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Farmers' knowledge, perception and management of mango mealy bug, *Drosicha mangiferae* Green (Hemiptera: Monophlebidae), on *Mangifera indica* in Punjab, PakistanHaider Karar^a, Muhammad Amjad Bashir^b, Reem Atalla Alajmi^c, Dina M. Metwally^{c,d}, Muneeba Haider^e, Najeeba Haider^e, Samad Raza^a, Ali Bakhsh^f, Rania Haddadi^{c,*}^a Mango Research Institute, Multan, Pakistan^b Department of Plant Protection Faculty of Agricultural Sciences, Ghazi University Dera Ghazi Khan Punjab, Pakistan^c Zoology Department College of Science, King Saud University, Riyadh 11451, Saudi Arabia^d Department of Parasitology, Faculty of Veterinary Medicine, Zagazig University, Zagazig 44519, Egypt^e MNS-University of Agriculture, Multan, Pakistan^f Department of Plant Breeding & Genetics Faculty of Agricultural Sciences, Ghazi University, Dera Ghazi Khan Punjab, Pakistan

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ABSTRACT

In 2004–05, during the December to February about 141 mango farmers were interviewed during peak activity of mango mealy bug in southern Punjab, Pakistan. The objective was to know the farmers' knowledge, perceptions and practices in the management of mango mealy bug. Most of the farmers (94.33%) reported that Chaunsa variety (king of all mango varieties) was susceptible to mango and irrigation water was the major source of flare up of this pest. Basudin and Supracide were the most commonly used insecticides as 72.92 and 51.77 percent farmers gave positive response and grease bands were applied for the control of mango mealy bug by the majority of the respondents. Hundred percent yield losses was told by 22.7 percent respondents whereas 75 percent, 50 percent and 25 percent losses were reported by 39.7, 31.9 and 14.2 insecticidal spray did not show satisfaction to the respondents for the control of fertilized females of mango mealy bug coming down from the trees. Lack of knowledge about the pest, lack of money, adulterated and shortage of pesticides, lack of unity amongst farmers Further the growers' views were tested in the field for confirmation and small land holdings were the main constraints for the control of mango mealy bug.

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1. Introduction

Mango (*Mangifera indica* L.), a member of family Anacardiaceae is known as “King of fruits”. It is an ancient fruit of Indo-Pakistan sub-continent and is of great importance to millions (Litz, 1997). Mango is also a valuable ornamental and shade tree and contributes to the protection of soil against erosion and different medicinal virtues of mango are also known (D' Almeida, 1995). After cotton and rice, mango is the third most important cash crop of Pakistan, which helps in improving livelihoods of resource poor

farmers being cultivated over an area of 95,000 ha with production of 100,000 tones/annum, however, the average productivity is only 80 mounds/acre (Anon, 2006), which is lower than most of the mango growing countries of the world. There are so many reasons of low yield of which insect pests are the most important. However, the severity of the insect pest can be identified through the growers' survey for developing management practices. For better management practices, there is a need to integrate indigenous knowledge and techniques into development processes in order to improve farmers' pest management practices (Nyeko et al. 2007). One of the major constraints upon establishing an IPM program is the lack of adequate information about growers' knowledge and perceptions, about mango insect pests, their ecology and practices in pest management (Heong, 1985; Teng, 1987; Morse and Buhler, 1997). The growers have the advantage over scientists in that they often have a life-long experience of growing their crops, system of passing over their knowledge on to their

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coming generations through exchange of information which has been built up through regular observations through formal and informal actor networks (Van Mele and Van Chien, 2004). Traditional pest management practices have been studied for different crops, and used as input for developing integrated pest management packages (Norton et al., 1999; Bently and Baker, 2002). It is well established that evaluation of farmers' knowledge and perception for the pests and their natural enemies is a useful tool for research agendas, planning campaign strategies and develop messages for communication (Fujisaka, 1992; Escalada and Heong, 1993). To identify farmers' problems and their existing knowledge and practices, surveys are considered important. The present survey was therefore conducted with the objective

- To determine the mango mealy bug, *Drosicha mangiferae* infestation and the major problems in management being faced by the mango growers of the Punjab
- To know alternate host plants and the means of dispersal of mealy bug to other for mango mealy bug.
- To compare the recommended and farmer's adopted management strategies host plants.

