The Andhra Agric. J 61(4): 942-948, 2014

Magnitude of adoption of IPM practices in Redgram by farmers of Prakasam district

Santhi Sri K V, Brahmaji Rao P and Sivanarayana G
Department of Foods and Nutritional Sciences, Acharya Nagarjuna University, Guntur 34

ABSTRACT

The study conducted in Prakasam district of Andhra Pradesh to know the Magnitude of adoption of Integrated Pest Management practices (IPM) in redgram crop. IPM applies different practices like pest resistant plants, use of entamopathogens such as bacteria, viruses and strategies that involves cultural, physical, mechanical, biological and chemical control. The use of these combined lactics reduces the chances of generating resistance and insect survival. The main aim of IPM is to protect crops with minimum cost and reduce the risk for humans, animals and ecosystems. In Prakasam District, 3 mandals were selected for the study based on the accessibility and area of redgram cultivation. From each selected mandal two villages were selected for the study one IPM village and the other non-IPM village. In IPM villages farmers were trained scientifically by Krishi Vigyan Kendra (KVK), Darsi, Prakasam district. In these villages farmers were exposed to advanced and scientific techniques by method demonstrations, Front line demonstrations, on farm trials, training programmes, vocational training programmes, group discussions etc. But in non IPM villages they were not trained scientifically. In this study the schedule consisted of 20 practices. The positive statements were scored with 1 and the negative with 0. For each practice in both IPM and non IPM villages frequencies and percentages were measured to see the extent of adoption by the farmers. Based on the number of IPM practices adopted, farmers were grouped into 3 categories with low adoption, medium adoption and high adoption to assess the difference in adoption between IPM and non IPM villages, whether it is significant or non-significant. Primary data was obtained directly from the farmers and fields. The observations in the present study denote that adoption of IPM practices were more in IPM villages. There were significant differences between the farmers of IPM and non IPM villages in the adoption of IPM practices.

Key words : Adomption, IPM, Redgram.

Redgram is second largest pulse crop in India accounting to 20 per cent of total pulse production. India annually produces about 2-2.5 million tones which is stagnant in the past 10 years (Sulaiman, 2002). The shift in cultivation from pulses to commercial crops and lack of technological innovations to increase yields has hindered the rise in output (Paranthaman *et.al*.,2 009). In our country, a large number of insects have been recorded feeding on this crop. Among the pod borers the gram pod borer, *Helicoverpa armigera*, the spotted pod borer, *Maruca testulalis Geyer* and the pod fly, *Melanagromyza obtuse* cause serious damage in South India (Tamboli and Lolage 2008). To reduce the incidence of insect pests in pulse crops and improve their productivity, adoption of Integrated Pest Management (IPM) is more relevant in these crops (Selvarajan, 2001). The integrated management including the use of biological control agents, neem (*Azadirachta indica)*-based formulations, cultural methods such as intercropping, and host plant resistance) of major insect pests of pulse crops should be carried out. (Singh and Singh, 2005)

Integrated pest management also defined as the combination and integration of approaches to pest management, which maximizes real profitability and genuine sustainability for the users and farming system and gives due regard to the environment (Max Whitten, 2008).

Integrated Pest Management (IPM) is a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks. (Schmitt, 1988).

Pest attacks were reduced by use of chemicals. Until recently, chemical pesticides were increasingly relied upon to limit the production losses. Pesticide use in India increased from a mere 15 g/ha of gross cropped in 1955-56 to 90 g/ha in

Table 1. Extent of Adoption of IPM Practices by Farmers in IPM villages. (n=90)

		Adopted		Not adopted	
		f	%	f	%
1.	Summer deep ploughing	84	93.3	6	6.66
2.	Application of FYM/ Neem cake at Pre-sowing	88	97.7	2	2.22
3	Timely sowing	78	86.6	12	13.3
4.	Seed treatment	69	76.6	21	23.3
5	Crop rotation	60	66.6	30	33.3
6	Inter cropping	26	28.8	64	71.1
7.	Wider spacing	55	61.1	35	38.8
8	Application of organic manures	77	85.5	13	14.4
9	Shaking of plants	45	50	45	50
10	Growing of guard crops	80	88.8	10	11.1
11	Growing of trap crops	85	94.4	5	5.55
12.	Foliar sprays	68	75.5	22	24.4
13	Using Phermone traps	85	94.4	5	5.55
14	Using light traps	73	81.1	17	18.8
15	Poison baiting	28	31.1	62	68.8
16	Using bird perches	88	97.7	2	2.22
17	Using 5% Neem seed kernel extract	75	83.3	15	16.6
18	Using NPV solution	38	42.2	52	57.7
19	Using tri chogramma cards	51	56.6	39	43.3
20	Collection and destruction of grown up larvae	51	56.6	39	43.3

