

## Management of diseases and insect pest in marigold and gladiolus flower

**Comment [A1]:** Add the region of the present study.

**Comment [A2]:** Recommended title "A brief study on disease and pest management practices in marigold and gladiolus flower under----- area"

**Comment [A3]:** Add one or two more sentence regarding your result.

### Abstract

Gladiolus and marigold being important commercial flowers are fetching high returns to the growers in national and international markets. The occurrence of diseases and insect pest attack in devastating form, has become a limiting its production. The present study was planned with objective to study management of common diseases and insect pest in marigold and gladiolus flower. A total of 80 farmers were selected for this study. Data were collected personally with the help of interview schedule. The findings revealed that 55 per cent of the respondents adopted recommended fungicide to control disease in marigold and all the respondents treated the corms before planting in gladiolus. Also 10 and 15 per cent of the respondents used recommended pesticides in marigold and gladiolus to control the attack of insect-pest.

**Keywords:** marigold, gladiolus, diseases, insects, management

### INTRODUCTION

Agriculture contributes about 17.8% to country GDP and gives work to over 54.60% of the population (Anonymous 2021). In our country almost 80.00% of the total cultivated land is put under cereals to make the nation self-sufficient in food requirements. The major crops after the green revolution in India are wheat, rice, cotton, sugarcane, sorghum, bajra and maize (Nelson *et al* 2019). In the context of Punjab, the majority of farmers follow the rice wheat cropping system. Rice and wheat yields have reached the plateau. There is a high time need for diversification to solve the problems of low farm income, yield plateau of cereals, marketing, deterioration of soil and water (Khanam *et al* 2018).

To meet the challenges of a globalizing market in agriculture as well as the growing and changing needs of the population many countries in South East Asia have undertaken crop diversification to enhance productivity and cultivate high value crop with positive outcome. These countries are gradually diversifying their crop sector in favour of high value commodities, especially flowers, fruits, vegetables and spices. Diversification is taking place either through area augmentation or by crop substitution. If carried out appropriately, diversification can be used as a tool to augment farm income, generate employment, alleviate poverty and conserve precious

**Comment [A4]:** Add 10 number of last 5 year reference.

**Comment [A5]:** Add some relevant information regarding the study like the pest and disease attacks these two specific crop in your locality and previous reviews also.

soiland water resources.

Modern flori-business in India has in recent years morphed into a technology and knowledge driven activity. Success or failure in flori-business is not only the outcome of grower/entrepreneur skill at growing flower crops successfully in a high tech. environment but also on a number of extraneous factors like marketing and supply and demand over which a grower has no control. Floriculture has become a highly capital and technology intensive enterprise. Even a marginal farmer/grower has to shell out a sizable cash/218 Agricultural Marketing financial outlay to be able to set up an enterprise that runs sustainably

**Comment [A6]:** Clarify this sentence properly.

Flowers, which symbolize love, affection, tranquility and peace, are the most beautiful creations on this earth. Among these, rose, gerbera, carnation and orchids have its admirers and enthusiasts all over the world for its use both as a commercial flower crop and as a popular exhibition flower. Commercial floriculture has become increasingly popular not only as an essential part of good living but also as a commercial enterprise with vast potential for export. After achieving self-sufficiency in the production of food grains following the green revolution in agriculture, of higher number of quality flowers from unit area for domestic and export markets there should be strong technological base to solve the day-to-day problems (Singh *et al* 2015)

Commercial floriculture has its own problems to achieve its full potential. One of such problems is recurrent occurrence of diseases and pests on these commercial flower crops. Due to congenial environment available inside the poly-house for quick and easy multiplication and spread of these diseases and pests, it makes a potential problem in achieving marketable yield. Keeping this in view, the present study was planned to study insect-pest management in marigold and gladiolus.

**Comment [A7]:** Add some reviews regarding the losses previously occurs due to the pest and disease of gladiolus and marigold.