2. Materials and methods

2.1. Study sites

Four main mango growing areas in Southern Punjab were covered for this study viz. Multan, Muzaffargarh, Bahawalpur and Rahim Yar Khan districts. These districts are considered good for the cultivation of mango.

	Multan	Muzaffargarh	Bahawalpur	R.Y. Khan
Latitude	30-12 N	30-12 N	29-25 N	29-12 N
Longitude	71-30 E	71-14 E	71-4 E	70-30 E
Altitude (ft)	0121	0124	0115	0120
Mean Annual Temp (°C)	26.50	26.50	26.50	26.00
Mean Annual Rainfall (mm)	168	160	162	160

2.2. Survey

After detecting the mango growers' most important problem regarding insect pest through preliminary survey in district Multan, the questionnaire was revised for conducting a comprehensive and detailed survey during January–2005 in major mango growing districts of The Punjab-Pakistan. In this study, only those growers where this pest was collected from the Department of Pest Warning and Quality Control, farmers were interviewed. The information regarding the farmers' having the attack of interviewed randomly who were suffering from mango mealy bug. A total of 141 mango Agriculture Extension, Ayub Agricultural Research Institute, Faisalabad and persons related to the purchase of mango fruits in the markets, pesticides dealers, contractors nursery growers and fellow farmers in different districts. Interviews were conducted either in the farmers house or in their orchards. Each farmer took 25–30 min for interview. The survey data were encoded, entered into

Excel sheets and verified prior to analysis. SPSS program was used to calculate the frequency distribution.

3. Results

The study was comprised of the problems of mango mealy bug *Drosicha mangiferae* in the mango orchards and farmer's views regarding various aspects relating to their mango varieties in relation to resistance/susceptibility against mango mealy bug mode of spread, hibernation places, comparison of recommended and farmer's management practices and losses caused by the insect pests. The results are described as under:

3.1. Respondent's knowledge about resistant and susceptible varieties of mango

The awareness of the respondents regarding susceptible/resistant mango varieties against mango mealy bug are shown in Table 1. Among the respondents, 94.33 percent reported Chaunsa variety, as the most susceptible, 2.84 percent told the resistant and 2.84 percent had no reply. Furthermore, Fajri and Langra were ranked next susceptible varieties according to 68.79 percent and 63.12 percent respondents, respectively to the survey, 63.12 percent respondent had the view that Black Chaunsa also majority of respondents (94.33%) Chaunsa is a susceptible genotype to mango mealy bug. Majority of the respondent did not know about the susceptibility and resistant response of mealy bug to other varieties of mango. The 56.74 percent respondents reported Hyder shah wala, as mealy bug resistant genotype followed by Dusheri, Sufaid Chaunsa, Sanglakhi and Langra by the view of 13.12 percent, 62.41 percent, 48.23. percent and

31.91 percent respondents, respectively. According to the opinion of the found susceptible, whereas 14.18 percent told resistant response of this variety to mango mealy bug. Majority of the respondent did not know about the susceptibility and resistant response of mealy bug to other varieties of mango. The 56.74 percent respondents reported Hyder shah wala, as mealy bug resistant genotype followed by Dusheri, Sufaid Chaunsa, Sanglakhi and Langra by the view of 13.12 percent, 62.41 percent, 48.23. percent and 31.91 percent respondents, respectively. According to the opinion of the majority of respondents (94.33%) Chaunsa is a susceptible genotype to mango mealy bug.

3.2. Awareness regarding methods of spreading of mealy bug

The results regarding awareness among the farmers about methods of spreading of mango mealy bug are presented in Table 2. The majority of the respondents i.e. 94.33 percent told that irriga-

Table 1

Awareness amongst the respondents regarding susceptibility and resistance mango varieties against mango mealy bug.

Name of Variety	Susceptible		Resistant		Not Known	
	FD	% age	FD	% age	FD	% age
Langra	89	63.12	44	31.20	8	5.68
Dusheri	48	34.04	88	62.41	5	3.55
Chaunsa	133	94.33	4	2.84	4	2.84
Fajri	97	68.79	12	8.51	32	22.70
Malda	32	22.70	65	46.10	44	31.21
Anwar Ratul	32	22.70	57	40.43	52	36.88
Muhammadwala	29	20.57	8	5.68	104	73.76
Khangarhribacha	0	0.00	24	17.02	117	82.98
Sindhri	33	23.40	32	22.70	76	53.90
Alphanso	0	0.00	17	12.06	124	87.94
Sanglakhi	20	14.18	45	31.91	76	53.90
Sobhawali ting	28	19.86	40	28.37	73	51.77
Hydershahwala	52	36.88	80	56.74	9	6.38
Zafrani	16	11.35	4	2.84	121	85.82
Sensation	28	19.86	16	11.35	97	68.79
Chanwal	4	2.84	20	14.18	117	82.98
Tukhmi	12	8.51	40	28.37	89	63.12
Black Chaunsa	89	63.12	20	14.18	32	22.70
Sufaid Chaunsa	53	37.59	68	48.23	20	14.18
Ratul-12	26	18.44	8	5.68	107	75.88

