# EFFECT OF YELLOW MITE, *POLYPHAGOTARSONEMUS LATUS* (BANKS) DENSITYON HOSTS (*CORCHORUS CAPSULARIS* L.) PHENOLOGY AND ASSESSMENT OFYIELD LOSS UNDER NET HOUSE CONDITION

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ABSTRACT: The yellow mite, *Polyphagotarsonemus latus* Banks (Acari: Tarsonemidae) population is one of the most destructive pests of jute crop (*Corchorus capsularis* L.) in Bangladesh. Jute plants of deshi (*Corchorus capsularis* L) varieties were considered as treatments viz., CVL-1, CVE-3, BJC-7370 and BJC-83. The paired plot treatments (miticide treated and miticide untreated cintrol) were laid out under net house condition. The effect of yellow mite, *Polyphagotarsonemus latus* Banks, were studied on three stages of jute plants: 60 DAS, 90 DAS and 120 DAS. The higher number of mite stages observed upto 90 DAS then declined afterward upto 120 DAS in var. BJC-7370 among four *C. capsularis* varieties. A damage index scale (0-5) was to assess yellow mite injury to jute plants. The percent infestation and damage index was also used to relate yellow mite injury to number of leaves, leaf area, fresh leaf weight, dry leaf weight, soluble solids, plant height, base diameter, fibre weight, stick weight, number of flowers per plant, number of pods, pod weight per plant, seed per pod, seed weight and 1000 seed weight of plants infested at three different phenological stages. The yield contributing characters of untreated pots showed significant damage at 60, 90 and 120 DAS in *C. capsularis* varieties compared to treatment pots. The highest fibre yield losses due to mite infestation was found in the variety BJC-7370 (65.10%) followed by CVE-3 (61.46%), CVL-1 (58.83%) and the lowest was in BJC-83 (52.97%); the highest stick yield losses due to mite infestation was found in the variety BJC-7370 (51.29%) followed by CVE-3 (47.54%), BJC-83 (46.49%) and the lowest was in CVL-1 (44.21%) and the highest seed yield losses due to mite infestation was found in the variety BJC-7370 (38.25%) followed by CVE-3 (31.93%), CVL-1 (29.28%) and the lowest was in BJC-83 (28.89%) for *Corchorus capsularis* under net house condition. High yellow mite population in the untreated check decreased plant growth and showed significant yield loss in the variety BJC-7370.

KEY WORDS: *Polyphagotarsonemus latus*, *Corchorus capsularis*, abundance, yield.

The occurrence of mite in Brazil has been registered long ago. Bitancourt (1935) reported in cotton (*Gossypium hirsutum* L.) in the State of São Paul, the occurrence of symptoms called "Tear sheets", suggesting agent a small mite found on the underside of leaves. This suspicion was confirmed, and the species identified as *Tarsonemus latus* (Hambleton 1938) subsequently placed gender *Polyphagotarsonemus* (Beer & Nucifora, 1965, cited by Flechtmann, 1967).

In recent years there has been outbreak of yellow mite population almost regularly as one of the most serious pests of jute crop (*Corchorus capsularis* L.). Its population builds up continual increase, reaches a peak in mid-June and again during the third week of July. The years of most serious mite infestation of jute are those of dry periods prevailing in these months (Kabir, 1975).

This destructive pest causes terminal leaves and flower buds to become malformed. The mite's toxic saliva causes twisted, hardened and distorted growth in the terminal of the plant (Baker, 1997). Mites are usually seen on the newest leaves and small fruit. Leaves turn downward and turn coppery or purplish. Internodes shorten and the lateral buds break more than normal. The blooms abort and plant growth is stunted when large populations are present (Denmark, 1980; Wilkerson et al., 2005; Anon, 2005). On fruit trees the damage is usually seen on the shaded side of the fruit, so it is not readily visible. Fruit is discolored by feeding and in severe cases premature fruit drop may occur. Severely damage fruit is not salable in the market but may be used for processing (Peña & Campbell, 2005).

Reduction in photosynthesis and instability of water balance are some the damaging effects to plants. Feeding damage also causes terminal leaves and flower buds to become cupped and distorted. As a result of feeding injury, corky brown areas appear between the main veins on the underside on the leaf. Young foliage sometimes becomes rust colored and nearly always deformed. Blooms abort, and the plant growth is stunted. Damaged leaves often become discolored, thickened and brown (Iacob, 1978).

