

**ADOPTION OF INTEGRATED PEST MANAGEMENT (IPM) IN CHILLI
(*CAPSICUM ANNUUM* L.): A CASE STUDY IN GUNTUR DISTRICT OF
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ABSTRACT: An Integrated Pest Management (IPM) project was implemented in Guntur district during the cropping season 2006-07 in six villages of Guntur district. Survey was conducted in six project villages and all the 150 participating chilli farmers in Crop Life India (CLI) sponsored IPM project were taken as sample for the study. In case of sucking pests, 56 per cent expressed mites as the important, in fruit bores, great majority (83.33%) expressed *Spodoptera litura* and in diseases, 56 per cent opined dieback as the major problem. More than two thirds of the respondents adopted all the components of IPM with exception of bio agents where in the adoption is only 46 per cent. With regard to diseases, 56 per cent felt dieback as the major problem while the rest felt leaf spot was the major disease. In case of border crops, trap crops, scouting techniques and mechanical control measures, more than 80 per cent adoption was observed. All the respondents are following 10-15 days pre-harvest interval of pesticide application as a measure for quality product and better price. The problems of post harvest pest and diseases was not observed in case of properly dried condition.

Key words: Integrated Pest Management, Crop Life India, Adoption.

INTRODUCTION

Chilli (*Capsicum annum* L.) is an important spice crop as well as vegetable crop grown all over India. India is the largest producer of chillies with an annual production of 10.5 lakh tonnes from an area of about 9.6 lakh ha. Chillies constitute about 20% of Indian spice exports in quantity and about 14% in value. Andhra Pradesh is the largest chilli producing state constituting a major portion of the total production. It is grown in an area of 2.37 lakh ha with a production of 7.48 lakh tonnes and productivity of 3164 kg/ha. In Andhra Pradesh, it is largely grown in Guntur, Khammam, Warangal, Prakasam and Krishna districts. From Guntur, chillies is being exported to USA, UK, Japan, France, Srilanka etc to a tune of Rs100 crores annually. Although, the crop has got great export potential besides huge domestic requirement, a number of limiting factors have been attributed for low productivity. Among them occurrence of viral diseases as well as ravages caused by insect pests are significant ones (Gundannavar *et al* 2007). The pest spectrum in chilli is complex with more than 293 insects and mite species debilitating the crop in the field as well as in storage (Anon, 1987). Amongst these, aphids, *Myzus persicae* Suler., *Aphis gossypii* Glover., thrips, *Scirtothrips doraslis* Hood., yellow mite, *Polyphagotarsonemus latus* Banks and fruit borer, *Helicoverpa armigera* Hubner are the most vital production constraints. A total of 39 and 57 insect pests were recorded in chillies in Karnataka on nursery and field crops, respectively (Reddy and Puttaswamy, 1983 and 1984). During the last two decades insecticidal control of chilli pests in general and especially in irrigated crop characterised by high pesticides usage, has posed problems of residues in the fruits (Nandihalli 1979 and Joia *et al.*, 2001). Besides pest resurgence, insecticide resistance and destruction of natural enemies (Mallikarjuna Rao and Ahmed, 1986), both domestic consumption and export of chilli necessitate production of quality chillies devoid of contamination of pesticides, industrial chemicals and aflatoxins.

Andhra Pradesh consumes about 22.5 per cent of the total pesticides produced and marketed in India. Guntur district is topped in the state regarding consumption of pesticides worth Rs 450 and 500 crores during cropping season 2001-02 and 2002-03, respectively. Of this, major consumption goes to two major commercial crops i.e., cotton and chillies (Crop Life India, 2005). The pesticide consumption is in down trend in cotton with the introduction of Bt cotton but not the case of chilli. Many instances the dry chilli exports from Guntur market were rejected because of pesticide residue problem. Hence, the need of the project in Guntur district is felt.

