



P-ISSN: 2349-8528  
E-ISSN: 2321-4902  
IJCS 2018; 6(1): 1377-1379  
© 2018 IJCS  
Received: 12-11-2017  
Accepted: 13-12-2017

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## Study of the frequency, extent, type and intensity of pesticides use in pigeon pea production

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### Abstract

About 70 per cent of pesticides are being used in developing countries like India and remaining 30 per cent in developed countries. The table delineates that IPM farmers used the contact insecticides with an average frequency of 1.50 times at the rate of 0.72 liter, which accounted for a cost share of Rs. 862, and systemic insecticide spraying average frequency of 1.83 times with a quantity of 1.05 liters includes a cost of Rs. 1232. Whereas, in case non-IPM farmers, sprayed 2.54 times at the rate of 1.17 liter per hectare with a cost of Rs. 1397 and systemic pesticide spraying frequency of 1.70 times and a quantity of 0.92 liters which includes a cost of Rs. 1100. Out of 60 IPM farmers, thirteen farmers used less than 2.5 liter, forty five farmers used pesticides in ranges between 2.5 to 5 liters and only two farmers were sprayed at 5.1 to 7.5 liters and they obtained average yield of 9.42 quintals, 10.17 quintals and 9.50 quintals per hectare, respectively.

**Keywords:** Pigeon pea, Pesticides use, IPM and non-IPM practice

### 1. Introduction

India ranks 10<sup>th</sup> in the world pesticides consumption and its total consumption was 45,386 tonnes per annum (Anon. 2012) [1]. In India, 400 chemical factories are manufacturing 55 different basic pesticides. Totally 164 pesticides have been registered for use in the country. Pesticide use in India is increasing at a rate of 2 to 5 per cent annually and it is about 3 per cent of total pesticides used in the world. About 90,000 metric tonnes of technical grade pesticides are currently produced and more than 67 per cent is used in agriculture sector alone. India is presently the largest manufacturer of basic pesticides among the South Asian and African countries with an exception of Japan. The Indian pesticides market is the 12<sup>th</sup> largest in the world (Anon. 2012) [1].

About 70 per cent of pesticides are being used in developing countries like India and remaining 30 per cent in developed countries. More than 1000 agro-chemicals are being manufactured and used for agriculture as well as for public health purposes. Out of these pesticides used, 80.5 per cent are insecticides, 11 per cent are fungicides and 7 per cent are herbicides. Karnataka stands 7<sup>th</sup> position in total quantity of consumption (1225 tonnes/annum), whereas consumption value of pesticides in Vijayapura district is Rs. 400 million (Anon, 2012) [1]. The present use of pesticides in India is 580 gm per hectare which is very low as compared to Taiwan (17 kg/ha) followed by Japan (16.5 kg/ha) and in the US (4.5 kg/ha) (Kumarswamy, 2008) [4].

Pigeon pea is highly sensitive to wide range of insect pests both in the fields (at various stages of crop growth) and storage. Most of the pests attack the crop at reproductive stage causing direct losses. Diseases, insect pests and viral diseases transmitted by insects are the major bottlenecks in realizing higher yields in pigeon pea (Dubey and Sharma, 2002) [3]. Every rupee spent on chemical pest control helps in saving crop output worth of Rs. 3. The average per hectare consumption of pesticides for cultivation of crops in India had increased from 0.03 kg in 1954-55 to 0.57 kg in 1996 (Bami, 1996) [2]. During nineties in Northern Karnataka, application of almost all broad spectrum insecticides failed to reduce the extensive damage of pests (70 to 90%) and the losses incurred were to the tune of Rs. 400 crores (Lingappa and Yelshetty, 1994). Similar situation with incidence of pests ranging between 90 to 100 per cent was observed during 1997-98 (Yelshetty and Siddegowda, 1998) [7]. The present study tells about the frequency, extent type and intensity of pesticides use in pigeon pea production from IPM and non-IPM farmers in Vijayapura regions of Karnataka.

