerala. As observed in the study the rainfed crop sown in the month of May will escape from mosaic disease by the obvious reason of a very low white fly population. The fruit yield in the rainfed crop was also

reasonable suggesting the scope of cultivating mosaic susceptible annual vegetable crops during May to August.

ACKNOWLEDGEMENT

This paper forms a part of M.Sc.(Hort.) thesis submitted by the first author to the Kerala Agricultural University in 1992 and the authors are grateful to the University for facilities provided.

REFERENCES

- Chelliah, S., Murugesan, S. and Murugesan, M. 1975. Influence of weather factors on the incidence of yellow vein mosaic disease of bhindi. *Madras agric. J.* 72 : 412-419
- KAU, 1993. *Package of Practices Recommendations*. Directorate of Extension, Kerala Agricultural University. Trichur, p. 174-175
- Keshwal, R. L. and Jain, A. C. 1983. Incidence and spread of yellow vein mosaic of okra. *Veg. Sci.* 10 (1) : 65-69
- Reddy, A. S., Rosaiah, B. and Rao, T. B. 1989. Seasonal occurrence of white fly (*Bemisia tabaci*) on cotton and its control. *Andhra agric. J.* 36 (4) : 275-279