



SEASONAL INCIDENCE OF MAJOR INSECT PESTS OF JASMINE *JASMINUM SAMBAC* L.

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ABSTRACT

Jasmine *Jasminum sambac* L. is an important ornamental crop that fetches recurrent income to farmers. The present study was carried out in three locations Sevandhanagar, Navalurkuttappattu and Horticulture farm, TNAU, Tiruchirappalli, Tamil Nadu, India from August 2019 to September 2020. The seasonal incidence of major insect pests such as *Hendecasis duplifascialis* Hampson, *Nausinoe geometralis* Guenee, *Contarinia maculipennis* Felt, *Frankliniella scultzei* Trybom and *Tetranychus urticae* Koch were studied. *Hendecasis duplifascialis* incidence was observed to be maximum (31.63% damaged buds) in second fortnight of October in Sevandhanagar; in Navalurkuttappattu, it was the incidence of *N. geometralis* (2.2 webs/ plant) that was maximum, and noticed in the second fortnight of December. In horticulture farm, maximum damage was of *C. maculipennis* (48.66% damaged buds) noticed in the second fortnight of September. Thrips population was significant and was observed positively correlated with maximum temperature in Sevandhanagar ($r = 0.55$).

Key words: *Jasminum sambac*, pest incidence, *Hendecasis duplifascialis*, *Nausinoe geometralis*, *Contarinia maculipennis*, *Frankliniella scultzei*, *Tetranychus urticae*, weather factors, correlation coefficient, linear regression

Jasmine is an important ornamental flower crop, known for its attractive and fragrant flowers (Rahman et al., 2011). Tamil Nadu ranks first with annual production of 1,38,280 mt. The first GI tag given to a flower in Tamil Nadu is Madurai Malli (jasmine) (Vandhana, 2013; Narasimhan, 2014). The genus *Jasminum* has more than 200 species, of which 40 are indigenous to India (Irulappan, 1994; Thakur et al., 2014). Among these, *Jasminum sambac*, *J. auriculatum* and *J. grandiflorum* are commercially cultivated (Green and Miller, 2009). The jasmine crops were habitually infested by bud worm *Hendecasis duplifascialis* Hampson, leaf web worm *Nausinoe geometralis* Guenee, blossom midge *Contarinia maculipennis* Felt, thrips *Frankliniella scultzei* Trybom and red spider mite *Tetranychus urticae* Koch. Conducive weather and the crop phenology of jasmine invite and favors the biology, growth and development of these pests. These pests are present in the crop during most of the cropping seasons with fluctuations in infestation due to weather factors. Studies on population dynamics of pests is essential not only to predict their severity but also to frame season based IPM practices (Harini et al., 2018; Kamala and Kennedy, 2018). Few attempts were made to explore the insect pest occurrence in jasmine. Hence, the present study focused on studying

the influence of weather parameters on the incidence of major pests of jasmine.

MATERIALS AND METHODS

Field studies were conducted at three locations in Tiruchirappalli district of Tamil Nadu from August first fortnight, 2019 to September second fortnight, 2020. The locations include two villages namely Sevandhanagar (Location 1, Farmer's field, 10.78471°N, 78.56833°E) and Navalurkuttappattu (Location 2, Farmer field, 10.755655°N 78.606448°E) and Horticultural farm (Location 3, TNAU, Tiruchirappalli, 10.75558°N 78.60280°E). Seasonal incidence of insect pests in jasmine plants was recorded in 10 randomly selected/ tagged plants. Fortnightly observations were made on the incidence of *H. duplifascialis*, *C. maculipennis*, *N. geometralis*, *T. urticae* and *F. scultzei*. Standard methodologies were followed to record the incidence of these (Sudhir, 2002; Neelima, 2005). The extent of damage by *H. duplifascialis* was assessed by recording number of total and bored buds in five randomly selected shoots/ plant, and expressed in %; *C. maculipennis* damage was also assessed by similar protocol and expressed in % bored buds; and *N. geometralis* was assessed by recording the total number of webbings made by the

