

POPULATION DYNAMICS OF LADY BEETLE, *MENOCHILUS SEXMACULATUS* AND INSECT PESTS ON BRINJAL CROP

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ABSTRACT: This field experiment was conducted at Entomology section, Agriculture Research Institute, Tandojam on the population dynamics of lady beetle, *Menochilus sexmaculatus* and insect pests on brinjal during 2014-15. The data showed that the highest population of whitefly was recorded (17.56/leaf) in the 3rd week of January. However, the lowest population of *B. tabaci* was showed (0.41/leaf) in the last week of March. The maximum predator prey ratio was displayed (1:122.65) as well as the minimum ratio was (1:0.76) in the 4th week of November and March on whiteflies. The data further reveals that the extreme population of jassid was showed (12.51/leaf) on 24th December. Similarly, the least population of *A. biguttula biguttula* was recorded (0.14/leaf) on 4th March. The highest and lowest predator prey ratio was recorded (1:92.25 and 1:0.09) in the 2nd week of November and 1st week of March on jassid. Therefore, the aphid infested the brinjal and increased their population (27.92/leaf) on 21st January, while its decreased population was showed (1.47/leaf) on 25th March. The maximum predator prey ratio of aphid was recorded (1:56.43) on 19th November and the minimum ratio was showed (1:2.71) on 25th March. The highest average of predatory beetle, *M. sexmaculatus* was shown (2.16/leaf) on 18th February and very lowest average was showed (0.03/leaf) on 5th November during experiment. The analysis of variance showed that is significant different ($P < 0.05$) among the lady bird beetle and insect pests.

KEYWORDS: *Menochilus sexmaculatus*, jassid, aphid, whitefly and *Solanum melongena*.

INTRODUCTION

Brinjal (*Solanum melongena* L.) is an important and mostly used vegetable in South and South East Asia, Central America and some parts of Africa [1]. This vegetable is used the poor as well as royal peoples and it is rich in vitamin A and B [2]. In our country, the area of vegetables are covered 385,578 and get production about 31,16808 tons. The annually production become about 82,999 tons from the area of 8,325 ha of this vegetable [3]. Brinjal is attacked by more than 50 species of insect pests but jassid and whitefly are major and serious insect pests of eggplant [4]. The brinjal leaves are damaged 70-92% by sucking insect pest's viz. leafhopper (*Amrasca biguttula biguttula*), whitefly (*Bemisia tabaci*) and aphid (*Aphis gossypii*) during the entire season [5]. Among all IPM components, the biological control is an effective, cheapest and useful method against soft bodies [6]. The grubs and adults of predatory beetles are very effective and feed many sucking insect pests of brinjal and other vegetables in ecosystem [7]. The coccinellidae family mostly 90% feed on aphids, aleyrodids, coccids and psyllids [8]. About 4000 species of coccinellidae found predatory at the global level [9]. *Coccinella undecimpunctata* L., *Coccinella septempunctata* L., *Hippodamia variegata*, *Scymnus* sp., *Stethorus punctum* and *Coccinella transversalis* F. are commonly found in Sindh province of Pakistan and these are all very effective predators against sucking insect pests [10]. The purpose of this study was to determine the reduction of sucking complex of brinjal through natural enemy.

MATERIALS AND METHODS

The present study was conducted at experimental fields of Entomology Section, Agriculture Research Institute Tandojam, to determine the population dynamics of lady beetle, *Menochilus sexmaculatus* and insect pests on Brinjal crop during winter season from November to March. The "Round Fruit" variety of brinjal was sown on ridges. The distance of plant to plant 1 feet and row to row 2 feet. The

total area of plot size 2000 m² and the plot was divided into four sub plots 500 m². The Randomized Complete Block Design (RCBD) was used with four replications. Randomly five plants selected from each sub plot. From each plant 5 leaves were observed. The population of sucking insect pests and lady beetle were taken randomly from top, middle and bottom portion of the leaves on weekly basis.