Of frequent occurrence in many cultures as cotton (Oliveira & Calcagnolo, 1974), papaya *(Carica papaya* L.) (Manica, 1982), lemon *(Citrus limon* Burm, *Citrus latifolia* Tanaka, *Citrus aurantifolia* Swingle) (Silveira, 1993) and jute (*Corchorus* sp. L.) (Kabir, 1975), the species has required each years more attention from producers for present populations increasingly high and be increasing the number of cultures severely attacked.

In this study, we considered the damage and the plant response to infestation at morphological and phenological levels. Also measure the impact of mite density on yield under net house condition.

## MATERIALS AND METHODS

The study was conducted in the field of the Department of Entomology, Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU) of Gazipur during the period from March to August, 2009.

**Collection and rearing yellow mite**

*Polyphagotarsonemus latus* were collected from the infested jute plant of the research field of Bangladesh Jute Research Institute, Dhaka in March 2009. The collected mites from infested leaves were transferred into the potted jute plants kept outside the laboratory. Fifteen plants were infested to have constant supply of mite for the study purpose.

Jute plants of deshi *(Corchorus capsularis* L) varieties considered as treatments viz., CVL1, CVE-3, BJC-7370 & BJC-83 were sown in earthen pots (5 plant/pot) at 15 March, 2009. Plants were fertilized with a spoonful of 15-2-3-4 NPKS and sprinkle irrigation twice daily. When the jute plants age as about 28$^{th}$ days, yellow mite (12 pairs female and male) infestation were allowed to build up by artificial inoculation. The paired treatments were laid out in a completely randomized design (strip trial) with three replication under net house condition (100% shaded by 0.05 mash white colored net). After population build up in the net house, the treatment pots were treated with miticide (Mycosul 80 WDG @ 3 gm per litre of water) and repeat treatment after 7 days interval until harvest to kill the nymphs which may hatch out after these treatments (kabir, 1975) and control pots were left untreated. Young 3$^{rd}$ leaf by each plant from the tip (from 5 plants/pot) described by Alagarmalai et al. (2009) were collected at 60, 90 & 120 days after sowing (DAS) , because yellow mites are commonly found on the lower surfaces of young apical leaves and flowers, where they deposit their eggs. The number of mite stages (egg, larva, pupa, female and male) per $cm^2$ leaf was counted under a stereomicroscope.

### Damage index at different plant ages

The experiment consisted of yellow mite infested plants and uninfested plants of each variety at different age (60, 90 & 120 DAS), where percentage of infestation, rating score of yellow mite infested plants were recorded at three stages of plants pre and post harvestation. To establish a damage index per plant, plants were separated into 5 categories of damage followed by Pradhan (1988) method. The rating scores of the categories were: 0=Fresh and healthy leaves, without any changes in colour, 1= Slight changes in colour of leaves, 2= Curling of leaves, 3= 1 to 3 infested leaves dropped from the top, 4= All infested leaves fall prematurely but top shoot alive and 5= Top shoots dead.

Different phenology viz., leaf area, fresh leaf weight, dry leaf weight, number of leaves, plant height, base diameter, fibre weight, stick weight, number of flowers per plant, number of pod per plant, pod weight, number of seed per pod, seed weight per plant and 1000' seed weight from both treated and untreated plots was also assessed at 3 stages (60, 90 & 120 DAS) of plants during the course of study. Leaf area was determined with a leaf area meter (LI-COR, Lambda Instruments Corporation, Lincoln, NE) and water content was determined by subtracting dry leaf weight from fresh leaf weight.

### Assessing yield loss

The difference between the weight of yield in treated and untreated plots was considered as loss. The percent loss in yield was calculated using the following formula (Khosla 1977):

$$\text{Per cent loss in yield} = \frac{X1-X2}{X1} \times 100$$

Where,
X1 is the mean yield in treated plots.
X2 is the mean yield in untreated plots.

### Data Analysis

The experimental data were analyzed statistically after appropriate transformation. Densityof mite population data were transformed into square root transformation and Tukey's test(P=0.05) was done using the program MSTAT and analysis of variance (ANOVA) wasused to determine differences among varieties.Differences in categories for treated and untreated plants were analyzed by t-test (P=0.05)using the program MSTAT and analysis of variance (ANOVA) was used to determinedifferences among plant ages.Yield data for both treated and untreated condition were transformed in to square root/logarithm transformation where necessary, percent data were transformed into arcsin (y =sin-1 x) or square root (y = x + 0.5) and means were separated by Tukey's test Test (Steeland Torrie, 1960).

