RESEARCH ARTICLE

COST EVALUATION OF PESTICIDE AGAINST MAJOR PEST COMPLEX OF PADDY CROP IN JANJGIR-CHAMPA DISTRICT OF CHHATTISGARH

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Abstract: The study was conducted at the prone area of different villages in Janjgir-Champadistrictof Chhattisgarh. During 2009&2010, On basis of overall the average cost of pesticides evaluated against major pest complex of paddy was ranged from Rs 50.56 to 748.42during 2009. Whereas, during 2010, the average cost of pesticides was ranged from Rs. 00.00 to 994.15 with the cost of share was 00.00 to 40.72 percent. Pooled pesticide cost of major pest complex was ranged from Rs. 00.00 to 871.28. The maximum cost (Rs. 871.28) was recorded against SB followed by HC (Rs.579.24) and minimum (Rs. 00.00) in GB with the cost of share was 39.29, 26.12 and 0.00 percent, respectively.Descending order of the average pesticide cost of major pest complexin paddy crop can be ranked as GM<GB<O<CW<HC<SB.On the basis of information collected from the contact farmer through personal interview, some possible reasons comes out which may be the maximum respondentsinvested cost against SB followed by HC on paddy cultivation which causesmajor problems in that areaandoccurring every season which causing a perceptible damage to rice.

Keywords: Paddy cultivation, Pesticides, Cost and return, Plant protection cost, Pest complex of paddy return

INTRODUCTION

Rice is important cereal crop of the World. Farmers due to inadequate knowledge habitually applied fertilizers and hazardous insecticides in high quantum without any concern to the actual level of field requirement. Such injudicious input, in many cases, consequences in insecticide resistance (Khan *et al*, 1989), resurgence (Kushwaha, 1995), secondary pest outbreak (Satpathi*et al.*, 2005), leading to environmental contamination and persistent residual toxicity (Wakil *et al.*, 2001) Chemical input in high amount is detrimental to natural enemy population disturbing the homeostasis of ecosystem (Way *et al.*, 194). In the absence of natural enemy population, the pest population multiplies more comfortably and thus enhances the extent of yield loss (Jena *et al.*, 1983 and Dash *et al.*, 2006). Kalode *et al*. (1995) reported that grain yield loss in rice due to insect pest in India has been estimated from 21 to 51 per cent varying from area to area as per variation in the agro climatic condition. Singh *et al*. (2004) they examined the pattern of pesticide use in paddy cultivation and assessed the economic and environmental impact of adaptation of IPM practices in paddy in Haryana. The study conducted by David Pimentel (2005) on economic costs of application of pesticides primarily in United States. The major economic and environmental losses due to application of pesticides in USA was $1.1 billion per year to public health, $1.5 billion pesticide resistance in pest, $1.4 billion crop losses caused by pesticides, $2.2 billion to bird losses, and about $2.0 billion to ground water contamination. Shende and Bagde (2013) suggested as the cost incurred and rate of return from pesticide use revealed that the expenditure on pesticides worked out to Rs 2054.30 ha^{-1}. The result also indicated that the rate of return obtained from pesticides use was Rs. 05.31. The decision to spend on PPC must be economic threshold of pest. Sarkar *et al.* 2013 reported that the magnitude of crop loss due to pests, disease and weed infestation in paddy crop is very high. The actual production with attack is varied from19.36 to 20.88 quintal (q)/ acre. The overall loss with attack has been found to be 3.54q/acre. Similarly, the overall normal production without attack is 23.52q/ acre. However, the percentage loss over normal production is less (15.05 per cent) than that of percentage loss over actual production.

MATERIALS AND METHODS

The study was carried out at the prone area of different villages in Janjgir-Champadistrictof Chhattisgarh.Cost evaluation of pesticide against major insect pest complex of paddy crop in each of the village during *kharif*crop season. There were ten each village in the Janjgir-Champa (*viz.*, Satrelikala, Temar, Portha, Dongiya, Jetha, Mudabhata, Parsadakala, Dumarpali, DeragarghandDorki villages) selected for the study. In each village, ten respondents were selected randomly in potential growing area during paddy cultivation in the year 2009 and 2010. Interview schedule was performed with the respondents in "Hindi" through proper discussion and easy response. Tools and techniques were adopted on the personal interview in collecting data with respondents on their observations/ experiences. Respondents were interviewed through personal interview technique with the assurance that information given by them would be kept confidential without complications in the most formal and friendly atmosphere. The cost of

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pesticidedata was processing and statistical framework used to calculatedstandard method.

