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## Influence of weather variables on the host range and population dynamics of guava spiralling whitefly (*Aleurodicus dispersus* Russell) in Tiruchirappalli district of Tamil Nadu, India

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### Abstract

A systematic survey was conducted from 2023 to 2024 across six blocks of Tiruchirappalli district, Tamil Nadu to evaluate the host range, intensity of infestation and seasonal incidence of the invasive Spiralling Whitefly (SWF) (*Aleurodicus dispersus* Russell). The study identified 35 plant species from 23 families as hosts for spiralling whiteflies with guava and country almond ranking as the most heavily infested hosts in this surveyed region. Infestation intensity was highest in Manikandam block (41.3%), followed by Manapparai (41.1%) and lowest in Thiruverumbur block (39.6%). The peak infestation period occurred from the first week of February to the last week of April. Correlation analysis with weather parameters revealed a significant positive correlation with temperature (maximum and minimum) and a significant negative correlation with RH (morning and evening) as well as rainfall. These findings indicate that SWF infestation is lower during the rainy season and peaks during the summer season in Tamil Nadu.

**Keywords:** Host plants, weather, damage, *Aleurodicus*, correlation

### Introduction

Guava (*Psidium guajava* L.) a member of the Myrtaceae family, is also known as “Poor man’s apple” and the “Apple of Tropics”. It is one of the most important commercially grown fruit crop in many tropical and subtropical regions worldwide with abundant source of vitamins, minerals, soluble sugars and fibers (Singh, 2011; Khan, 2017; Angulo-Lopez *et al.*, 2021) [23, 7, 1]. Guava production faces significant threats from various biotic stresses including numerous insect pests such as spiralling whitefly, mealybugs, aphids, thrips, tea mosquito bugs, scale insects, psyllids, fruit flies, hairy caterpillars and leaf weevils (Nair and Visalakshi, 1999; Baradevanal *et al.*, 2018; Picanco *et al.*, 2022) [12, 2, 15]. Among these pests, the spiralling whitefly-*Aleurodicus dispersus* Russell (Aleyrodidae; Hemiptera) the second invasive whitefly in India, is a major sucking pest that inflicts substantial damage on guava trees adversely affecting yield and fruit quality (Gupta *et al.*, 2018; Rashid *et al.*, 2003; Reddy *et al.*, 2020; Sampiano and Aceres, 2021) [6, 18, 20, 21]. The spiralling whitefly, *Aleurodicus dispersus* is native to Central America and was first collected from coconut plantations in Florida- USA in 1957, with its formal description by Russell in 1965. During its description, Russell documented 44 plant species as hosts of the spiralling whitefly from regions including Florida, Central and South America and the Caribbean islands. *A. dispersus* is notable for having the highest number of host plants among whiteflies with 481 plant species spanning 295 genera and 90 families. In India, it is known to attack 253 plant species, which accounts for 52.5% of its known host plant species (Srinivasa, 2000) [24].

In India, *Aleurodicus dispersus* was first recorded on cassava in Kerala in 1993 (Palanisami *et al.*, 1995) [13]. It was subsequently reported in the Western Ghats of Kerala and the Kanyakumari district of Tamil Nadu on various hosts (David and Regu, 1995) [4]. The pest was also noted in

Maharashtra in 1997 (Sathe, 1999) [22], Andhra Pradesh in 1998 (Reddy and Chandurkar, 1999) [19] and in Karnataka from Bangalore on guava (Mani and Krishnamoorthy, 2000) [9]. Due to its rapid dispersal, the pest is now widespread throughout Tamil Nadu, emerging as a key pest on numerous cultivated plant species including fruits, plantations, vegetables, field crops and ornamental plants. Some significant cultivated hosts include guava, banana, coconut, mulberry, mango, fig, papaya, cassava, chili, cotton, okra, tomato, eggplant, citrus, avocado, rose, hibiscus, crotons and acahypha. While the literature on the rugose spiralling whitefly *Aleurodicus rugioperculatus* is sparse, the host range of the spiralling whitefly *Aleurodicus dispersus* has not been extensively studied in Tamil Nadu. Therefore, the present study aims to explore the host range and population dynamics of *Aleurodicus dispersus* in the Tiruchirappalli district of Tamil Nadu.

### Materials and Methods

An intensive survey was conducted from 2023 to 2024 in Tiruchirappalli district covering the blocks of Andhanallur, Lalgudi, Manikandam, Manapparai, and Thiruverumbur (Figure 1.) to document the various host plants and to assess the damage intensity of *Aleurodicus dispersus*. Host plants were recorded by randomly surveying plant species along roadsides, household ornamentals, kitchen gardens, field and horticultural crops in

both urban and rural areas. The host plants were photo-documented and the samples were collected for preservation. Specimens from heavily infested guava and country almond plants were collected and sent to NBAIR, Bengaluru for species identification and were confirmed as *Aleurodicus dispersus*.