## RESULTS AND DISCUSSION

### Mite dynamics related to plant age

The number of mite stages varied for different plant stages. The mean number of eggs, larvae, pupae, females and males per $cm^2$ leaf in different varieties, viz., CVL-1, CVE-3, BJC-7370 and BJC-83 (*C. capsularis*) at different plant stages under net house condition is presented in table 1. Number of eggs, larvae, pupae, females and males increase over time upto 90 DAS then decreased. There are significant differences in the population of eggs, larvae, pupae, females and males among the different varieties of jute. The maximum number of eggs, larvae, pupae, females and males population was found at 90 DAS with *Corchorus capsularis* variety, BJC-7370. The ascending orders of infestation in case of egg population among the varieties were BJC-83 (61.45) < CVE-3 (78.11) < CVL-1 (87.67) < BJC-7370 (90.11); larvae population those were CVE-3 (34.89) < CVL-1 (40.89) < BJC83 (41.78) < BJC-7370 (43.22); pupal population those were CVE-3 (2.55) < BJC-83 (3.00) < CVL-1 (3.34) < BJC-7370 (4.22) ; female population among the varieties were CVL-1 (3.34) < BJC-83 (5.89) < CVE-3 (6.44) < BJC-7370 (11.11) and male population among the varieties were CVE-3 (2.44) < BJC-83 (3.22) < CVL-1 (4.00) < BJC-7370 (4.67), respectively.Similar trend of result was reported by De Coss-Romero and Peña (1998) in pepper plant. Apparently, tarsonemid mouthpart appendages are unsuitable for effective penetration ofrenitent tissues (Jeppson et al., 1975). Thus *P. latus* may not be able to puncture the morelignified tissues found in after 90 days old plants as opposed to those tissues in 60-90 daysold plants. These data may be of value in programs for evaluating resistance of jute to *P. latus*. Assessments of plant resistance to *P. latus* made at early growth stages of jute would be particularly effective for identifying highly resistant plants.

**Incidence of *P. latus* on host (*Corchorus capsularis*) phenology and yield**

Yellow mites significantly reduced the leaf sizes of untreated plants compared to the treated plants in all varieties (CVL-1, CVE-3, BJC-7370 and BJC-83) at three plant growth stages (Table 2). Fresh leaf weight was reduced at all the three plant stages, but significant reductions in dry weight were observed at 90 DAS in CVE-3 & BJC-83 and 120 DAS in CVE-3, BJC-7370 & BJC-83. The level of significance associated with the soluble solids was also reduced at all the three plant growth stages (Table 3). The numbers of leaves per plant, plant heights, base diameter, fibre weight, stick weight, number of flowers, number of pods, pod weight, number of seed per pod, seed weight and 1000 seed weight per plant were also affected by mite injury as observed at three plant growth stages in all the varieties and was significantly reduced compared to those of uninfested plants (Table 4 & 5). The data suggest that yellow mite reduce height in the infested plants, and induced lateral shoot growth.

Fibre weght, stick weight and seed weight both in treated and untreated situation in varieties, CVL-1, CVE-3, BJC-7370 and BJC-83 (*C. capsularis*) and their respective yield loss due to yellow mite infestation are presented in Table 6. The differences in the fibre weight, stick weight and seed weight in different varieties, which could be minimized by the insecticidal treatment. The weight and percent yield losses have been found to vary in different varieties. Both in treated and untreated situation the highest fibre weght was obtained in the variety BJC-83 (20.44 gm/plant) followed by BJC-7370 (20.11 gm/plant), CVE-3 (18.22 gm/plant) and the lowest fibre weight was obtained in CVL-1 (17.00 gm/plant). Yield loss was varied because of mite population fluctuations due to host phenology and environmental condition. The highest fibre yield losses due to mite infestation was found in the variety BJC-7370 (65.10%) followed by CVE-3 (61.46%), CVL-1 (58.83%) and the lowest fibre yield losses was obtained in BJC-

83 (52.97%). The highest stick weight was obtained in the variety BJC-7370 (41.22 gm/plant) followed by BJC-83 (37.89 gm/plant), CVE-3 (35.56 gm/plant) and the lowest stick weight was obtained in CVL-1 (31.89 gm/plant). The highest stick yield losses was found in the variety BJC-7370 (51.29%) followed by CVE-3 (47.54%), BJC-83 (46.49%) and the lowest was in CVL-1 (44.21%). The highest seed weight was obtained in the variety BJC-83 (6.44 gm/plant) followed by CVE-3 (6.30 gm/plant), CVL-1 (6.06 gm/plant) and the lowest seed weight was found in BJC-7370 (5.36 gm/plant). The highest seed yield losses was found in the variety BJC-7370 (38.25%) followed by CVE-3 (31.93%), CVL-1 (29.28%) and the lowest was found in BJC-83 (28.89%).

