Survey and Monitoring the Incidence of Thrips and Ground Nut Bud Necrosis Virus (GBNV) infected Tomato \((Solanum lycopersicum L.)\) and Pesticide usage pattern of Tamil Nadu

T Tamilnayagan, M Suganthy, P Renukadevi and VG Malathi

Abstract

Tomato is one of the important vegetable crops cultivated in throughout the world. It is affected by many causal agents such as fungal, bacterial, viral and nematodes. Among viral diseases, tomato leaf curl and groundnut bud necrosis disease are causing considerable damage to the crop and yield. The groundnut bud necrosis virus is a Tospovirus group, which could be transmitted by many thrips species in the field on various crops. Result revealed that the maximum number of 4.0 thrips per plant was recorded in Krishnagiri district and minimum number 0.8 thrips per plant was recorded in Perambalur district. Correspondingly, maximum GBNV incidence of 82 per cent was recorded in Krishnagiri district and the minimum of 44 per cent disease incidence was observed in Perambalur district and usage of pesticide pattern revealed that the Imidacloprid 17.8 % SL (62.5 per cent), followed by Thiomethxam 25 % WG, Dimethoate 30 EC (50 per cent) and Azadirachtin 1 % (37.5 per cent) pesticides are frequently used in major tomato growing districts of Tamil Nadu.

Keywords: Tomato, Ground Nut Bud Necrosis virus (GBNV), Pesticides, Tamil Nadu.

1. Introduction

Tomato \((Lycopersicon esculentum L.)\) belongs to the genus Lycopersicon under Solanaceae family. It is a native to Peruvian and Mexican region. Tomato is one of the most important "protective foods" because of its special nutritive value. It is one of the most versatile vegetable with wide usage in Indian culinary tradition. Tomatoes are used for soup, salad, pickles, ketchup, puree, sauces and in many other ways. It is also used as a salad vegetable. Tomato has very few competitors in the value addition chain of processing. It is the world's largest vegetable crop after potato and sweet potato.

Tomato has very few competitors in the value addition chain of processing. It is the world's largest vegetable crop after potato and sweet potato. It is the world's largest vegetable crop after potato and sweet potato. It is the world's largest vegetable crop after potato and sweet potato. It is the world's largest vegetable crop after potato and sweet potato.

Survey and Monitoring the Incidence of Thrips and Ground Nut Bud Necrosis Virus (GBNV) infected Tomato \((Solanum lycopersicum L.)\) and Pesticide usage pattern of Tamil Nadu

T Tamilnayagan, M Suganthy, P Renukadevi and VG Malathi

Abstract

Tomato is one of the important vegetable crops cultivated in throughout the world. It is affected by many causal agents such as fungal, bacterial, viral and nematodes. Among viral diseases, tomato leaf curl and groundnut bud necrosis disease are causing considerable damage to the crop and yield. The groundnut bud necrosis virus is a Tospovirus group, which could be transmitted by many thrips species in the field on various crops. Result revealed that the maximum number of 4.0 thrips per plant was recorded in Krishnagiri district and minimum number 0.8 thrips per plant was recorded in Perambalur district. Correspondingly, maximum GBNV incidence of 82 per cent was recorded in Krishnagiri district and the minimum of 44 per cent disease incidence was observed in Perambalur district and usage of pesticide pattern revealed that the Imidacloprid 17.8 % SL (62.5 per cent), followed by Thiomethxam 25 % WG, Dimethoate 30 EC (50 per cent) and Azadirachtin 1 % (37.5 per cent) pesticides are frequently used in major tomato growing districts of Tamil Nadu.

Keywords: Tomato, Ground Nut Bud Necrosis virus (GBNV), Pesticides, Tamil Nadu.

