



SURVEY ON PESTICIDE USAGE PATTERN IN RICE CROP GROWN IN THE SOUTHERN ZONE OF ANDHRA PRADESH

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ABSTRACT

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A roving survey was conducted on pesticide usage pattern in rice crop grown in Southern Agro-climatic Zone of Andhra Pradesh during *rabi*, 2024-25. Data from 120 farmers were collected in four districts *viz.*, Kadapa, Nellore, Chittoor, Tirupati, two mandals from each district and three villages from each mandal. The data on crop management practices followed by the rice farmers, occurrence of insect pests and diseases, time of plant protection, pesticides, dose, method of application, *etc.*, was recorded. The results indicated that, stem borer, leaf folder, gall midge and brown plant hopper are the common insect pests of rice in surveyed areas and the insecticides *viz.*, chlorantraniliprole, dinotefuran, triflumezopyrim, acephate, cypermethrin, were used in the insect pest control. Diseases *viz.*, sheath blight, blast, grain discoloration were observed in common and fungicides azoxystrobin, tebuconazole, propiconazole, tricyclazole, carbendazim were the most frequently used to control the diseases. Among the insecticides, chlorantraniliprole being applied to the extent of 77 per cent against stem borers in Kadapa district followed by triflumezopyrim (70%) in Tirupati and Nellore districts against brown plant hoppers. In Chittoor district, 66.7 per cent farmers used cypermethrin against leaf folder. Among the fungicides, the combination of azoxystrobin and tebuconazole was used against sheath blight to the tune of 25.0 per cent, followed by tricyclazole (23.33%) against rice blast and propiconazole (20.8%) against sheath blight. Highest fungicide usage was observed in Tirupati district. The studies revealed that most of the farmers are using insecticides and fungicides in combination spray after tank mixing, limited to 3-5 no. of sprays with the power sprayer. This study provides an overview of the history and evolution of pesticide use in rice cultivation, explores the functions and application patterns of different types of pesticides.

KEYWORDS: Survey, rice, insecticides, fungicides, Andhra Pradesh.

INTRODUCTION

Pesticides constitute the key control tactics for management of pests and diseases and the productivity of crops depends on their effective control. As global food demand continues to grow, the use of pesticides in rice cultivation has become a common practice to ensure high yields. In India, 76 per cent of the pesticides were used as insecticides as against 44 per cent globally. The use of herbicides and fungicides were correspondingly less (Dey *et al.*, 2013). Rice crop is known to attack by more than 100 insect pest species worldwide and among them 10-12 are major in Indian context. Yellow stem borer, leaf folder, brown plant hopper, gall midge, green leaf hoppers, are the major insect pests in one and other rice growing locations of Andhra Pradesh. Rice crop is next to cotton in pesticidal application. Several new molecules with novel modes of action are applying in rice ecosystem for insect pest and disease control (Reddy *et al.*, 2023). The pesticide application in rice crop is started from nursery till maturity. In recent years end

of the season pesticide application observed in different rice growing areas of Andhra Pradesh. In view of the availability and usage of latest pesticide molecules, the present studies were planned to collect the data on pesticide usage in rice crop from Southern Agro-Climatic Zone of Andhra Pradesh.

MATERIAL AND METHODS

Roving survey was conducted in major rice growing areas of Andhra Pradesh *viz.*, Chittoor, S P S Nellore, Tirupati and Y S R Kadapa districts during early *rabi*, 2024-2025 to study the pesticide usage pattern. In each district, two mandals were selected and in each mandal, three villages were chosen randomly and 5 farmers in each village will be selected for conducting the survey. The list of districts, mandals and villages surveyed are mentioned in (Table 1). Survey was conducted as per standard proforma to access the pesticide usage pattern in rice crop by collecting the information on variety sown, seed treatment, date of sowing and transplanting, fertilizer dosage, insecticides and fungicides sprayed,

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Table 1. List of districts, mandals and villages of Andhra Pradesh surveyed for the pesticide usage pattern during *rabi*, 2024-2025