Observations on the damage intensity were recorded in three villages within each block. In each village, five orchards were selected and within each orchard ten trees were selected randomly and observations on percent infestation were made on upper, middle and lower canopy level of each tree and the average were worked out. The population data of *Aleurodicus dispersus* was recorded at weekly intervals on ten randomly selected, untreated guava trees infested by spiralling whiteflies in the guava orchards of the Department of Horticulture, Horticultural College and Research Institute for Women, Tiruchirappalli over the seven-month study period. The data on weather parameters including maximum temperature, minimum temperature, relative humidity, sunshine, wind velocity, evaporation and rainfall were collected from the Department of Agronomy, Anbil Dharmalingam Agricultural College and Research Institute, Tiruchirappalli. A simple correlation studies were worked out between the weekly mean level of pest incidence and weather parameters using OPSTAT online software.

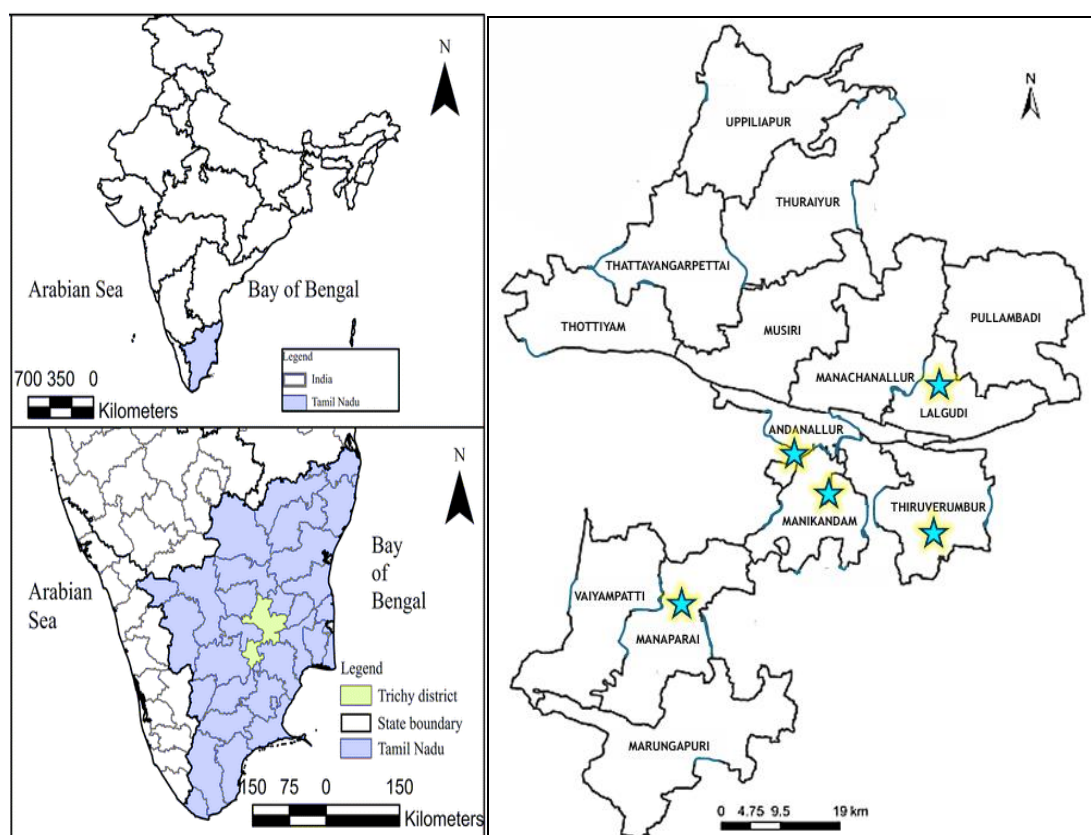


**Fig 1:** Study area in Tiruchirappalli district of TN, India

### Results and discussion

During the survey conducted in selected blocks of Tiruchirappalli district, a total of 35 plant species from 23 families were identified as host plants for *Aleurodicus dispersus* (Table 1.) with some examples shown in Figure 2. Out of hosts recorded during the present studies, 4 in Arecaceae, 3 in Euphorbiaceae, 2 each in Annonaceae, Apocynaceae, Combretaceae, Fabaceae, Meliaceae, Myrtaceae, Poaceae. Apart

from these 14 other families were recorded. Among the hosts plants in this surveyed region all the life stages such as egg spirals, nymphs, adults and the damage intensity was more in the host plants such as Guava, coconut, banana, Indian almond and custard apple. Being polyphagous, *A. dispersus* is known to attack about 500 plants in different countries (Mware *et al.*, 2010) [11] and 280 in India alone (Ramani *et al.*, 2002; Mani, 2010) [16, 8].

