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# INVENTORY OF DISEASES AND COMPLIANCE WITH THE USE OF CHEMICAL PESTICIDES TO CURB THE SPREAD OF DISEASE

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## ABSTRACT

Diseases are a major cause of yield loss and plant mortality in horticultural crops. Horticultural crops are a primary focus for farmers in meeting public demand. However, diseases often pose a problem in their cultivation. The diseases that attack cultivated plants include fungi and viruses. Fungal diseases can damage cultivated plants and reduce yields. Viruses are spread by insect vectors and can cause significant damage to plants. The use of chemical pesticides to suppress the growth and development of plant diseases can yield quick results. However, the use of chemical pesticides poses a problem because the dosage, timing, and application methods are often inappropriate. The objective of this study was to identify plant diseases and the role of chemical pesticides in suppressing the growth and development of diseases affecting horticultural crops. The research method employed purposive sampling and interviews with 30 horticultural farmers, each of whom cultivated 50 plants. The data, presented in descriptions, tables, and figures, were analyzed using RStudio. Based on the results of the study, the diseases affecting horticultural crops among the 30 farmers were viruses and fungi. The highest percentage of infection for viral diseases reached 100%, while for fungal diseases it was 84%. Infection rates for viral diseases ranged from 12.5% to 82.0%, while those for fungal diseases ranged from 19.5% to 38.5%. Farmers' compliance with pesticide application guidelines was high, indicating a high level of knowledge regarding pesticide use. The correlation between compliance with pesticide use guidelines and disease infection rates was very weak.

**Keywords:** Fungi, Correlation, Infection Rate, Viruses, Pesticides

## 1 INTRODUCTION

Horticultural crops are widely cultivated by the public to meet market demand (Abdurahman et al., 2022; Immanuela et al., 2025). Horticultural crops include vegetables, fruits, and flowers. Vegetables are the most widely cultivated commodity, primarily due to high consumer demand. Furthermore, horticultural commodities that are widely cultivated and have high market value include fruits and flowers. There is high demand for horticultural crops, particularly vegetables, fruits, and flowers. The cultivation of horticultural crops continues to increase (Andriani et al., 2024; Imadudin et al., 2024; Pitaloka, 2017). This is because public demand for horticultural crops continues to rise (Abdurahman et al., 2022; Andriani et al., 2024; Ilsan et al., 2016). The cultivation of horticultural crops faces challenges, particularly attacks by plant pests (Arsi et al., 2023). The challenges faced in horticultural crop cultivation due to attacks by plant pests can reduce yields and cause plant death (Nur et al., 2024).

Plant pests that can reduce crop yields and cause plant death include diseases (Anwar et al., 2024; Arsi et al., 2023; Ekawati et al., 2023). In crop cultivation, diseases are among the primary factors contributing to reduced yield and quality. A variety of diseases affect horticultural crops, including fungal, bacterial, viral, and nematode infections (Berutu et al., 2023; Ramadhan et al., 2023; Simbolon et al., 2023; Warman et al., 2025). Disease outbreaks in horticultural crops can disrupt plant growth and development (Amara, 2026; Elfanda et al., 2024; Karenina et al., 2022; Nur et al., 2024). Symptoms of disease outbreaks vary depending on the specific pathogen involved. Diseases affect cultivated plants by infecting leaves, roots, stems, and fruits. Infestations can disrupt the photosynthesis process and impair a plant's ability to produce agricultural products (Nabila et al., 2022; Santoso et al., 2022; Suparman et al., 2024). Diseases pose a major problem in horticultural crop cultivation, making it necessary to control them. Identifying the diseases affecting plants is necessary to determine the appropriate steps for controlling them (Akbario et al., 2023; Elfanda et al., 2024).

Diseases affecting horticultural crops caused by fungi include *Colletotrichum capsici*, *Colletotrichum acutatum*, *Colletotrichum gloeosporioides*, *Cercospora* sp., stem rot, fruit rot, *Fusarium* wilt, downy mildew, and *Alternaria* spp. (Akbario et al., 2023; Amara, 2026; Elfanda et al., 2024). In addition to fungal diseases, horticultural crops are also susceptible to viral diseases. Viral diseases affecting horticultural crops include leaf curl, yellow virus, mosaic virus, and Banana Bunchy Top virus (Arsi et al., 2023; Karenina et al., 2022; Suparman et al., 2024). Viruses transmitted by insect vectors: insect vectors help spread viral diseases from infected plants to healthy ones. Insect vectors that transmit viruses to plants have piercing-sucking mouthparts. Insects that act as virus vectors include *Aphid gossypii*, *Bemisia tabaci*, *Myzus persicae*, *Empoasca* sp., *Aphid carotovora*, *Pentalonia nigronervosa*, and *Thrips* sp. (Arsi et al., 2020) Diseases affecting plants require an inventory. This process is carried out by observing plants exhibiting symptoms.