RESULTS:

The results presented in Table.1 and Fig.I shows that the abundance of *M. sexmaculatus* predator in

i. Whitefly, *Bemisia tabaci* (Gennadius)

The data in Table.1 and Fig.I. reveals that whitefly population was highest in the months of December-2014 to January-15. It was increased gradually and reached its maximum level (17.56/leaf) on 21st of January. Thereafter it started decreasing and reached its minimum level (0.4/leaf) on 25th March. The whitefly remained on brinjal plants till the last week of March. The data further reveals that predator prey ratio was highest during 4th week of November (1:122.65) and lowest ratio (1:0.76) during 4th week of March-15.

ii. Jassid, *Amrasca biguttula biguttula* (Ishida)

The jassid Table.1 and Fig.I. appeared on brinjal from November-14 to March-15. It was (2.35/leaf) on 5th November at the start of observation. It was increased with passage of time and reached at maximum (12.51/leaf) on 24th December. The jassid population were decreased slowly and reached at (0.14/leaf) on 4th March-15. The results further reveal that predator prey ratio was highest during 2nd week of November (1:92.25) and lowest ratio (1:0.09) was recorded during 1st week of March-15.

iii. Aphid, *Aphis gossypii* (Glover)

The Aphid population Table.1 and Fig.I. started infesting brinjal crop from November to March-15. It was increased gradually and reached its maximum level (27.92/leaf) on 21st January-15. Thereafter it started decreasing and reached its minimum level (1.47/leaf) on 25th March-15. The predator

prey ratio was highest during 3rd week of November (1:56.43) and lowest ratio was (1:2.71) during last week of March-15.

iv. Zigzag beetle, *Menochilus sexmaculatus* (Fabricius)

the result further revealed in Table.1. and Fig.I. indicated that the predator, *M. sexmaculatus* was active throughout the brinjal growing period and it was found on aphids and other sucking insect pests i.e. whitefly, jassid, and thrip in the field conditions. In the beginning i.e. on 5th November the population of *M. sexmaculatus* was very low (0.03/leaf). As the aphid population was multiplied faster, the predator population also developed more and reached to its maximum (2.16/leaf) on 18th February-15. This trend remained until the host was present and then the predator population reduced to the lowest level.

DISSCUSSIONS:

The present result showed that the highest population of aphid, whitefly and jassid was (27.92, 17.56 and 12.51) per leaf. Similarly, the *M. sexmaculatus* feed more aphids as compared to whitefly and jassid and made maximum average (2.16/leaf) on eggplant. Our findings disagreed with those [11]. Who described the maximum average of aphid was highly reduced in the third week of November. Therefore, [12] mentioned that the population of whitefly (2.80/leaf) was increased in the first week of November. We agreed with

[13], who described that the maximum population of jassid (5.00/leaf) was highly increased. According to [14] mentioned that the average population of aphid was (7.40/leaf) in the 15th December. Our results have conformity with [15] that the mean average of lady bird beetle, *M. Sexmaculatus* (0.12 and 1.00) and reduced the population of sucking complex. [16] Reported that the population of aphid (0.3/leaf) was started from the November. Our findings have more or less agreed with [17] who described the zigzag beetle feed whitefly, jassid and aphid and reached the mean population (2.44/leaf).

CONCLUSION:

It is concluded that the maximum population of whiteflies were showed (17.05/leaf) in the 2nd week of January followed by December, November, February and March. Similarly, the highest average of jassid was recorded (12.51/leaf) in the 4th week of December followed by January, November, March and February. The maximum population of aphid was showed in the 3rd week of January (27.92/leaf) followed by February, December, November and March. The highest population of zigzag beetle was shown (2.16/leaf) in the 3rd week of February as compared to March, January, December and November.

Table. 1 Weekly mean population and predator prey ratio of sucking insect pests and, *M. sexmaculatus* predator on Brinjal-2014-15.