Districts	Mandals	Villages	Farmers
Chittoor	Rompicherla	3	15
	Pulicherla	3	15
Nellore	Indukurpet	3	15
	Venkatachalam	3	15
Y. S. R. Kadapa	Duvvur	3	15
	Proddatur	3	15
Tirupati	Chinnagottigallu	3	15
	Yerravaripalem	3	15
Total		24	120

stage of spraying, date of harvesting, source for pesticides, precautionary measures *etc.*,

RESULTS AND DISCUSSION

Pesticide usage pattern on rice crop against insect pests, diseases and weeds during *rabi*, 2024-25

From the Table 2, it was clear that different formulations of 19 insecticides, 10 fungicides were used by paddy farmers throughout the crop growing season during *rabi*, 2024-25. The highest number of farmers (65.00%) used chlorantraniliprole followed by triflumezopyrim (63.33%) and monocrotophos (60.00%), while the least number of farmers used bifenthrin (35.00%) for control of different insect pests, while, in case of fungicides, azoxystrobin and tebuconazole (25.00%) followed by tricyclazole (23.00%) and propiconazole (20.83%) were used by farmers against different fungal infections. In case herbicides, 10.00 and 3.33 per cent farmers used butachlor and bispyribac sodium and the remaining farmers (86.67%) followed manual method for weed control.

Among the insecticides used by the farmers, bifenthrin, cypermethrin, profenophos, phorate, deltamethrin and lambda-cyhalothrin and fungicide, copper oxychloride were not recommended on rice crop as per CIB & RC (2024). Pesticides *viz.*, trifloxystrobin fungicide

recommended in combination with other fungicides. Among the pesticides used monocrotophos belongs to class Ib which was highly toxic and likely to cause ill-effects whereas, chlorantraniliprole, azoxystrobin, mancozeb and carbendazim unlikely to cause ill-effects in normal use and belongs to class 'U' according to WHO Classification 2019.

Based on the survey during *rabi*, 2024-25, it was concluded that farmers used more insecticides followed by fungicides and herbicides to reduce the insect pests, diseases and weeds. These results were similar with the observations of Sai *et al.* (2019) who reported that insecticides (72%) were the most commonly used among pesticides, followed by fungicides and bactericides (18%) and herbicides (6%). From the obtained results it was revealed that among different pesticides, farmers used different formulations of insecticides and fungicides which were available in different trade names. The results were in conformity with the survey done by Ahmad *et al.* (2014) who reported that, most of the insecticides which were used frequently by the famers contains active ingredients of thiamethoxam, lambda-cyhalothrin, chlorpyrifos, cypermethrin, buprofezin and cartap hydrochloride and among the fungicides, difenoconazole and isoprothiolane were the active ingredients used to control fungal pathogens (*Rhizoctonia solani* and *Pyricularia oryzae*).

Table 2. Pesticide usage pattern on rice crop against insect pests, diseases and weeds during *rabi*, 2024-25