**Table 1:** Major host plants recorded in surveyed blocks of Tiruchirappalli district

| Plant family   | Common name        | Scientific name                     | Plant category | Infestation level |
|----------------|--------------------|-------------------------------------|----------------|-------------------|
| Acanthaceae    | Firecracker flower | <i>Crossandra infundibuliformis</i> | Ornamental     | +                 |
| Amaryllidaceae | Spider lily        | <i>Crinum asiaticum</i>             | Ornamental     | ++                |
| Anacardiaceae  | Mango              | <i>Mangifera indica</i>             | Fruit          | +                 |
| Annonaceae     | Ashoka tree        | <i>Polyalthia longifolia</i>        | Tree           | +                 |
| Annonaceae     | Custard apple      | <i>Annona Squamosa</i>              | Fruit          | +++               |
| Apocynaceae    | Nerium             | <i>Nerium oleander</i>              | Flower         | +                 |
| Apocynaceae    | Pagoda tree        | <i>Plumeria alba</i>                | Ornamental     | +++               |
| Araceae        | Money plant        | <i>Epipremnum aureum</i>            | Ornamental     | +                 |
| Arecaceae      | Coconut            | <i>Cocos nucifera</i>               | Plantation     | +++               |
| Arecaceae      | Fiji fan palm      | <i>Pritchardia pacifica</i>         | Ornamental     | +                 |
| Arecaceae      | Fish tail palm     | <i>Caryota mitis</i>                | Ornamental     | ++                |
| Arecaceae      | Manila palm        | <i>Adonidia merrilli</i>            | Ornamental     | +                 |
| Caricaceae     | Papaya             | <i>Carica papaya</i>                | Fruit          | +                 |
| Combretaceae   | Country almond     | <i>Terminalia catappa</i>           | Tree           | +++               |
| Combretaceae   | Rangoon creeper    | <i>Combretum indicum</i>            | Ornamental     | ++                |
| Euphorbiaceae  | Cassava            | <i>Manihot esculenta</i>            | Tuber          | ++                |
| Euphorbiaceae  | Castor             | <i>Ricinus communis</i>             | Oilseed        | ++                |
| Euphorbiaceae  | Crotons            | <i>Codiaeum variegatum</i>          | Ornamental     | +                 |
| Fabaceae       | Green gram         | <i>Vigna radiata</i>                | Pulse          | +                 |
| Fabaceae       | Pungam             | <i>Pongamia pinnata</i>             | Tree           | +                 |
| Lamiaceae      | Teak               | <i>Tectona grandis</i>              | Timber         | ++                |
| Lythraceae     | Henna tree         | <i>Lawsonia inermis</i>             | Medicinal      | +                 |
| Malvaceae      | Chinese rose       | <i>Hibiscus rosa-sinensis</i>       | Flower         | +                 |
| Meliaceae      | Mahogany tree      | <i>Swietenia macrophylla</i>        | Ornamental     | +                 |
| Meliaceae      | Neem               | <i>Azadirachta indica</i>           | Medicinal      | +                 |
| Moraceae       | Jackfruit          | <i>Artocarpus heterophyllus</i>     | Fruit          | ++                |
| Musaceae       | Banana             | <i>Musa paradisiaca</i>             | Fruit          | +++               |
| Myrtaceae      | Guava              | <i>Psidium guajava</i>              | Fruit          | +++               |
| Myrtaceae      | Jamun              | <i>Syzygium cumini</i>              | Fruit          | +++               |
| Poaceae        | Maize              | <i>Zea mays</i>                     | Cereal         | ++                |
| Poaceae        | Sorghum            | <i>Sorghum bicolor</i>              | Millet         | +                 |
| Rubiaceae      | Ixora              | <i>Ixora coccinea</i>               | Ornamental     | +                 |
| Rutaceae       | Citron lime        | <i>Citrus medica</i>                | Fruit          | +                 |
| Sapotaceae     | Sapota             | <i>Manilkara zapota</i>             | Fruit          | +                 |
| Simaroubaceae  | Paradise tree      | <i>Simarouba glauca</i>             | Tree           | ++                |

+ (Low level) = less than 10 live adults/leaflet; ++ (Medium level) = 11–20 live adults/leaflet; +++ (Severe level) = above 20 live adults/leaflet

|                                                                                     |                                                                                     |                                                                                      |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |  |
| Guava – <i>Psidium guajava</i>                                                      | Banana – <i>Musa paradisiaca</i>                                                    | Coconut – <i>Cocos nucifera</i>                                                      | Country Almond – <i>Terminalia catappa</i>                                            |
|  |  |  |  |
| Maize – <i>Zea mays</i>                                                             | Rangoon creeper – <i>Combretum indicum</i>                                          | Custard apple – <i>Annona squamosa</i>                                               | Sapota – <i>Manilkara zapota</i>                                                      |