Date of observation	White fly		Jassid		Aphid		Zigzag beetle
	Mean	Predator prey ratio	Mean	Predator prey ratio	Mean	Predator prey ratio	
Nov-05	1.05	1:35.00	2.35	1:78.33	1.43	1:47.67	0.03
Nov-12	3.25	1:81.25	3.69	1:92.25	2.22	1:55.50	0.04
Nov-19	7.25	1:103.57	3.25	1:46.43	3.95	1:56.43	0.07
Nov-26	12.51	1:122.65	6.89	1:67.55	4.11	1:40.29	0.10
Dec-03	11.41	1:93.52	7.21	1:59.10	4.52	1:37.05	0.12
Dec-10	14.02	1:118.81	9.24	1:78.31	6.42	1:54.41	0.12
Dec-17	12.91	1:63.91	11.23	1:55.59	7.51	1:37.18	0.20
Dec-24	12.98	1:35.08	12.51	1:33.81	9.67	1:26.14	0.37
Dec-31	14.06	1:28.69	12.03	1:24.55	13.05	1:26.63	0.49
Jan-07	16.41	1:20.98	9.33	1:11.93	21.37	1:27.33	0.78
Jan-14	17.05	1:14.67	6.14	1:5.28	23.48	1:20.21	1.16
Jan-21	17.56	1:12.01	5.03	1:3.44	27.92	1:19.10	1.46
Jan-28	11.02	1:6.77	3.91	1:2.40	23.94	1:14.71	1.63
Feb-04	8.02	1:4.19	2.84	1:1.49	20.36	1:10.65	1.91
Feb-11	6.31	1:3.15	2.05	1:1.02	15.16	1:7.56	2.00
Feb-18	3.41	1:1.58	1.81	1:0.84	12.62	1:5.84	2.16
Feb-25	2.08	1:1.13	0.89	1:0.48	8.72	1:4.72	1.85
Mar-04	1.81	1:1.22	0.14	1:0.09	6.49	1:4.39	1.48
Mar-11	1.33	1:1.25	0.54	1:0.51	4.23	1:3.97	1.07
Mar-18	0.81	1:0.96	0.16	1:0.19	2.79	1:3.31	0.84
Mar-25	0.41	1:0.76	0.22	1:0.41	1.47	1:2.71	0.54

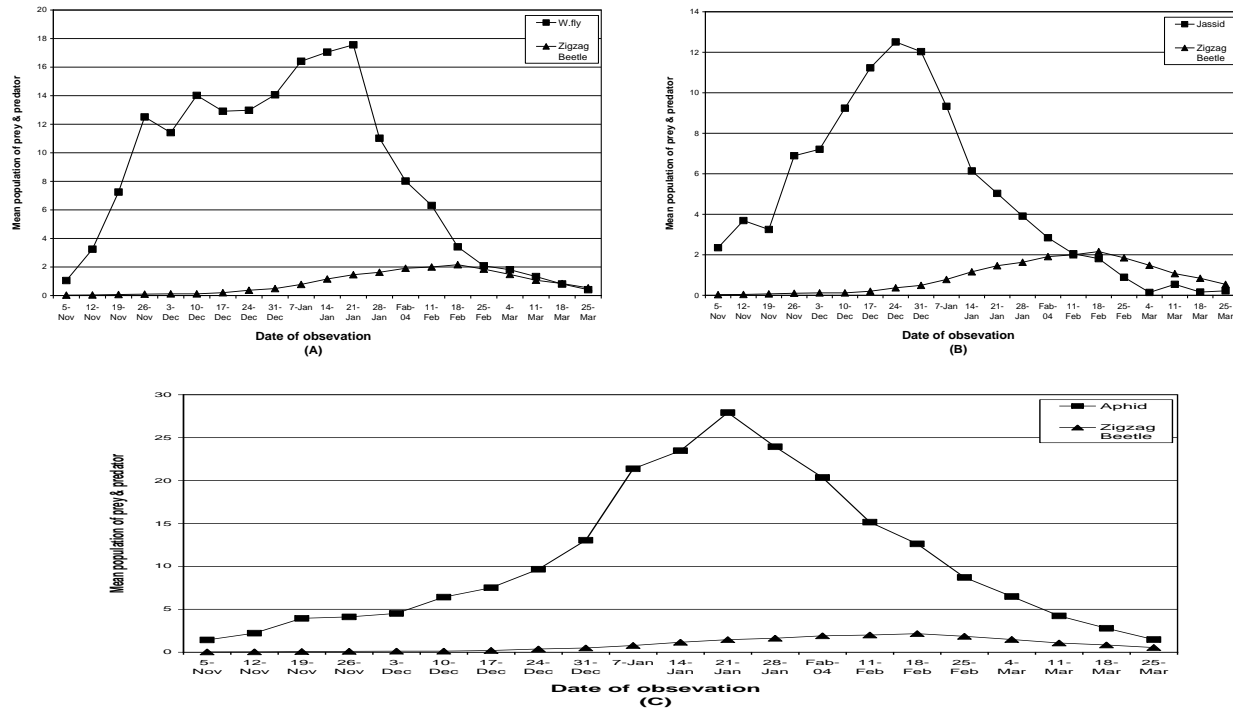


Fig.1. Weekly mean population of Whitefly (A), Jassid (B), Aphid (C) and Zigzag beetle on Brinjal crop.

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