## **MATERIALS AND METHODS**

The study was conducted in Punjab state in year 2022. The prominent flower crops grown in Punjab can be categorized into cut flower and loose flower. Further marigold and gladiolus was selected from loose and cut flower category respectively for the present study. List of flower growers of the Punjab state was procured from the Department of Floriculture & Landscaping (PAU) and Department of Horticulture, Punjab. From the list, 40 farmers cultivating each flower crop was selected through simple random sampling technique. Thus, 80 respondents were surveyed through face to face interviews. The data was compiled on a reference excel file to

**Comment [A8]:** Add the locality names from where the data was collected. The period of data collection should mention here. Enlist the disease name and pest names, against which this experiment was conducted.

perform computation. The data collected were analyzed and interpreted based on their frequencies and percentages.

## RESULTS AND DISCUSSION

### Disease Management in marigold

Table 1 emphasized that marigold growers faced problem of leaf spot, it was found that 55 per cent of the respondents adopted recommended fungicide (Dithane M-45) for the disease control. ~~Among them~~ Among them 55 per cent % applied the recommended dose (2gm/ltr) while 10 per cent of the growers applied more than recommended dose of same fungicide. Among un-recommended fungicides, 70 per cent of respondents applied Ridomil Gold MZ followed by Kavach (65%), Indofil Z-78 and Zineb 75 % WP (62.5 %), Tilt 25 EC (60 %), Baviston 50 % WP (55 %) and Amistar Azoxystrobin 23% SC (50%) respectively. During the study it was observed that growers who faced the problem of blight, about one third of the respondents applied an un-recommended fungicide i.e. Score (Difenoconazole) 25 % EC and Ridomil Gold MZ, while 25 per cent of the respondents applied Baviston 50 % WP (Carbendazim) and 20 per cent applied Kavach (Chlorothalonil) 75 % WP. The results were in track with findings of Gowda (2005) and Subhash (2010) who reported that of jasmine ~~growers knew~~ growers knew about fertilizer requirements during planting, the first year, and the second year, respectively

**Comment [A9]:** Add some recent reference to support your finding.

**Table 1** Distribution of respondents according to disease management in marigold loose flower n=40

Diseases	Treatments			Frequency (f) *	Percentage (%)
Leaf spot	<b>Recommended</b>	Dithane M-45	Recommended	22	55.00
			More than recommended	4	10.00
	<b>Un-recommended</b>	Kavach (chlorothalonil) 75 % WP		26	65.00
			Ridomil Gold MZ	28	70.00
			Blitox 50 W	16	40.00
			Copper oxychloride		
	Kocide 46 DF (Copper		10	25.00	

	oxychloride)		
	Baviston 50 % WP	22	55.00
	Score (Difenoconazole) 25 % EC	16	40.00
	Indofil Z-78, Zineb 75 % WP	25	62.50
	FolicurTebuconazole 250 EC (25.9% w/w)	11	27.50
	Curzate fungicide (cymoxanil 8% + mancozeb 64%)	6	15.00
	Pulsor 24 SC (thiﬂuzamide)	10	25.00
	Sixer (Carbendazim 12% + Mancozeb 63% WP)	6	15.00
	Tilt 25 EC (propiconazole)	24	60.00
	Spectrum (Azoxystrobin 11% &Tebuconazole)18.3% w/w SC.	11	27.50
	Amistar (Azoxystrobin 23% SC)	20	50.00
Blight	<b>Un-recommended</b>		
	Score (Difenoconazole) 25 % EC	13	32.50
	Baviston 50 % WP	10	25.00
	Pulsor 24 SC (thiﬂuzamide)	2	5.00
	Kavach (chlorothalonil) 75 % WP	8	20.00
	Ridomil Gold MZ	13	32.50

\*multiple response

### **Insect- Pests Management in Marigold**

An overview of data in Table 2 indicated that marigold growers faced the problem of tined bug and Thrips. It was found that 10 per cent of the respondents adopted recommended pesticides i.e. Ekalux 25 EC (quinalphos) and Spinosade 48 SC) but in more than recommended quantity. Among un-recommended pesticides, 75 per cent of the respondents applied Dhanuka largo Spinetoram 11.7 SC followed by Delegate 11.7 SC (70%), Actara, Thiamethoxam 25% WG(55%), Osheen 20 SG (55%) and Syngenta Pegasus(47.5) respectively.

