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FARMERS BEHAVIOR TOWARDS HORTICULTURAL PLANT DISEASE INFECTIONS IN BANGKA REGENCY

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ABSTRACT

This study explores the knowledge, attitudes, and practices of farmers in Bangka Regency, Indonesia, regarding the management of diseases affecting horticultural crops. Field surveys and structured interviews were conducted across nine villages to assess the incidence of plant diseases and the control methods employed by local farmers. The results showed an average disease incidence of 23.33%, with the highest observed in cucumber crops at 66%. Most farmers (75%) practiced monoculture farming, which contributed to the persistence and spread of soil-borne diseases such as Fusarium wilt and root rot. Synthetic pesticides were the predominant control method, with 68% of farmers applying them regularly, and many exceeding recommended dosages. Although most respondents could visually identify disease symptoms, their understanding of disease development stages, causal agents, and sustainable control options was limited. Notably, none of the farmers were familiar with biological control agents and only a minority believed that organic materials could reduce disease incidence. The findings underscore a heavy dependence on chemical control and highlight a significant gap in awareness of integrated and environmentally friendly disease management practices. Factors such as improper pesticide use, poor seed quality, and suboptimal soil conditions further exacerbated disease risks. To enhance productivity and sustainability, it is critical to strengthen farmers' capacity through education and training in integrated disease management, emphasizing crop rotation, balanced fertilization, and the adoption of biological control strategies. These interventions are essential for reducing losses and promoting sustainable horticultural production in Bangka Regency.

Key words: Farmer practices, Fruit, Horticulture, Plant disease, Vegetable

INTRODUCTION

Indonesia is an agricultural country with most of its population engaged in farming. Horticultural crops such as vegetables, fruits, biopharmaceuticals, and ornamental plants are the most widely cultivated crops (Pitaloka, 2020). According to Angreini *et al.*, (2021), horticultural crops have a potential market share based on their advantages. This is due to increasing public demand (Suwardi *et al.*, 2023). Based on data from the Central Statistics Agency

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(CSA) in 2024, horticultural crop production has fluctuated over the past three years, with a decline of 14.77%. This also occurred in the Bangka Belitung Islands, where the horticultural crop production value fluctuation decreased by 11.19%. One of the factors causing this decline in production value is plant disease infection. Plant diseases are one of the causes of declining production value, particularly in Bangka Regency, Bangka Belitung Islands Province. The fluctuating decline in production value reached 96.18% (Bangka Belitung Statistic, 2024). Plant diseases can reduce the quality and quantity of horticultural crops. The development of plant diseases is influenced by many factors, including environmental factors, plant species, and cultivation techniques (Munif & Sulistiawati 2014). Cultivation techniques or farming habits are thought to influence the development of plant diseases.

Based on this, it is necessary to analyze farmers' attitudes and actions in managing horticultural plant diseases, particularly in Bangka Regency, Bangka Belitung. This study aims to obtain information on farmers' knowledge, attitudes, and actions in managing horticultural plant diseases, particularly in Bangka Regency, Bangka Belitung. Integrated Disease Management (IDM) is a plant disease control approach that combines various techniques such as cultivation, biological, physical, and chemical control to effectively and sustainably prevent disease development. Integrated Disease Management can reduce reliance on chemical pesticides while increasing crop production (Maheswari *et al.,* 2021; Pandey *et al.,* 2019).

Dominant monoculture practices increase the risk of disease spread due to the lack of plant genetic diversity, allowing pathogens to spread widely and rapidly. Selecting less diverse cropping patterns increases pathogen populations and leads to significant economic losses (Bubici *et al.,* 2019). Biological control agents such as *Trichoderma* spp., *Bacillus subtilis*, and Plant Growth-Promoting Rhizobacteria (PGPR) effectively control plant diseases through antagonism, nutrient competition, and activation of plant defense mechanisms. The use of these agents helps significantly reduce the use of chemical pesticides (Villavicencio-Vasquez *et al.,* 2025; Rithesh & Radhakrishnan, 2024; Pandit *et al.,* 2022).

Overdoses and repeated use of chemical pesticides can lead to pathogen resistance, hazardous chemical residues in crop products, and negative impacts on human health and the environment, such as cancer, DNA damage, and neurological disorders (Curl *et al.,* 2020). Other studies have shown that although farmers recognize disease symptoms, their knowledge of the causes, disease cycle, and sustainable control methods remains very limited. The majority still rely on chemical pesticides as the primary method (Nepal *et al.,* 2022).