Observations in the field are necessary to identify disease outbreaks in horticultural crops. In addition, observations are conducted to identify the diseases affecting the plants, followed by laboratory analysis of these diseases (Arsi et al., 2020). However, an inventory of diseases in horticultural crops in the field can be conducted by directly observing disease symptoms. Direct observation of plant diseases can be used to map the symptoms of infection and identify the causes of the diseases affecting the plants. Plant disease research conducted through surveys to collect data directly can classify disease causes based on the symptoms of infection observed on the plants (Ekawati et al., 2023; Islam et al., 2016). Surveys conducted as part of this research can facilitate the classification of pathogens that attack plants. The cultivation of horticultural crops within agroecosystems, particularly on experimental plots, can provide information about the types of pathogens that cause diseases in these horticultural crops. In this context, such information can aid in the protection of cultivated plants and inform decision-making. Conducting an inventory of horticultural plant diseases is one way to pursue further research on these plant diseases (Ekawati et al., 2023; Islam et al., 2016; Murinto et al., 2024).

Horticultural plant diseases must be controlled to suppress their growth and spread. The control method most commonly used by the public is the use of chemical pesticides. Chemical pesticide control is widely preferred because these products are readily available, easy to apply, and produce quick results. Chemical pesticides are widely used to suppress the growth and development of diseases in horticultural crops. Farmers' use of chemical pesticides in the field needs to be monitored to evaluate pesticide application practices (Arsi et al., 2023; Gea et al., 2024; Zhonareva et al., 2026). Applications of chemical pesticides in the field are often carried out without proper and efficient use. The objective of this study is to identify diseases that affect horticultural crops and the use of chemical pesticides to control these diseases in horticultural crops.

## 2 MATERIAL AND METHOD

A research inventory of diseases in horticultural crops was conducted through direct observation in the Betung and Suak Tapek subdistricts. The study was located in Banyuasin Regency. This research employed direct observation and survey methods. The survey was conducted among horticultural farmers in the area through interviews. The interviews conducted in both subdistricts involved 30 horticultural farmers. This study employed purposive sampling for its observations. Purposive sampling in this study was intentionally applied by observing farmers who cultivate horticultural crops in both subdistricts (Arsi et al., 2025). Research locations were determined through a site survey of crop cultivation practices, followed by observations of the cultivated plants, particularly horticultural crops. The observed crop sites were then divided into 5 plots within each study area. From each observed plot, 10 sample plants were selected. A total of 50 plants were observed at each study site (Arsi et al., 2024; Arsi et al., 2024; SHK et al., 2023). For each plant observed in each plot, the researchers examined disease symptoms, identified the disease, assessed the severity of the disease, and conducted interviews with horticultural farmers. Symptoms of plant diseases were observed directly, and the diseases affecting the horticultural crops were recorded. The observed disease symptoms were documented. The level of disease incidence observed in the horticultural crops was determined by recording all types of diseases and calculating the percentage and intensity of disease incidence in the horticultural crops. The percentage of disease incidence in the horticultural crops was calculated based on all types of diseases affecting those crops, using the following formula for disease incidence percentage: (Supriatna et al., 2017), Note: P: Percentage of disease incidence (%), n: total number of infected plants, N = Total number of plants observed

$$P= (n )/(N ) \times 100\ \%$$

The intensity of disease outbreaks in horticultural crops is calculated using the following disease intensity formula: (Triwidodo & Tanjung, 2020; Zahrawati et al., (2021): Note:

I = Disease intensity on plants (%), N = Total observed population, v = Disease score , n = Total number of plants affected by the disease and Z = Highest score

$$I= (\Sigma (n\times v))/(Z \times N) \times 100\ \%$$

The intensity of a disease outbreak can be determined by observing the level of disease incidence in the field. Plants showing no symptoms of infection are classified as healthy plants with a score of 0; plants showing symptoms with a score of 1 are classified as infected plants with an infection range of 1–25%; plants showing symptoms with a score of 2 have an infection range of 26–50%; plants with a score of 3 have a disease prevalence of 51–75%, while plants with a score of 4 have a disease prevalence exceeding 75%.(Triwidodo & Tanjung, 2020). The use of chemical pesticides in horticultural crop cultivation is assessed by calculating the compliance rate of horticultural farmers in implementing pesticide use in the field. The compliance rate of farmers in using pesticides to suppress the growth and development of diseases in the field is determined through interviews. The results of these interviews are then calculated and processed using the following formula:

$$SKP= \Sigma (S\times B)$$

An explanation of how to use the formula for assessing farmers' compliance with pesticide use on horticultural crops is provided in detail as follows: SKP is the score used to describe compliance with pesticide use; S is the score used to evaluate each criterion; and B is used to assign a weight to each criterion. Compliance scores for pesticide use by horticultural farmers are categorized as follows: highest with a score of 401–600 and a scale of 6; very high with a score of 301–400 and a scale of 5; high with a score of 225–300 and a scale of 4; moderate with a score of 150–224.9 and a scale of 3; low with a score of 75–149.9 and a scale of 2; and very low with a score of 0–75 and a scale of 1. Relationship between the pesticide score used in horticultural crop farming, denoted by x, and the population and disease incidence affecting horticultural crops, denoted by y; the correlation between the pesticide score and disease incidence can be expressed as follows: Note: r = Correlation coefficient, n = Sample size, x = Horticultural farmers' compliance scores regarding pesticide use, y = Disease incidence rate (%)

$$r=(n(\Sigma xy)-(\Sigma x)(\Sigma y))/(\sqrt{\{n\Sigma x^2-(\Sigma x)^2\}\{n\Sigma y^2-(\Sigma y)^2\}})$$

The correlation results (r) were then categorized according to a predetermined range (Table 1)

**Table 1: Value intervals for the correlation coefficient (r)(Napitupulu et al., 2018)**

| Type of Relationship | Correlation coefficient (r) |
|---|---|
| Very strong correlation | 0.800–1.000 |
| Strong correlation | 0.600–0.799 |
| Moderately strong correlation | 0.400–0.599 |
| Weak correlation | 0.200–0.399 |
| Very weak correlation | 0.000–0.199 |
| No correlation | 0.000 |

Determination coefficient calculation: This is performed by assessing the impact of the percentage of variable X (farmer compliance score) on variable Y (percentage and intensity of pests and diseases). The determination coefficient ($R^2$) is calculated by squaring the correlation coefficient (r) using the following equation: Note; $r^2$ = Coefficient of determination anda r = Correlation coefficient

$$r^2=r^2\times 100\%$$

Analysis of Data: The data in this study were analyzed using RStudio and presented in descriptive form, as well as in figures and tables.

## 3 RESULT AND DISCUSSION

Based on observations of plant pests and diseases on agricultural land in Banyuasin Regency, the highest percentage of disease outbreaks in horticultural crops was caused by the curly virus, Gemini virus, Phytophthora infestans, CAMV, and Colletotrichum sp., at 100%, with 50 plants affected by each pathogen. The lowest percentage was for PMWaV, at 50%, with 25 plants affected. Viral disease outbreaks are commonly found in horticultural crop fields. This is because plants infected with viruses are highly susceptible to insect vectors. Many of the insect vectors that attack horticultural crops belong to the order Hemiptera. Insects that transmit viral diseases to plants have piercing-sucking mouthparts, or haustella. Insect vectors of plant viruses include *Bemisia tabaci*, *Aphis gossypii*, *Aphis carotovora*, and *Myzus persicae* (Arsi et al., 2023). Among fungal diseases affecting horticultural crops, Cescospora sp. was observed to cause the least severe infections (Amara, 2026). This disease was found in 7 farmers. *Cescospora* sp. is a disease that primarily affects plant leaves, thereby reducing agricultural yields. Leaves infected with *Cescospora* sp. can disrupt the photosynthesis process. Plant diseases can be influenced by the environment, the host, and the pathogen. The environment significantly influences the development of plant diseases. Viral diseases in plants are most common during the summer, as insect vectors thrive in dry environmental conditions. During the rainy season, insect vectors are naturally washed away by rainfall. However, the rainy season also brings a high incidence of fungal diseases (Table 2).