High levels of stress induced by *P. latus* feeding resulted in reduction in vegetative growth, flower development and reduction in quantity & quality of seed might be in response to some anatomical, physiological or biochemical differences between vegetative and reproductive stage of plants. These reductions were due to chronic feeding on plants younger leaf tissue, which appear to be more susceptible than plants with greater numbers of mature leaves. This effect has been shown to vary with the phenological development of hedera,reported by Nemestothy et al. (1982). Plants with younger hirsute leaves suffered the strongest damage compared to older plants with leaves with less hairs and where cell differentiation has already occurred. These results are in agreement with the reports of Smith (1935) who stated that the yellow mite cannot survive longer on the tough, mature leaves of most plants. It was reported that about 15.50% (O9897) & 10.00% (CVL-1) of fibre yield were decreased by the attack of yellow mite in potted plants and 12.30% (O-9897) of fibre yield was decreased under field condition (Faruquzzaman 1987). De Coss-Romero & Peña (1998) reported about 80% of yield reduced by *P. latus* in green house pepper plant.

The above discussion concluded that the variety BJC-7370 of *C. capsularis* showed most susceptible against *P. latus* under net house condition. The knowledge that the damage arises from mite responses to the phenological stage of the crop can enhance the efficiency and value of yellow mite monitoring programs and control strategies by focusing attention on the critical periods in jute crop. We observed in economic crop jute, *Corchorus capsularis* L.,that rapid increases of yellow mite numbers coincided with different stages of the plant. However, yield responses to yellow mite damage under field conditions may differ from those observed under conditions in the net house.

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Table 1. Comparison of mean number of population at different stages of yellow mite per $cm^2$ of leaf at three DAS of *C. capsularis* under net house condition.

| Variety | Egg | | | Larva | | | Pupa | | | Female | | | Male | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 60 DAS | 90 DAS | 120 DAS | 60 DAS | 90 DAS | 120 DAS | 60 DAS | 90 DAS | 120 DAS | 60 DAS | 90 DAS | 120 DAS | 60 DAS | 90 DAS | 120 DAS |
| CVL-1 | 25.66c (5.06) | 87.67a (9.36) | 15.00b 3.87 | 24.45c (4.95) | 40.89ab (6.39) | 9.00c (3.00) | 2.56a (1.60) | 3.34ab (1.82) | 2.22b (1.48) | 3.11a (1.76) | 3.34c (1.82) | 5.00b (2.23) | 2.33a (1.52) | 4.00ab (1.99) | 2.11b (1.44) |
| CVE-3 | 31.67b (5.63) | 78.11b (8.84) | 19.89b 4.45 | 27.11b (5.21) | 34.89b (5.90) | 20.33b (4.51) | 2.44a (1.56) | 2.55b (1.60) | 2.11b (1.44) | 4.33a (2.08) | 6.44b (2.54) | 3.56c (1.88) | 3.22a (1.79) | 2.44c (1.56) | 2.00b (1.41) |
| BJC-7370 | 39.22a (6.26) | 90.11a (9.49) | 34.44a 5.87 | 30.45a (5.52) | 43.22a (6.57) | 34.67a (5.89) | 3.11a (1.76) | 4.22a (2.05) | 3.67a (1.91) | 4.56a (2.13) | 11.11a (3.33) | 7.55a (2.75) | 3.34a (1.82) | 4.67a (2.16) | 3.67a (1.91) |
| BJC-83 | 29.78b (5.46) | 61.45c (7.84) | 19.78b 4.44 | 27.66b (5.26) | 41.78ab (6.46) | 10.89c (3.30) | 3.00a (1.73) | 3.00b (1.73) | 1.89b (1.37) | 3.55a (1.88) | 5.89b (2.43) | 3.89bc (1.97) | 3.11a (1.76) | 3.22bc (1.79) | 1.89b (1.37) |

Means followed by same letter in column do not differ by Tukey's test (P = 0.05). Figures in the parentheses are the square root transformed mean values.