RESULTS AND DISCUSSIONS

Cost incurred per ha in paddy major insect pest complex at different villages of Janjgir-Champadistrict (*viz.*, Satrelikala, Temar, Portha, Dongiya, Jetha, Mudabhata, Parsadakala, Dumarpali, DeragarghandDorki villages)district during 2009 and 2010 are presented in table- 1, 2, & 3 and fig.- 1, 2& 3.

Cost of insecticides against SB

During 2009, the cost incurred on SB ranged from Rs. 190.00 to 1590.24. The maximum the cost incurred on SB (Rs.1590.24) was recorded in village V_9 followed by village V_5(Rs.1332.68) with the minimum (Rs.190.00) in village V_2. During 2010, the cost was ranged from Rs. 218.80 to 1666.55. The maximum (Rs.1666.55) was recorded in village V_6 followed by village V_9 (Rs.1383.30) with the minimum (Rs.218.80) in village V_1.On the basis of two years, the cost was ranged from Rs. 260.52 to 1486.77. The maximum (Rs.1486.77) was recorded in village V_9 followed by village V_5 (Rs.1332.68) with the minimum (Rs.260.52) in village V_2.

Cost of insecticides against CW

During 2009, the cost incurred on CW ranged from Rs. 0.00 to 963.24. The maximum the cost incurred on CW (Rs.963.24) was recorded in village V_6 followed by village V_5 (Rs.461.94) with the minimum (Rs.51.96) in village V_1 while cost was not recorded in village V_3, V_4, V_8, V_9 and V_{10}, respectively. During 2010, the cost was ranged from Rs. 0.00 to 1045.90. The maximum (Rs.1045.90) was recorded in village V_6 followed by village V_7 (Rs.433.14) with the minimum (Rs.191.64) in village V_2 while cost was not recorded in village V_3, V_4, V_8, V_9 and V_{10}, respectively. On the basis of two years, the cost was ranged from Rs. 0.00 to 1004.57. The maximum (Rs.1004.57) was recorded in village V_6 followed by village V_5 (Rs.534.24) with the minimum (Rs.139.46) in village V_1.

Cost of insecticides against HC

During 2009, the cost incurred on HC ranged from Rs. 68.53 to 1392.82. The maximum the cost incurred on HC (Rs.1392.82) was recorded in village V_9 followed by village V_6 (Rs.1283.04) with the minimum (Rs.68.53) in village V_1.During 2010, the cost was ranged from Rs. 69.49 to 1763.67. The maximum (Rs.1763.67) was recorded in village V_6 followed by village V_9 (Rs.1256.86) with the minimum (Rs.69.49) in village V_8.On the basis of two years, the cost was ranged from Rs. 181.87 to 1523.36. The maximum (Rs.1523.36) was recorded in village V_6 followed by village V_9 (Rs.1324.84) with the minimum (Rs.181.87) in village V_5.

Cost of insecticides against GM

The cost was not recordedinboth years against GM.

Cost of insecticides against LF

During 2009, the cost incurred on LF ranged from Rs. 0.00 to 1815.49. The maximum cost incurred on LF (Rs.1815.49) was recorded in village V_2 followed by village V_1 (Rs.848.44) with the minimum (Rs.516.45) in village V_3 while cost was not recorded in village V_4, V_5, V_6, V_7 and V_8, respectively. During 2010, the cost was ranged from Rs. 0.00 to 1760.49. The maximum cost (Rs.1760.49) was recorded in village V_2 followed by village V_8 (Rs.831.81) with the minimum (Rs.28.50) in village V_9 and the cost was not recorded in village V_4, V_5, V_6, and V_7, respectively. On the basis of two years, the cost was ranged from Rs. 14.25 to 1787.99. The maximum (Rs.1787.99) was recorded in village V_2 followed by village V_8 (Rs.831.81) with the minimum (Rs.14.25) in village V_9.

Cost of insecticides against GB

During 2009 and 2010, the cost incurred on GB ranged from Rs. 0.00 to 632.02. The maximum cost incurred on GB (Rs.632.02) was recorded in village V_3 while cost was not recorded in village V_1, V_2, V_4, V_5, V_6, V_7, V_8 V_9 and V_{10}, respectively.