**Table 2: Percentage of Disease Incidence in Horticultural Crops**

| Farmer | Types of diseases | Infected plants | Percentage of attacks (%) |
|---|---|---|---|
| 1 | *Cercospora* sp. | 39 | 78 |
| | Gemini virus | 46 | 92 |
| 2 | Curly virus | 50 | 100 |
| 3 | Curly virus | 50 | 100 |
| 4 | Gemini virus | 50 | 100 |
| 5 | Gemini virus | 50 | 100 |
| 6 | *Phytophthora infestans* | 40 | 80 |
| | Curly virus | 49 | 98 |
| 7 | *Phytophthora infestans* | 42 | 84 |
| | Curly virus | 49 | 98 |

| | | | |
|---|---|---|---|
| 8 | *Phytophthora infestans* | 42 | 84 |
| | Curly virus | 50 | 100 |
| 9 | *Phytophthora infestans* | 50 | 100 |
| 10 | *Phytophthora infestans* | 46 | 90 |
| | Curly virus | 50 | 100 |
| 11 | *Cercospora* sp. | 40 | 80 |
| | Curly virus | 50 | 100 |
| 12 | *Cercospora* sp. | 40 | 80 |
| | Curly virus | 50 | 100 |
| 13 | *Cercospora* sp. | 42 | 84 |
| | Curly virus | 50 | 100 |
| 14 | *Cercospora* sp | 42 | 84 |
| | Curly virus | 50 | 100 |
| 15 | *Puccinia arachidis* | 37 | 74 |
| 16 | *Puccinia arachidis* | 46 | 90 |
| | CAMV | 34 | 68 |
| 17 | *Puccinia arachidis* | 49 | 98 |
| | CAMV | 50 | 100 |
| 18 | *Puccinia arachidis* | 46 | 90 |
| | CAMV | 27 | 54 |
| 19 | *Cercospora* sp. | 44 | 88 |
| 20 | *Cercospora* sp. | 33 | 66 |
| | CAMV | 41 | 82 |
| 21 | *Phytophthora infestans* | 47 | 94 |
| | Gemini virus | 44 | 88 |
| 22 | *Phytophthora infestans* | 35 | 70 |
| | Gemini virus | 38 | 76 |
| 23 | Gemini virus | 41 | 82 |
| 24 | Gemini virus | 35 | 70 |
| 25 | *Colletotrichum* sp. | 43 | 86 |
| | Curly virus | 46 | 90 |
| 26 | *Downy mildew* | 34 | 68 |
| 27 | *Penicillium* sp. | 40 | 80 |
| 28 | *Penicillium* sp. | 41 | 82 |
| | PMWaV | 29 | 58 |
| 29 | *Colletotrichum* sp. | 50 | 100 |
| | PMWaV | 29 | 58 |
| 30 | *Colletotrichum* sp. | 49 | 98 |
| | PMWaV | 25 | 50 |

Based on observations of disease-carrying insects conducted on horticultural crops in Banyuasin Regency, the highest disease incidence was found to be the curly virus among Farmer 2's crops, at 82% in the severe category; the lowest disease incidence was PMWaV among Farmer 30's crops, at 12.5% in the very mild category. Insect vectors influenced the intensity of disease outbreaks in the observed horticultural crops, causing high rates of viral disease outbreaks. The presence of insect vectors on plants is influenced by a supportive environment, where high temperatures and low humidity can lead to increased population growth of insect vectors. Viruses that infect plants can survive on inanimate objects; they can crystallize when present on such surfaces. Viruses replicate when present in living organisms. Viruses are difficult to control; however, their spread can be suppressed by controlling the viral vectors (Arsi et al., 2023; Irwansyah et al., 2019). Based on research conducted on diseases affecting horticultural crops, viral diseases cause the most severe infections, while fungal diseases result in milder infections. The spread of these plant diseases can cause plants to fail to bear fruit and become stunted (Table 3).

