

# SURVEY AND SEASONAL ABUNDANCE OF DIFFERENT INSECT PEST OF MANGO IN SAURASHTRA REGION OF GUJARAT

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## ABSTRACT

An experiment on survey of different insect pests i.e. mango hopper *Amritodus atkinsoni* (Lethiery), thrips *Frankliniella schultzei* Bangnall and Leaf gall midge *Procontarinia matteiana* in mango were carried out in five different taluka's of South saurashtra region of Gujarat during 2007 to 2015. The activities of leaf gall midge and thrips were found more or less throughout the year it's ranged from 2.70 to 18.80 per cent leaf damage and 0.34 to 12.31 numbers of thrips per inflorescence, or leaf respectively while the activities of hopper was found from moth of September to May (0.03 to 12.31 hoppers inflorescence) at vegetative or flowering stage of mango. The maximum population of leaf gall midge, hopper and thrips were recorded in first fortnight of October (18.80%), first fortnight March (20.13 hopper/inflorescence) and first fortnight February (12.31 thrips/leaf), respectively. Location wise mean data showed that the maximum population of leaf gall midge and mango hopper were noticed in Chalala (7.92 %) and Ankolwadi (5.90 hoppers / inflorescence) while thrips was found maximum in Talala (5.01 thrips/leaf). The incidence of leaf gall midge, mango hopper and thrips was found enormously during the month of September to November, December to March and January to March, respectively

## INTRODUCTION

Mango (*Mangifera indica* Linnaeus) is national fruit of India and known as "King of fruits" due to its wide adaptability, attractive colour, excellent taste, exotic flavour, and exemplary nutritive value, richness in variety, attractive appearance and popularity among the masses. This perennial crop which can be grown in diverse agroclimatic conditions faces differential biotic and abiotic stress limiting its production and productivity. The main reasonable abiotic constraints to low mango production and quality e.g. water stress, nutritional deficiencies. Similarly, all the parts of plant, namely trunk, branch, twig, leaf, petiole, inflorescence and fruit are attacked by a number of insect pests including mango hopper *Amritodus atkinsoni* (Lethiery), thrips *Frankliniella schultzei* Bangnall and flower bug *Campylomma* sp., Leaf gall midge *Procontarinia matteiana* Kieffer and shoot borer *Chlumetia transversa* Walker. According to Tandon and Verghese, (1985) reported the crop is attacked by about 492 species of insects, 17 species of mites and 26 species of nematodes in the world level. Of these, 188 species of insects have been reported from India. Patil *et al.* (1988) from India stated that the loss ranged from 20 to 60 per cent with the incidence of hoppers. The hoppers cause a loss of 20-100 % of inflorescence (Haseeb, 2006). The insect pests i.e. gall midge, mango hopper and thrips enormously and economically damage to the mango crop thought the year Hence, it is important to know the seasonal fluctuation of these insect pests in popular mango variety Kesar in different area of south Saurashtra.

## MATERIALS AND METHODS

Survey on the occurrence of different insect pests in mango

was carried out in five taluka's i.e. Vanthali, Talala, Chalala, Medarada and Ankolwadi of South saurashtra region during 2007 to 2015. Observations of different insect pest of mango were recorded by randomly selected 10 trees of each location at fortnightly interval during the year.

The number of hopper was recorded from 10 inflorescences or leaf or twig of randomly selected 10 trees at 15 days interval as per the method suggested by Girish kumar and Giraddi (2001) and Borad and Rathod (2013). The thrips population was counted from five randomly selected leaves or panicle of 10 randomly selected trees as per methodology given by Bana *et al.* (2015). In case of per cent damage of leaf gall midge was done through count number of young leaves infested by leaf gall midge out of total number of young leaves from randomly selected 10 twigs as per CABI (2009).

## RESULTS AND DISCUSSION

The survey on major insect pests revealed that the mango tree was attacked by the following insect pest i.e. Leaf gall midge, Mango hopper and Thrips species in different taluka's of south saurashtra region.