F.D = Frequency Distribution.

Table 2

Awareness amongst the respondents regarding method of spreading of mango mealy bug.

Methods of spreading	Yes		No	
	FD	% age	FD	% age
Through irrigation water	133	94.33	8	5.67
Through nursery plant	69	48.94	72	51.06
Through Air	25	17.73	116	82.27
Transportation by machinery	69	48.94	72	51.06
Through Birds	0	0	141	100
Through malformed inflorescence	41	29.08	100	70.92
By walking	74	52.48	67	47.52
Through Farm Yard Manure	15	10.64	126	89.36
Through dissidence	47	33.33	94	66.67
Plants to plants	58	41.13	83	58.87
Through weeds taken by woman	39	27.66	102	72.34

F.D = Frequency Distribution.

Table 3

Awareness amongst the respondents regarding places of hibernation of mango mealy bug.

Places	Yes		No	
	FD	% age	FD	% age
Under tree near trunk	117	82.98	24	17.02
Mud wall around orchards	80	56.74	61	43.26
Cracks in tree	96	68.09	45	31.91
Soil under tree canopy	61	43.26	80	56.74
Kacha water channel/kacha road	24	17.02	117	82.98
Under leaves	24	17.02	117	82.98
In roots of plants	31	21.99	110	78.01

F.D = Frequency Distribution.

tion water is the main source of dispersal of mango mealy bug, while 48.94 percent respondents opined that mango mealy bug spread through nursery plants and transportation by machinery. The other methods of spreading like affected branches of inflorescence by malformation, by walking of insects, farm yard manure, dissidence, migration from one plant to another. However, the dispersal of mealy bugs through weeds by human being cannot be ignored as 29.08, 52.48, 10.64, 33.33, 41.13 and 27.66 percent respondents had positive views about it. None of the respondent reported birds as active spreaders of mango mealy bug.

3.3. Awareness among respondents regarding hibernation places of mango mealy bug

According to survey results on hibernation of mango mealy bug (Table 3) reveal that 82.98 percent respondents had the view that the places under mango trees were the most favorable sites for hibernation followed by cracks in trees (68.09 percent respondents) and mud walls around orchards (56.74 percent respondents). Amongst the respondents 43.26, 21.99, 17.02 and 17.02 percent told that mango mealy bug hibernates in soil under tree

Table 4

Awareness amongst the respondents regarding cultural practices of mango mealy bug.

Practices	Yes		No		Satisfaction			
	FD	%age	FD	%age	25%	50%	75%	100%
Hoeing	71	50.35	70	49.64	53	18	0	0
Ploughing	19	13.48	122	86.52	12	7	0	0
Irrigation	67	47.52	74	52.48	61	6	0	0
Removal of weeds	85	60.28	56	39.72	85	0	0	0
Removal of eggs	48	34.08	93	65.96	7	20	21	0

F.D = Frequency Distribution.

canopy, roots of plants, kacha water channels and under the fallen leaves, respectively.

3.4. Practices adapted by the farmers for the control of mango mealy bug

3.4.1. Cultural practices

The cultural management practices adapted by the farmers to control mango mealy bugs are given in Table 4. The practice of removal of weeds was adapted by the majority of the respondents i.e., 60.28 percent. However, 50.35, 47.52, 34.08 and 13.48 percent farmers' adapted hoeing, irrigation, removal of eggs and ploughing as the major mango mealy bug management practices, respectively. From these results it is concluded that removal of weeds was adapted by the majority of the respondents for the control of mango mealy bug. The results regarding to the satisfaction of respondents relating to control practices adapted so far reveal that 18 respondents had the view that hoeing practices controlled the mango mealy bug up to 50 percent while seven, six and twenty farmers had the views that ploughing, irrigation and removal of eggs also resulted in 50 percent control. The practice adapted by the majority of the respondents regarding removal of weeds showed that 85 respondents had the view that this practice resulted in 25 percent control of mango mealy bug. Twenty one respondents satisfied 75 percent control of mango mealy bug by adapting removal of eggs. From these results it was observed that the practices adapted by the farmers did not show satisfactory control of mango mealy bug.