**Table 3: Severity of Disease Infection in Horticultural Crops**

| Farmer's | Types of diseases | Disease attack intensity (%) | Description |
|---|---|---|---|
| 1 | *Cercospora* sp. | 27.5 | Light |
| | Gemini virus | 60.5 | Medium |
| 2 | Curly virus | 82.0 | Heavy |
| 3 | Curly virus | 75.5 | Heavy |
| 4 | Gemini virus | 69.5 | Medium |
| 5 | Gemini virus | 74.0 | Medium |
| 6 | *Phytophthora infestans* | 30.5 | Light |
| | Curly virus | 77.5 | Heavy |
| 7 | *Phytophthora infestans* | 24.0 | Very light |
| | Curly virus | 69.5 | Medium |
| 8 | *Phytophthora infestans* | 28.0 | Light |
| | Curly virus | 79.5 | Heavy |
| 9 | *Phytophthora infestans* | 32.0 | Light |
| 10 | *Phytophthora infestans* | 28.5 | Light |
| | Curly virus | 67.0 | Medium |
| 11 | *Cercospora* sp. | 21.0 | Very light |
| | Curly virus | 74.5 | Medium |
| 12 | *Cercospora* sp. | 20.0 | Very light |
| | Curly virus | 61.5 | Medium |
| 13 | *Cercospora* sp. | 21.5 | Very light |
| | Curly virus | 64.5 | Medium |
| 14 | *Cercospora* sp. | 21.5 | Very light |
| | Curly virus | 64.5 | Moderate |
| 15 | *Puccinia arachidis* | 35.0 | Light |
| 16 | *Puccinia arachidis* | 35.0 | Light |
| | CAMV | 26.0 | Light |
| 17 | *Puccinia arachidis* | 38.5 | Light |
| | CAMV | 48.5 | Light |
| 18 | *Puccinia arachidis* | 39.0 | Light |

| | | | |
|---|---|---|---|
| | CAMV | 24.0 | Very light |
| 19 | *Cercospora* sp. | 35.0 | Light |
| 20 | *Cercospora* sp. | 16.5 | Very light |
| | CAMV | 27.5 | Light |
| 21 | *Phytophthora infestans* | 30.5 | Light |
| | Gemini virus | 30.0 | Light |
| 22 | *Phytophthora infestans* | 20.0 | Very light |
| | Gemini virus | 25.5 | Light |
| 23 | Gemini virus | 23.5 | Very light |
| 24 | Gemini virus | 22.5 | Very light |
| 25 | *Colletotrichum* sp. | 26.5 | Light |
| | Curly virus | 42.0 | Moderate |
| 26 | *Downy mildew* | 19.5 | Very light |
| 27 | *Penicillium* sp. | 29.0 | Light |
| 28 | *Penicillium* sp. | 26.0 | Light |
| | PMWaV | 17.5 | Very light |
| 29 | *Colletotrichum* sp. | 38.5 | Light |
| | PMWaV | 15.0 | Very light |
| 30 | *Colletotrichum* sp. | 44.0 | Light |
| | PMWaV | 12.5 | Very light |

Observations on horticultural farms in Banyuasin Regency revealed plant disease symptoms on horticultural plots infested with pathogens. The diseases affecting horticultural crops in Banyuasin are caused by several pathogens, such as fungi and viruses. Observations were conducted by identifying observation points, then recording and documenting the results in the field. The symptoms found in the field were then compared with reference guides for disease symptoms in horticultural crops. The symptoms caused by these pathogen attacks vary depending on the type of pathogen infecting the plants. The symptoms of viral infections in horticultural crops observed differ depending on the insect vectors that transmit them. Viruses that infect chili plants are transmitted by two insect pests: *Bemisia tabaci* and *Aphid gossypii* (Arsi et al., 2023). These two insects infect plants, causing distinct symptoms. *Bemisia tabaci* transmits a viral disease to chili plants that causes the leaves to curl and turn yellow, while *Aphid gossypii* causes the chili leaves to dry out. *Empoasca* sp. attacks eggplant plants, causing the leaves to turn yellow. This insect is characterized by a green body with black spots. The nymphs can be found on eggplant leaves and are not capable of flight. The adult form, however, has wings and is agile. All insects that attack horticultural crops and transmit viruses have piercing-sucking mouthparts. Fungi that attack plants also have distinct characteristics depending on the specific pathogen involved. The fungus *Colletotrichum* sp. infects chili plants, affecting both the leaves and the fruit. Small spots first appear on the leaves and fruit; these spots then turn brown to black, depending on the fungal species. Over time, the spots grow larger, and a sunken area forms in the center of each spot. The spots are dry, but they resemble wet, soft scabs. The disease worsens under high humidity conditions. Small dots appear on the plant parts. These small dots come in various colors such as orange, pink, and black and are found in the center of the spots. The spots on the lesions are clusters of spores. *Colletotrichum* sp. infects the leaves and stems of plants. On leaves infected with *Colletotrichum* sp., brown and blackish lesions appear, and the infected leaves eventually fall off. On stems and twigs, *Colletotrichum* sp. can cause the plant stems to rot, while on twigs it can cause the plant's shoots to die. *Cescospora* sp. is a common pathogen that attacks plant leaves. Leaves infected with this disease develop round or oval spots that are brown or grayish in color; in the center of the spot is a white patch, and the edges are dark (Figure 1).

