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MANAGEMENT OF INSECT PESTS OF BOTTLE GOURD IN POLYHOUSE

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ABSTRACT

This study on the insect pests of bottle gourd *Lagenaria siceraria* grown in polyhouse revealed the incidence of whitefly *Trialeurodes vaporariorum* and melon aphid *Aphis gossipii* from 26th to 38th standard week (SW). The peaks in incidence were observed in 34th SW (*T. vaporariorum*- 12.99 ± 1.18/ leaf and *A. gossypii*- 52.5 ± 9.60/ leaf. The incidence of these exhibited a positive correlation with temperature and a negative one with relative humidity. When insecticides were evaluated against these in polyhouse, after two sprays, imidacloprid 17.8SL (0.45 ml) was superior. Imidacloprid 17.8SL (0.3 ml) and dimethoate 30EC (1 ml) provided efficient control.

Key words: *Trialeurodes vaporariorum*, *Aphis gossipii*, bottle gourd, polyhouse, population dynamics, relative humidity, temperature, imidacloprid, neem oil, natural enemies

Bottle gourd is one of the most important crops although considered as a poor man's crop (Milind and Satbir, 2011). It is grown both under open field as well as protected conditions, and its production under polyhouse is gaining importance. Polyhouses are generally considered to be free from pests and diseases, as these act as a physical barrier (Rathee et al., 2018). Various constructional flaws and the use of infested planting material, however, facilitate the entry of pests, and the congenial microclimate is favourable for the multiplication of pests (Kaur et al., 2010. Common and important polyhouse pests of bottle gourd include aphids, thrips, white flies, caterpillars, leaf miners, mealy bugs and mites. Some of these transmit diseases and thus are often more serious (Bessin et al., 1997). This study explores the major insect pests of bottle gourd in polyhouse at the Faculty of Agriculture, Wadura, Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir (34°20' N, 74° 24' E, 1610 masl)

MATERIALS AND METHODS

Bottle gourd seedlings were raised in polyhouse as per recommended package of practices. Initially, the incidence of whitefly *Trialeurodes vaporariorum* and aphid *Aphis gossipii* were observed on whole plant (Heathcote, 1972) while the basal, middle and terminal leaves were taken as a composite unit in later stage (Satpathy, 1973); *A. gossypii* incidence was observed by taking 10 cm apical portion of the plant (Vashisth et al., 2013). An infrared thermometer (Fluke 59 Max + Esp) and hygrometer (Homesoul) were used in the polyhouse to monitor temperature (°C) and relative humidity (%). Two sprays of insecticides were applied, at peak incidence (1st spray) followed by 2nd spray at 14 days after first. The data on incidence/ leaf and reduction were observed on 1, 3, and 7 days after treatment (DAT), and these were subjected to ANOVA for statistical analysis.

RESULTS AND DISCUSSION

The results revealed that *T. vaporariorum* commenced from 26th standard week (SW)- 0.87 ± 0.81/ leaf reaching a peak- 12.99 ± 1.18/ leaf in 34th SW, then declined to 0.03 ± 0.02/ leaf in 38th SW (Fig. 1). Janu and Dahiya (2017) observed that *Bemisia tabaci* on American cotton started in 24th SW and reached to peak in 34th SW; Sharma et al. (2004) also reported the first appearance in June. Purohit et al. (2006) and Roomi (2014) observed whitefly attaining its peak in August and September. Similarly, *A. gossipii*, commenced from 26th SW- 1.6± 1.20/ leaf, and reached its peak- 52.5± 9.60/ leaf in 34th SW, and then disappeared in 38th SW. (Fig. 1). Thamilarasin (2016) observed maximum incidence of aphids on cow pea under protected conditions from 60-90 days of sowing which in the present study coincides with mid-August. *Trialeurodes vaporariorum* exhibited a positive correlation (0.550294) with temperature (°C)

Table 1. Reduction in incidence of *T. vaporariorum* and *A.gossypii* on bottle gourd with insecticides under polyhouse

