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A Comparative Study on Effect of Mercury Vapor and Ultraviolet Lamp as a Light Source Against Major Insect Species During *rabi* Season Vegetables Ecosystem at District Chhindwara under Satpura Plateau Region of Madhya Pradesh

P. L. Ambulkar, A. K. Sharma, A. K. Bhowmick, A. K. Saxena

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ABSTRACT

An experiment was conducted during *rabi* 2019-20 under the comparison between 125 watt mercury lamp and 15 watt Ultraviolet lamp used as light source collected in light trap against major insect species of vegetable at district Chhindwara under Satpura plateau region of Madhya Pradesh. A comparative studies of trap catches revealed that Mercury vapor 125 watt has given a higher response than Ultraviolet 15 watt in the following species- *Helicoverpa armigera*, *Plucia orichalsia*, *Spodoptera litura*, *Eariasvitella*, *Leucinods orbonalis* and *Plutella zylostella*, while Ultraviolet watt has given higher response than Mercury vapor in following species- *Chrysodeixix chalcites*, *Aulacophora foveicollis*, *Dysdercus koenigii* and *Nezara viridula*. Since, all these six species differences in trap catches were statistically non-significant shows that trapping efficiency of MV was at par with UV light source and another four species differences in trap catches were statistically non-significant shows that trapping efficiency of UV with MV light source. In other words Mercury vapor light source can be successfully used for the operation of light trap as survey and pest control tool against lepidopterous insects but the total wattage of electricity consumption in 125 watt MV v/s 15 watt UV, the Ultraviolet 15 watt seems to a much cheaper and economic light source than MV. The trapping efficiency of Mercury vapor light source is also at par with Ultraviolet in majority of the species as stated above. In view of these observations, Mercury vapor light source can be successfully used against lepidopterous insects but Ultraviolet light source (15 watt) also seems to be a very good alternative source for Coleoptera and Hemiptera to MV 125 watt for

P. L. Ambulkar[1]*
[1]Scientist (Plant Protection), JNKVV, KrishiVigyan Kendra, Chandan Nagar, Chhindwara 480001, MP

A.K. Sharma[2]
[2]Associate Professor (Entomology), Department of Entomology, JNKVV, Jabalpur, MP

A. K. Bhowmick[3]
[3]Professor (Entomology) Department of Entomology, JNKVV, Jabalpur, MP

A.K. Saxena[4]
[4]Professor (Entomology), Department of Entomology JNKVV, Jabalpur, MP 482004
Email: plambulkar_2007@rediffmail.com
*Corresponding author

Table 1. Major insect species of vegetables trapped in Jawahar Light trap by use of different light sources, during 2019-20 and 2020-21. Results of comparative study on Light source – during 2019-20.Treatments-T_{1-}MV (Mercury Vapor) lamp 125 watt,T_2-UV (Ultra Violet) tube 15 watt (18" length). Period–1th week of November (2019) to Last week of April (2020).

Sl. No.	Common name	Scientific name	Family	Status
Order Lepidoptera				
1.	Tomato fruit borer	*Helicoverpa armigera* (Hubner)	Noctuidae	Major pest of tomato
2	Cabbage semilooper	*Plucia orichalsia* (Fabricius)	Noctuidae	Major pest of cabbage
3.	Tobaco caterpillar	*Spodoptera litura* (Fabricius)	Noctuidae	Feed on tomato
4.	Okra shoot and fruit borer	*Earias vitella* (Linnaeus)	Noctuidae	Major pest of okra
5	Green semi looper	*Chrysodeixix chalcites* (Esper)	Noctuidae	Pest of cabbage and cauliflower
6	Brinjal shoot and fruit borer	*Leucinodsorbonalis*	Pyraustidae	Major pest of brinjal
7.	Diamond back moth	*Plutella zylostella*	Plutellidae	Major pest of cabbage and cauliflower
Order -coleoptera				
8.	Red pumpkin beetle	*Aulacophora foveicollis* (Lucas)	Chrysomelidae	Major pest of cucurbits
Order - hemiptera				
9.	Red cotton bug	*Dysdercus koenigii* (Fabricius)	Pyrrhocoridae	Major pest of okra and cotton
10.	Green stink bug	*Nezara viridula* (Linnaeus 1758)	Pentatomidae	Major pest of cauliflower and cabbage

operation of light traps for monitoring activity and pest control device.