Observations conducted on horticultural farms in Banyuasin Regency revealed symptoms of plant diseases on horticultural plots infested by pathogens. The diseases affecting horticultural crops in Banyuasin are caused by several pathogens, such as fungi and viruses. Observations were conducted by identifying observation points, then recording and documenting the results in the field. The symptoms found in the field were then compared with reference guides for disease symptoms in horticultural crops.

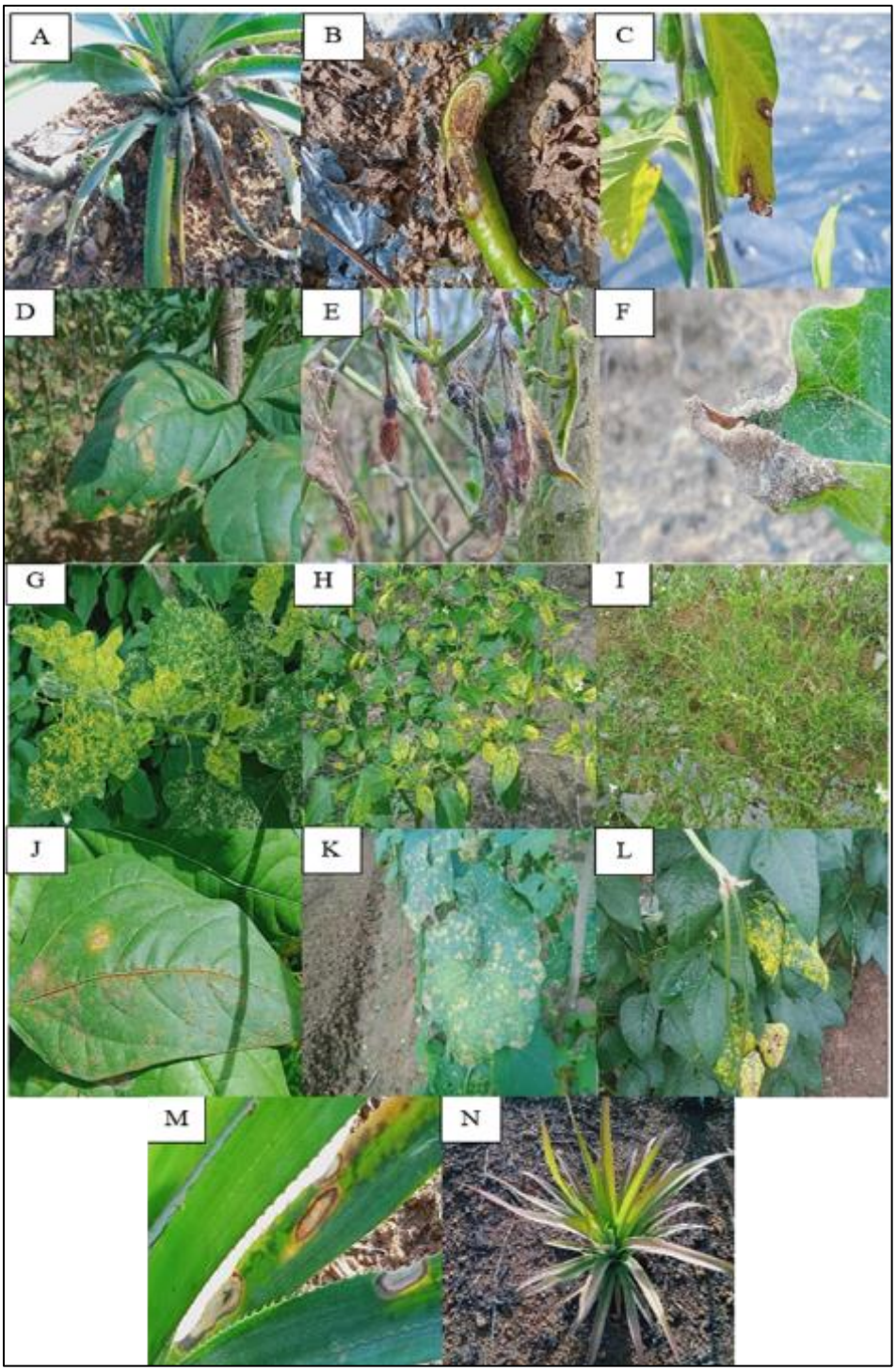



**Figure 1: Plant diseases found in horticultural fields in Banyuasin: *Colletotrichum* sp. (A, B); *Cercospora* sp. (C, D); *Phytophthora infestans* (E, F); Gemini virus (G, H); Curly virus (I); *Puccinia arachidis* (J); Downy mildew (K); CAMV (L); *Penicillium* sp. (M); PMWaV (N).**

The symptoms caused by these pathogen attacks vary depending on the type of pathogen infecting the plants. The symptoms of viral infections in horticultural crops observed differ depending on the insect vectors that transmit them. Viruses that infect chili plants are transmitted by two insect pests: *Bemisia tabaci* and *Aphid gossypii* (Arsi et al., 2023). These two insects infect plants, causing distinct symptoms. Bemisia tabaci transmits a viral disease to chili plants that causes the leaves to curl and turn yellow, while *Aphid gossypii* causes the chili leaves to dry out. *Empoasca* sp. attacks eggplant plants, causing the leaves to turn yellow. This insect is characterized by a green body with black spots. The nymphs can be found on eggplant leaves and are not capable of flight. The adult form, however, has wings and is agile. All insects that attack horticultural crops and transmit viruses have piercing-sucking mouthparts. Fungi that attack plants also have distinct characteristics depending on the specific pathogen involved. The fungus *Colletotrichum* sp. infects chili plants, affecting both the leaves and the fruit. Small spots first appear on the leaves and fruit; these spots