Insecticide	Type of formulation	Trade name	Chemical class	IRAC class	No. of farmers (120)	%	Rank
Acephate	75 SP	Asataf	Organophosphate	1B	67	55.83	5
Bifenthrin	10 EC, 8 SC	Talstar	Pyrethroid	3A	42	35	15
Buprofezin	25 SC	Applaud	Insect growth regulator (IGR)	16	45	37.5	14
Carbofuran	3 G	Furadan	Carbamate	1A	48	40	12
Cartap-hydrochloride	50 WP, 4G	Sanvex, Caldan	Nereistoxin analogue	1B	49	40.83	11
Chlorantraniliprole	18.5 SC, 0.4 GR	Coragen, Ferterra	Diamide	28	78	65	1
Chlorpyrifos	20 EC	Dursban	Organophosphate	1B	69	57.5	4
Cypermethrin	10 EC	Cyperkill	Pyrethroid	3A	39	32.5	16
Deltamethrin	2.5 EC	Butoflin	Pyrethroid	3A	39	32.5	16
Dinotefuran	20 SG	Dinogold	Neonicotinoid	4A	47	39.17	13
Flubendiamide	20 WDG, 480 SC	Fame	Diamide	28	53	44.17	10
Imidacloprid	17.8 SL, 600 FS	Confidor, Gaucho	Neonicotinoid	4A	56	46.67	8
Indoxacarb	14.5 SC	Avaunt	Oxadiazine	22A	64	53.33	6
Lambda-cyhalothrin	5 EC	Warrior	Pyrethroid	3A	56	46.67	8
Monocrotophos	36 SL	Monokem, Hycrophos	Organophosphate	1B	72	60	3
Phorate	10 G	Thimet	Organophosphate	1B	52	43.33	9
Profenofos	50 EC	Pivot, ProfiganS	Organophosphate	1B	62	51.67	7
Pymetrozine	50 WG	Chess	Pyridine azomethine	9B	56	46.67	8
Triflumezopyrim	10 SC	Trifluzopy	Mesonoic pyridol [1,2-a] pyrimidine	4E	76	63.33	2
Fungicide			Chemical class	IRAC class			
Azoxystrobin	23 SC	Amistar	Strobilurin (QoI)	11	30	25	1
Carbendazim	50 WP, 46.27 SC	Bavistin	Benzimidazole	1	20	16.67	5
Copper oxychloride	50 WP	Blitox	Inorganic (multi-site)	M1	14	11.67	7
Difenoconazole	25 EC	Score	Triazole (DMI)	3	7	5.83	8
Hexaconazole	5 EC	Contaf Plus, Sitara	Triazole (DMI)	3	21	17.5	4
Mancozeb	75 WP	Dithane m-45	Dithiocarbamate	M3	14	11.67	7
Propiconazole	25 EC	Tilt, Radar	Triazole (DMI)	3	25	20.83	3
Tebuconazole	25.9 EC, 430 SC	Folicur	Triazole (DMI)	3	30	25	1
Tricyclazole	75 WP	Beam, Sivic	Benzimidazole	16	28	23.33	2
Trifloxystrobin	50 WG, 25 WG	Nativo	Strobilurin (QoI)	11	16	13.33	6
Herbicide							
Butachlor	50 EC	Machete	Acetanilide		12	10	1
Bispyribac sodium	10 SC	Nominee Gold	Pyrimidinylthiobenzoate		4	3.33	2

Table 3. General awareness of farmers on usage of pesticides on paddy crop during *rabi*, 2024-25

S. No.	Particulars	<i>Rabi</i> , 2024-25 (n=120)	
		Frequency	Percentage
1.	Period of farming activity in using pesticides on paddy crop		
	<5 years	28	23.33
	>5 years	92	76.67
2.	Awareness on recommendations of pesticides		
	With awareness	17	14.17
	Without awareness	103	85.83
3.	Farmers desire to mix different pesticides		
	Insecticide + insecticide	72	60.00
	Insecticide + fungicide	34	28.33
	Fungicide + fungicide	14	11.67
4.	Measurement of pesticides		
	Bottle cap (correct dosage)	36	30.00
	Approximately (more or less dosage)	84	70.00
5.	Mixing of pesticides with water to prepare spray solution		
	Bare hands	0	0.00
	Stick	120	100.00
6.	Frequency of application		
	4 days interval	21	17.50
	5 days interval	38	31.67
	Weekly interval	61	50.83
7.	Selection of spraying equipment		
	Knapsack sprayer	19	15.83
	Power sprayer	101	84.17
8.	Time of pesticide application		
	Morning or evening hours	78	65.00
	Day light hours	42	35.00
9.	Precautions while application of pesticides		
	Face masks	0	0.00
	Hand gloves	3	2.50
	Shirts with full hands	101	84.17
	No precautions	16	13.33

General awareness of farmers on usage of pesticides on paddy crop during *rabi*, 2024-25

From the table 3, information on paddy farmers of 76.67 and 23.33 per cent have been using different chemical pesticides for more than five and less than five years respectively against different pests. Since most of the famers had an farming experience of 10-15 years

on different crops. These results were similar with the findings of Sankoh *et al.* (2016) who reported that most of the respondents used at least one type of pesticide on their farms throughout their farming experience. Only 14.17 per cent of the farmers had awareness to use recommended pesticides for different pests and 85.83 per cent of the farmers used recommended pesticides without