Keywords Light trap, Mercury vapor, Ultraviolet, Light sources, Insect pest.

INTRODUCTION

India's diverse climate ensures availability of all varieties of vegetables. It ranks second in vegetable production in the world, after China. In India the total area of vegetables is 10,353 thousand ha, production 191,769 thousand MT and productivity of vegetables 17.97 MT /ha. In Madhya Pradesh it was cultivated in 967.23 thousand ha and production 19144.37 thousand MT during 2019-20 second estimate (Anonymous 2020). In district Chhindwara of Madhya Pradesh total cultivated area of vegetable was 65.04 thousand ha with production 1513.11 thousand MT during 2019-20 (Anonymous 2020).

Extensive work has been carried out by Vaishampayan (2002), Sharma and Bisen (2013) associates on various aspects of light-trap designs, light sources and seasonal activities of major insect pests of chickpea and paddy. Garris and Snyder (2010) reported that phototactic behavior toward Ultraviolet light varies among nocturnal flying insects. Low wattage of Ultraviolet (Black light) lamps 8/10 and 15 watt with low electricity consumption, maintaining high trapping efficiency, makes these lamps most convenient to operate the light traps with solar electric panel or a set of dry recharging batteries, in the farmer's field or even in remote areas where electricity is not available. Ashfaq *et al*. (2005), studied the effect of different colors on light trap catches and the lights of six different colors were blue, green, yellow, red, black and white. The highest number of insects was observed in container placed under the black light (UV light), while the lowest in that of red light. The common insect orders frequented among all color lights were, Dipteral, Coleoptera, Lepidoptera. Mercury light was more effective for Lepidoptera, Hemiptera, Hymenoptera, Odonata, Diptera while black light was

Table 2 (a). Comparative response of insect pest species towards light sources, *rabi* 2019-20.

Sl. No.	Obser-vation period (weekly)	Species wise mean per day catch per trap *H.armigera* T1	T2	*P.orichalsia* T1	T2	*S. litura* T1	T2	*E.vitella* T1	T2	*C. chalcites* T1	T2
1	Nov. I wk	3.99	3.95	0	0	0	0	0	0	0	0
2	Nov. II wk	9.08	12	0	0	0	0	0	0	0	0
3	Nov. III wk	11.97	14	19.25	17.8	6	6	0	0	0	0
4	Nov. IV wk	12.67	8	20.7	14.75	5	8.5	0	0	0	0
5	Dec. I wk	16.12	12.29	16.15	15.11	2.5	4.5	0	0	0	0
6	Dec. II wk	37.25	34.16	16.16	12.39	12.5	10.5	0	0	0	0
7	Dec. III wk	15.25	24.5	14.5	16	14	15	0	0	0	0
8	Dec. IV wk	13.75	18.14	13.25	12.5	16.5	18.5	0	0	0	0
9	Jan. I wk	12.17	22.67	9.75	8.5	16	9.75	7	6.25	0	0
10	Jan. II wk	12.88	32.5	11.75	10.88	8.5	12	8	3.5	3.5	4.25
11	Jan. III wk	26.83	35.66	16.5	8.66	16.75	19	6.65	1.5	4	2.83
12	Jan. IV wk	34.75	45.12	11.62	26.37	12	7.5	3	2.13	2.25	5.87
13	Feb. I wk	24.43	35.29	31.43	27	14.55	22	3	8	4.35	6
14	Feb. II wk	35.12	28.25	20.12	23.13	10.25	8.65	4.5	5.75	4.75	4.37
15	Feb. III wk	15.72	24.25	18.55	19.71	13.5	18.65	3.5	3.14	5	3
16	Feb. IV wk	35	27.66	18.44	26.11	19.5	26	4.35	2.56	3.25	2.75
17	Mar. I wk	48.15	35.5	95.55	85.55	45.5	42.55	8.85	6.5	0	0
18	Mar. II wk	12.35	18.14	88.15	78.15	58	49.5	7.15	6.12	0	0
19	Mar. III wk	45.12	45.67	85.25	87.25	69.25	57	7.5	4.55	0	0
20	Mar. IV wk	36.4	32.9	105.75	90.14	68.5	58.25	6.5	4.55	0	0
21	Apr. I wk	68.35	52.25	120.25	98.12	60	55	0	0	0	0
22	Apr. II wk	65.55	55.75	115.13	78.13	62	55.65	0	0	0	0
23	Apr. III wk	85.45	32.85	85.15	95.5	63.75	56	0	0	0	0
24	Apr. IV wk	90.65	58.5	115.15	120.25	67.55	58.5	0	0	0	0