1. Introduction

Tomato \((Lycopersicon esculentum L.)\) belongs to the genus Lycopersicon under Solanaceae family. It is a native to Peruvian and Mexican region. Tomato is one of the most important "protective foods" because of its special nutritive value. It is one of the most versatile vegetable with wide usage in Indian culinary tradition. Tomatoes are used for soup, salad, pickles, ketchup, puree, sauces and in many other ways. It is also used as a salad vegetable. Tomato has very few competitors in the value addition chain of processing. It is the world's largest vegetable crop after potato and sweet potato. It is the world's largest vegetable crop after potato and sweet potato. It is the world's largest vegetable crop after potato and sweet potato.
Early infection in plants resulted yellowing of leaves, stunted growth, finally wilting and death of the plants. Some infected plants set fruits with chlorotic concentric rings with reduced size. Similar type of symptoms was observed by several workers in Karnataka (Hemalatha, 1999, Anjaneya Reddy et al., 2008) [14][1] and Manjunath, 2008) [9]. With this background we conducted survey and monitoring the incidence of thrips and Ground Nut Bud Necrosis Virus (GNBV) infected tomato growing major districts of Tamil Nadu.

2. Materials and methods

Survey was carried out in major tomato growing district of Tamil Nadu during 2015 viz., Dharmapuri, Krishnagiri, Salem, Erode, Thiruppur, Dindugul Coimbatore and Perambalurur district to monitor the incidence of thrips, Ground Nut Bud Necrosis Virus (GBNV) infesting tomato crop and pesticide usage pattern of in the farmer’s holding areas (Table 1).

To assess the population of thrips in different locations, observations were made on three leaves per plant, one each from top, middle and bottom region from ten randomly selected plants per farm leaving border rows.

To work out per cent disease incidence (PDI), total number of plants and number of plants infected with begomovirus were counted leaving the outs of two rows on all the four sides in each farm. PDI was calculated by adopting the following formula (Salam et al., 2010) [13].

\[
\text{Per cent disease incidence} = \left( \frac{\text{Number of infected plants}}{\text{Total number of plant}} \right) \times 100
\]

3. Results and discussion

Field survey was conducted to monitor the incidence of thrips, Ground Nut Bud Necrosis Virus infected tomato crop and pesticides usage pattern in tomato growing major districts of Tamil Nadu viz., Dharmapuri, Krishnagiri, Salem, Erode, Thiruppur, Dindugul Coimbatore and Perambalur districts. The results revealed that the minimum number 0.8 thrips per plant was recorded at Perambalur district and maximum number of 4.0 thrips per plant was recorded at Krishnagiri district and followed by Salem (3.2 thrips/Plant), Dharmapuri (2.7 thrips/ plant), Dindugul (1.7 thrips/ plant), Coimbatore (1.5 thrips/ plant), Erode (1.1 thrips/ plant) and Thiruppur (1.0 thrips/ plant) (Table 1). Correspondingly, minimum of 44 per cent disease incidence was observed in Perambalur district and maximum GBNV incidence of 82 per cent was recorded in Krishnagiri district and the followed by Salem (68 per cent), Dharmapuri (62 per cent), Dindugul (56 per cent), Coimbatore (48 per cent) and Erode (45 per cent) (Table 1).

Gupta and Shukla (2011) [3] reported groundnut bud necrosis virus infection on groundnut up to 70% in Indian Agricultural Research Institute experimental farm, New Delhi on different varietal trials. The survey conducted in 14 states in the major vegetable-growing areas in India representing southern, northwestern, north-eastern and central regions from 2002 to 2009 in tomato and chili and bell peppers revealed the presence of Peanut bud necrosis virus (PBNV) Watermelon bud necrosis virus was (WBNV) Capsicum chlorosis virus (CaCV), and Iris yellow spot virus (IYSV), predominantly detected in watermelons and cucurbits in all regions except northeastern regions were reported by Suresh et al. (2011) [15]. Raja and Jain (2006) [12] revealed that groundnut bud necrosis virus causing bud blight disease in hybrid tomatoes in Karnataka, Kerala, Maharashtra, Tamil Nadu and Uttar Pradesh and reported disease incidence ranged from 19 to 34 per cent. Nagaraja, (2004) [10] reported that the disease incidence of GBNV is more in kharif and summer season as compared to rabi season (Anon, 2004) [2]. In surveyed fields of groundnut, the GBNV disease incidence was 1.5 to 22.5 per cent in Karnataka and 2.0 to 23.4 per cent in Andhra Pradesh. Sreekanth et al. (2003) [14] surveyed in different districts of Andhra Pradesh for the occurrence of thrips and incidence of peanut bud necrosis virus Green gram. Thrips infestation and PBNV incidence was much higher in kharif than rabi and summer season. PBNV infection and thrips population was widespread in Greengram in Naglona, Khammam, Warangal, Karimnagar and Medak districts of Telangana region, and in Srikakulam, Vizianagaram and East Godavari districts of the north coastal region of Andhra Pradesh. Usage of pesticides pattern revealed that the Imidacloprid 17.8 % SL (62.5 per cent), followed by Thiometham 25 % WG, Dimethoate 30 EC (50 per cent) and Azadirachtin 1% (37.5 per cent) pesticides are frequently used in tomato growing areas of Tamil Nadu.