3.4.2. Mechanical practices

The growers' views regarding mechanical practices adapted by them and their satisfaction level for the control of mango mealy bug are presented in Table 5. The results reveal that Grease bands were adapted by majority of the respondents i.e., 88.65 percent and 43 respondents told that this practice controlled the mango mealy bug up to 25 percent while 82 respondents reported up to 50 percent control of this pest. The second most common practice was the application of plastic sheet bands which was adapted by 43.26 percent respondents and 29 farmers told that this practice

controlled the pest up to 25 percent while 32 farmers had the view that this practice depressed the pest population up to 50 percent. The practices for the control of mango mealy bug i.e. application of gunny bags and cotton bands were not adapted by any respondent. Non recommended practices i.e., the application of mud bands, daily spray, spreading of insecticides and use of calcium carbonate were also adapted by the some of the farmers and showed unsatisfactory control of mango mealy bug. From these results, it was observed that none of the mechanical control adapted by the respondents gave complete control of mango mealy bug.

3.4.3. Response of chemical insecticides

The results regarding the awareness amongst the respondents regarding chemical control of mango mealy bug are given in Table 6. Basudin was used abundantly for the control of mango mealy bug followed by Supracide. About the satisfaction level it was observed that 86 respondents reported 75 percent control whereas 14 respondents told 100 percent control with the three sprays of Basudin. Regarding the application of Supracide, 51.77 percent respondents replied the answer whereas 48.23 percent did not know. Forty one respondents replied that the application of Supracide 50 percent control was observed whereas 12 and 20 respondents reported 75 percent and 100 percent control. The application of Hostation, Methyl parathion, Decis, Fenprothrin, Karate, Methamidophos, Malathion, Talstar, Sumicidin, DDT, Polytrin-C, Nuvacron, Danitol, Chlorpyrifos, Furadan and Kerosine oil are being used for the control of mango mealy bug and resulted in unsatisfactory control as reported by the respondents. The majority of the respondents did not know about these insecticides. The number of respondents who were given the reply in positive response, ranged from 2.84 to 29.08 percent. According to the results it was observed that none of the insecticides fulfilled the desire satisfaction of the respondents.

3.4.4. Practices adapted by the farmers to control the fertilized female of mango mealy bug coming down the tree

The results given in Table 7 shows the awareness amongst the respondent practices regarding fertilized female of mango mealy bugs coming down from the tree. For the control of coming down

Table 5

Awareness amongst the respondents regarding mechanical practices of mango mealy bug.

Practices	Yes		No		Satisfaction			
	FD	%age	FD	%age	25%	50%	75%	100%
Plastic sheet bands	61	43.26	80	56.74	29	32	0	0
Grease bands	125	88.65	16	11.35	43	82	0	0
Cotton bands	0	0	141	100	0	0	0	0
Black oil cloth bands	20	14.18	121	85.82	7	13	0	0
Gunny bags	0	0	141	100	0	0	0	0
Mud bands	12	8.51	129	91.49	12	0	0	0
Daily spray	40	28.37	101	71.63	3	29	8	0
Spread insecticides	12	8.51	129	91.49	0	8	4	0
Use of calcium carbonate	8	5.67	133	94.33	6	2	0	0

F.D = Frequency Distribution.

Table 6

Awareness amongst the respondents regarding chemical control of mango mealy bug.