more efficient for Coleoptera, Orthoptera, Isoptera and Dictyoptera. As reported by Vaishampayan and Verma (1983), the efficiency of various light sources in attracting night-flying adults of *Heliothis armigera* (Hubner), *Spodoptera litura* (Boisd), *Agrotis ipsilon* (Hufn) was tested in the field during 1977-1978 in paired tests. The light sources were mercury vapor lamps of 125 and 250 watt, UV 15-watt, tube light and fluorescent tube light of 40 watt, in shades of white, blue, green, yellow and red, incandescent tungsten lamp of 150 and 300 watt and petromax lamp of 400 candle power. Mercury vapor and UV proved the best light sources while, Incan descent tungsten was the least effective. Blue light radiation in 450-480 nm wave length band proved a more attractive source than green, yellow and red. Mercury vapor lamp of 125 watt was as good as that of 250 watts. Trap catches in petromax light were higher than catches in incandescent light.The response to Ultraviolet light was higher in October and November than in February and March. The Mercury vapor lamp and Ultraviolet light are the well-known light sources used in light trap for survey and monitoring of insect pest. Mercury vapor lamp, because of its high wattage (power consumption) and difficulties in installation, heavy weight of chock and expenses in fitting UV light seems to be much cheaper and economic light source than MV source.

MATERIALS AND METHODS

The experiment was conducted at two different farmers' fields of Chhindwara (MP) during *rabi* season 2019-20. The experiment was conducted by using Jawahar light trap with Mercury vapor 125 watt and Ultraviolet light 15 watt (18" tube) was used as light source. Comparison of Ultraviolet blue light lamp and Mercuryvapor lamp against major insect pest of *rabi* vegetable crops was based on catches obtained on daily basis by operating the light trap throughout the *rabi* season. As per the objectives of the study experiments were conducted in the field. Light traps

Table 2 (b). Comparative response of insect pest species towards light sources, *rabi* 2019-20.

Sl. No.	Obser-vation period (weekly)	Species wise mean per day catch per trap									
		L. arbonalis		*P. zylostella*		*A. foveicollis*		*D. koenigii*		*N. viridula*	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
1	Nov I wk	0	0	0	0	0	0	0	0	10.58	8
2	Nov II wk	0	0	0	0	0	0	0	0	10.13	5.75
3	Nov III wk	15	13.25	20.25	18.25	13.65	11	0	0	3.14	7.14
4	Nov IV wk	14	18.52	20.8	25.8	11	5.63	0	0	3.33	2.56
5	Dec. I week	15.65	13.5	16.15	22.11	3.12	4.13	0	0	8.63	5.25
6	Dec. II week	18	18.13	14.5	22.56	4.16	2.83	0	0	4.43	7.43
7	Dec. III wk	22	27.47	16.16	18.39	2.13	5.87	0	0	3.44	6.67
8	Dec. IV wk	30.5	21.75	13.25	16.5	4.42	6	0	0	12.5	19.25
9	Jan. I wk	28.5	32.14	9.75	15.54	5.87	7.37	0	0	12.29	19.86
10	Jan. II wk	22.35	17.56	11.75	9.88	4.83	7.16	0	0	5.25	11.63
11	Jan. III wk	32.17	23.67	16.5	8.66	7.5	8	0	0	4.43	7.43
12	Jan. IV wk	28.88	22.5	11.62	18.37	14.29	14.86	0	0	7	12.25
13	Feb. I wk	24.83	20.66	31.43	38.2	12.29	12.86	0	0	3.12	9.13
14	Feb. II wk	35.75	29.12	38.44	29.11	5.25	8.63	0	0	4.16	6.83
15	Feb. III wk	32.43	38.29	32.58	26.71	4.43	7.75	14.75	8.5	2.13	9.87
16	Feb. IV wk	38.12	32.25	37.12	28.23	3.67	6.55	16.75	9.88	1.52	4.55
17	Mar. I wk	29.72	31.15	195.55	178.55	13.25	16.35	16.5	8.66	31.43	29.14
18	Mar. II wk	27.24	22.75	160.15	170.14	9.75	15.35	15.62	11.37	38.44	35.11
19	Mar. III wk	160.15	152.36	178.25	158.25	11.75	9.88	48.43	45.9	16.5	18.66
20	Mar. IV wk	120.55	130.25	180.15	165.17	6.73	15.75	38.44	52.38	11.62	11.35
21	Apr. I wk	135.4	150.55	140.25	152.71	16.16	12.39	32.58	47.71	31.43	23
22	Apr. II wk	145.14	138.55	130.35	122.35	13.25	12.5	42.46	48.13	38.44	26.11
23	Apr. III wk	160.25	152.025	140	135.15	9.75	11.26	51.12	58.15	16.5	18.66
24	Apr. IV wk	155.37	147.55	110	95.37	11.75	9.88	48.35	55.32	11.62	15.37