1965-66. Introduction of green revolution technologies in mid-1960s gave a fillip to pesticide use, and in 1975-76, it had increased to 266 g/ha, and reached a peak of 404 g/ha in 1990-91 (Birthal, 2003). Although, there is a paucity of reliable time-series information on pest-induced production losses, anecdotal evidences suggest increase in losses (Pradhan, 1983, Atwal, 1986, Dhaliwal and Arora, 1996), despite increase in the Pesticide use. The paradox is explained in terms of rising pest problem, technological failure of chemical pesticides and changes in production systems. Nevertheless, pesticide use has started declining since 1990-91, reaching 265g/ha in 1998-99, without much affecting the agricultural productivity (Birthal, 2003).

MATERIAL AND METHODS

The objective was operationalized as the extent to which an individual adopted number of various IPM practices. The schedule consisted of 20 practices. The positive statements were scored with 1 and the negative with 0. For each practice in both IPM and non IPM villages frequencies and percentages were measured to see the extent of adoption of each practice by the farmers. And also, based on the number of IPM practices adopted, farmers were grouped into 3 categories with low adoption, medium adoption and high adoption to assess the difference in adoption between IPM and non IPM villages, whether it is significant or non-significant. The crops were monitored continuously to see the extent and efficacy of the adoption. Primary data was obtained directly from the farmers and fields.

The state of Andhra Pradesh was selected purposively. Prakasam District was also selected purposively as the researcher was working in that place. Out of 56 mandals in Prakasam District, 3 mandals were selected for the study based on the accessibility and area of redgram cultivation. From each mandal two villages were selected for the study one IPM village, which is nothing but IPM trained village and the other non-IPM village, nothing but IPM non-trained village.

In IPM villages farmers were trained scientifically by Krishi Vigyan Kendra (KVK), Darsi, Prakasam district. So, in these villages farmers were exposed to advanced and scientific techniques by method demonstrations, Front line demonstrations, on farm trials, training programmes, vocational training programmes, group discussions etc. But in non IPM villages they were not trained scientifically. So they have been practicing very few techniques mostly traditional, irrespective of IPM total concept.

RESULTS AND DISCUSSION

From the table 1**,** it is striking to notice that in the IPM villages equal number of the farmers have adopted IPM techniques like Application of FYM/ Neem cake at pre-sowing, using bird perches. These are followed by other techniques like growing of trap crop, summer deep ploughing, using pheromone traps, growing of guard crops, timely sowing. Application of organic manures, using 5% neem seed kernel extract, using light traps, seed treatment, foliar sprays, crop rotation, wider spacing occupied the next positions. Next comes using tri chogramma card as well as collection and destruction of grown up larvae at equal proportion. Shaking of plants, using NPV solution, poison baiting; inter cropping occupied next places, in descending order.

From the table 2, it is apparent to see that in the non IPM villages majority of the farmers have adopted IPM techniques like application of FYM/ neem cake at pre sowing. Next comes the timely sowing followed by application of oragic manures, poison baiting , collection and destruction of grown up larvae, seed treatment, Wider spacing, installation of bird perches. Next occupied techniques were summer deep ploughing, inter cropping and crop rotation. Growing of trap crops and growing of guard crops. Other techniques were followed at very minimal proportions like – using 5% neem seed kernel extract, using pheromone traps, using light traps, shaking of plants, using NPV solution, Foliar sprays, using trichogramma cards.