**Comment [A10]:** Add some recent reference to support your finding.

It can be seen from the Table 2 that marigold growers faced the problem of American bollworm, Bihar hairy caterpillar, tobacco caterpillar, it was observed that 17.5 per cent of the respondents applied recommended (Ekalux 25 EC (quinalphos) but in more than recommended quantity. Among un-recommended 80 per cent applied Coragen (chlorantraniliprole 18.5 SC) while 77.5 per cent used Fame (Flubendiamide 39.35 % SC). However *Celcron 50 EC prophenophosand Regent 5 SC Fipronil 5 % SC* was applied by 52.5 and 50 per cent of the respondents respectively.

**Table 2 Distribution of respondents according to the adoption of insect-pests management measures in marigold (loose flower) n=40**

S. No.	Pest	Preventive measures		Frequency (f) *	Percentage (%)		
1.	Tinged Bug, Thrips	<b>Recommended</b>	Ekalux 25 EC (quinalphos), Spinosade 48 SC	More than recommended	4	10.00	
		<b>Un-recommended</b>	Dhanuka, largo Spinetoram 11.7 SC			30	75.00
			Monocrotophos 36 % EC			13	32.50
			Delegate 11.7 SC			28	70.00
			Nuvan Dichlorvos (ddvp) 76% EC			3	7.50
			Imida (Imidachloprid 30.5% SC			5	12.50
			Syngenta Pegasus (diafenthuiuron) 50 % w/w			19	47.50
			Actara, Thiamethoxam 25% WG			22	55.00
			Kingdoxa 14.5 SC (indoxacarb)			14	35.00
			Osheen 20 SG (dinotefuran)			22	55.00
2.	American bollworm, Bihar hairy	<b>Recommended</b>	Ekalux 25 EC (quinalphos)	More than recommended	7	17.50	
		<b>Un-</b>	Coragen (chlorantraniliprole 18.5		32	80.00	

caterpillar, tobacco caterpillar	<b>recommended</b>	SC		
		Monocrotophos 36 % EC	6	15.00
		Jump (Fipronil 80 % WG)	14	35.00
		Sevin (carbyrl 50 % WDP)	3	7.50
		<i>Proclaim 5SG (emamectin Benzoate)</i>	12	30.00
		<i>Celcron 50 EC prophenophos</i>	21	52.50
		<i>Spark (Deltamethrin 1% + Trizophos 35 %)</i>	4	10.00
		<i>DecisDeltamethrin 2.8 % EC</i>	1	2.50
		<i>Delegate Spinetoram 120 SC</i>	2	5.00
		<i>Lethal super (chloropyriphos 50 % + cypermethrin 5 %)</i>	3	7.50
		<i>Regent 5 SC (Fipronil 5 % SC ww)</i>	20	50.00
		<i>Tata Takumi (Flubendiamide 20 % WG)</i>	11	27.50
		CyruxCypermethrin 25% EC	14	35.00
		Jadu (Triazophos 25% + Deltamethrin 1% EC)	3	7.50
		<i>Asataf 75 SP acephate</i>	7	17.50
Fame (Flubendiamide 39.35 % SC)	31	77.50		

\*multiple response

### Disease Management in gladiolus

Table 3 inferred that to control wilt/collar rot in gladiolus, all of the respondents treated the corms before planting and Corms raised from cormels should be used for planting. The reason may be that gladiolus faces the problems of botrytis, which had no cure, only precautions is the best measure. Field rotation was adopted by 52.5 per cent of the respondents to control wilt and collar rot disease while 35 per cent of the respondents gave pre storage treatment to corms as

**Comment [A11]:** Add some recent reference to support your finding.

preventive measure. From the data, it was evident that only 15 per cent of the respondents adopted the storage of corms in a thin layer as a preventive measure against the storage rot of corms. The results were in line with Lakshmi (2010).

