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EFFECT OF TIME OF SOWING ON INCIDENCE OF MOSAIC IN PUMPKIN

Pumpkin (*Cucurbita moschata* Poir) is well known for its low cost of production and long keeping quality of fruits, having high carotene content. Of late, cultivation of this traditional crop suffered a set back due to severe outbreak of mosaic diseases. None of the pumpkin varieties available in India has resistance or tolerance to mosaic diseases. Suitable management practices to reduce disease incidence may be one of the approaches for successful cultivation of this crop. In the present study, sowing of pumpkin at bimonthly intervals is taken up to assess severity of mosaic diseases at different months and to identify an ideal time of sowing, to harvest an economic crop.

The present study was conducted at the Department of Olericulture, College of Horticulture, Vellanikkara during November, 1990 to April 1992. The locally adapted high yielding variety 'Ambili' was sown at bimonthly intervals from March, 1991. As practised by the traditional growers, an additional crop was also sown in October, making the treatments seven. The experiment was laid out in a randomized block design with four replications. Seeds were sown in pits at a spacing of 4.5 m x 2 m and cultural operations done as per package of practices of the Kerala Agricultural University (KAU, 1989). Incidence of mosaic diseases was recorded as and when the symptoms appeared. Based on the symptomatology, incidences of yellow vein mosaic (Jayasree, 1984), pumpkin mosaic (Umamaheswaran, 1985), bottlegourd mosaic (Nariani, 1977), watermelon mosaic (Reddy and Nariyani, 1963) and cucumber mosaic (Bhargava and Bhargava, 1977) were recorded.

Pumpkin sown in different months was affected by yellow vein mosaic, pumpkin mosaic, bottlegourd mosaic, cucumber mosaic and watermelon mosaic. Yellow vein mosaic was maximum in January sown crop (65%) followed by November (60%) and March (51.67%). The disease is characterized by yellow network of veins and veinlets finally resulting in complete yellowing. Infection in early stage of the crop resulted in complete loss of yield as observed in January sowing. May sown crop was completely free from mosaic and July sown crop had a low incidence (15%).

Pumpkin mosaic characterized by light green and dark green patches was also maximum during summer as indicated by severe symptoms in March and January sown crops (36.67% and 30% respectively). Crops sown in May, July and November were completely free from pumpkin mosaic. Early expression of both yellow vein mosaic and pumpkin mosaic occurred in January sown crop (28 and 15 days respectively). ftroni e plants affected by pumpkin mosaic had retained fruits, yield reduction, malformation and reduction in fruit size were noticed.

Heavy build up of vectors, white flies (*Bemisia tabaci*) and aphids (*Aphis gossipi*) at high temperature may be the reason for heavy incidence of yellow vein mosaic and pumpkin mosaic during summer (Bhargava and Bhargava, 1977; Chelliah *et al.*, 1975). Similarly, heavy rainfall during monsoon might have caused a sizeable reduction in insect vectors resulting in low incidence of yellow vein mosaic and pumpkin mosaic for rainy season crop. The low night temperature during November, December and January may be ascribed for the late expression of pumpkin mosaic in September and October sown crops.

In the order of disease severity and economic loss, bottlegourd mosaic, watermelon mosaic and cucumber mosaic stand next to yellow vein mosaic and pumpkin mosaic. Though bottlegourd mosaic was noticed through out, the incidence was more during rainy months. Watermelon mosaic and cucumber mosaic also had the same climatic influence and both January and March sown crops were completely free from the symptoms.

Table 1. Incidence of mosaic diseases at different dates of sowing in pumpkin

Month of sowing	Yellow vein mosaic		Pumpkin mosaic		Bottlegourd mosaic		Watermelon mosaic		Cucumber mosaic		Yield kg plant^{-1}
	Incidence (%)	Days for expression	Incidence (%)	Days for expression	Incidence (%)	Days for expression	Incidence (%)	Days for expression	Incidence (%)	Days for expression	
March	51.67	32	36.67	42	6.67	20	0.00	-	0.00	-	Nil
May	0.00	-	0.00	-	18.30	30	45.00	42	30.00	70	5.14
July	15.00	60	0.00	-	3.33	50	36.67	40	0.00	-	6.80
September	88.33	40	13.33	90	6.67	55	10.00	60	0.00	-	6.83
October	30.00	45	10.00	63	20.00	32	0.00	-	3.33	30	7.06
November	60.00	32	0.00	-	13.33	25	5.00	25	10.00	32	4.95
January	65.00	28	30.00	25	5.00	25	0.00	-	0.00	-	2.28
CD (0.05)	4.40		4.20		3.97		3.07		3.07		3.12

Yield and contributing characters were influenced by change in time of sowing. All the characters except fruits per plant were significantly affected by dates of sowing. Fruit yield per plant was maximum in October sowing (7.06 kg) closely followed by September sowing (6.83 kg). One of the reasons for better performance of the crop sown during October may be due to the comparatively low incidence of yellow vein mosaic and pumpkin mosaic. Moreover, in this crop, symptom expression took place after the vegetative phase and initial development of fruits. As a result, yield was not drastically reduced. The crop sown during January yielded only 2.28 kg per plant and March sown crop did not yield at all due to heavy incidence of yellow vein mosaic and pumpkin mosaic in summer. Considering the *per se* performance in terms of fruit yield, fruit size and incidence of mosaic, sowing of pumpkin during October is the most ideal followed by early rainy season.

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