### Leaf gall midge

The infestation of leaf gall midge was seen more or less found throughout the year. The maximum (Table 1 & fig. 1) damage was found in first fortnight of October (18.80%) followed by second fortnight of September and October month. Rathod and Borad (2011) also reported the higher leaf damage was found during 1<sup>st</sup> fortnight of October (25.5%) in different five location of middle Gujarat. Similar result was found Anon (2000) at Anand. Kannan and Rao (2006a) studied seasonal

**Table 1: Population of leaf gall midge in mango at different location of South Saurashtra during 2007 to 2015 (year wise mean data)**

Month	Leaf Damage (%)		2009	2010	2011	2012	2013	2014	2015	Mean
	2007	2008								
Jan	0.86	4.55	2.80	3.18	4.74	5.38	4.26	6.10	4.49	4.04
	1.14	3.53	2.40	2.58	3.92	4.85	3.32	4.85	3.59	3.35
Feb	2.72	5.33	3.88	3.96	5.00	4.94	4.61	5.34	3.80	4.40
	3.31	4.91	3.20	3.27	3.74	4.40	2.85	4.59	3.76	3.78
March	3.97	3.11	3.30	2.98	4.40	5.68	3.24	4.49	4.05	3.91
	4.08	3.81	3.18	3.25	3.78	5.40	2.63	3.20	4.07	3.71
April	3.33	2.71	3.70	3.50	5.16	4.32	3.64	4.38	2.54	3.70
	2.51	2.79	3.21	3.20	4.61	4.38	2.76	2.95	2.25	3.18
May	0.70	1.70	4.83	3.62	3.80	5.46	1.96	2.83	2.72	3.07
	1.50	2.02	4.94	2.97	4.17	5.67	1.42	2.28	1.14	2.90
June	1.01	1.61	2.61	2.90	3.83	4.65	3.10	2.54	2.02	2.70
	2.11	2.22	3.29	4.28	4.38	5.04	2.94	2.24	3.21	3.30
July	9.00	7.05	6.52	7.05	8.36	6.62	4.84	6.26	3.85	6.62
	9.94	9.62	5.70	6.84	6.59	6.92	5.30	5.59	5.83	6.93
Aug	10.86	11.00	7.22	10.15	7.06	5.02	6.07	7.16	6.60	7.90
	9.07	15.69	6.97	8.70	6.95	7.00	5.27	6.59	8.77	8.33
Sept	15.33	16.70	9.58	12.67	13.28	12.48	7.81	11.05	14.31	12.58
	20.68	16.33	9.36	10.72	13.67	12.48	8.98	10.28	19.53	13.56
Oct	23.99	18.66	16.15	23.17	17.71	15.81	14.51	15.80	23.40	18.80
	21.03	11.43	14.91	20.81	18.32	13.36	10.91	11.61	19.91	15.81
Nov	13.24	10.03	16.93	16.36	14.49	11.83	10.94	12.51	9.16	12.83
	9.10	6.23	15.11	10.25	11.24	6.95	5.52	6.75	5.82	8.55
Dec	4.11	5.38	5.84	4.46	5.72	4.91	1.95	2.65	1.10	4.01
	2.62	2.64	3.18	1.72	3.44	2.62	1.49	1.63	0.70	2.23

**Table 2: Population of leaf hopper in mango at different location of South Saurashtra during 2007 to 2015 (year wise mean data)**

Month	Hopper per inflorescence or twig		2009	2010	2011	2012	2013	2014	2015	Mean
	2007	2008								
Jan	6.88	7.71	6.44	6.00	9.75	8.86	8.51	7.37	6.57	7.57
	8.71	9.70	8.08	7.20	11.40	10.85	10.43	8.32	8.67	9.26
Feb	18.21	17.22	14.76	14.74	21.18	19.38	18.89	13.94	13.23	16.84
	20.99	22.80	21.10	19.99	20.82	20.48	20.05	16.73	15.78	19.86
March	21.68	22.08	19.99	19.58	21.86	22.41	20.01	18.08	15.45	20.13
	18.34	19.78	18.14	16.48	16.67	17.45	15.13	12.30	14.63	16.55
April	11.72	9.74	8.74	8.12	7.09	8.91	9.87	7.33	8.01	8.84
	5.37	5.56	4.78	4.30	4.90	3.89	5.06	2.33	1.77	4.22
May	2.36	1.90	1.16	1.20	1.22	0.71	0.51	0.00	0.00	1.01
	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
June	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
July	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sept	0.00	0.70	2.90	0.53	4.12	2.13	0.91	1.42	1.97	1.63
	2.76	4.54	5.43	4.04	6.51	6.67	6.86	4.42	6.83	5.34
Oct	4.36	8.28	7.27	6.87	6.95	8.38	8.66	6.67	7.63	7.23
	5.30	7.38	7.24	7.50	2.29	5.02	4.30	3.62	4.89	5.28
Nov	3.47	1.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51
	1.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15
Dec	0.65	1.80	1.46	1.23	4.48	5.01	4.37	3.44	2.90	2.82
	1.57	3.30	2.90	2.77	5.98	6.62	5.44	4.73	4.21	4.17

