Evaluation of integrated crop management in chilli of Prakasam district, A.P.

Ravi Venkanna Babu M, Jahnavi M, Prasada Rao GMV and Varaprasada Rao CH

Abstract
The study on evaluation of integrated crop management in chilli of Prakasam District, Andhra Pradesh was carried out during Kharif 2017-18, 2018-19 and 2019-20 in chilli farmers fields of Prakasam district. The experiment was carried out in 4.0 ha each with active participation of farmers with an objective to assess the integrated management module for enhancing the productivity and profitability. Mean of Gemini virus incidence in IPM module and farmer practice was 18.9 and 28.6 percent respectively. Mean yield of ICM module was 85.83 q ha-1 with net returns and C: B ratio of 573666.6 Rs ha -1 and 1:2.75, respectively. Whereas, farmer practice recorded mean yield of 78.86 q ha -1 with net returns and C: B ratio of Rs ha-1 and 1:2.34, respectively.

Keywords: Chilli, viral diseases, integrated management

1. Introduction
Chilli (Capsicum annuum L.) is an important spice grown for its fruits, which are used in green as well as ripe dried form for its pungency. It is richest sources of vitamin C and A (Howard, 2000) [3]. In India chilli is cultivated in all the states including Andhra Pradesh, Karnataka, Maharastra, Orissa, Rajasthan, Tamil nadu, West Indian and Punjab over an area of 804790 hectares with total production of 1276300 metric 1 ndia of dry chilli with productivity of 1.5 metric 1 ndia per hectare. Andhra 1 ndian 1 alone contributes 46 per cent of total chilli production of India. India contributes one-fourth of the total quantity of chilli exported in the world. Chilli is known to be affected by forty five viruses. Twenty four of them have been reported to occur naturally and rest can infect on artificial inoculation. Among the twenty four viruses reported to occur naturally on chilli, eleven viruses have been reported from India, viz., cucumber mosaic virus, tobacco leaf curl virus, Indian chilli mosaic virus, potato virus Y, potato virus X, tobacco ring spot virus, pepper mottle virus and pepper vein bending virus, chilli leaf curl virus, tomato leafcurl virus, capsicum chlorosis virus. Among all, the chilli leaf curl virus is the most destructive virus in terms of incidence and yield loss. In severe cases 100 per cent losses of marketable fruit have been reported. To manage this, generally farmers use huge amount of pesticides indiscriminately without any proper diagnosis which results into development of resistance and resurgence of the pests as well as environment pollution. The potential solution is to manage the viral diseases by integrated pest management approach. Out of various viral diseases; damping off in nursery stage and fruit rot are the major diseases causing severe yield losses. Adoption of ICM practices by improving production practices and plant protection practices enhances the productivity and profitability. Keeping the above problem in view the demonstration on evaluation of ICM module in chilli of Prakasam district was conducted during 2017-18, 2018-19 and 2019-20.

2. Materials and Method
2. Area- 4.0 ha each year
3. No. of farmers- 10 each year
4. Design front line demonstration in farmers’ fields in 4 ha each year
5. Treatments:
TO1-Farmers practice
Indiscriminate spraying of different insecticide mixture like diafenthiuron, fipronil, synthetic pyrethrroids at different crop stages

TO2- ICM module
1. Soil Test Based Fertilizer application.
2. Application of Neem cake @ 200 kg per acre during last ploughing
3. Micro nutrient application (Foliar spray): Formula-4 @ 5 g/l of water (30 DAS, 50 DAS and 70 DAS).
4. Spraying of Neem oil @ 5 ml/lit of water at 15 days interval from vegetative stage to flowering stage.
5. Installation of Yellow and Blue sticky traps 20 No./acre and Pheromone trap 4 No./acre.
6. Trap crops: Marigold and chilli (1:16) ratio.
7. Spraying of thiamethoxam 25% WG@ 60g/ac
8. Spraying with diafenthiuron 50% WP @ 250 g/acre against thrips

Plot wise data was recorded in ICM module and farmers practice plots. The percentage of disease incidence was calculated on the basis of total number of healthy plants and infested ones. Information of yield and economic evaluation in terms of net profit earned and cost benefit ratio was recorded.