were operated every night and collection was being observed next morning. Observations were recorded every day throughout the *rabi* season and converted into standard weekly averages. Total insects' fauna was observed and sorted out on the basis of major orders, families and species. In all, two light traps were installed in the experimental area. Spacing between each trap was approximately 400 meters. The insects collected in the collection bag were killed by the exposure of Dichlorvos 76% EC vapors (as fumigating agent) released in a dispenser with scrubber, placed in a collection tray for instant killing of trapped insects. Insects were collected from the collection bag every morning. It includes two treatments to compare the relative efficiency of Ultraviolet lamp over mercury vapor lamp as light source in a light trap in trapping and collecting insects of various crop pest species. The comparison between both the light sources was conducted during the peak activity period of major phototactic insect pests. The data so obtained were analyzed by using paired t-test. T_1 - MV (Mercury vapor) lamp 125-watt and T_2 - UV (Ultraviolet) tube 15 watt.

RESULTS AND DISCUSSION

Comparative efficiency of Ultraviolet and Mercury vapor light sources based on response of ten insect pest species namely Tomato fruit borer *Helicoverpa armigera* (Hubner), Cabbage semilooper *Plucia orichalsia* (Fabricius), Tobaco caterpillar *Spodoptera litura* (Fabricius), Okra shoot and fruit borer *Earias vitella* (Linnaeus), Green semilooper *Chrysodeixix chalcites* (Esper), Brinjal shoot and fruit borer *Leucinod sorbonalis* (Guenée), Diamond back moth *Plutella zylostella*, Red pumkin beetle *Aulacophora foveicollis* (Lucas), Red cotton bug *Dysdercus koenigii* (Fabricius) and Green stink bug *Nezara viridula* (Linnaeus) were identified as important positively phototropic insect pests in the *rabi* vegetable crops because they occurred regularly and significantly high number in trap catches. Name of

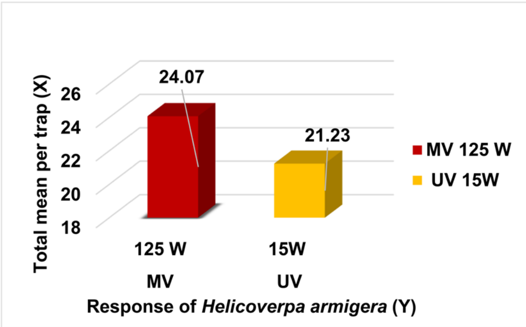

Fig. 1. Response of Tomato fruit borer (*Helicoverpa armigera*).

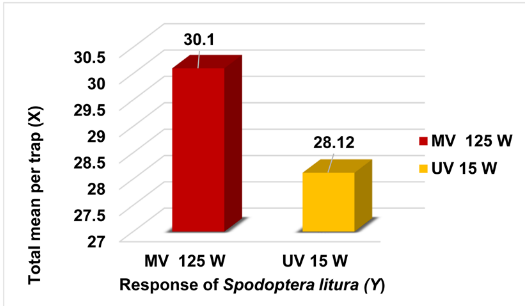

Fig. 3. Response of tobacco caterpillar (*Spodoptera litura*).

major species observed in trap catches and species wise description is given in Table 1. The comparative responses of the insect pests towards the light sources is described in Table 2.