larvae and expressed as number of webs/ plant. Total number of *T. urticae* present on apical three leaves of plant were collected and brought to laboratory. Then counted under microscope and expressed as number of mites/ leaf. Three flower clusters, each from the bottom, middle and top canopy were selected and beaten against white cardboard sheet and the thrips collected were counted. The incidence of *F. scultzei* was expressed as number of thrips/ flower cluster (Pirithiraj et al., 2020). The damage % with standard error was worked out for each fortnight data for all the insect pests. Cumulative incidence was worked out in three fields in Sevandhanagar. Weather data such as maximum and minimum temperature, morning and evening relative humidity, wind velocity, sunshine hours, evaporation and rainfall were obtained from the meteorological observatory, Department of Agronomy, Anbil Dharmalingam Agricultural College and Research Institute, Tamil Nadu Agricultural University, Tiruchirappalli, Tamil Nadu, India. Mean data on seasonal incidence of insect pests were used to correlate with weather parameters. Regression equation was worked out for each location to assess the influence of weather parameters.

RESULTS AND DISCUSSION

The observations revealed a significant variation in the incidence of pests in three locations. Pirithiraj et al. (2021) recorded significant variation in population of herbivores in different fields of jasmine. *Hendecasis duplifascialis* incidence was maximum (31.63% damaged buds) in second fortnight of October at Sevandhanagar fields; in the same second fortnight,

it was 11.50 and 0.00% in Navalurkuttappattu and Horticulture farm, respectively. Maximum incidence of *H. duplifascialis* (31.94%) was observed in February second fortnight (Neelima, 2005). Kiran et al. (2017) noticed its maximum occurrence in August first fortnight (31.87 %); while a maximum (21.50% bored buds) was recorded in September, and minimum was in November 2001 (Vanitha, 2001). Bud borer of sapota crop was recorded throughout the year and maximum was in March (Sathish et al., 2014). With sapota bud borer *Anarsia achrasella*, maximum damage was 53% (Jayanthi et al., 2006); and with *Maruca vitrata* it was second week of July in pigeon pea (Jat et al., 2017). In Navalurkuttappattu, maximum incidence of *N. geometralis* (2.2 webs/ plant) was in the second fortnight of December (Fig. 1). Kiran et al. (2017) reported the nil incidence of *N. geometralis* during December to April and maximum was observed during first fortnight of November (4.6 webs/ plant). In Navalurkuttappattu, the regression equation fitted with weather parameter was $Y = 11.38 - 0.03X_1 - 0.15X_2 - 0.08X_4 - 0.02X_5 - 0.11X_6 - 0.26X_7$. The R^2 obtained in Navalurkuttappattu was 0.6388 which indicates that the weather parameters influence the pest by 63.88%.

In College horticulture farm, the highest mean damage of *C. maculipennis* (48.66% damaged buds) was noticed in the second fortnight of September. Whereas in the same second fortnight of September, Sevandhanagar and Navalurkuttappattu had a bud damage of 40.33 and 15.64 % respectively. Maximum incidence of blossom midge was recorded in Madurai district of Tamil Nadu (Kamala, 2020a). Jayasheelan and Allwin (2018) reported the maximum occurrence