Table 2. Comparison of mean percent infestation, damage rating, leaf area of jute plants infested with yellow mite at three plant stages under net house condition.

| Variety | % infestation | | | | | | Damage rating | | | | | | Leaf area | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 60 DAS | | 90 DAS | | 120DAS | | 60 DAS | | 90 DAS | | 120DAS | | 60 DAS | | 90 DAS | | 120DAS | |
| | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control |
| CVL-1 | 0.00 b | 40.00 a | 0.00 b | 53.33 a | 0.00 b | 46.67 a | 0.00 b | 1.03 a | 0.00 b | 1.32 a | 0.00 b | 1.33 a | 4.93 a | 2.88 b | 22.73 a | 16.17 b | 15.00 a | 7.73 b |
| CVE-3 | 0.00 b | 46.67 a | 0.00 b | 60.00 a | 0.00 b | 53.33 a | 0.00 b | 0.73 a | 0.00 b | 1.50 a | 0.00 b | 1.33 a | 5.30 a | 2.68 b | 22.57 a | 15.47 b | 13.03 a | 7.43 b |
| BJC-7370 | 0.00 b | 53.33 a | 0.00 b | 66.67 a | 0.00 b | 60.00 a | 0.00 b | 1.13 a | 0.00 b | 1.69 a | 0.00 b | 1.67 a | 5.77 a | 2.85 b | 25.43 a | 17.87 b | 14.87 a | 7.67 b |
| BJC-83 | 0.00 b | 46.67 a | 0.00 b | 46.67 a | 0.00 b | 46.67 a | 0.00 b | 0.67 a | 0.00 b | 1.11 a | 0.00 b | 1.33 a | 4.90 a | 2.93 b | 18.47 a | 11.77 b | 12.33 a | 6.33 b |

Means for each parameter within rows followed by the same letter are not significantly different (t-test, P=0.05).

Table 3. Comparison of mean fresh leaf weight, dry leaf weight and soluble solids at three jute plant stages infested with yellow mite under net house condition.

| Variety | Fresh leaf weight | | | | | | Dry leaf weight | | | | | | Soluble solids | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 60 DAS | | 90 DAS | | 120DAS | | 60 DAS | | 90 DAS | | 120DAS | | 60 DAS | | 90 DAS | | 120DAS | |
| | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteate control |
| CVL-1 | 0.09 a | 0.06 b | 0.22 a | 0.11 b | 0.16 a | 0.08 b | 0.03 a | 0.01 a | 0.06 a | 0.04 a | 0.03 a | 0.02 a | 0.06 a | 0.05 b | 0.15 a | 0.08 b | 0.13 a | 0.07 b |
| CVE-3 | 0.09 a | 0.06 b | 0.19 a | 0.12 b | 0.14 a | 0.07 b | 0.02 a | 0.02 a | 0.08 a | 0.04 b | 0.03 a | 0.01 b | 0.06 a | 0.04 b | 0.11 a | 0.09 b | 0.11 a | 0.06 b |
| BJC-7370 | 0.08 a | 0.07 b | 0.23 a | 0.13 b | 0.16 a | 0.08 b | 0.02 a | 0.02 a | 0.06 a | 0.04 a | 0.05 a | 0.01 b | 0.06 a | 0.04 b | 0.17 a | 0.09 b | 0.11 a | 0.07 b |
| BJC-83 | 0.08 a | 0.06 b | 0.19 a | 0.13 b | 0.12 a | 0.07 b | 0.02 a | 0.02 a | 0.06 a | 0.03 b | 0.03 a | 0.02 b | 0.06 a | 0.04 b | 0.13 a | 0.09 b | 0.09 a | 0.06 b |

Means for each parameter within rows followed by the same letter are not significantly different (t-test, P=0.05).

Table 4. Comparison of mean number of leaves, plant height and base diameter at three jute plant stages infested with yellow mite under net house condition.