incidence and population fluctuation of leaf gall midge, *P. matteiana* Keiffer. The result revealed peak population of leaf gall midge during second week of September. Patel (2009) reported the maximum activities of gall midge in month of January – February (62.51%). The variation in finding may be due to the different environmental condition. The location wise studies indicated that the maximum mean per cent damage

was recorded from Chalala (7.92%) followed by Mendarda (6.76%) and Ankolwadi (6.38%).

#### Mango hopper

The hoppers excrete honeydew which covers the inflorescence, leaves and fruits encouraging growth of fungi giving rise to sooty mold which affects photosynthetic activity

**Table 3: Population of thrips in mango at different location of South Saurashtra during 2007 to 2015 (year wise mean data)**

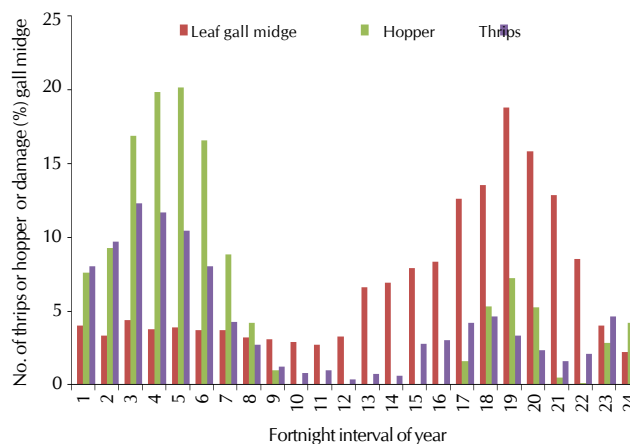
Month	Thrips per inflorescence or twig or leaf									
	2007	2008	2009	2010	2011	2012	2013	2014	2015	Mean
Jan	7.09	4.83	7.54	9.50	8.54	9.56	9.31	7.85	8.29	8.06
	8.67	6.75	8.78	11.13	9.28	10.86	10.73	9.38	11.64	9.69
Feb	10.15	8.02	13.69	13.95	12.72	12.99	13.75	11.22	14.27	12.31
	8.93	9.80	14.60	11.90	14.43	12.25	11.73	9.75	11.78	11.69
March	9.04	9.07	12.26	8.80	11.60	10.54	10.35	10.93	11.23	10.42
	7.14	6.98	7.23	6.29	10.34	6.57	8.48	9.56	9.55	8.02
April	4.63	2.23	5.30	3.13	6.32	2.49	3.73	4.45	5.93	4.25
	3.09	1.06	1.10	1.77	2.92	2.03	3.71	4.03	4.55	2.70
May	2.32	0.45	0.00	1.32	0.30	1.83	1.75	1.76	1.16	1.21
	2.22	0.20	0.00	1.40	0.00	1.72	0.95	0.65	0.00	0.79
June	1.00	0.00	0.00	2.46	0.00	3.76	0.72	0.80	0.00	0.97
	0.35	0.00	0.00	0.45	0.00	1.83	0.47	0.00	0.00	0.34
July	0.60	0.00	0.51	1.68	0.65	2.03	1.16	0.00	0.00	0.74
	0.50	0.51	0.70	0.80	0.92	0.52	0.52	0.45	0.65	0.62
Aug	3.14	2.68	3.01	3.40	2.42	3.49	1.80	2.95	2.10	2.78
	1.83	4.00	3.16	2.49	3.39	3.37	2.53	3.95	2.50	3.02
Sept	0.76	5.63	4.80	2.30	5.20	3.29	5.28	5.25	5.16	4.19
	2.91	6.00	4.10	2.95	3.73	4.15	5.74	6.20	6.08	4.65
Oct	1.20	2.48	3.03	2.14	3.88	2.74	4.30	4.88	5.53	3.35
	2.44	1.30	1.58	2.40	0.98	3.03	2.43	2.42	4.66	2.36
Nov	1.28	0.24	0.10	1.37	0.25	3.55	2.37	2.25	2.83	1.58
	1.86	2.78	0.73	2.40	0.45	2.85	1.50	3.95	2.09	2.07
Dec	3.40	4.96	1.97	7.17	2.18	6.88	4.86	5.26	4.90	4.62
	3.50	5.19	3.90	7.89	5.07	8.51	7.68	6.65	6.95	6.15