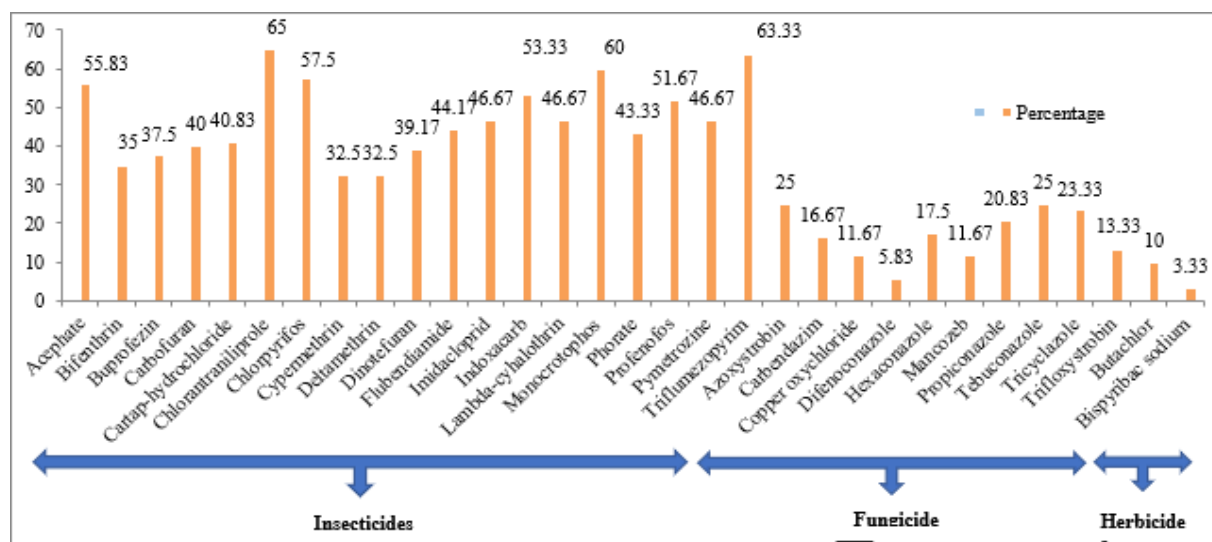


Fig 3.1 Pesticide usage pattern on rice crop against insect pests, diseases and weeds during rabi, 2024-25

awareness. The results were similar with the outcome of Deviprasad *et al.* (2015) who observed that most of the pesticide formulations which were used against different pests at various stages of crop production by the farmers were recognized. Shetty *et al.* (2010) observed that 52.49 per cent of the farmers applied combination of two to three pesticides against major pests and 48 per cent of the respondents in the study area sprayed pesticides without mixing two or more pesticides. Fajardo *et al.* (2000) observed that the pesticides were sprayed with a 15 litre capacity knapsack sprayer on paddy crop by majority of the farmers. This output was similar with the findings of Hamsan *et al.* (2017) who observed that 89.60 per cent of farmers sprayed in the morning or evening and only 4.0 per cent sprayed pesticides while it was so hot in the afternoon. The findings of Jallow *et al.* (2017) who reported that the majority (58%) of the farmers did not use any protection equipment when mixing or spraying pesticides due to lack of availability when needed.

Present surveys in Southern Agro-Climatic Zone of Andhra Pradesh revealed that the farmers were using 19 insecticides, 10 fungicides and 2 herbicides. The compounds *viz.*, bifenthrin, cypermethrin, profenophos, phorate, deltamethrin and lambda-cyhalothrin were not recommended on rice crop and fungicides; copper oxychloride also not recommended. Pesticides *viz.*, trifloxystrobin fungicide recommended in combination with other fungicides. The farmers applying tank mixture of insecticides and fungicides alone and in combination also. End season application of fungicides was resulted

for fungal diseases and grain discoloration. Hence the harvest time residues in rice also need to be studied.

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