|                                                                                     |                                                                                     |                                                                                      |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|    |    |    |    |
| Fishtail palm – <i>Caryota mitis</i>                                                | Manila palm – <i>Adonidia merrillii</i>                                             | Mango – <i>Mangifera indica</i>                                                      | Fiji fan palm – <i>Pritchardia pacifica</i>                                           |
|    |    |    |    |
| Paradise tree – <i>Simarouba glauca</i>                                             | Money plant – <i>Epipremnum aureum</i>                                              | Hibiscus – <i>Hibiscus rosa-sinensis</i>                                             | Ashoka tree – <i>Saraca asoca</i>                                                     |
|   |   |   |   |
| Sorghum – <i>Sorghum bicolor</i>                                                    | Henna – <i>Lawsonia inermis</i>                                                     | Citron lime – <i>Citrus medica</i>                                                   | Neem – <i>Azadirachta indica</i>                                                      |
|  |  |  |  |
| Papaya – <i>Carica papaya</i>                                                       | Pungam – <i>Pongamia pinnata</i>                                                    | Spider lily – <i>Crinum asiaticum</i>                                                | Pagoda tree – <i>Plumeria alba</i>                                                    |
|  |  |  |  |
| Crotons – <i>Codiaeum variegatum</i>                                                | Jackfruit – <i>Artocarpus heterophyllus</i>                                         | Mahogany – <i>Swietenia macrophylla</i>                                              | Castor – <i>Ricinus communis</i>                                                      |

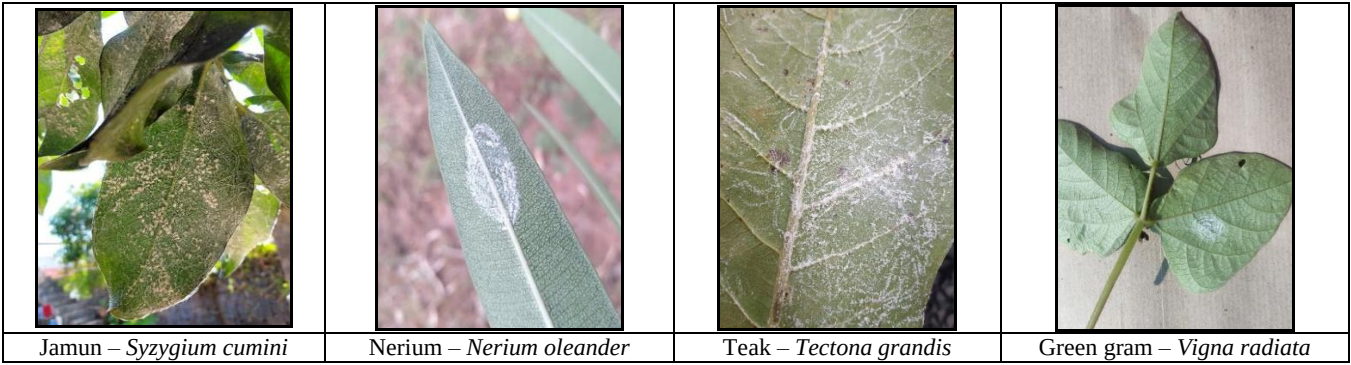


Fig 2: Host plants documented during the survey

Table 2: Intensity of *Aleurodicus dispersus* in different blocks of Tiruchirappali district

| Block         | Village           | Intensity % at each village | Intensity % at each block Mean± SE |
|---------------|-------------------|-----------------------------|------------------------------------|
| Andhanallur   | Mekkudy           | 41.5                        | 40.93 ± 0.28                       |
|               | Periakaruppur     | 40.62                       |                                    |
|               | Perur             | 40.68                       |                                    |
| Lalgudi       | Sembarai          | 40.38                       | 40.54± 0.28                        |
|               | Mettupatti        | 40.14                       |                                    |
|               | Thinniyam         | 41.1                        |                                    |
| Manikandam    | Ariyavoor         | 41.14                       | 41.30± 0.10                        |
|               | Navalurkottapattu | 41.5                        |                                    |
|               | Paganur           | 41.28                       |                                    |
| Manapparai    | Kannudaiyanpatti  | 40.56                       | 41.14± 0.17                        |
|               | Poigaipatti       | 41.34                       |                                    |
|               | Sampatti          | 41.52                       |                                    |
| Thiruverumbur | Thirunedunkulam   | 39.48                       | 39.65± 0.08                        |
|               | Navalpattu        | 39.76                       |                                    |
|               | Asur              | 39.72                       |                                    |

\*Mean of five locations in each village

The data was collected from several villages within each block and the intensity percentage was recorded and the pooled data of each village is presented in Figure 3. The intensity of *Aleurodicus dispersus* was assessed across various blocks including Andhanallur, Lalgudi, Manikandam, Manapparai and Thiruverumbur blocks of Tiruchirappalli district during the period from December 2023 to June 2024. The results from the Table 2. revealed that the intensity of infestation was significantly high in manikandam block (41.3%) followed by manapparai (41.14%) and andhanallur block (40.93%). On the other hand, the intensity of infestation was significantly low in thiruverumbur block with the intensity level of (39.6%) and the intensity of incidence was slightly higher in lalgudi block (40.54%) than thiruverumbur block.