**Table 3** Distribution of famers according to the adoption of disease management of *Gladiolus* cut flower n=40

	Preventive measures		Frequency (f)	Percentage (%)
<b>1.</b>	<b>Wilt / collar rot</b>			
a.	Corms treated before planting	Practiced	40	100.00
b.	Field rotation	Practiced	21	52.50
		Not practiced	19	47.50
c.	Corms raised from cormels should be used for planting	Practiced	40	100.00
d.	Drenching soil with Bavistin(0.2 %)	Practiced	04	10.00
		Not practiced	36	90.00
e.	Pre storage treatment to corms	Practiced	14	35.00
		Not practiced	26	65.00
<b>2.</b>	<b>Storage rot of corms</b>			
a.	Storage of corms in thin layers	Practiced	06	15.00
		Not practiced	34	85.00

\* multiple response

#### Insects Pests Management in gladiolus

An overview of Table 4 figured out that ~~gladiolus-growers~~ gladiolus growers faced the problem of thrips. Only 15 % of respondents used the recommended pesticide Rogor 30 EC (dimethoate) in greater quantities than recommended for controlling the attack of thrips. The data

**Comment [A12]:** Add some recent reference to support your finding.

further revealed that amongunrecommended pesticides, 80 per cent of respondents applied Pager (Diafenthiuron 50% WP) followed by 57.50per cent of respondents who applied Actara (Thiamethoxam 25% WG, and *Imida (Imidachloprid 30.5% SC)*. Nearly half of the respondents applied *Dantotsu 50 WG (clothianidin)*, and 40 ~~per cent~~per cent of the respondents *applied Syngenta Pegasus (diafenthiuron) 50 w/w*. The results were supported by Lakshmi (2010).

**Table 4** Distribution of famers according to insect-pests management of Gladiolus cut flower n=40

Pest	Preventive measures		Frequency	Percentage
			(f)*	(%)
Thrips	<b>Recommended</b>	Rogor 30 EC (dimethoate)	06	15.00
	<b>Un-recommended</b>	Actara, Thiamethoxam 25% WG	23	57.50
		Areva (Thiamethoxam 25% WG)	4	10.00
		Pager (Diafenthiuron 50% WP)	32	80.00
		Syngenta Pegasus (diafenthiuron) 50 % w/w	16	40.00
		<i>Osheen 20 SG (dinotefuran)</i>	14	35.00
		<i>Dantotsu 50 WG (clothianidin)</i>	21	52.50
		<i>Imida (Imidachloprid 30.5% SC)</i>	23	57.50
		<i>Celcron 50 EC (profenophos)</i>	6	15.00
		Polo 50 WP (diafenthiuron)	4	10.00

\*multiple response

**CONCLUSION**

Flower cultivation is the fastest growing enterprise in agriculture and flower power is ceaseless to blossom in the Indian context. In Flower cultivation to get quality products under control or open conditions must require accurate knowledge, fine quality seed, expert systems, tools, equipment's, packaging facilities, storage facilities and advisory services at every point from field to market. In order to have more people use the effective techniques for growing and controlling insect-pest, diseases in marigold and gladiolus, people awareness through extension

**Comment [A13]:** Conclude your study in reference to disease and pest only.

programmes like trainings, workshops, seminars etc need to be done.

## REFERENCES

- Anonymous.2021. Annual report 2020-21. [Department](#) of agriculture cooperation & farmers welfare. Government of India.
- Gowda. 2005. *A study on cultivation and marketing pattern of selected Belghum district*. MSc thesis, University of Agriculture sciences, Dharwad, West Bengal.
- Khanam, R. Bhaduri, D. Nayak, A.K. 2018. Crop Diversification. *Ind Farming* **68**: 31-32.
- Lakshmi, M. 2010. *Performance evaluation of chrysanthemum growers in Mandya District of Karnataka*. M.Sc. thesis, University of Agriculture Sciences, Bangalore, India
- Nelson, A. Ravichandran, K. Antony, U. 2019. The impact of the Green Revolution on indigenous crops of India. *J Ethnic Foods* **6**: 1-10.
- Singh, P. Kakade, D. S. Majumder, N. Sridhar, V. Girish, K. S. Prabha, K. Singh, K. P. Holajjer, P. 2015. Disease and Pest Management in Flower Crops under Polyhouse. *Extension Bulletin* 12. ICAR – Directorate of Floricultural Research, College of Agriculture, Pune. Pp1-3
- Subhash. 2010. *Knowledge and adoption of recommended package of practices by jasmine growers in Nanded district*. M.Sc. thesis, Marathwada Agricultural University, Parbhani, India.