**Table 4: Survey on insect pests of mango at different locations of South Saurashtra (Year 2007 to 2015)**

Year	Vanthali			Talala			Chalala			Medarada			Ankolwadi		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
2007	4.61	9.17	3.88	4.96	4.54	4.86	5.03	10.85	3.91	7.23	6.86	3.55	6.10	5.57	2.14
2008	5.21	9.35	3.47	5.99	5.67	4.59	6.47	6.23	3.13	6.56	4.83	3.06	5.69	9.14	3.50
2009	5.19	4.73	4.48	5.04	5.41	5.25	5.78	10.56	3.69	6.68	5.99	2.84	4.48	6.39	4.17
2010	4.43	5.09	4.27	4.07	7.58	5.21	5.16	9.00	2.79	6.74	7.99	3.98	4.72	6.30	6.47
2011	4.88	4.43	4.54	7.78	8.85	5.66	7.38	11.41	5.14	4.21	6.03	2.77	6.01	6.44	3.77
2012	5.96	4.67	4.32	8.03	6.48	6.35	6.21	8.94	3.33	3.85	7.32	4.35	6.52	7.22	6.08
2013	5.58	6.32	3.72	7.05	3.81	4.32	5.15	2.78	5.29	3.91	6.83	4.52	7.27	4.33	5.81
2014	3.71	6.53	3.91	5.10	6.44	4.60	4.32	5.34	5.09	3.24	6.87	4.85	6.70	5.04	5.02
2015	4.26	5.79	3.42	5.31	5.98	4.22	4.37	6.21	5.58	3.90	8.13	4.54	5.61	7.00	7.22
Mean	4.87	6.23	4.00	5.93	6.08	5.01	5.54	7.92	4.22	5.15	6.76	3.83	5.90	6.38	4.91

1 = Hopper/Inflorescence or leaf; 2 = Gall midge (% Leaf damage); 3 = Thrips/ Inflorescence or leaf

of leaves and quality of fruits. Activity of this pest was found more or less observed throughout the study period. The population of mango hoppers was found maximum in the month of January to March (Table 2). It increased from second fortnight of January (9.26 hoppers / inflorescence) with initiation of flowering, and reached at peak in first fortnight of March (20.13 hoppers / inflorescence). Thereafter, it decreased gradually from 8.84 to 1.01 hoppers in the subsequent months of April to October. It raised again (0.51 – 4.17 hoppers) with starting of new vegetative growth during November and December months. Gunddapa *et al.* (2014) reported the maximum activities of hopper at inflorescence and panicle emergence stage and also significant positive correlation ( $r = 0.65$ ) between the hoppers present on the flower panicle with the availability of inflorescence on the tree. Jhala *et al.* (1989) also reported that the activity of this pest was abundant



**Figure 1: Population of different insect pest of mango**

throughout the year. More or less similar trend was found by Rathod and Borad (2011), Tandon *et al.* (1983), Patel *et al.* (1994), Rahman and Singh (2004) and Varshneya and Rana (2007) their reported maximum and minimum population density of mango hopper during flowering season (March-May) and colder months (January - February), respectively. On other hand Kannan and Rao (2006b) noticed peak incidence of hopper, *Amritodus atkinsoni* (85.0 hoppers/ inflorescence) during third week of January. Location wise mean population of hopper showed that the population of hoppers found the maximum in Talala (5.93 hoppers / inflorescence) taluka followed by Ankolwadi (5.90 hoppers / inflorescence) and Chalala (5.54 hoppers / inflorescence) (Table 4).

### Thrips

The population of thrips more or less found throughout the year. The maximum population thrips per inflorescence was notice during the month of first fortnight of February to Second fortnight of March (9.69 to 12.31 thrips/ inflorescence) (Table 3 & Fig.1), while the lowest population was found in month of May to July. Kannan and Rao (2006b) The result revealed peak population of thrips last week of January. The maximum thrips population per leaf was found in Talala (5.02 thrips/ leaf) followed by Ankolwadi (4.91 thrips/leaf) and Chalala (4.22 thrips/leaf).

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