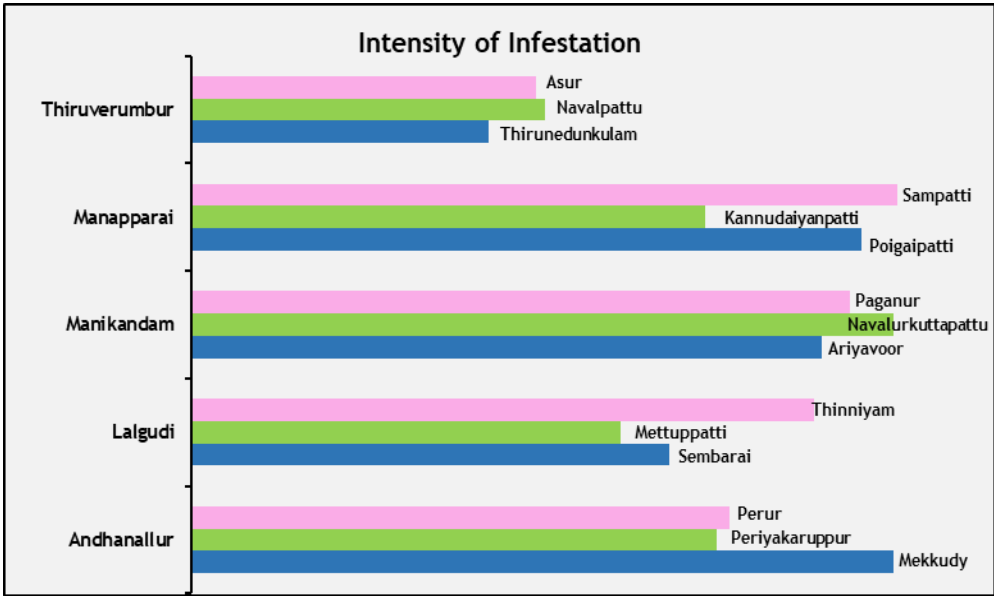


Fig 3: Percentage of incidence at village levels in each block

The variability within each block, as indicated by the standard error, shows that the measurements were relatively consistent across villages within the same block, with the Thiruverumbur block displaying the least variability (SE = 0.08). This suggests

that the infestation level of *Aleurodicus dispersus* is fairly uniform within individual blocks, but there are minor noticeable differences in infestation intensity between different blocks in the Tiruchirappalli district.