Species wise response :

1. Tomato fruit borer (*Helicoverpa armigera*).

Details of statistics with light sources MV and UV	T_1 MV125W	T_2 UV15W
Mean	24.07	21.23
Variance	595.41	218.86
No.of observation	24	24
df	23	

^{t}cal	0.789 NS
^{t}tab (0.05)	2.069

The calculated value of t (0.789) is found to be less than the tabulated value of t at 23 df at (5%) level of significance (2.069). Hence, we accept the nullhypothesis and conclude that there is no significant difference between mean of MV125 Wattand UV 15 watt. Numerically trap catch was higher in UV than MV.

2. Cabbage semilooper (*P. orichalsia*).

Details of statistics with light sources MV and UV	T_1 MV125W	T_2 UV15W
Mean	47.64	44.18
Variance	1812.233	37.894
No.of ob-		

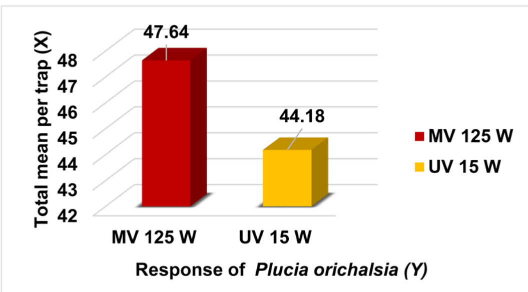

Fig. 2. Response of Cabbage semilooper (*Pluciaorichalsia*).

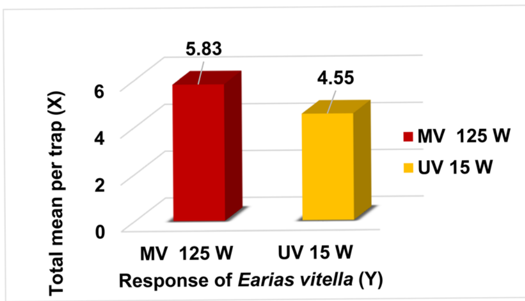

Fig. 4. Response of okra shoot and fruit borer (*Earias vitella*).

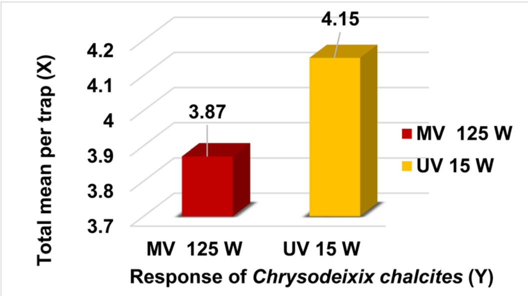

Fig. 5. Response of green semilooper (*Chrysodeixix chalcites*).

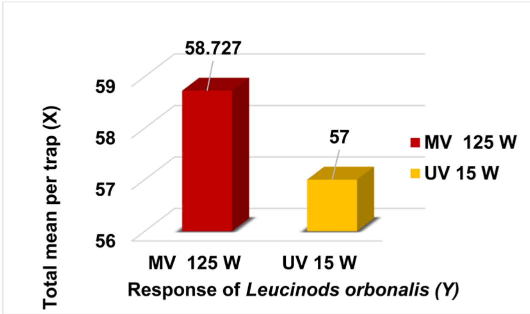

Fig. 6. Response of brinjal shoot and fruit borer (*Leucinodsorbonalis*).

servation	22		22
df		21	
tcal		1.455 NS	
ttab		2.080	

The calculated value of t (1.455) is found to be less than the tabulated value of t at 21 df at (5%) level of significance (2.080). Hence, we accept the null-hypothesis and conclude that there is no significant difference between mean of MV125 watt and UV 15 watt. Numerically trap catch was higher in MV than UV.