The observations in the present study denote that adoption of various IPM practices were more in IPM villages. This is because of favourable factors responsible to achieve this like activities of KVK in IPM villages, higher educational level, numerous extension contacts, high risk taking ability, higher economic orientation, superior scientific orientation, greater achievement motivation and higher innovativeness of IPM farmer. The effect of all these might have led to adopt more number of practices. These results were coincided with Rajagopalan, 1983; Ajaykumar, 1989; Jagadal, 1989; Patil,1990; Hanchinal *et.al.,* 1991; Juliana *et.al.,* 1991; Koppad, 1991; Kulakarni*et.al.,* 1994; Dolli and Swamy, 1997; Patel and Patel 1997; Balikai.*et.al.,*1997; Vijayalakshmi, 1998; Veluswamy and Manoharan, 1998; Patil, 1998; Gadageri, 1998; Rajinder Peshin *et.al.,*1998; Sriram and Paliniswamy, 1999; Amtul Waris *et.al.,* 1999; Sudha Rani,1999; Rajendra, 2000; Saxena and Singh,2000; Sumati and Alagsan, 2000; Nuzaman *et.al.,*2000; Raja Ratnam,2000; Jondhale *et.al.,*2000; Bhople *et.al.,*2001; Ranganatha, 2001; Jin *et.al.,*2001; Sudhakar and Kanagasabhapathy, 2002; Kale *et.al.,*2003; Chauhan *et.al.,* 2003; Vazquez and Moreno, 2003; Brodt *et.al.,* 2004; Bhosle *et.al.,* 2004; Darling and Vasanth Kumar, 2004; Hegde *et.al.,*2004; Mahmoud and Shively, 2004; Gundannavar *et.al.,* 2004; Blanco and Metzler,2004; Christian *et.al.,*2005; Chauhan *et.al.,*2005; Rao *et.al.,* 2005; Gajanana *et.al.,* 2006; Venkata Shiva Reddy, 2006; Opolot *et.al.,*2006; Maraddi *et.al.,*2007; Venkatesh *et.al.,* 2007; Prasanth Kumar, 2007; Santosh, 2008; Stoddard *et.al.,* 2010; Paudel and Khadka, 2010 and Walter and Andrea, 2011.

From table 3, it is obvious that there was a significant difference between the farmers of IPM and non IPM villages with number of IPM practices adopted. High adoption was noticed in IPM villages. Out of 20 practices more than 60 farmers had adopted 65 per cent of practices. Medium adoption 25 per cent was farmers by the number of 31 to 60 farmers whereas low adoption was taken by below 30 farmers. There are differences in the non IPM villages. Only 10 per cent of the practices were adopted by more than 60 farmers. 15 per cent of the practices were under medium adoption where as 75 per centof the practices were under low adoption. This difference might be due to trainings, on farm demonstrations, frontline demonstrations and method demonstrations organized by KVK in IPM villages.

Table 2. Extent of Adoption of IPM Practices by Farmers in non IPM villages.

(n=90)

		Adopted		Not adopted	
		f	%	f	%
1.	Summer deep ploughing	27	30	63	70
2.	Application of FYM/ Neem cake at Pre-sowing	85	94.4	5	5.55
3	Timely sowing	71	78.8	19	2.11
4.	Seed treatment	36	40	54	60
5	Crop rotation	19	21.1	71	78.8
6	Inter cropping	15	27.7	65	72.2
7.	Wider spacing	32	35.5	58	64.4
8	Application of organic manures	55	61.1	35	38.8
9	Shaking of plants	2	2.22	88	97.7
10	Growing of guard crops	16	17.7	74	82.2
11	Growing of trap crops	19	21.1	71	78.8
12.	Foliar sprays	1	1.11	89	98.8
13	Using Phermone traps	2	2.22	88	97.7
14	Using light traps	2	2.22	88	97.7
15	Poison baiting	4	44.4	86	95.5
16	Using bird perches	3	33.3	87	96.6
17	Using 5% Neem seed kernel extract	12	13.3	78	86.6
18	Using NPV solution	1	1.11	89	98.8
19	Using tri chogramma cards	1	1.11	89	98.8
20	Collection and destruction of grown up larvae	4	44.4	86	95.5

Table 3. Number of IPM practices adopted by farmers in both IPM and non-1PM villages.