**Table 3:** Population dynamics of spiralling whitefly on Guava in relation to weather parameters

| Std. Week | Date (July 2023 to June 2024) | Weekly mean population of SWF/plant | Temp. (°C) |       | RH (%) |       | Evap. (mm) | Wind velocity (Km/hr) | Sunshine (hrs) | Rainfall (mm) |
|-----------|-------------------------------|-------------------------------------|------------|-------|--------|-------|------------|-----------------------|----------------|---------------|
|           |                               |                                     | Max.       | Min.  | Mrng   | Evng  |            |                       |                |               |
| 27        | Jul 3- 9                      | 7.2                                 | 34         | 25.17 | 87.5   | 42.17 | 6.33       | 3.38                  | 4.05           | 0             |
| 28        | Jul 10- 16                    | 0                                   | 34.5       | 25.17 | 85.83  | 37.33 | 8          | 4.7                   | 6.4            | 5.7           |
| 29        | Jul 17- 23                    | 0                                   | 34.15      | 25    | 89.67  | 42.83 | 7.03       | 4.2                   | 6.9            | 0             |
| 30        | Jul 24- 30                    | 0                                   | 34.17      | 25.67 | 84.83  | 42.67 | 8          | 4.68                  | 4.83           | 0             |
| 31        | Jul 31- Aug 6                 | 0                                   | 34.25      | 25.83 | 80.57  | 38.83 | 9.33       | 4.77                  | 4.63           | 0             |
| 32        | Aug 7- 13                     | 0                                   | 32         | 25.33 | 85.39  | 39    | 8.87       | 4.97                  | 4.28           | 11.47         |
| 33        | Aug 14- 20                    | 0                                   | 32.2       | 23    | 86.67  | 40.5  | 9          | 3.35                  | 5.37           | 4.37          |
| 34        | Aug 21- 27                    | 0                                   | 31.5       | 23.42 | 81.67  | 44.67 | 7.73       | 3.08                  | 5.45           | 0             |
| 35        | Aug 28- Sep 3                 | 0                                   | 31.83      | 23    | 84.72  | 52.17 | 5.62       | 3.12                  | 4.1            | 17.47         |
| 36        | Sep 4- 10                     | 0                                   | 31.86      | 23.57 | 86.29  | 47.29 | 5.03       | 3.5                   | 4.31           | 7.09          |
| 37        | Sep 11- 17                    | 0                                   | 30         | 21    | 88.67  | 48.14 | 5.63       | 4.1                   | 4.1            | 0.14          |
| 38        | Sep 18- 24                    | 0                                   | 30.14      | 22.36 | 89.5   | 49.71 | 6          | 3.69                  | 4.04           | 5.69          |
| 39        | Sep 25- Oct 1                 | 0                                   | 30.36      | 22.14 | 80.2   | 55    | 4          | 3.94                  | 3.91           | 1.29          |
| 40        | Oct 2- 8                      | 2.8                                 | 31.21      | 23.86 | 83.14  | 49.71 | 4.31       | 3.41                  | 3.97           | 2.23          |
| 41        | Oct 9- 15                     | 5.1                                 | 32.43      | 23.29 | 85.29  | 51.14 | 4.17       | 4.02                  | 5              | 4.14          |
| 42        | Oct 16- 22                    | 9.6                                 | 33.43      | 24.29 | 88.43  | 52.17 | 2.74       | 4.27                  | 4.3            | 4.94          |
| 43        | Oct 23- 29                    | 12.7                                | 32.86      | 22.14 | 83     | 52.57 | 3.29       | 3.57                  | 4.69           | 0             |
| 44        | Oct 30- Nov5                  | 18                                  | 32.5       | 24.29 | 88.57  | 51.43 | 3.11       | 3.89                  | 5.24           | 7.97          |
| 45        | Nov 6- 12                     | 25.5                                | 31.71      | 24.29 | 86.14  | 63    | 2.77       | 4.53                  | 3.94           | 1.37          |
| 46        | Nov 13- 19                    | 29                                  | 30.86      | 23.57 | 85.86  | 58.43 | 3.77       | 3.63                  | 3.9            | 0             |
| 47        | Nov 20- 26                    | 30.7                                | 31.86      | 24.57 | 87.71  | 68.71 | 4.29       | 3.74                  | 3.3            | 4.57          |
| 48        | Nov 27- Dec 3                 | 32.4                                | 32.43      | 23.14 | 88.14  | 66.29 | 2.93       | 3.54                  | 4.3            | 1.71          |
| 49        | Dec 4-10                      | 35.4                                | 30.93      | 22.79 | 88.71  | 45.43 | 3.71       | 3.26                  | 3.89           | 8.71          |
| 50        | Dec 11-17                     | 36.7                                | 31.89      | 23.64 | 84.29  | 43.86 | 2.41       | 3.37                  | 4.39           | 3.94          |
| 51        | Dec 18-24                     | 40.5                                | 32.64      | 24.04 | 81.29  | 45.71 | 1.93       | 2.93                  | 4.91           | 0.34          |
| 52        | Dec 25-31                     | 42                                  | 34.44      | 24.99 | 82.13  | 47.13 | 2.38       | 4.09                  | 4.58           | 0             |
| 1         | Jan 1-7                       | 45.2                                | 33.5       | 24.29 | 80     | 45.43 | 4.16       | 4.59                  | 5.03           | 0             |
| 2         | Jan 8-14                      | 47.5                                | 34.43      | 23.79 | 72.14  | 43.71 | 1.6        | 4.54                  | 5.13           | 0             |
| 3         | Jan 15-21                     | 48.8                                | 34         | 24.29 | 79.86  | 44    | 2.79       | 4.07                  | 6.14           | 0             |
| 4         | Jan 22-28                     | 49                                  | 33.6       | 25.1  | 81.57  | 38.43 | 4.94       | 4.61                  | 7.67           | 0             |
| 5         | Jan 29-Feb 4                  | 50.5                                | 35.93      | 25.57 | 80.86  | 33.92 | 6.69       | 3.7                   | 7.06           | 0             |
| 6         | Feb 5-11                      | 50.7                                | 34         | 26.14 | 81.43  | 35.86 | 7.91       | 4.84                  | 9.07           | 0             |
| 7         | Feb 12-18                     | 51.4                                | 34.86      | 24.79 | 80.86  | 39.71 | 5.83       | 2.94                  | 8.33           | 0             |
| 8         | Feb 19-25                     | 49.7                                | 35.71      | 25.86 | 81.29  | 42    | 3.37       | 4.53                  | 8.16           | 0             |
| 9         | Feb 26-Mar 3                  | 49.3                                | 37.86      | 24.64 | 81.57  | 36.57 | 5.23       | 3.99                  | 9.74           | 0             |
| 10        | Mar 4-10                      | 50                                  | 36.86      | 26.99 | 82.86  | 41.89 | 6.97       | 4.66                  | 9.77           | 0             |
| 11        | Mar 11-17                     | 47.5                                | 36.57      | 25.64 | 79.86  | 35.43 | 5.6        | 3.67                  | 9.44           | 0             |
| 12        | Mar 18-24                     | 48.6                                | 35.29      | 25.14 | 78.43  | 40.86 | 7.23       | 4.44                  | 8.91           | 0             |
| 13        | Mar 25-31                     | 47.4                                | 36.71      | 24.93 | 77.43  | 37.14 | 5.31       | 5.13                  | 8.04           | 0             |
| 14        | Apr 1-7                       | 49.7                                | 36.29      | 27.1  | 79.71  | 39.14 | 6.89       | 5.03                  | 7.09           | 0             |
| 15        | Apr 8-14                      | 48.9                                | 37.87      | 24.29 | 79.43  | 38.29 | 6.89       | 4.43                  | 7.4            | 0             |
| 16        | Apr 15-21                     | 49.5                                | 36.71      | 26.57 | 80.14  | 38.43 | 5.91       | 4.37                  | 8.06           | 0             |
| 17        | Apr 22-28                     | 47.9                                | 37.57      | 26.97 | 80.14  | 40.14 | 5.8        | 5.21                  | 7.3            | 0             |
| 18        | Apr 29-May 5                  | 46.3                                | 36.5       | 26.58 | 79.23  | 38.5  | 7          | 5.75                  | 7.25           | 0             |
| 19        | May 6-12                      | 36.7                                | 34.83      | 24.67 | 84.17  | 44.17 | 7.37       | 4.12                  | 4.48           | 0.73          |
| 20        | May 13-19                     | 34.1                                | 34.67      | 25.17 | 84.2   | 44.5  | 6.83       | 4.32                  | 5.98           | 5.07          |
| 21        | May 20-26                     | 31.8                                | 32.17      | 24.92 | 83.5   | 45.5  | 5.87       | 5.2                   | 4.28           | 7.53          |
| 22        | May 27-Jun 2                  | 27.1                                | 32.83      | 23.83 | 85.3   | 40.83 | 6.07       | 4.83                  | 5.62           | 19.47         |
| 23        | Jun 3-9                       | 22.2                                | 32.83      | 24.33 | 82.17  | 45.67 | 5.47       | 4.3                   | 5.98           | 11.43         |
| 24        | Jun 10-16                     | 20.1                                | 33.08      | 24.17 | 81.67  | 49.67 | 7.03       | 4.6                   | 3.53           | 0.2           |
| 25        | Jun 17-23                     | 14                                  | 32         | 23.5  | 82.17  | 45.83 | 8.17       | 4.77                  | 4.25           | 4.17          |
| 26        | Jun 24- 30                    | 10.5                                | 33.92      | 23.7  | 85.67  | 41.83 | 6.17       | 4.65                  | 4.03           | 14.4          |
| Mean      |                               | 26.96                               | 33.66      | 24.47 | 83.26  | 45.06 | 5.702      | 4.173                 | 5.49           | 3.002         |
| Variance  |                               | 405.27                              | 4.295      | 1.715 | 12.85  | 56.40 | 3.365      | 0.431                 | 3.931          | 22.51         |
| S.D       |                               | 20.13                               | 2.072      | 1.309 | 3.585  | 7.510 | 1.834      | 0.657                 | 1.982          | 4.745         |
| S.E       |                               | 2.791                               | 0.287      | 0.181 | 0.497  | 1.041 | 0.254      | 0.091                 | 0.274          | 0.658         |