An Integrated Pest Management (IPM) programme was implemented in Guntur district during the cropping season 2006-07 in six villages of Guntur district viz., Mandapadu, Visadala, Bandarupalli, GG Palem, Ravipadu, Gogulamudi. The project was supported by Crop Life Asia (CLI). The project was started with the special objective of educating chilli farmers of six selected villages in Guntur district of Andhra Pradesh on rational use of crop protection chemicals in an integrated pest management approach and thereby reduce the problem of pesticide residues in the harvested produce. With this background the present study was conducted during September 2007 after the completion of one season with an objective to know the extent of adoption of IPM practices by the project participating farmers.

MATERIALS AND METHODS

A. Study area and sampling

Guntur in Andhra Pradesh is the major chilli growing district with an area of 56,000 ha and production of 2, 74,000 tonnes (Table 2). The district accounts for 24 % area and 37 % production. All the six villages in Guntur district viz., Mandapadu, Visadala, Bandarupalli, GG Palem, Ravipadu, Gogulamudi where the project activities carried out were purposively selected (Table 1). Twenty five participants of IPM project were selected from each village adding totally to one hundred and fifty farmers from six villages.

Table 1: Sample villages and respective mandals in Guntur district

S. No	Mandal	Name of the village	Sample size
1	Medikonduru	Mandapadu	25
2	Medikonduru	Visadala	25
3	Tadikonda	Bandarupalli	25
4	Pedanandipadu	GG Palem	25
5	Pedanandipadu	Ravipadu	25
6	Pedanandipadu	Gogulamudi	25

Note: Twenty five farmers from each village were contacted

Table2. District wise area, production and productivity of chillies in Andhra Pradesh

S. No	District	Area (ha)	Productivity (Kg/ha)
1	Guntur	56000	4900
2	Prakasam	20000	1789
3	Kurnool	17000	2030
4	Mahaboobnagar	10000	1977
5	Nalgonda	10000	1929
6	Warangal	27000	2665
7	Khammam	31000	4115
8	Karimnagar	10000	1505

B. Data collection and statistical analysis

A questionnaire developed for the purpose was used for the survey. The questionnaire was translated into Telugu and was used for collecting responses from the project farmers. The data were collected from the respondents through personal interview with the help of interview schedule. Necessary precautions were taken to ensure that the questions in the schedule were unambiguous, clear, concise, complete, and comprehensive. The respondents were contacted in person mostly at the common place in the village. The assistance of the local project staff was availed to establish rapport with the respondents. The data collected for the study was tabulated, processed and analysed using simple statistical tools like frequency and percentage.

C. Confirmation of results with the respondents

In order to have more realistic opinion, a selected group of 20 respondents representing six villages along with the coordinators of the project were called to RARS, Lam and were presented with the results analysed and concurrence was obtained from the respondents

RESULTS AND DISCUSSION

I. Profile of the Respondents

A. Literacy status of the respondents

The literacy status of the respondents shows that more than half of the respondents are educated to the level of elementary level while one-fourth of them completed high school education. Illiterate constituted about 15 per cent and college educated constituted about 25 per cent of the total respondents (Table 3).

Table 3: Literacy status of the respondents

S No	Literacy status	% of the respondents
1	Illiterate	15.00
2	Elementary school	55.00
3	High school	5.00
4	College	25.00
	Total	100.00

B. Area allocation for chilli by the respondents

It could be inferred from (Table 4) that respondents allotted about 50 per cent of their total agricultural land area grown chilli crop. This shows that chilli constituted the major crop in their stay.

Table 4: Chilli grown area in total land owned by the respondents

S No	Village	Total area (ha)	Area under chilli (ha)	Chilli area - % to total
1	Bandarupalli	3.896	2.08	53.38
2	Mandapadu	4.160	2.64	63.46
3	Visadala	3.064	1.96	63.94
4	G.G. Palem	3.440	1.12	32.56
5	Ravipadu	2.176	0.88	40.44
6	Gogulamudi	2.016	0.64	31.75
	Average	3.164	1.58	49.94

II. Adoption of Integrated Pest Management

A. Important pest and diseases on chilli crop as perceived by the respondents

In response to the questions on important pests and diseases of chilli crops, they opined differently (Table 5). In case of sucking pests 56 per cent expressed mites as the major problem while the rest felt thrips. They expressed that severity of thrips is higher but the control of mites is difficult compared to thrips. In response to fruit borers great majority (83.33%) expressed *Spodoptera litura* as the major problem. With regard to diseases 56 per cent felt dieback as the major problem while the rest felt leaf spot.

