Pest Management in Horticultural Ecosystems,
Vol. 17, No. 2 pp 109-112 (2011)

Damage potential of spiralling whitefly, *Aleurodicus dispersus* and red spider mite, *Tetranychus* spp. and influence of weather parameters on their occurrence in *Coccinia grandis* (L.) Voigt.

VIJAYASREE. V[1], T. NALINAKUMARI[2] and GEORGE XAVIER[3]

[1, 2] Department of Agricultural Entomology, College of Agriculture, Vellayani, Thiruvanthapuram, Kerala, India
[3] AINP on Pesticide Residues, College of Agriculture, Vellayani, Thiruvananthapuram, Kerala, India
E-mail: vsree_ag@yahoo.co.in

ABSTRACT: Studies were undertaken at the College of Agriculture, Vellayani and various locations at Thiruvananthapuram, S. India during 2006-2007 to assess the extent of damage caused by spiralling whitefly, *Aleurodicus dispersus* and red spider mite, *Tetranychus* spp. infesting coccinia. The damage by *A. dispersus* was observed in the field only from February 2007 to June 2007 and it ranged from 2.39 to 14.76 and the infestation by *Tetranychus* sp. was observed only in five months during the period of observation and the infestation ranged from 4.06 to 27.62. Both *A. dispersus* and *Tetranychus* sp. occurred only in the summer season. The damage caused by *A. dispersus* and *Tetranychus* sp. had significant positive correlation with maximum temperature.

Key words: Coccinia, *Aleurodicus dispersus*, *Tetranychus* spp.

INTRODUCTION

Coccinia (*Coccinia grandis* (L.) Voigt.) is an under-exploited vegetable and its nutritional value was assessed to be as high as that of goat's milk and meat. The roots, stems and leaves of the plant are also used as ingredients of medicines for treatment of skin diseases, bronchitis and diabetes (Veeraragavathatham *et al*., 1998). The importance of the crop was known even from antiquity in India. The holy books and books of Ayurveda bear testimony to this. Coccinia was mainly confined to kitchen gardens, but the gourd has now attained export status. It has great demand in both domestic markets as well as in foreign countries. The widespread cultivation of the crop resulted in the invasion of large number of pests. But reports from Kerala showed that coccinia is a pest free crop (KAU, 2002) and the damage caused by pests are neither highlighted so far. Hence the study was to identify the summer season pests, their nature and extent of damage, their relationship with weather parameters.

MATERIALS AND METHODS

Local variety of coccinia obtained from Instructional farm, College of Agriculture,Vellayani was raised and maintained during the period from March 2006 to September 2007. It was raised in an area of 1000 m^2 with a spacing of 5m × 4m. The crop husbandry practices were done as envisaged in the package of practices recommendations of the Kerala Agricultural University (KAU, 2002) except the spacing adopted for planting. Pandals made of wooden poles and coir was erected and vines of individual plants were grown separately. Inter twining of vines was prevented by separating out the vines at weekly intervals. The number of infested leaves was counted from the total number of thirty leaves sampled from each plant and the percentage of leaves infested was worked out for finding the extent of damage by both *A. dispersus* and *Tetranychus* sp. The weather parameters *viz*., maximum and minimum temperature, relative humidity, rainfall and number of rainy days were recorded from the Department of Meteorology, College of Agriculture, Vellayani. The average of the monthly data was worked out and used for the study. The monthly weather parameters were correlated with the population of pests and extent of damage caused by the pests during the month of observation and the succeeding month. Data were subjected to ANOVA (Panse and Suhatme, 1985).

RESULTS AND DISCUSSION

A. dispersus

The adult fly of *A. dispersus* resembled a tiny moth, wings of which were covered with white powdery material. The occurrence of the pest in coccinia was reported earlier by Prathapan (1996). The nymphs and adults congregated on the underside of the leaves and

Table 1. Extent of leaves damaged by *Tetranychus* sp. in coccinia at Kalliyoor panchayat in Thiruvananthapuram district (%)