During the study period from July 2023 (27th standard week) to June 2024 (26th standard week), the population of the spiralling whitefly fluctuations in density corresponding to changes in weather parameters. The population dynamics data from (Table 3.) revealed that in 2023, July to September the population of spiralling whiteflies disappears due to rainy season and thus increases slightly from the first week of October (40<sup>th</sup> standard week). Then a peak population of 51.4 individuals per plant was observed during the (7th standard week) in February 2024, which significantly increased in the subsequent months of March and April due to rising temperatures in the summer season. In the first week of May, the population slightly decreased due to sudden rainfall and further declined to the lowest level of 10.5 individuals per plant by the 26th standard week in the last week of June (Figure 4). These results indicate that the spiralling whitefly population is highest in the summer when higher sunshine hours and temperatures accelerate

metabolic activities in insects leading to a rapid buildup of pest populations. Conversely, the population is lower during the rainy season, as lower temperatures, high relative humidity and rainfall reduce pest numbers with heavy rains washing them away. These findings are consistent with previous research (Chaman *et al.*, 2021; Patel *et al.*, 2021) <sup>[3, 14]</sup>. Ranjith *et al.* (1996) <sup>[17]</sup> observed a sharp increase in the spiralling whitefly population during the summer followed by a decline after rainfall in Kerala. Mani and Krishnamoorthi (2000) <sup>[9]</sup> reported that the population of spiralling whitefly was higher from March to June and lower from October to January. Morde *et al.* (2017) <sup>[10]</sup> found that the incidence of spiralling whitefly peaked from the first week of March to the last week of May. Elango and Nelson (2020) <sup>[5]</sup> noted that the infestation of the rugose spiralling whitefly was low during the rainy season, moderate during the post-rainy season and high in the summer.