Treatment	Conc. (%)	Dosage per water	Pre-count (No/leaf)	Mortality (%) 1 DAS	1 DAS	7 DAS	Cumulative mean	Pre-count (No/leaf	Mortality (%)	3 DAS	7 DAS	Cumulative mean
Whitefly (*Trialeurodes vaporariorum*)												
Dichlorvos 76 EC	0.076	1	11.00	52.6 (46.50)cd	61.3 (51.54)d	66.5 (54.62)d	60.13	6.4	*50.9 **(45.53)bcd	66.0 (54.30)d	80.7 (63.91)d	65.86
Dimethoate 30 EC	0.030	1	9.67	61.4 (51.61)bc	70.4 (57.06)bc	71.4 (57.68)bc	67.73	4.5	57.2 (49.16)abc	78.3 (62.21)b	93.5 (75.28)bc	76.33
Imidacloprid 17.8 SL	0.008	0.45	10.77	76.2 (60.85)a	79.0 (62.71)a	80.2 (63.57)a	78.46	4.3	63.8 (52.98)a	100.0 (90.00)a	100.0 (90.00)a	87.93
Imidacloprid 17.8 SL	0.005	0.30	11.43	64.1 (53.21)ab	71.8 (57.92)b	73.9 (59.28)b	69.93	5.3	57.9 (49.52)ab	77.7 (61.84)bc	93.9 (75.72)b	76.5
Imidacloprid 17.8 SL	0.002	0.15	11.00	40.4 (39.46)def	44.9 (42.66)f	47.7 (43.08)f	44.33	6.9	20.5 (26.91)fg	35.1 (36.35)fg	70.9 (57.35)g	42.1
Chlorpyriphos 20 EC	0.02	1	11.33	44.9 (42.05)de	53.5 (47.03)e	55.8 (48.33)e	51.4	6.9	36.4 (37.10)e	55.6 (48.21)de	77.7 (61.80)e	56.56
Neem oil	0.03	2	11.77	13.9 (21.35)g	22.7 (28.42)g	28.0 (31.95)g	21.53	11.6	24.4 (29.62)f	35.9 (36.81)f	74.0 (59.36)f	44.76
Control (water)			10.43	7.2 (12.82)h	0.0 (0.07)h	0.9 (4.32)h	2.7	10.4	2.8 (7.01)h	5.9 (10.80)h	6.4 (14.60)h	5.03
C.D. (p≤0.05)				8.43	1.80	3.40			5.23	7.04	1.21	
Melon aphid (*Aphis gossypii*)												
Dichlorvos 76 EC	0.076	1	34.10	35.5 (36.51)d	60.9 (51.33)d	63.5 (52.87)d	53.3	17.6	*76.5 **(60.97)b	86.4 (68.34)d	86.8 (68.68)d	83.23
Dimethoate 30 EC	0.030	1	34.43	54.1 (47.30)ab	84.6 (66.91)ab	89.5 (71.06)b	76.06	13.1	71.9 (57.99)bcd	93.3 (75.00)b	97.0 (80.03)bc	87.40
Imidacloprid 17.8 SL	0.008	0.45	35.53	60.5 (51.08)a	89.7 (71.27)a	93.9 (75.70)a	81.36	10.1	81.1 (64.19)a	100.0 (90.00)a	100.0 (90.00)a	93.70
Imidacloprid 17.8 SL	0.005	0.30	35.10	50.3 (45.15)bc	83.2 (65.85)bc	86.8 (68.73)bc	73.43	13.3	75.6 (60.41)bc	93.0 (74.70)bc	97.1 (80.23)b	88.56
Imidacloprid 17.8 SL	0.002	0.15	35.33	20.9 (27.08)f	39.8 (39.10)ef	41.9 (40.34)f	34.2	30.4	44.4 (41.79)f	55.9 (48.39)f	76.3 (60.87)ef	58.80
Chlorpyriphos 20 EC	0.02	1	35.53	34.0 (35.62)de	42.8 (40.83)e	47.7 (43.65)e	41.5	29.7	55.2 (47.97)e	75.0 (59.97)e	77.2 (61.47)e	69.13
Neem oil	0.03	2	34.80	10.2 (17.91)g	26.9 (31.16)g	31.2 (33.96)g	22.76	34.7	1.1 (4.77)g	26.3 (30.85)g	45.1 (42.17)g	24.16
Control (water)			33.43	0.3 (1.91)h	0.0 (0.7)h	0.0 (0.7)h	0.1	33.4	0.4 (2.00)h	0.4 (2.00)h	0.0 (0.7)h	0.3
C.D.(p≤0.05)			5.98	3.57	3.51	-		3.52	2.33	1.10		

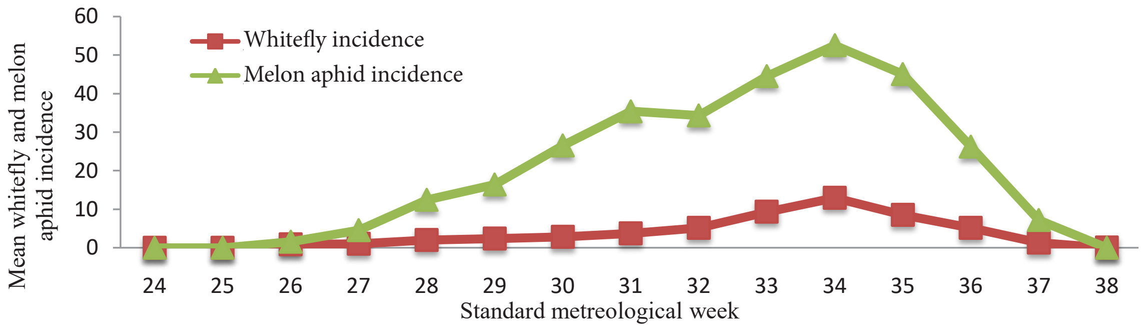

Fig. 1. Incidence of *Trialeurodes vaporariorum* and *Aphis gossypii* on bottle gourd in polyhouse

and a negative correlation (-0.58528) with relative humidity (%). *Aphis gossipii* also revealed a positive correlation (0.625765) with temperature (°C) and negative one (-0.67032) with relative humidity (%). Kharbade et al. (2015) observed a positive correlation of *Polyphagotarsonemus latus* in capsicum with maximum and minimum temperature and negative correlation with relative humidity.

The maximum reduction of 78.46% of *T. vaporariorum* was observed with higher dose of imidacloprid 17.8 SL (0.45 ml) after first spray; after 2nd spray, also there was 87.93% reduction (Table 1); after 2nd spray, cumulative reduction of 87.93% was observed. With *A. gossipii*, 81.36% reduction was observed with higher dose of imidacloprid 17.8 SL (0.45 ml) after first spray; after 2nd spray, it was 93.70% (Table 1). Raghuraman et al. (2008) observed that imidacloprid 17.8 SL was superior in checking whitefly in cotton, and imidacloprid 17.8 SL @ 0.3-0.5ml has been suggested in tomato (Anonymous, 2015). Kar (2017) however, found dimethoate 30EC as more effective against sucking pests of cotton.

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