Table 1: Survey and monitoring the incidence of thrips and Groundnut bud necrosis virus and pesticides usage pattern of Tamil Nadu.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>District</th>
<th>GIS co-ordinate</th>
<th>Variety/Hybrid</th>
<th>Stage of the crop</th>
<th>No. of. thrips/3 leaves/plant</th>
<th>PDI</th>
<th>Pesticide usage pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Krishnagiri</td>
<td>12°37’32.45&quot;N 78°11’03.44”E</td>
<td>Paiyur 1</td>
<td>Fruiting</td>
<td>4.0</td>
<td>82.00</td>
<td>Dimethoate 30 EC@ 2 ml/litre Imidacloprid 17.8% SL@4ml/tank</td>
</tr>
<tr>
<td>2</td>
<td>Dharmapuri</td>
<td>12°6’23.50&quot;N 78°8’11.01”E</td>
<td>Sivam</td>
<td>Harvesting</td>
<td>2.7</td>
<td>62.00</td>
<td>Imidacloprid 17.8% SL@ 4ml/tank Thiometham 25 % WG@ 0.2g/litre</td>
</tr>
<tr>
<td>3</td>
<td>Salem</td>
<td>11°39’51.57”N 78°8’45.65”E</td>
<td>Sivam</td>
<td>Flowering</td>
<td>3.2</td>
<td>68.00</td>
<td>Dimethoate 30 EC@2 ml/litre</td>
</tr>
<tr>
<td>4</td>
<td>Erode</td>
<td>11°20’27.73&quot;N 77°43’1.79”E</td>
<td>Sagar</td>
<td>Fruiting</td>
<td>1.1</td>
<td>46.00</td>
<td>Azadirachtin 1% @ 2.5ml/litre Imidacloprid 17.8% SL@ 4ml/tank</td>
</tr>
<tr>
<td>5</td>
<td>Trippur</td>
<td>11°6’30.69”N 77°20’27.84”E</td>
<td>PKM 1</td>
<td>Flowering</td>
<td>1.0</td>
<td>45.00</td>
<td>Thiometham 25 % WG@ 0.2g/litre Dimethoate 30 EC@ 2 ml/litre Imidacloprid 17.8% SL@ 4ml/tank</td>
</tr>
<tr>
<td>6</td>
<td>Dindugul</td>
<td>10°22’2.33”N 77°58’49.04”E</td>
<td>PKM 1</td>
<td>Harvesting</td>
<td>1.7</td>
<td>52.00</td>
<td>Thiometham 25 % WG@ 0.2g/litre Azadirachtin 1%@ 2.5ml/litre</td>
</tr>
<tr>
<td>7</td>
<td>Coimbatore</td>
<td>11°10’6.4”N 76°57’21.00”E</td>
<td>Co 3</td>
<td>Flowering</td>
<td>1.5</td>
<td>48.00</td>
<td>Imidacloprid 17.8% SL@ 4ml/tank</td>
</tr>
<tr>
<td>8</td>
<td>Perambalur</td>
<td>10°47’25.74”N 78°42’16.82”E</td>
<td>PKM 1</td>
<td>Fruiting</td>
<td>0.8</td>
<td>44.00</td>
<td>Dimethoate 30 EC@ 2 ml/litre Thiometham 25 % WG@ 0.2g/litre Azadirachtin 1%@ 2.5ml/litre</td>
</tr>
</tbody>
</table>
4. Conclusion
Based on the result of the survey it is concluded that maximum number of 4.0 thrips per plant and GBNV incidence of 82 per cent was recorded at Krishngiri district and maximum usage of pesticide pattern revealed that the Imidacloprid 17.8% SL (62.5 per cent) pesticide are frequently used in major tomato growing districts of Tamil Nadu.

5. References