| Variety | No. leaves/plant | | | | | | Plant height | | | | | | Base diameter | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 60 DAS | | 90 DAS | | 120DAS | | 60 DAS | | 90 DAS | | 120DAS | | 60 DAS | | 90 DAS | | 120DAS | |
| | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control |
| CVL-1 | 63.07 a | 51.47 b | 121.67 a | 99.62 b | 92.67 a | 61.50 b | 1.70 a | 1.46 b | 2.40 a | 2.11 b | 2.95 a | 2.66 b | 9.33 a | 7.13 b | 14.87 a | 11.28 b | 16.11 a | 13.22 |
| CVE-3 | 57.60 a | 48.87 b | 102.92 a | 77.50 b | 100.67 a | 68.00 b | 1.59 a | 1.35 b | 2.24 a | 1.82 b | 3.12 a | 2.73 b | 8.00 a | 6.20 b | 12.14 a | 8.33 b | 13.56 a | 7.33 |
| BJC-7370 | 53.53 a | 49.80 b | 112.50 a | 77.93 b | 118.50 a | 74.50 b | 1.57 a | 1.41 b | 2.35 a | 2.10 b | 3.04 a | 2.52 b | 7.80 a | 6.40 b | 13.42 a | 9.98 b | 13.66 a | 10.78 |
| BJC-83 | 38.20 a | 31.07 b | 101.91 a | 73.05 b | 100.83 a | 63.00 b | 1.46 a | 1.26 b | 2.20 a | 1.82 b | 2.87 a | 2.53 b | 6.67 a | 5.80 b | 11.53 a | 8.58 b | 11.67 a | 5.22 |

Means for each parameter within rows followed by the same letter are not significantly different (t-test, P=0.05).

Table 5. Comparison of mean fibre weight, stick weight, number of flowers, number of pods, pod weight, number of seed per pod, seed weight and 1000 seed weight at three jute plant stages infested with yellow mite under net house condition.

| Variety | Fibre weight | | Stick weight | | No. flowers | | Pod/plant | | Pod weight/plant | | Seed/pod | | Seed weight/plant | | 1000 seed weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 120DAS | | 120DAS | | 120DAS | | 120DAS | | 120DAS | | 120DAS | | 120DAS | | 120DAS | |
| | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control | Treated | Unteated control |
| CVL-1 | 17.00 a | 6.95 b | 31.89 a | 17.78 b | 444.54 a | 258.77 b | 336.17 a | 205.67 b | 52.00 a | 41.98 b | 32.32 a | 26.46 b | 6.06 a | 4.28 b | 3.60 a | 3.23 |
| CVE-3 | 18.22 a | 7.00 b | 35.56 a | 18.67 b | 190.22 a | 149.60 b | 147.67 a | 115.17 b | 32.92 a | 27.83 b | 43.01 a | 33.76 b | 6.30 a | 4.26 b | 3.57 a | 3.33 |
| BJC-7370 | 20.11 a | 7.00 b | 41.22 a | 20.11 b | 230.00 a | 138.75 b | 195.00 a | 111.00 b | 37.12 a | 22.25 b | 36.13 a | 31.95 b | 5.36 a | 3.29 b | 3.27 a | 3.03 |
| BJC-83 | 20.44 a | 9.62 b | 37.89 a | 20.34 b | 213.90 a | 128.18 b | 165.83 a | 98.17 b | 30.43 a | 21.92 b | 33.78 a | 30.52 b | 6.44 a | 4.57 b | 3.47 a | 3.30 |

Means for each parameter within rows followed by the same letter are not significantly different (t-test, P=0.05).

Table 6. Yield loss of *C. capsularis* varieties due to *P. latus* infestation under nethouse condition.

| Variety | Fibre weight/plant (gm.) | | | Stick weight/plant (gm.) | | | Seed weight/plant (gm.) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Treated | Unteated control | Loss(%) | Treated | Unteated control | Loss(%) | Treated | Unteated control | Loss(%) |
| **CVL-1** | 17.00 b (4.12) | 6.95 b (2.63) | 58.83 ab (50.09) | 31.89 b (5.64) | 17.78 a (4.21) | 44.21 b (41.66) | 6.06 a (2.46) | 4.28 a (2.07) | 29.28 a (32.71) |
| **CVE-3** | 18.22 ab (4.27) | 6.99 b (2.64) | 61.46 ab (51.63) | 35.56 ab (5.96) | 18.67 a (4.31) | 47.54 ab (43.57) | 6.30 a (2.51) | 4.26 a (2.06) | 31.93 a (34.23) |
| **BJC-7370** | 20.11 ab (4.48) | 7.00 b (2.64) | 65.10 a (53.78) | 41.22 a (6.42) | 20.11 a (4.48) | 51.29 a (45.72) | 5.36 a (2.31) | 3.29 b (1.81) | 38.25 a (38.09) |
| **BJC-83** | 20.44 a (4.51) | 9.62 a (3.10) | 52.97 b (46.68) | 37.89 a (6.15) | 20.34 a (4.50) | 46.49 ab (42.96) | 6.44 a (2.54) | 4.57 a (2.14) | 28.89 a (32.45) |

In a column, treatment means having the same letter(s) are not significantly different by Tukey's test (P=0.05). Figures in the parentheses are the transformed mean values.