Chemical used	Yes		No of spray	No		Satisfaction			
	FD	%age		FD	%age	25%	50%	75%	100%
Basudin	100	72.92	3	41	29.08	0	0	86	14
Supracide	73	51.77	4	68	48.23	0	41	12	20
Hostathion	41	29.08	4	100	72.92	13	24	4	0
Methyl parathion	28	19.86	2	113	80.14	0	10	18	0
Decis	8	5.67	3	133	94.33	0	2	6	0
Fenpropathrin	24	17.02	4	117	82.98	10	14	0	0
Karate	32	22.70	3	109	77.30	0	14	18	0
Methamidophos	25	17.73	4	116	82.27	2	18	5	0
Malathion	16	11.35	1	125	88.65	0	7	9	0
Talstar	16	11.35	3	125	88.65	2	11	3	0
Sumiciden	4	2.84	4	137	97.16	0	1	3	0
DDT	8	5.67	2	133	94.33	0	0	8	0
Polytrin-C	8	5.67	3	133	94.33	0	2	8	0
Nuvacron	24	17.02	4	117	82.98	0	7	17	0
Danitol	8	5.67	3	133	94.33	0	2	6	0
Chlorpyrifos	16	11.35	4	125	88.65	0	3	11	2
Furadon	4	2.84	1	137	97.16	0	1	3	0
Kerosine oil	4	2.84	1	137	97.16	0	0	4	0

F.D = Frequency Distribution.

Table 7

Awareness amongst the respondents practices regarding fertilized female of mango mealy bug coming down the tree.

Practices	Yes		No		Satisfaction			
	FD	%age	FD	%age	25%	50%	75%	100%
Burning the females	53	37.59	88	62.41	45	8	0	0
Grease bands	24	17.02	117	82.98	24	0	0	0
Spray insecticides	24	17.02	117	82.98	24	0	0	0

F.D = Frequency Distribution.

female of mango mealy bug, 37.59 percent respondents had positive view for burning the female, 17.02 percent for grease bands and 17.02 percent for insecticides spray, whereas 62.41, 82.98 and 82.98 percent, respectively were replied negatively. The practice of burning the females gave 50 percent satisfactory control as reported by 8 respondents. The satisfaction level was found to be zero.

3.5. Yield losses by mango mealy bug

The farmers' views regarding yield losses by mango mealy bug are given in Table 8. Among the respondents, 35.46 percent told that mango mealy bug caused up to 75 percent yield losses, whereas 27.66, 22.7 and 14.18 percent respondents had the view that mealy bug cause 50, 100 and 25 percent yield losses, respectively. From these results it is concluded that mango mealy bug is a very serious pest of mango orchards and can cause 100 percent yield losses.

3.6. Major problems faced by the farmers

The results regarding the problems faced by the farmers are presented in Table 9. Lack of knowledge about the pest was the

Table 8

Awareness amongst the respondents regarding losses in yield of mango mealy bug.

Losses in yield by Mango Mealy bug	FD	%age
25%	20	14.18
50%	39	27.66
75%	50	35.46
100%	32	22.70

F.D = Frequency Distribution.

major problem. The other problem faced by the farmers are lack of money, lack of sprayer, lack of pesticides, lack of unity interest, eggs spread in wide areas, costly control measures, small land holding and adulterated pesticides. It was further observed that 54.61% respondents have the view that no control

4. Discussion

A survey was conducted regarding the growers' views relating to the awareness among farmers about insect pests of mango, to observe the most damaging insect pests, to identify the reasons of seriousness of the pest, respondents knowledge of resistance and susceptible varieties of mango, awareness regarding methods of spreading of mango mealy bug, to determine the hibernation places of the mealy bug, practices adapted by the farmers for the control of mango mealy bug, problems faced by the farmers and yield losses caused by mango mealy bug. The results revealed that majority of the respondents i.e. 88 percent knew about mango mealy bug followed by mango hopper (80%), fruit fly (80%), scale insect (44%), galls (24%) and mango midges (8%). Furthermore 40 percent farmers have the view that the mango mealy bug damaged the fruit up to 100 percent. However, 32 percent told 75 percent loss, 20 percent told 50 percent loss and 8 percent told 25 percent loss, respectively. In case of other insect pests, the extent of damage was viewed lower by the respondents surveyed. The reason of seriousness of mango mealy bug have been interviewed and the majority of the respondents told that mango mealy bug spread quickly, difficult to control, lack of information, non effective insecticides and hibernate in different places. Chaunsa variety of mango was the most susceptible as told by maximum respondents i.e., 94.33 percent as compared to all the other mango varieties. Irrigation water is the major source of spreading of mango mealy bug as

Table 9

Awareness amongst the respondents regarding major problems faced by mango growers.