3. Tobacco caterpillar (*Spodopteralitura.*)

Details of statistics with light sources MV and UV	T_1 MV125W		T_2 UV15W
Mean	30.10		8.12
Variance	637.66		438.65
No.of observation	22		22
df		21	
tcal		1.606 NS	
ttab		2.08	

The calculated value of t (1.606) is found to be less than the tabulated value of t at 21 d fat (5%) level of significance (2.08). Hence, we accept the null hypothesis and conclude that there is no significant difference between mean of MV 125 watt and UV 15 watt. Numerically trap catch was higher in MV than UV (Fig. 3).

4. Okra shoot and fruit borer (*Eariasvitella*).

Details of statistics with light sources MV and UV	T_1 MV125W		T_2 UV15W
Mean	5.83		4.55
Variance	4.205		4.064
No.of observation	12		12
df		11	
tcal		1.684 NS	
ttab		2.201	

The calculated value of t (1.684) is found to be less than the tabulated value of t at 11 dfat (5%) levelofsignificance(2.201). Hence, weacceptthenull-hypothesis and conclude that there is no significant difference between mean of M V125 wattand UV 15 watt. Numerically trap catch washigherin MV than UV.

5. Green semilooper (*Chrysodeixixchalcites*).

Details of statistics with light sources MV and UV	T_1 MV125W		T_2 UV15W

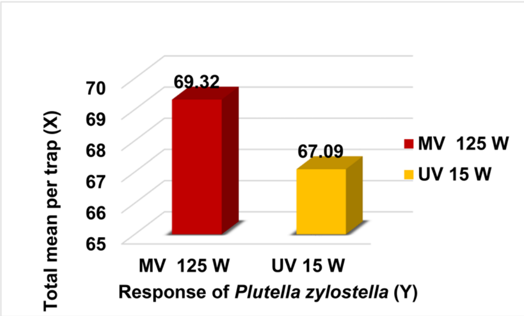

Fig.7. Response of Diamond back moth (*Plutella zylostella*).

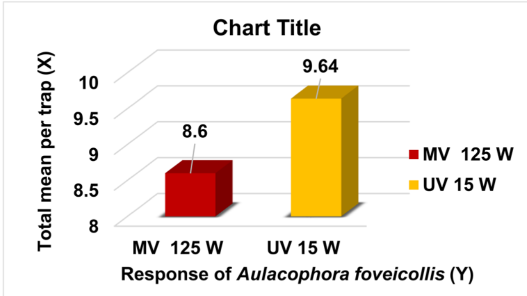

Fig. 8. Response of Red pumpkin beetle (*Aulacophora foveicollis*).

Mean	3.87		4.15
Variance	0.907		1.911
No. of observation	7		7
df		6	
^{t}cal		0.392 NS	
^{t}tab		2.447	

The calculated value of t (0.392) is found to be less than the tabulated value of t at 6 d fat (5%) level of significance (2.447). Hence, we accept the null hypothesis and conclude that there is no significant difference between mean of MV 125 watt and UV 15 watt. Numerically trap catch was higher in UV than MV.

6. Brinjal shoot and fruit borer (*L. arbonalis*).

Details of statistics with light sources MV and UV	T_1 MV125W		T_2 UV15W
Mean	58.727		57.00
Variance	3101.57		3113.29
No.of observation	22		22
df		21	
^{t}cal		1.220 NS	
^{t}tab		2.08	

The calculated value of t (1.22) is found to be less than the tabulated value of t at 6 df at (5%) level of significance (2.08). Hence, we accept the null-hypothesis and conclude that there is no significant difference between mean of MV 125 Watt and UV 15 Watt. Numerically trap catch was higher in MV than UV.

7. Diamond back moth (*Plutella zylostella*).

Details of statistics with light sources MV and UV	T_1 MV125W		T_2 UV15W
Mean	69.32		67.09
Variance	4669.60		4140.57
No. of observation	22		22
df		21	
^{t}cal		1.10 NS	
^{t}tab		2.08	

The calculated value of t (1.10) is found to be less than the tabulated value of t at 21 df at (5%) level of significance (2.08). Hence, we accept the null hypothesis and conclude that there is no significant difference between mean of M V 125 Watt and UV 15 Watt. Numerically trap catch was higher in MV than UV.