Month	Locations										
	Instructional farm					Farmers' field					Mean
	1	2	3	4	5	6	7	8	9	10	
February-2007	8.89 (3.15)	3.75 (2.18)	5.17 (2.48)	10.30 (3.36)	3.85 (2.20)	3.65 (2.16)	5.81 (2.61)	7.33 (2.89)	10.15 (3.34)	14.59 (3.95)	7.01 (2.83)
March-2007	17.34 (4.28)	14.11 (3.89)	31.08 (5.66)	21.27 (4.72)	21.51 (4.72)	23.04 (4.90)	17.45 (4.29)	15.66 (4.08)	23.70 (4.97)	25.45 (5.14)	20.81 (4.67)
April-2007	25.09 (5.11)	22.28 (4.82)	38.76 (6.30)	25.36 (5.13)	31.93 (5.74)	19.41 (4.52)	22.00 (4.80)	31.67 (5.72)	22.81 (4.88)	28.51 (5.43)	26.56 (5.25)
May-2007	25.26 (5.12)	37.05 (6.17)	26.23 (5.22)	38.30 (6.27)	22.47 (4.84)	18.46 (4.41)	23.27 (4.93)	40.51 (6.44)	31.49 (5.70)	17.93 (4.35)	27.62 (5.35)
June-2007	1.21 (1.49)	3.65 (2.16)	4.16 (2.27)	7.35 (2.89)	11.82 (3.58)	7.05 (2.84)	8.47 (3.08)	8.45 (3.07)	2.99 (2.00)	3.44 (2.11)	5.50 (2.55)
Mean	13.67 (3.83)	13.75 (3.84)	18.27 (4.39)	19.07 (4.48)	16.81 (4.22)	13.21 (3.77)	14.52 (3.94)	18.71 (4.44)	16.47 (4.18)	16.64 (4.20)	

CD (0.05) , Month - 0.928, Location : Not Significant, M × L : Not Significant

Figures in parentheses are √x +1 transformed values

Table 2. Extent of leaves damaged by *A. dispersus* in coccinia at Kalliyoor panchayat in Thiruvananthapuram district (%)

Month	Locations				Mean
	Instructional farm				
	1	2	3	4	
February-2007	6.12 (2.67)	9.31 (3.21)	9.24 (3.20)	5.82 (2.61)	7.53 (2.92)
March-2007	6.65 (2.77)	9.26 (3.20)	14.38 (3.92)	8.46 (3.08)	9.50 (3.24)
April-2007	9.28 (3.21)	12.84 (3.72)	10.61 (3.41)	13.76 (3.84)	11.53 (3.54)
May-2007	13.77 (3.84)	15.13 (4.02)	14.51 (3.94)	15.64 (4.08)	14.76 (3.97)
June-2007	4.16 (2.27)	1.45 (1.57)	1.21 (1.49)	3.21 (2.05)	2.39 (1.84)
Mean	7.70 (2.95)	8.86 (3.14)	9.18 (3.19)	8.80 (3.13)	

CD (0.05)
Month : 1.227
Location : Not Significant
M × L : Not Significant

Figures in parentheses are √x +1 transformed values

Table 3. Correlation coefficient between weather parameters and the extent of damage caused by *A. dispersus* and *Tetranychus* sp. of coccinia during the month and succeeding month

Parameters	*A. dispersus*		*Tetranychus* sp.	
	A	B	A	B
Maximum temperature	0.7934**	0.8962**	0.5563	0.7949**
Minimum temperature	0.3152	0.1034	0.3108	-0.0946
Relative humidity (Morning)	-0.3622	-0.1035	-0.1750	-0.3496
Relative humidity(Evening)	-0.3261	-0.7353**	-0.1214	-0.6029*
Rain fall	-0.3330	-0.7375**	-0.1535	-0.6065*
Number of rainy days	-0.4373	-0.7390**	-0.2904	-0.6341*

A - During the month, B - Succeeding month, ** - Significant at 0.01, * - Significant at 0.05

feeding of the pest resulted in yellowish discolouration of the leaves.