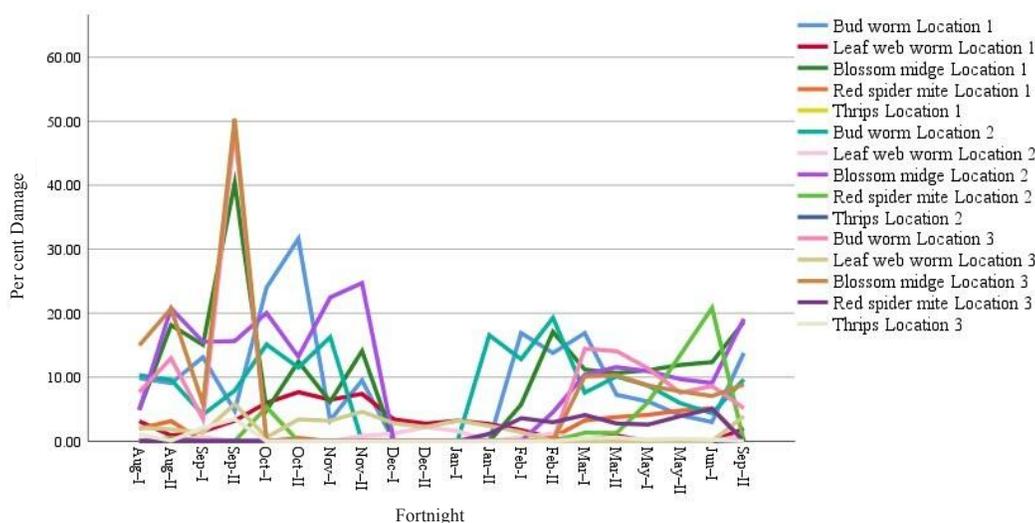


Fig. 1. Seasonal incidence of major insect pests of jasmine

of the midge in April and minimum was in November. However, the midge, *Asphondylia capsici* was maximum of 62% in chilli crop during the period (Divya et al., 2018); and maximum in chilli was 63.79% during 50th standard mean week of 2008-09 (Pathipati et al., 2014). In Navalurkuttappattu the midge damage has a significant positive correlation ($r = 0.47^*$) with minimum temperature. However, in Navalurkuttappattu and Sevandhanagar the blossom midge damage was comparatively less than the damage of *H. duplifascialis* in certain fortnights and vice-versa. There is limited evidence for interspecific competition while comparing intraspecific competition (Jermy, 1985). Competition between phytophagous insect occurs if they were closely related, sessile and feed on discrete resource. Wang et al. (2011) reported the displacement of one species of thrips by other by means of interspecific interaction in purple cabbage.

In Navalurkuttappattu, maximum incidence of *T. urticae* was noticed during first fortnight of June (20.83 mites/ leaf), while it was 5.15 and 5.06 mites/ leaf in Sevandhanagar and Horticulture farm, respectively. Neelima (2005) studied the seasonal occurrence of red spider mite and reported no population in July (second fortnight) to March (second fortnight). Shah et al., 2014 reported maximum incidence of red spider mite in July, also in the 12th standard week on rose plants (Norboo et al., 2017). Maximum mite population density of 11.72/ 2 cm² was recorded in 2015 on tomato plants (Premalatha et al., 2016). In Sevandhanagar, the regression equation fitted with weather parameter was $Y = -24.28 + 1.11X_1 - 0.57X_2 + 0.03X_3 + 0.02X_4 - 0.23X_5 - 0.59X_6 + 0.46X_7 - 0.01X_8$. This indicates one unit rise in maximum temperature will increase the number of mites by 1.11/ leaf. Shukla et al. (2015) recorded significant and positive correlation between mites and average temperature. Putri et al. (2021) reported an increase in 1°C of maximum temperature would lead to an increase of 1.342 numbers of two spotted spider mite. In Sevandhanagar and Navalurkuttappattu, no incidence of mite was observed during the first fortnight of September whereas in horticulture farm, thrips population was maximum during (4.12 thrips/ flower cluster). Kiran et al. (2017) observed maximum thrips incidence during May first fortnight and no incidence during June- September. Gopal et al. (2018) noticed maximum thrips incidence in chilli crop during 3rd standard week. Thrips population was significant and positively correlated with maximum temperature in Sevandhanagar ($r = 0.55^{**}$).

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AUTHOR CONTRIBUTION STATEMENT

UP conducted the experiment and drafted the manuscript. RPS conceptualized the research idea and fine-tuned the manuscript. CGLJ succour throughout the research work and publication. All authors read and approved the manuscript.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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