8. Red pumpkin beetle (*Aulacophora foveicollis*).

Details of statistics with light sources MV	T_1		T_2

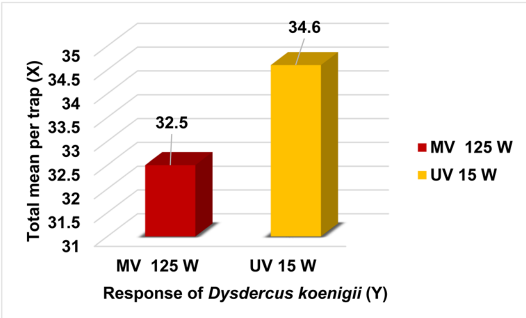

Fig. 9. Response of Red cotton bug (*Dysdercus koenigii*).

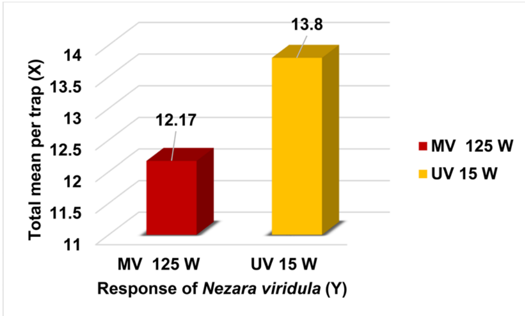

Fig. 10. Response of Green stink bug (*Nezara viridula*).

and UV	MV125W		UV15W
Mean	8.60		9.64
Variance	18.50		15.30
No.of observation	22		22
df		21	
^{t}cal		1.526NS	
^{t}tab		2.080	

The calculated value of t (1.526) is found to be less than the tabulated value of t at 21 df at (5%) level of significance (2.080). Hence, we accept the nullhypothesis and conclude that there is no significant difference between mean of MV125 Watt and UV 15 Watt. Numerically trap catch was higher in UV than MV.

9. Red cotton bug (*Dysdercus koenigii*).

Details of statistics with light sources MV and UV	T_1 MV125W		T_2 UV15W
Mean	32.50		34.60
Variance	232.25		476.39
No.of observation	10		10
df		9	
^{t}cal		0.763 NS	
^{t}tab		2.262	

The calculated value of t (0.763) is found to be less than the tabulated value of t at 9 d fat (5%) level of significance (2.262). Hence, weacceptthenull-hypothesis and conclude that there is no significant difference between mean of M V125 Wattand UV 15 Watt. Numerically trap catch was higher inUV than MV.

10. Green stink bug (*Nezaraviridula*).

Details of statistics with light sources MV and UV	T_1 MV125W		T_2 UV15W
Mean	12.17		13.8
Variance	129.14		73.75
No.of observation	24		24
df			23
^{t}cal		1.163 NS	
^{t}tab		2.069	

The calculated value of t (1.163) is found to be less than the tabulated value of t at 23 df at (5%) level of significance (2.069). Hence, we accept the nullhypothesis and conclude that there is no significant difference between mean of M V 125 Watt and UV 15 Watt. Numerically trap catch was higher in UV than MV.

DISCUSSION

Comparison is based on the relative response of the insect pest species (trap catch per week) in two light sources that is MV and UV. Statistically analyzed by Paired t-test. Results are summarized in two head as given below:

1. Higher response in MV compared to UV (Statistically non-significant)

The species show higher response in UV is listed below:

1. Tomato fruit borer, *Helicoverpa armigera* (Lepidoptera)

2. Cabbage semilooper, *Plucia orichalsia* (Lepidoptera)

3. Tobaco caterpillar, *Spodoptera litura* (Lepidoptera)

4. Okra shoot and fruit bore, *Earias vitella* (Lepidoptera)

5. Brinjal shoot and fruit borer, *Leucinod sorbonalis (Lepidoptera)*

6. Diamond back moth, *Plutella zylostella* (Lepidoptera).

In above six species numerically (by number of trap catch) MV 125 watt has given higher response i.e. better than UV 15 watt, but statistically, differences were non-significant in the trap catch of these six species.

2. Lower response in MV compared to UV (Statistically non-significant)

The species show higher response in UV is listed below :

1. Green semi looper, *Chrysodeixix chalcites* (Lepidoptera)

2. Red pumpkin beetle, *Aulacophora foveicollis* (Coleoptera)

3. Red cotton bug, *Dysdercus koenigii* (Hemiptera)

4. Green stink bug, *Nezara viridula* (Hemiptera).

In above four species numerically (by number of trap catch) MV 125 watt has given lower response i.e. better than UV 15 watt, but statistically, differences were non-significant in the trap catch of these four species.