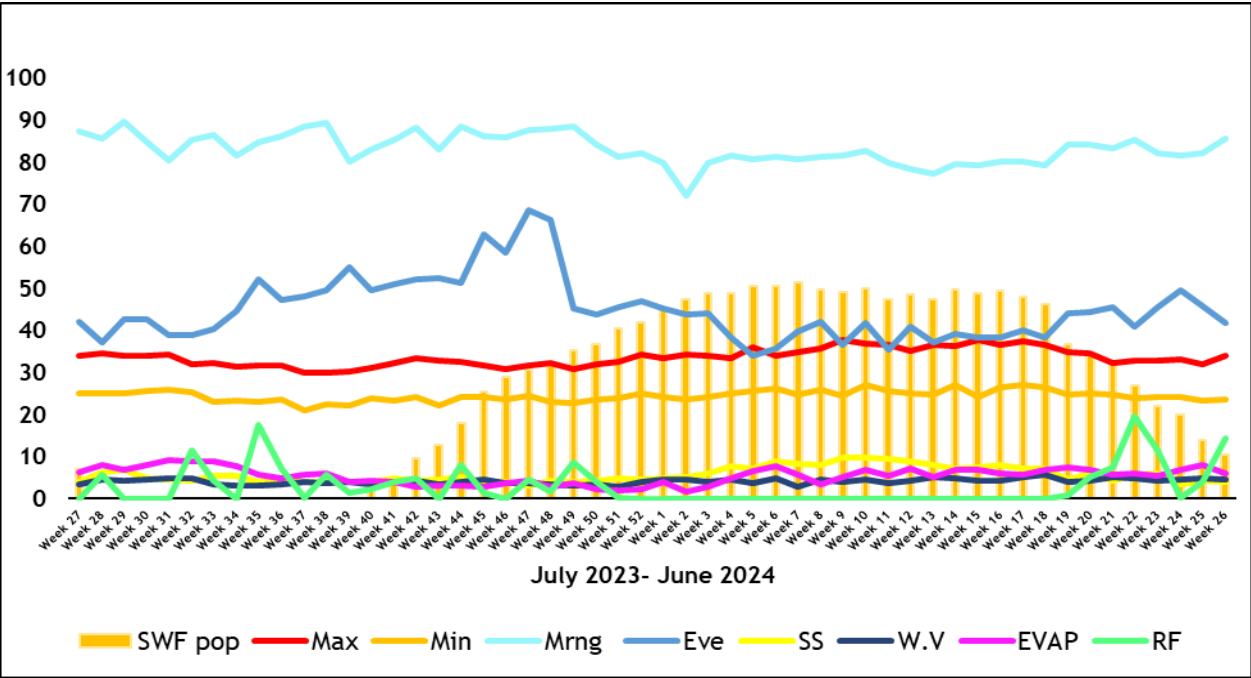


Fig 4: Seasonal incidence of SWF on guava from July 2023- June 2024

Table 4: Correlation coefficients between weather parameters and SWF adults populations on Guava

|                   |    | (Y) - SWF Population |
|-------------------|----|----------------------|
| Tmax (°C)         | X1 | 0.648**              |
| Tmin (°C)         | X2 | 0.518**              |
| RH -M (%)         | X3 | -0.594**             |
| RH- E (%)         | X4 | -0.314*              |
| Evap. (mm)        | X5 | -0.243 <sup>NS</sup> |
| Wind vel. (Km/hr) | X6 | 0.230 <sup>NS</sup>  |
| Sunshine (hrs)    | X7 | 0.637**              |
| Rainfall (mm)     | X8 | -0.382**             |

\* = significant at 5%, \*\* = significant at 1% and NS = non-significant

Correlation studies between the mean level of spiralling whitefly population with weather parameters on standard week basis in the guava orchard shows that the population of SWF was positively correlated and highly significant with maximum temperature ( $r = 0.648$ ), minimum temperature ( $r = 0.518$ ) and also with sunshine hours ( $r = 0.637$ ). On the other hand, a significant negative correlation shows with the parameters such as relative humidity both on morning and evening ( $r = -0.594$  and  $r = -0.314$ ) and rainfall ( $r = -0.382$ ). A non-significant

positive correlation was observed between *Aleurodicus* population with wind velocity ( $r = 0.230$ ) and non-significant negative correlation ( $r = -0.243$ ) with evaporation. Due to the parameters wind velocity and evaporation there was no changes that affects the population of spiralling whiteflies. The present findings are in line with earlier research. Mani (2010) and Elango and Nelson (2020) <sup>[8,5]</sup> reported a positive correlation between whitefly density and maximum temperature and a negative correlation with relative humidity. Similarly, Yadav and Singh (2013) and Patel *et al.* (2021) <sup>[25, 14]</sup> observed a significant positive correlation with temperature and sunshine hours, and a negative correlation with relative humidity. These observations are further supported by Morde *et al.* (2017) <sup>[10]</sup>, who also found a significant positive correlation with temperature and a significant negative correlation with relative humidity and rainfall.

Conclusion

The exploration of the host range and population dynamics of the guava spiralling whitefly, *Aleurodicus dispersus* Russell in Tiruchirappalli district of Tamil Nadu has provided critical insights into its behavior and impact on local agriculture. The

study identified a wide range of host plants indicating the pest adaptability and potential for widespread infestation. Population dynamics revealed significant seasonal fluctuations with peak infestations correlating with specific climatic conditions. These findings emphasize the need for integrated pest management strategies tailored to the regions unique environmental factors. Continued monitoring and research are essential to mitigate the economic impact on guava and other susceptible crops, ensuring sustainable agricultural practices in Tiruchirappalli.

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