Cost of insecticides against O

During 2009, the cost incurred on others ranged from Rs. 0.00 to 266.19. The maximum cost incurred on O (Rs.266.19) was recorded in village V_6 followed by village V_8 (Rs.172.73) with the minimum (Rs.66.67) in village V_{10} while cost was not recorded in village V_1, V_2, V_3,V_4, V_5, V_7 and V_9, respectively. During 2010, the cost was ranged from Rs. 0.00 to 297.73. The maximum cost (Rs.297.73) was recorded in village V_8 followed by village V_3 (Rs.171.12) with the minimum (Rs.110.67) in village V_7 while cost was not recorded in village V_1, V_2, V4, V_5, V_6, V_9 and V_{10}, respectively. On the basis of two years, the cost was ranged from Rs. 0.00 to 235.23. The maximum (Rs.235.23) was recorded in village V_8 followed by village V_6 (Rs.133.10) with the minimum (Rs.33.34) in village V_{10}.

Table 1. Cost evaluation of pesticides against major pest complex of paddy in selected villages of Janjgir - Champa district during 2009

Practices	Surveyed village (ha^{-1})										Av	Share (%)
	V_1	V_2	V_3	V_4	V_5	V_6	V_7	V_8	V_9	V_{10}		
SB	558.30	190.00	894.69	388.21	1332.68	892.18	633.19	690.27	1590.24	314.40	**748.42**	**37.55**
CW	51.96	191.64	0.00	0.00	461.94	963.24	104.80	0.00	0.00	0.00	**177.36**	**8.90**
HC	68.53	329.60	655.78	309.55	77.07	1283.04	253.30	69.49	1392.82	406.19	**484.54**	**24.31**

GM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
LF	848.44	1815.49	516.45	0.00	0.00	0.00	0.00	831.81	0.00	677.65	**468.98**	**23.53**
GB	0.00	0.00	632.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**63.20**	**3.17**
O	0.00	0.00	0.00	0.00	0.00	266.19	0.00	172.73	0.00	66.67	**50.56**	**2.54**
Total	**1527.23**	**1527.23**	**1527.23**	**1527.23**	**1527.23**	**1527.23**	**1527.23**	**1527.23**	**1527.23**	**1527.23**	**1993.06**	**44.90**

Table 2. Cost evaluation of pesticides against major pest complex of paddy in selected villages of Janjgir - Champa district during 2010

Practices	**Surveyed village (ha^{-1})**										**Av**	**Share (%)**
	V_1	**V_2**	**V_3**	**V_4**	**V_5**	**V_6**	**V_7**	**V_8**	**V_9**	**V_{10}**		
SB	218.80	331.03	1377.69	678.14	1332.68	1666.55	633.19	994.86	1383.30	1325.21	**994.15**	**40.72**
CW	226.96	191.64	0.00	0.00	606.54	1045.90	433.14	0.00	0.00	0.00	**250.42**	**10.26**
HC	927.31	327.24	704.63	381.28	286.67	1763.67	446.10	69.49	1256.86	576.15	**673.94**	**27.60**
GM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
LF	487.50	1760.49	271.88	0.00	0.00	0.00	0.00	831.81	28.50	639.65	**401.98**	**16.46**
GB	0.00	0.00	632.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**63.20**	**2.59**
O	0.00	0.00	171.12	0.00	0.00	0.00	110.67	297.73	0.00	0.00	**57.95**	**2.37**
Total	**1860.57**	**2610.4**	**3157.34**	**1059.42**	**2225.89**	**4476.12**	**1623.1**	**2193.89**	**2668.66**	**2541.01**	**2441.64**	**39.09**

Table 3. Pooled cost of pesticides against major pest complex of paddy in selected villages of Janjgir -Champa district during 2009 &2010

Practices	**Surveyed village (ha^{-1})**										**Av**	**Share (%)**
	V_1	**V_2**	**V_3**	**V_4**	**V_5**	**V_6**	**V_7**	**V_8**	**V_9**	**V_{10}**		
SB	388.55	260.52	1136.19	533.18	1332.68	1279.37	633.19	842.57	1486.77	819.81	**871.28**	**39.29**
CW	139.46	191.64	0.00	0.00	534.24	1004.57	268.97	0.00	0.00	0.00	**213.89**	**9.65**
HC	497.92	328.42	680.21	345.42	181.87	1523.36	349.70	69.49	1324.84	491.17	**579.24**	**26.12**
GM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
LF	667.97	1787.99	394.17	0.00	0.00	0.00	0.00	831.81	14.25	658.65	**435.48**	**19.64**
GB	0.00	0.00	632.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**63.20**	**2.85**
O	0.00	0.00	85.56	0.00	0.00	133.10	55.34	235.23	0.00	33.34	**54.26**	**2.45**
Total	**1693.90**	**2568.57**	**2928.14**	**878.59**	**2048.79**	**3940.39**	**1307.20**	**1979.10**	**2825.86**	**2002.96**	**2217.35**	**45.79**