Problems	Yes		No	
	FD	%age	FD	%age
Lack of money	44	31.21	97	18.79
Lack of sprayer	16	11.35	125	88.65
Lack of knowledge	68	48.23	73	51.77
Shortage of pesticides	22	15.60	119	84.39
Lack of unity interest	28	19.86	113	80.14
Eggs widely spread	39	27.66	102	72.34
No attention after entering the soil	28	19.86	113	80.14
Costly control measures	24	17.02	117	82.91
Small land holding	23	16.31	118	83.69
Adulterated pesticides	29	20.57	112	79.43
Fellow farmers don't spray	24	17.02	117	82.98
No control measures	77	54.61	64	45.39

F.D = Frequency Distribution.

told by the majority of the respondents i.e. 94.33 percent. However, 48.94, 17.33, 48.94, zero percent, respondents have the view that mango mealy bug spread through nursery plants, through air, through transportation of machinery, through birds, through baton, by walking, through farm yard manure, through dissidence, through plant to plant and through weeds taken by women has been reported by 29.8%, 52.48%, 10.64%, 33.33%, 41.13%, and 27.66 percent respondents.

Majority of the respondents i.e. 82.98% has reported that the mango mealy bug hibernated under tree near trunk followed by cracks entries (68.09%), mud walls around orchards (56.74%), soil under tree canopy (43.26%), roots of the plants (21.99%), sides of kacha water channel (17.02%) and under leaves (17.02%). None of the cultural and mechanical practices gave 100 percent satisfaction regarding control of mango mealy bug to the respondents. Amongst various insecticides Basudin was found to be the most effective as 86 and 14 respondents reported 75 and 100 percent control of mango mealy bug. Majority of the respondents i.e. 35.46 percent had the view that mango mealy bug caused losses up to 75%, whereas 27.66, 22.70 and 14.18 percent respondents had the view that mango mealy bug caused losses to mango fruits up to 50%, 100% and 25%, respectively. No control measure adopted by the farmers for the control of mango mealy bug as viewed by 54.61% respondents was the major constraint. The other major constraint was the lack of knowledge (48.23% respondents) about the pest amongst the farmers. The other problems as pointed out by the respondents are the lack of money (31.21%), eggs widely spread (27.66%), adulterated pesticide (20.57%), lack of unity interest, no attention after entering the soil (19.86%), costly control measures fellow farmers don't spray (12.02%), small land holding (16.31%), shortage of pesticides (15.60%) and lack of sprayers (11.35%).

From the above results it was observed that lack of knowledge about the pest amongst farmers, poverty, small land holding, lack of unity amongst the farmers were main constraints for the formulation of effective IPM strategy. The present findings can be compared with those of (Van Mele et al., 2001; Heong, 1985; Teng 1987; Morse and Buhler, 1997). To improve the knowledge of the farmers for perception of pest and natural enemies it is necessary to improve the communication system, develop messages and plan campaigns for the effective control of insect pests of mango especially mango mealy bug (Fujisake 1992; Escalada and Heong, 1993). The work on the same aspects have so far been conducted by (DOA and DOAE, 1995; PCARRD, 1994; Waite, 1998; Ochou et al. 1998; Pollard, 1991; Trutmann et al. 1993, 1996; Burleigh et al. 1998; Van Huis et al. 1982; Atteh, 1984; Chitere and Omolo, 1993 Bottenberg, 1995; Raheja, 1995; Kenmore, 1991; Bentley, 1992; Morse and Buhler, 1997; Van Mele et al., 2002).

Furthermore, according to the present survey the majority of the respondent told that mango mealy bug is the major pest of mango and caused 100 percent loss to mango fruits. These findings can be compared with those of Boknon-Ganta et al. (2001). From the above results it was observed that majority of the respondents knew something about mango mealy bug, mango hoppers and fruit flies, whereas the minority of the respondents have little information about other insects of mango like scale, galls and mango midges. Hundred percent loss in mango fruits was reported by 40 percent respondents caused by mango mealy bug whereas, zero percent response was observed from the respondents about the losses caused by other insects. Non effective spray, spread quickly, hibernates in different places, difficult to control and lack of information about mango mealy bug was the main reasons for the formulation of an effective IPM strategy. The variety Chaunsa was the most susceptible to mango mealy bug as viewed by the majority of the respondents. From the above findings it has been suggested problem orientation studies are the need of the day. If the scientists worked with the farmers he should know their existing problems and knowledge, which are the base line for setting the research objectives. The scientists think about the crop problems may be not the growers' problems. So first he recognize the problems through survey as the growers feeling most important regarding insect pest and collect the basic information which will be helpful in planning the research activities.

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