S.No.	Adoption Pactices	IPM villages f	%	Non- IPM villages f	%	'Z' value
1	Low adoption (<30 farmers)	2	10	15	75	4.84
2	Medium adoption (31-60farmers)	5	25	3	15	
3	High adoption (>60 farmers)	13	65	2	10	

$\overline{X}$ = 2.55 S.D (ó) = 2.26 = 1.35 S.D (ó) =0.65

Conclusion

The observations in the present study denote that adoption of various IPM practices were more in IPM villages. And there were significant differences between the farmers of IPM and non IPM villages with number of IPM practices adopted.

LITERATURE CITED

Ajaykuamr P 1989 A study on adoption behaviour and in former consultancy pattern of grape growers in Rangareddy district of Andhra Pradesh. M. Sc. (Agri) Thesis, University of Agricultural Sciences, Dharwad.

Amtul Waris and Sudarshanreddy M 1999 Technological gap in adoption of government production technology. *Maharashtra Journal of Extension Education,* 3(1): 268-269.

Balikai R A, Giraddi R S, Suhas-Yelshetty Sattigi H N, Yelshetty S 1997 Control of *Helicoverpa armigera* (Hubner) on redgram with neem seed kernel extract, Bellary jali leaf extract, NPV and insecticides. *Karnataka Journal of Agricultural Sciences,* 10(4): 999-1002.

Bhople R S, Shinde P S and Dhule S S 2001 Knowledge and adoption of biocontrol pest management in cotton. *Maharashtra Journal of Extension Education,* 20:18-21

Bhosle B B, Patange N R, Rathod K S and Pande A K 2004 A step towards ustainable cotton production: the success story of IPM. Paper presented in the symposium Strategies for Sustainable Cotton Production - A Global Vision, Univ.Agric. Sci., Dharwad

Birthal P S 2003 Economic potential of biological substitutes for agrochemicals NCAP Policy Paper 18. National Centre for Agricultural Economics and Policy Research, New Delhi.

Blanco and Metzler H 2004 Pheromones and their uses in integrated pest management. Manejo-Integrado-de-Plagas-y-Agroecologia, 71:112-118 .

Brodt S, Klonsky K, Tourte L, Duncan R, Hendricks L, Ohmart C and Verdegaal P 2004 Influence of farm management style on adoption of biologically integrated farming practices in California. Renewable Agriculture and Food Systems, 19: 237-247.

Chauhan V B, Singh V B and Singh O N 2005 Integrated management on Phytophthora blight of pigeonpea. *Indian Journal of Pulses Research,* 18: 46-49

Chauhan V B, Singh V B, Singh P N and Singh A K 2003 Efficacy of cultural practices, chemical seed dressing and date of sowing on the severity of Phytophthora blight of pigeon pea. *Annals-of-Plant-Protection-Sciences,* 11: 289-291

Christain B M, Vyasa H V and Patil K F 2005 Adoption of IPM strategy by cotton growers. Rural India, 130-131.

Darling B S and Vasanthkumar J 2004 Knowledge and adoption of botanical pesticides. *J.Extn. Edu,* 15(2&3): 3655-3658.

Dhaliwal G S and Arora R 1996 Principles of insect management.Commonwealth Publishers, New Delhi.

Dolli S S, Swamy B S 1997 Impact of adoption of recommended practices on yield of pulse crops.*Karnataka-Journal-of-Agricultural Sciences,* 10(1):177-182.

Gajanana T M, Krishnamurthy P K, Anupama H L and Raghunatha R 2006 Integrated pest and disease management in tomato: an economic analysis. *Indian Journal of . Agril. Economics,* 19: 269-280.

Gedager K R 1988 A comparative study on knowledge and adoption behavior of the recommended practice of groundnut cultivation be beneficiaries and nonbeneficiaries of Karnataka oil seeds growers federation in Dharwad district of Karnataka state. M. Sc. (Agri) Thesis, University of Agricultural Sciences, Dharwad.

Gundannavar K P, Lingappa S and Giraddi R S 2004 Biorational approaches for the management of pod borer in pigeon pea ecosystem *Karnataka-Journal-of-Agricultural-Sciences,* 17: 597-599.

Hanchinal S N, Manjunath L and Chandargi D M 1991 Adoption pattern of recommended cultivation pattern of potato crop. *Maharashtra Journal of Agricultural Education,* 3**:** 13-60.