*SB = stem borer; CW = cut worms; HC = hopper complex; GM=gall midge; LF = leaf folder; GB = gandhibug and O = other pest

* V_1= Satrelikala, V_2= Temar, V_3= Portha, V_4= Dongiya, V_5= Jetha, V_6= Mudabhata, V_7= Parsadakala, V_8= Dumarpali, V_9= DeragarghandV$_{10}$= Dorki

* Number of ten farmers in each village

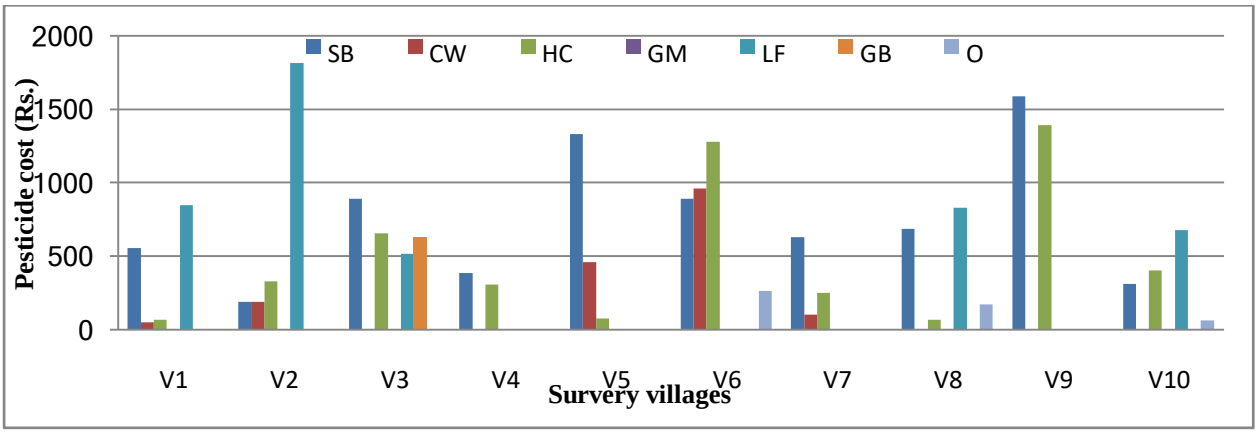

Fig. 1: Cost evaluation of pesticides against major pest complex of paddy in selected villages of Janjgir - Champa district during 2009

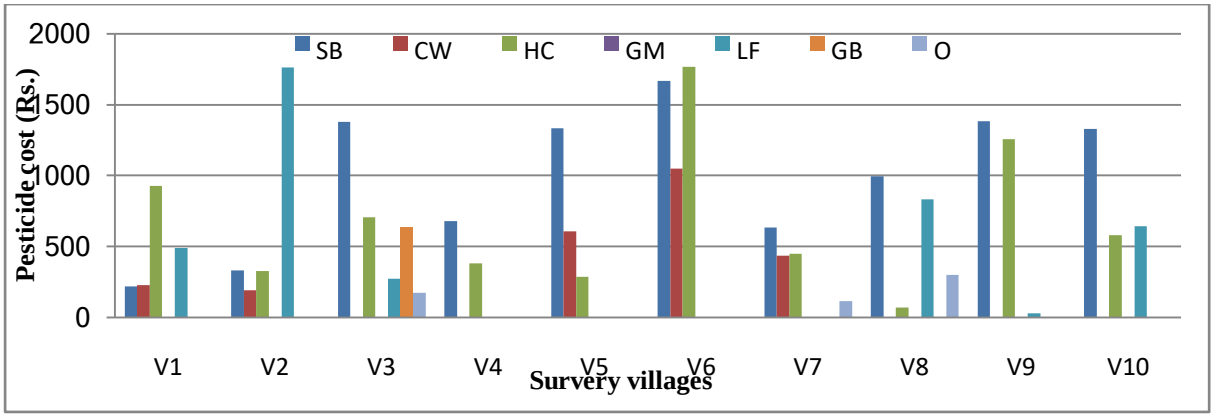

Fig. 2: Cost evaluation of pesticides against major pest complex of paddy in selected villages of Janjgir - Champa district during2010