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## 2. Material and Methods

The present study attempted to evaluate the economics of pesticide use in pigeon pea. Pigeon pea is predominantly grown in Vijayapura district. The area under pigeon pea in Vijayapura district is 1,83,550 hectare (2014). The Pesticide use studies in this area is lacking hence, Vijayapura in Karnataka state is purposively selected for the study. The map showing the study area is presented in Fig.1. Vijayapura district is located in Northern part of Karnataka and is situated

between 15° 20' to 17° 28' North latitude and 74° 54' to 76° 28' East longitude.

Quantity of pesticide usage was calculated by using tabular analysis which were employed for determining pesticide usage, Frequency, quantity, type, pesticide use intensity and costs etc, from pigeon pea cultivation in the study area. The percentages and averages were worked out to draw meaningful inferences. The Plant Protection Chemicals input was measured in physical quantity.

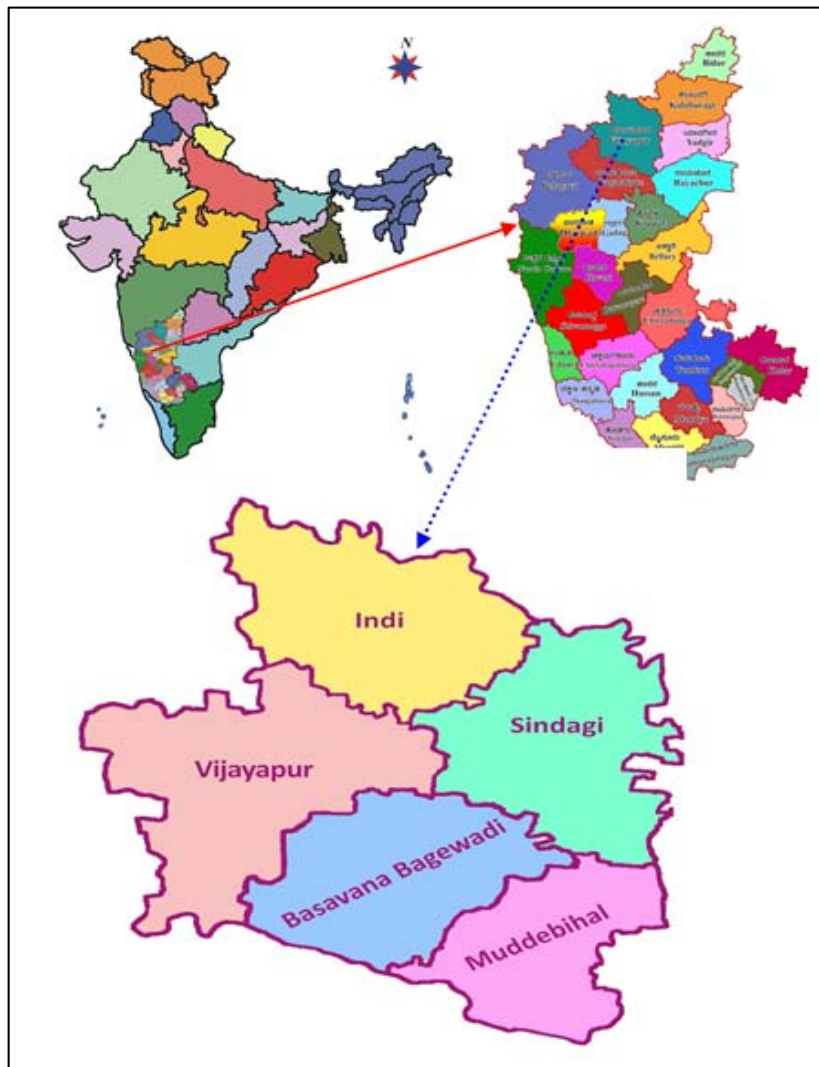


Fig 1: Map of study area in Karnataka

Table 1: Frequency, quantity, type and cost of PPC used in pigeon pea cultivation (N=120)