Therefore, taking into consideration the relative response, MV 125 watt mercury vapor lamp is better for Lepidopterous insects as compare to UV 15-watt light source and a MV 125-watt light very good source for pest control, survey and monitoring.

As reported by Vaishampayan and Verma (1983), the efficiency of various light sources in attracting night-flying adults of *Heliothis armigera* (Hubner), *Spodoptera litura* (Boisd) and *Agrotis ipsilon* (Hufn) was tested in the field during 1977-1978 in paired tests. Mercury vapor followed by UV proved the best light sources.

CONCLUSION

Comparative studies of trap catches revealed that Mercury vapor 125 watt has given a higher response than Ultraviolet 15 watt in the following species- *Helicoverpa armigera*, *Pluciaorichalsia*, *Spodopteralitura*, *Earias vitella*, *Leucinodsorbonalis* and *Plutella zylostella*, while Ultraviolet watt has given higher response than Mercury vapor in following species-*Chrysodeixix chalcites*, *Aulacophora foveicollis*, *Dysdercus koenigii* and *Nezara viridula*. Since, all these six species differences in trap catches were statistically non-significant shows that trapping efficiency of MV was at par with UV light source and another four species differences in trap catches were statistically non-significant shows that trapping efficiency of UV with MV light source. In other words Mercury vapor light source can be successfully used for the operation of light trap as survey and pest control tool against lepidopterous insects but the total wattage of electricity consumption in 125 watt MV v/s 15 watt UV, the Ultraviolet 15 watt seems to a much cheaper and economic light source than MV.

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REFERENCES

Anonymous (2020) National Horticulture database, http://www.nhb.gov.in

Anonymous (2020) Department of Horticulture and Food Processing, Chhindwara, Madhya Pradesh.

Ashfaq M, Khan RA, Khan MA, Rasheed F, Hafeez S (2005) Insect orientation to various color light in the agricultural biomass of Faisalabad. *Pak Entomol* 27 (1) : 49—52.

Baehaki SE, Iswanto EH, Munawar D, Sumaryono N (2016) Light traps abilities of mercury (ML-160 Watt) BSE models and light traps of solar cell (CFL-20 Watt) to capture of pests in the rice field. *Am J Engg Res* (AJER) 5 (11) : 138—144.

Band SS, Vaishampayan Sanjay, Patidar Shrikant,Matcha Navya (2019) Comparative efficiency of ultra violet black light lamp and mercury vapor lamp as a light source in light trap against major insect pest of *kharif* crops. *J Entomol Zool Stud* 7 (1) : 532—537.

Garris HW, Snyder JA (2010) Sex-specific attraction of mothspecies to ultraviolet light traps. *Southeastern Naturalist* 9 (3) : 427—434.

PatidarShrikant, Vaishampayan Sanjay Band SS (2019) Comparative efficiency of 125-watt Mercury lamp and 15-watt UV (Black light) tube against the major insect-pest in paddy ecosystem. *J Entomol Zool Stud* 7 (5) : 1163—1167.

Shama AK,Bisen UK (2013) Taxonomic documentation of insect pest fauna of vegetable ecosystem collected in light trap. *Int J Environm Sci* : Develop Monit (IJESDM) 4 (3) : 4—10.

Vaishampayan SM, Verma R (1983) Comparative efficiency of Various light trap sources in trapping adults of *Heliothi sarmigera* (Hubn.), *Spodoptera litura* (Boisd.) and *Agrotis ipsilon* (Hufn.) ,(Lepidoptera: Noctuidae). *Ind J Agric Sci* 53 (3) : 163—167.

Vaishampayan SM (2002) Use of light trap as a component ofadult oriented strategy of pest management. *Resour Manag Pl Prot* 2 : 139—144.

Vaishampayan SM, Vaishampayan Sanjay (2016) Light trap : An ecofriendly IPM tool. Book published by Daya Publishing House a division of Astral International Pvt Ltd New Delhi.