Table 5: Important pest and diseases on chilli crop as perceived by the respondents

S. No	Type of pest/disease	Name of the pest	% of respondents felt as problem
1	Sucking pest	Mites	56.00
		Thrips	44.00
2	Fruit borer	<i>S exigua</i>	16.67
		<i>S litura</i>	83.33
3	Disease	Dieback	56.00
		Leaf spot	44.00

B. Status of adoption of different IPM components

From (Table 6) it could be observed that the adoption of different IPM components was in good progress in all the components in comparison to 2005-06. More than two thirds of the respondents adopted all the components with exception of bio agents where in the adoption is only 46 per cent. In case of border crops, trap crops, scouting techniques and mechanical control measures, great majority (> 80%) adoption was observed. All the farmers expressed that they could identify beneficial insects like Lady bird beetle, spider and crysopa. Regarding pheromone traps the respondents expressed that the CLI staff facilitated to get traps through department of agriculture subsidised schemes. It can be inferred that the project farmers adopted IPM practices with very good progress when compared to the previous season

Table 6: Status of adoption of different IPM components

S No	IPM Component	% Adoption	
		2005-06	2006-07
1	Pheromone trap	6.00	66.00
2	Bird perches	0	67.33
3	Border crop	0.67	82.00
4	Trap crop	0.67	88.00
5	Scouting	4.67	82.33
6	Bio-agents	17.67	46.00
7	Bio-control agents	10.67	77.33
8	Chemical sprays	100.00	100.00
9	Mechanical control	12.67	82.33

C. Sources of advice on crop production issues

Prior to the project inception farmer to farmer transfer was the major source of advice (55%) followed by dealers (27%) and Agricultural Officers (17%). In the farmer to farmer case also, the farmer might have received the information from the dealer early to the receiver; possibility of this trend has been expressed by many farmers.

It was evident from the response that all the respondents are following 10-15 days pre harvest interval of pesticide application as a measure to get quality product and better price.

D. Productivity of dry chillies

The productivity during project period i.e., 2006-07 (5408 kg/ha) is slightly higher compared 2005-06 (5153 kg/ha). Increment in productivity of chilli crop is not considerable. But taking into consideration that 2005-06 is being a very good year for chilli crop, the slight increment or sustaining the productivity level is also a good effort.

E. Storage of dry chillies

Regarding storage and post harvest problems; all the farmers stored in cold store either some quantity or total as per their individual requirement and prevailing price. All the respondents expressed that dry chilli can safely be stored in cold stores for a period of two to three years. The problems of post harvest pest and diseases is not observed but whenever the produce stored without proper drying then the problem of rotting was observed. The cost per storage is a fixed price i.e., Rs 84/- (eighty four rupees) per tikky (thirty five kilograms) per season.

F. Issue of sustainability

During the discussion good signs on sustenance of the project were observed that

- In one of the project villages (Bandarupalli) farmers have been purchasing the trap crop (Marigold) seedlings @ 2/- per seedling. This exemplifies the confidence of the farmers on a particular practice which has the potential to continue even after the project is withdrawn.
- In one of the villages (Ravipadu) farmers are coming in agreement with big export company to export chilli. This will result in getting premium price for the farmers.

SUMMARY AND CONCLUSIONS

- In case of sucking pests 56 per cent expressed mites as the important, in fruit bores great majority (83.33%) expressed *Spodoptera litura* and in diseases 56 per cent opined dieback as the major problem.
- More than two thirds of the respondents adopted all the components of IPM with exception of bio agents where in the adoption is only 46 per cent. In case of border crops, trap crops, scouting techniques mechanical control measures great majority (more than 80%) adoption was observed
- All the respondents are following 10-15 days pre-harvest interval of pesticide application as a measure to get quality product and better price.

There is a unanimous agreement among the respondents regarding the benefits from CLI project, good suggestions from CLI staff and continuation of the CLI project in their villages. This was observed even from the non-project participant farmers also during discussions at the time of data collection.

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