Pesticides	IPM (n=60)			Non IPM (n=60)			Difference		
	Freq (No.)	Qty (l/ha)	Cost (Rs./ha)	Freq (No.)	Qty (l/ha)	Cost (Rs./ha)	Freq (No.)	Qty (l/ha)	Cost (Rs./ha)
A. Insecticides									
1. Contact	1.50	0.72	862	2.54	1.17	1397	1.04	0.45	535
2. Systemic	1.83	1.05	1232	1.70	0.92	1100	-0.13	-0.12	-132
B. Fungicides	0.00	0.00	0	0.10	0.10	190	0.10	0.1	190

Table 2: Frequency distribution of sample farmers by pesticide use intensity (N=120)

Pesticide use intensity (l / ha)	IPM (n=60)	Yield of IPM farmers (q/ha)	Non-IPM (n=60)	Yield of non-IPM farmers (q/ha)
<2.5	13	9.42	0	0
2.5 - 5.0	45	10.17	30	9.19
5.1 - 7.5	2	9.50	26	9.81
>7.5	0	0	4	10.45

### 3. Result

Information on frequency, quantity and type of pesticides per hectare used in pigeon pea cultivation are presented in Table 1. The table delineates that IPM farmers used the contact insecticides with an average frequency of 1.50 times at the rate of 0.72 liter, which accounted for a cost share of Rs. 862, and systemic insecticide spraying average frequency of 1.83 times with a quantity of 1.05 liters includes a cost of Rs. 1232. Whereas, in case non-IPM farmers, sprayed 2.54 times at the rate of 1.17 liter per hectare with a cost of Rs. 1397 and systemic pesticide spraying frequency of 1.70 times and a quantity of 0.92 liters which includes a cost of Rs. 1100. The difference between non-IPM to IPM farmers with respect to average frequency, quantity and its cost was 1.04 times, 0.45 liters and Rs. 535, respectively. They use the same contact insecticides with average frequency of 2.54 times at the rate of 1.17 liter with a cost of Rs. 1397. Hence, there was observed a remarkable difference between IPM and non-IPM farmers with respect to frequency, quantity, and its costs were 1.04 times, 0.45 liter and Rs. 535, respectively in case of contact insecticides. Similarly, the difference for systemic insecticides was -0.13 times, -0.12 liters and Rs. -132, respectively. The frequency, quantity and type of pesticides used are not followed as per recommendations in pigeon pea production, hence, the null hypothesis is accepted.

#### 3.1 Frequency distribution of sample farmers according to pesticide use intensity

Frequency distribution of farmers by pesticide used intensity per hectare was presented in Table 2. It revealed that out of 60 IPM farmers, thirteen farmers used less than 2.5 liter, forty five farmers used pesticides in ranges between 2.5 to 5 liters and only two farmers were sprayed at 5.1 to 7.5 liters and they obtained average yield of 9.42 quintals, 10.17 quintals and 9.50 quintals per hectare, respectively. While in case of non-IPM farmers, thirty farmers were sprayed in ranges between 2.5 to 5 liters, twenty six farmers used pesticides in ranges between 5.1 to 7.5 liters and four farmers applied more than 7.5 liters of pesticides. Similarly the average yield obtained was 9.19, 9.81 and 10.45 quintals per hectare, respectively.

### 4. Discussion

The frequency, quantity, type and cost of PPC used in pigeon pea cultivation in case of both IPM and non-IPM farmers is presented in Table 1. It could be seen from the table that, there was positive a difference in frequency, quantity and cost involved in usage of contact insecticides and fungicides between non-IPM and IPM farmers. The non-IPM farmers used more quantity of contact insecticides (0.45 lit/ha) and fungicides (0.1 lit/ha) than that of IPM farmers, whereas the usage of systemic insecticides (-0.12 lit/ha) was more in case of IPM farmers as compared to non-IPM farmers. This was mainly due to the fact that IPM farmers control the chewing and biting type of insects with the help of cultural and mechanical practices and if the population of insect exceeds they go for spraying contact insecticides and for sucking type of insects, they use systemic insecticide. The results of the study are in line with that of Singh *et al.* (2007) <sup>[6]</sup> in case of paddy, vegetables and cotton cultivation.

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