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Based on interviews conducted with 30 farmers in Banyuasin Regency, in which 20 questions were asked, the average pesticide compliance score among farmers was 291.9. This indicates that the farmers possess a high level of knowledge. The highest pesticide compliance score, 332, was achieved by Ibu Mawar, who grows chili peppers. Horticultural farmers adhere to the use of chemical pesticides to suppress the growth and development of diseases in the field. Based on the interview results, farmers' compliance with pesticide use scored highly on every question. These high scores indicate a high level of knowledge among farmers, which is attributed to the usage instructions provided on pesticide packaging. Experience with pesticide use, discussions among fellow farmers, and interactions with pesticide experts and agricultural extension workers all contribute to knowledge regarding pesticide application in the field (Table 3).

**Table 3: Compliance scores of horticultural farmers in applying chemical pesticides**

| **Number of farmers (Individu)** | Average compliance score | Average compliance score |
|---|---|---|
| 30 | 291,9 | High level of knowledge |

A correlation test was conducted to determine the relationship between pesticide compliance scores and the percentage of disease outbreaks in Banyuasin Regency. The correlation coefficient (r) was 0.09, indicating a very weak correlation between the two variables. The coefficient of determination ($R^2$) was 0.007, indicating that the influence of farmer compliance on the percentage of disease outbreaks was weak, with the remainder being influenced by other variables. Farmers demonstrated a high level of knowledge regarding the proper use of chemical pesticides; however, the relationship between the percentage of disease outbreaks and farmer compliance was very weak. This is likely due to the application of pesticides that are not properly targeted, as well as incorrect dosage and timing of application (Table 4).