The spiralling white fly was observed to be a dry season pest. The damage by *A. dispersus* was observed in the field only from February 2007 to June 2007 and it ranged from 2.39 to 14.76 and the related data is presented in the Table 1. The infestation by *A. dispersus* showed significant difference during different months of observation. The lowest damage was observed in June 2007 (2.39). The highest infestation was observed in May 2007 (14.76) and it was statistically similar to the infestation caused by the pest in February 2007 (7.53), March 2007 (9.50) and April 2007 (11.53). High temperature favoured the multiplication of the pest and high rainfall suppressed the infestation. The damage caused by *A. dispersus* during the month had significant positive correlation (Table 3) with maximum temperature (r value = 0.7934). The damage caused by *A. dispersus* had significant positive correlation with maximum temperature (r value = 0.8962) and had significant negative correlation with evening relative humidity(r value =É 0.7353), rainfall (r value =É 0.7375) and number of rainy days (r value =É 0.7390) of the succeeding month. The population of spiralling whitefly is found to be relatively higher during summer months and the density of the whitefly is positively correlated with maximum temperature and negatively correlated with relative humidity (Mani, 2010). The infestation was seen only in four locations in Instructional Farm and there was no significant difference between the percentage of infestation in the four locations and also when the interaction between months and locations was considered.

Tetranychus sp.

The only non insect pest observed in the field was *Tetranychus* sp. The red spider mite, *Tetranychus* sp. colonized on the underside of the leaves. They sucked sap from the leaves and produced chlorotic spots on the upper surface of the leaves. These spots coalesced into wider patches and the leaves withered ultimately.

The mean percentage of infestation by *Tetranychus* sp. during different months showed significant difference and the data is presented in the Table 2. The mite was seen during summer at all the locations. The infestation by *Tetranychus* sp. was observed only in five months during the period of observation and the infestation ranged from 4.06 to 27.62. The lowest infestation was recorded during June 2007 (5.50) and no significant variation was observed in the infestation during February 2007 (7.01). The highest infestation was recorded during the period of March to May 2007. No significant difference was observed in the infestation caused by *Tetranychus* sp. when the ten locations and the interaction between various months and locations were considered.

The damage due to *Tetranychus* sp. had significant positive correlation (Table 3) with maximum temperature (r value = 0.7949) negative correlation with evening relative humidity (r value =É 0.6029), rainfall (r value =É 0.6065) and number of rainy days (r value =É 0.6341) during the succeeding month. *Tetranychus* populations attained their optimum growth and reproductive rates at 35±2°C (Tanigoshi *et al*., 1975). Although vegetable crops were found to be attacked by phytophagous mites almost throughout the year, the mite problem remained extremely severe during the summer months (April to July) followed by post-monsoon (September to October) periods according to the observations made by Prasad, 2006.

Incidence of both *A. dispersus* and *Tetranychus* sp. occurred only in the summer season, conforming to similar observations made by Palaniswami *et al*. (1995).

REFERENCES

KAU. 2002. *Package of Practices Recommendations*: Crops. Twelfth edition. Directorate of extension, Kerala Agricultural University, Thrissur, 278 p.

Mani, M. 2010. Origin, introduction, distribution and management of the invasive spiralling whitefly *Aleurodicus dispersus* Russell in India. *Karnataka Journal of Agricultural Sciences*, 2010. **23**(1): 59-75.

Panse, V. G. and Suhatme, P. V. 1985. *Statistical methods for agricultural workers.* Fourth Edition. Indian Council of Agricultural Research, NewDelhi, 381p.

Palaniswami, M. S., Pillai, K. S, Nair, R. R. and Mohandas, C.1995. A new cassava pest in India. *Cassava Newsl*, 19: 6-7.

Prasad, R. 2006. Occurrence and pest status of phytophagous mites infesting common vegetables. *Indian Journal of Entomology*, 2006. **68**(3): 235-239.

Prathapan, K. D.1996. Outbreak of the spiralling white fly *Aleurodicus dispersus* Russell (Aleyrodidae : Homoptera) in Kerala. *Insect Environment*, 2: 36 – 38.

Tanigoshi, L. K., Hoyt, S. C., Browne, R. W and Logan, J. A. 1975. Influence of Temperature on Population Increase of *Tetranychus mcdanieli* (Acarina: Tetranychidae). *Annals of the Entomological Society of America*, **68** (6): 972-978.

Veeraragavathatham, D., Jawaharlal, M. and Seemanthiniramdas. 1998. *A guide on vegetable culture*. Suri associates Coimbatore, 265 p.

MS Received : 20 January 2012
MS Accepted : 8 February 2012