Table 2: Impact of demonstration on yield and economics of chilli

<table>
<thead>
<tr>
<th>Year</th>
<th>ICM module</th>
<th>Farmer practice</th>
<th>IPM module</th>
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<th>Farmer practice</th>
<th>IPM module</th>
<th>Farr practice</th>
<th>IPM module</th>
<th>Farmer practice</th>
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</thead>
<tbody>
<tr>
<td>2017-18</td>
<td>85</td>
<td>76.5</td>
<td>300000</td>
<td>335000</td>
<td>722500</td>
<td>650250</td>
<td>422500</td>
<td>315250</td>
<td>1:2.4</td>
<td>1:1.9</td>
</tr>
<tr>
<td>2018-19</td>
<td>95</td>
<td>87.5</td>
<td>305000</td>
<td>325000</td>
<td>836000</td>
<td>770000</td>
<td>531000</td>
<td>445000</td>
<td>1:2.7</td>
<td>1:2.3</td>
</tr>
<tr>
<td>2019-20</td>
<td>77.5</td>
<td>72.5</td>
<td>356250</td>
<td>370500</td>
<td>1123750</td>
<td>1051250</td>
<td>767500</td>
<td>680750</td>
<td>1:3.15</td>
<td>1:2.83</td>
</tr>
<tr>
<td>Mean</td>
<td>85.83</td>
<td>78.86</td>
<td>320416.6</td>
<td>343500</td>
<td>894083.3</td>
<td>823833.3</td>
<td>573666.6</td>
<td>480333.3</td>
<td>1:2.75</td>
<td>1:2.34</td>
</tr>
</tbody>
</table>

3.1 Yield
Data presented in Table 2 revealed that under ICM module, yield was found to be higher than farmers practice during the years 2017-2018, 2018-19 and 2019-20. The ICM module recorded yield of 85, 95 and 77.5 q/ha-1 during 2017-2018, 2018-19 and 2019-20, respectively with mean of 85.83 q/ha-1. Whereas, farmer practice recorded yield of 76.5, 87.5 and 72.5 q/ha-1 during 2017-2018, 2018-19 and 2019-20, respectively with mean of 78.8 q/ha-1.

3.2 Economics
Perusal of the data presented in the table 2 revealed that gross returns, net returns and C: B ratio were higher in ICM module over farmers practice. Gross returns of ICM module were 722500, 836000 and 1123750 Rs ha-1 during 2017-2018, 2018-19 and 2019-20, respectively with mean of 894083.3 Rs ha-1. Whereas, in farmer practice, gross returns were 650250, 770000 and 1051250 Rs ha-1 during 2017-2018, 2018-19 and 2019-20, respectively with mean of 823833.3 Rs ha-1. Net returns of ICM module were 422500, 531000 and 445000 Rs ha-1 during 2017-2018, 2018-19 and 2019-20, respectively with mean of 315250 Rs ha-1 and C: B ratio of 1:2.4, 1:2.7 and 1:3.15 during 2017-2018, 2018-19 and 2019-20, respectively with mean of 1:2.34. Thus, favorable cost benefit ratio and higher net returns in ICM module proved the economic viability of the assessed technology and convinced the farmers on the utility of technology provided at real farming situation. Similar results were also reported by Hiremath and Nagaraju (2009) [3]. Similarly, Yadav (2017) [5] reported that the 26 % more yield (116q/ha) in ICM technology as compared to farmers practice (92 q/ha).

4. Conclusion
The integrated management practices were found effective over farmer’s practice of indiscriminate use of pesticides.

5. Acknowledgment
The authors are thankful to Programme Coordinator, KVK, Darsi & Associate Director of Research, ANGRAU, Lam, Guntur for providing the necessary facilities and ATARI zone X, Hyderabad for providing financial support in carrying out the present investigation.

6. References

3. Results and Discussion

During the period wise report incidence of Gemini virus was observed and incidence of peanut bud necrosis virus and cucumber mosaic virus was not observed. Per cent Gemini virus incidence was presented in the table 1. Mean incidence of 18.9 was recorded in IPM module over 28.6 per cent in farmers practice.

Sanat et al., 2014 [6] reported that the symptomological study among nine locations revealed that the incriminating (Leaf curl virus) disease incidence was 11.4 % to 55.90 %.

Similarly, Khaire (2017) [4] reported that the treatment acetamiprid 20%SP@0.004 per cent recorded minimum of 1.38 mean whiteflies/3 leaves/plant which was at par with treatments spinosad 45% SC @ 0.016 per cent (1.39), diafenthiuron 50%WP@ 0.06 per cent (1.53).

Table 1: Per cent disease incidence in chilli

<table>
<thead>
<tr>
<th>Year</th>
<th>IPM module</th>
<th>Farmer practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per cent of Gemini virus incidence</td>
<td>Per cent of Gemini virus incidence</td>
<td></td>
</tr>
<tr>
<td>2017-18</td>
<td>22</td>
<td>34</td>
</tr>
<tr>
<td>2018-19</td>
<td>19.7</td>
<td>25</td>
</tr>
<tr>
<td>2019-20</td>
<td>15</td>
<td>27</td>
</tr>
<tr>
<td>Mean</td>
<td>18.9</td>
<td>28.6</td>
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</tbody>
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