Hegde M R, Datttatri K, Sundakar N, Mahadeva reddy K and Rajender Reddy G 2004 Role and impact of krishi vigyan Kendra in watershed development. Indian journal of dry land agricultural research and development 19:106-212

Jagadal L H 1989 A study on knowledge and adoption of recommended cultivation practices of cabbage growing farmers of Belgaum district, Karnataka state. M.Sc. (Agri) Thesis, University of Agricultural Sciences, Dharwad.

Jin S Q, Huang J K and Rozelle S 2001 Working paper department of agricultural and resource economics, University of California Davis, 30-32.

Jondhale S D, Ingale L A and Fakak U N 2000 Impact of Krishi Vigyan Kendra on adoption of improved practices of summer groundnuts. *Maharastra Journal of Extension Education,* 19:109-111.

Juliana R S 1991 Adoption pattern of IPM technology. Progressive Farming, 11: 32-35.

Kale N M and Bhople R S 2003 Correlation of adoption gap of recommended cotton technology among small and big farmers. Punjabrao Krishi Vidyapeeth Research Journal

Koppad S B 1991 A study on adoption pattern of groundnut cultivation practices among beneficiaries of national oilseed development project in Dharwad district. M.Sc. (Agri) Thesis, University of Agricultural Sciences, Dharwad.

Kulkarni V V, Bhople R S and Shinde P S 1994 Constraints in adoption of cotton technology. *Maharashtra Journal of Agricultural Education,* 13**:** 253-256.

Mahmoud C and Shively G 2004 Agricultural diversification and integrated pest management in Bangladesh. *Agricultural Economics,* 30: 187-194

Maraddi G N, Hirevenkanagoudar L V, Angadi J G and Kunnal L B 2007 Extent of adoption of IPM practices by sugarcane growers. *Karnataka J. Agric. Sci.,* 20 (3): 564-567.

Max Whitten 2008 Biotechnology and IPM: the relevance to small scale farmers in tropical Asia article first published online: 28 June, 2008

Nurzaman M, Islam M N and Ahmed S 2000 Practice of Integrated Pest Management by FFS and non-FFS farmers. *Bangladesh Journal of Training and Development,* 13: 219-227

Opolot H N, Agona A, Kyamanywa S, Mibata G N and Adipala E 2006 Integrated field management of Cowpea pests using selected synthetic and botanical pesticides.

Patel B S and Patel R S 1997 Impact of Lab to Land programmes on beneficiary and non-beneficiary farmers. *Maharashtra Journal of Extension Education,* 337-340.

Pati L R 1998 A study on knowledge, altitude and adoption behaviour of the SF growers in Raichur district of Karnataka state. M. Sc. (Agri) Thesis, University of Agricultural Sciences, Dharwad.

Patil V G 1990 A critical analysis of technological gap of constraints in the adoption of improved rice cultivation practices in Konkan region, Maharashtra state. Ph. D.Thesis, University of Agricultural Sciences, Dharwad.

Paudel M N and Khadka R 2010 On-farm comparison of improved maize variety Manakamana-3 with Local Thulo Seto forgrain yield and agronomic attributes at Dukuchhap, Lalitpur, Nepal Agronomy Journal of Nepal.

Prashanth Kumar T V R R 2007 A study on the knowledge and adoption of AMC level trained and un-trained farmer in Mahaboobnagar district of Andhra Pradesh. M.Sc (Ag) Thesis, Acharya N.G. Ranga Agricultural University Hyderabad.

Paranthaman R, Vidyalakshmi and K Alagusundaram 2009 Production on Tannin Acyl Hydrolase from Pulse Milling By-Products Using Solid State Fermentation *Academic Journal of Plant Sciences,* 2 (3): 124-127

Raja Ratnam T 2000 impact of sunflower on-farm extension demonstration (OFEDs) in kurnool district of Andhra Pradesh.

Rajagopalan V 1983 Deceleration rates of agricultural growth in Tamil Nadu: Trends and explanatory factors. *Indian Journal of Agricultural Economics,* 38(4): 568-584.

Rajendra Chupke 2000 Knowledge and adoption of farmers about biocontrol measures. *Maharashtra Journal of Extension Education,* 19: 41-47.