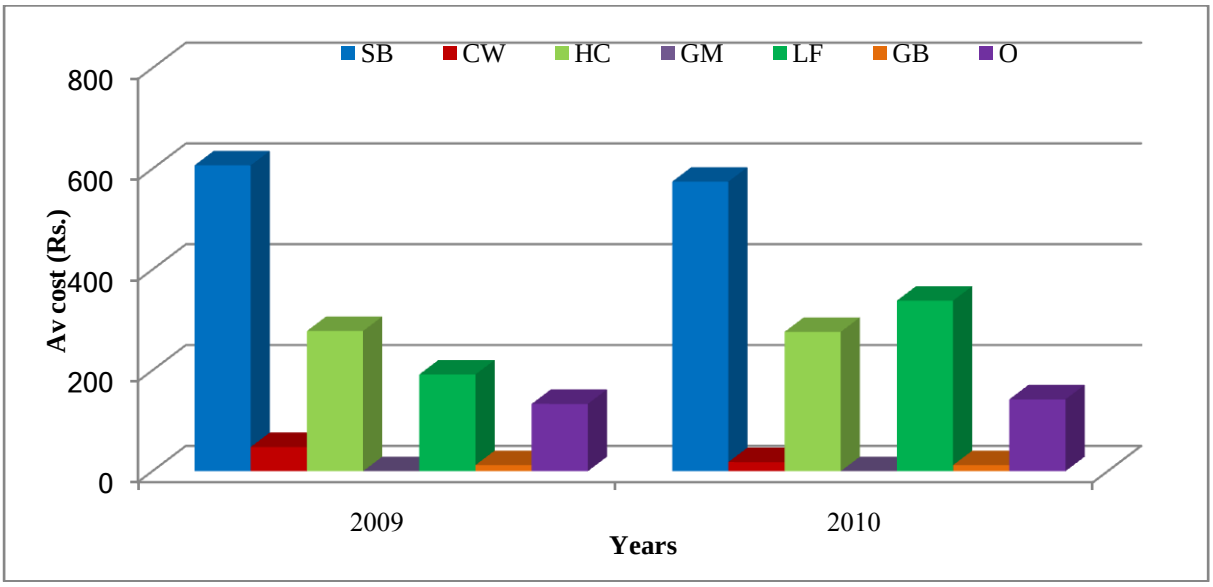

Fig. 3. Average cost evaluation of pesticides against major pest complex of paddy in selected villages of Janjgir -Champa district during2009 &2010

On basis of overall the average cost of pesticides evaluated against major pest complex of paddy was ranged from Rs50.56to 748.42 during 2009. The highest cost of the pesticides against SB (Rs. 748.42) was recorded followed by HC (Rs. 484.54) and minimum (Rs.50.56) in O with the cost of share was 37.55, 24.31 and 2.54 percent, respectively. Whereas, during 2010, the average cost of pesticides was ranged from Rs. 00.00 to 994.15 with the cost of share was 00.00 to 40.72 percent. Pooled pesticide cost of major pest complex was ranged from Rs. 00.00 to 871.28. The maximum cost (Rs. 871.28) was recorded against SB followed by HC (Rs.579.24) and minimum (Rs. 00.00) in GB with the cost of share was 39.29, 26.12and 0.00 percent, respectively. Shende and Bagde (2013) suggested as the cost incurred and rate of return from pesticide use revealed that the expenditure on pesticides worked out to Rs 2054.30 ha^{-1}. Similar type finding were reported by David Pimentel (2005) on economic costs of application of pesticides primarily in United States that major economic losses due to application of pesticides in USA was $1.4 billion crop losses caused by pesticides.Singh *et al.* (2004) they examined the pattern of pesticide use in paddy cultivation and assessed the economic and environmental impact of adaptation of IPM practices in paddy in Haryana. IPM and INM practices can be popularized to control the pests and diseases during the stage of pre-harvest of crops. SB and HC is very important pest in that area which occurring every season and causing a perceptible damage to rice.

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