**Table 4: Correlation test of farmer compliance scores with the percentage of disease outbreaks**

| **Test** | **Value** | **Description** |
|---|---|---|
| Correlation (r) | 0.09 | Very weak correlation |
| Coefficient of determination | 0,007 | The effect of farmers' compliance scores |

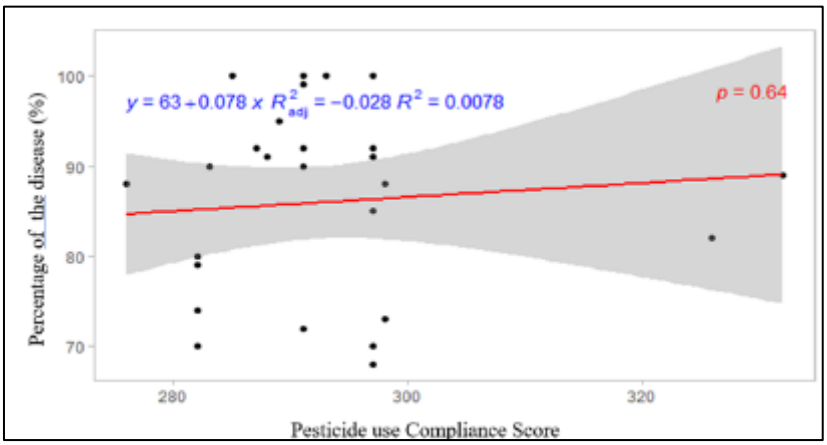



**Figure 2: Correlation between farmers' compliance scores and the percentage of disease outbreaks**

The correlation coefficient indicates the direction of the relationship in the graph, which shows a y-value of 63 + 0.078x, meaning that the x-value represents the treatment (pesticide compliance score). The coefficient of determination ($r^2$) of 0.004 indicates a weak influence of the pesticide score on the percentage of disease incidence (Figure 2).

A correlation test was conducted to determine the relationship between pesticide compliance scores and the intensity of disease outbreaks in Banyuasin Regency. The correlation coefficient (r) was -0.12, indicating a very weak correlation between the two variables. The coefficient of determination ($R^2$) of 0.01 indicates that the influence of farmer compliance on the intensity of disease outbreaks is weak, and the remainder is influenced by other variables (Table 5).

**Table 5: Correlation test of farmer compliance scores with the intensity of disease outbreaks**

| Test | Value | Description |
|---|---|---|
| Correlation (r) | -0.12 | Very weak correlation |
| Coefficient of determination | 0.01 | The effect of farmers' compliance scores |

The correlation coefficient indicates the direction of the relationship; the graph shows y = 0.18x, which means that x represents the treatment (pesticide compliance score). The coefficient of determination ($r^2$) of 0.001 indicates a weak influence of the pesticide score on the intensity of disease infestation (Figure 3).

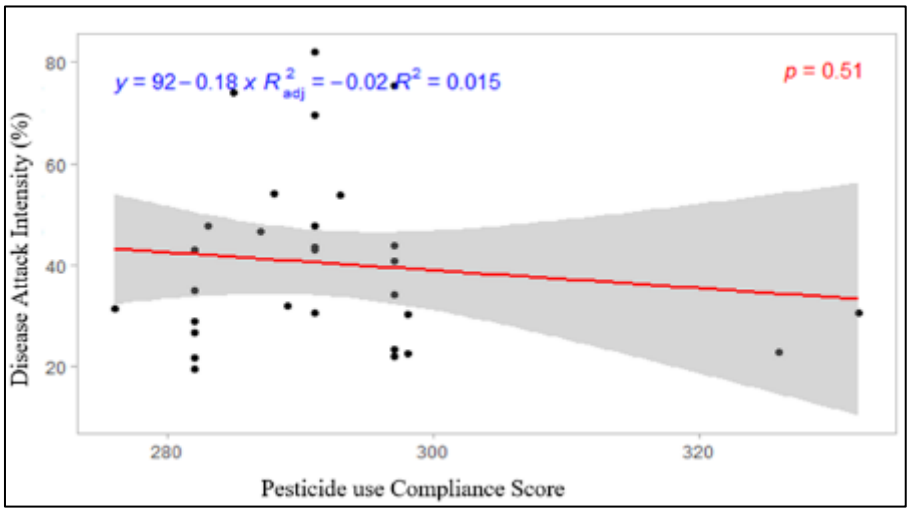



**Figure 3: Correlation between farmers' compliance scores and the intensity of disease outbreaks**

## 4 CONCLUSION

The diseases found to affect horticultural crops were fungal and viral. The highest incidence rate was for viral diseases, and the lowest was for fungal diseases. Farmers' compliance with the use of chemical pesticides, with a score of 291.9, was classified as high; however, its correlation with the incidence rate was weak.

## STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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The authors declare no conflicts of interest regarding this manuscript.

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