Rajinder Peshin, Rajinder Kalra, Peshin R, Kalra R, Dhaliwal G S (ed.), Arora R (ed.), Randhawa-NS (ed.), Dhawa A K 1998 Integrated pest management: adoption and economic impact at farmers' level. Ecological agriculture and sustainable development: volume 2. Proceedings of International Conference on Ecological Agriculture: towards Sustainable Development, Chandigarh, India, 15-17 November, 1997. 1998, 624-628; 5

Ranganatha B D 2001 A study on knowledge and adoption of bio-fertilizers by the farmers

Rao M S, Reddy K D, Singh T V K, Reddy G S 2002 Integrated management of pod borers of pigeonpea.Resources management in plant protection during twenty first century, Hyderabad,-India,-14-15-November-2002. 156-164

Santosh S P, Karnool N N, Vijayakumar H S and Kunnal L B 2007 Farmers Perception About the Various Technologies Released by the Research Institutions and Their Impact on Redgram Economy. *Karnataka J. Agric. Sci.,* 20(1): 72 - 75

Saxena K K and Singh R L 2000 Adoption of organic farming practices by farmers of Malwa region. *Maharashtra J. Extn. Edn.,* 19: 53-58.

Schmitt M A 1988. A survey of fertilizer dealers: I. Sources of agronomic training. *Journal of Agronomic Education,* 17: 17-20.

Selvarajan S 2001 Sustaining India's Irrigation Infrastructure. Agricultural Economics Policy Paper 15,. New Delhi: ICAR.

Singh S S and Singh J P 2005 Integrated pest management in pulse crops. *Indian-Journal-of-Entomology,* 67 (2): 109-118

Sriram N and Paliniswamy A 2000 Cotton growers extent of awareness about the ecofriendly agricultural practices in cotton. *J. Extn. Edu.,* 11(2): 2790-2794.

Stoddard F L, Nicholas A H, Rubiales D, Thomas J and Villegas- Fernandez A M 2010 Integrated pest management in faba bean., Field Crops Research, 115: 308-318.

Sudha Rani M 1999 NGOs role in farm women development –A descriptive study. M.Sc (Ag) Thesis, Achrya N.G. Ranga Agricultural University, Hyderabad .

Sulaiman V Rasheed and Andy Hall 2002 Beyond Technology Dissemination-Can Indian Agricultural Extension Re-invent itself

Sumathi P and Alagsan V 2000 Level adoption of IPM practices by the cotton growers in adoption of IPM strategy. Rural India, 130-131.

Tamboli N D and Lolage G R 2008 Bio-efficacy of newer insecticides against pod borer, *Helicoverpa armigera* Hub (Noctuidae : Lepidoptera) on pigeonpea. *Pestology,* 32 (10) : 29-32.

Vazquez-Moreno L L 2003 Integrated management of pests. Manejo integrado de plagas:-Preguntas y respuestas para extensionists y agricultures. Pp: 566

Velusamy R manohoor M 1998 perceived impact of non-governmental organizations in rural development. *Journal of Extension Education,* 9(3):2084-2088

Venkata Shiva Reddy 2006 A study on knowledge and adoption of integrated pest management practices among vegetable growers of Gadag district in north Karnataka. M.Sc.(Agri.) Thesis, University of Agricultural Science, Dharwad.

Venkatesh Gandi R, Hanchinal S N, Shivamurthy M and Shailaja Hittalamani 2007 Adoption of Integrated Pest Management Practices among Tomato Growers. *Karnataka J. Agric. Sci.,* 21 (1): 17-19.

Vijalakshmi V 1998 A study on knowledge and adoption of development women and children in rural areas (DWACRA) beneficiaries in vegetables cultivation in Guntur district of Andhra Pradesh. M.Sc (Ag) Thesis, Achrya N.G. Ranga Agricultural University, Hyderabad .

Waheed I Bajwa and Marcos Kogan 2002 Compendium of IPM Definitions (CID) Integrated Plant Protection Center (IPPC) Publication Number 998

Walter Zegada-Lizarazu and Andrea Monti 2011 Energy crops in rotation. A review. Biomass and Bioenergy, 35(1), 12-25.

(Received on 02.03.2013 and revised on 26.09.2013)