MATERIALS AND METHODES

This research was conducted in several villages in Bangka Regency, Bangka Belitung Islands Province, including Matras, Air Ruai, Pemali, Kenanga, Balunijuk, Bedeng Akeh, Nangnung, Riding Panjang, and Jelitik Villages. This research was conducted from April to July, 2025.

Research methods

This research consisted of two activities: a field survey of yellow fever

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incidence and direct interviews with farmers. The field survey aimed to determine the incidence and extent of the disease in farmers' fields, while the farmer interviews were intended to obtain information on the management systems and control measures used by farmers in horticultural plant diseases.

Disease Survey

Disease observations were conducted on horticultural fields owned by farmers in several villages in Bangka Regency. Village selection was done using purposive sampling, which involves selecting villages where horticultural cultivation activities occur. Systematic observations and identification of plant diseases were conducted on each plot. Assessing yellowing disease symptoms in horticulture refers to general symptoms in the field. Horticultural plants showing early or advanced symptoms were considered completely infected. The number of affected plants was then recorded to determine the incidence of yellowing disease in the field. Disease incidence was calculated using the formula.

Disease incidence = number of plants affected by disease/total number of plants x 100%

Farmer Interview

Interviews with farmers were conducted to obtain an overview of the knowledge and control measures taken by the respondent farmers against horticultural plant diseases. Direct interviews were conducted with horticultural farmers in Bangka Regency using a questionnaire. Respondent farmers from each village were determined purposively based on the criteria that the farmers had planted horticulture in the last three years. They had horticultural plants at the time of the interview. The data collected included farmers' knowledge, attitudes, and practices in managing horticultural plants (seedling selection, land preparation, knowledge of the causes and symptoms of yellow disease, disease control techniques that have been used and the reasons for them, as well as obstacles faced by farmers in disease control). The data obtained were analyzed using *Microsoft Excel*.

RESULTS AND DISCUSSION

The survey results showed that the average incidence of disease in horticultural crops in Bangka Regency reached 23.33%, with a relatively wide range of incidence, ranging from 0.75% to 66% (Table 1). The highest incidence of disease was found in Bedeng Akeh Village on cucumber plants at 66%, followed by Air Ruai and Balunijuk villages with a value of 50% on kale, cayenne pepper, and sweet mustard greens. The high incidence of disease indicates that plant diseases are a significant problem in horticultural cultivation in the region.

Variations in disease incidence observed between villages and commodities are influenced by the type of crop cultivated and the cultivation practices applied. According to the Indonesian Ministry of Agriculture (2023), the development of plant diseases is strongly influenced by environmental factors and cultivation techniques, including seed selection, land management, and pest and disease control. Plants such as cucumbers, cayenne peppers, and mustard greens, which have specific water content and physiological conditions, tend to be more susceptible to yellowing disease, thus

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triggering high disease incidence rates in these cultivation locations. Furthermore, plant cultivation factors, particularly environmental conditions and the application of cultivation techniques, play a significant role in plant pathogen development. These two aspects form the basis for consideration in developing plant disease management strategies (Susanna, 2020). The finding that some villages exhibited low disease incidence, for example, melon in Matras Village at 0.75% and spinach in Kenanga Village at 1%, may indicate that plant varieties or management techniques in those areas are more effective in suppressing disease spread.

Table 1. Percentage of Horticultural Plant Disease Incidence in Bangka Regency

Observation Village	Commodity	Disease Incidence (%)
Matras	Beans	30
	Melon	0.75
Air Ruai	Mustard	20
	Spinach	50
	Celery	30
	Cucumber	10.5
	Mustard	13.6
	Long beansk	20.9
	Chilli	8.5
	Pakcoy	20
	Cayenne pepper	50
Pemali	Spinach	17
Kenanga	Spinach	1
	Chilli	40
	Eggplant	25
	Chilli	40
Balunijuk	Mustard	1
	Sweet mustard greens	50
	Bitter mustard greens	20
Bedeng Akeh	Peanuts	10
	Avocado	14
	Cucumber	66
Riding Panjang	Chili	5
Jelitik	Chili	20
Nangnung	Leek	20

This is consistent with previous research by Annisa & Helfi, (2017), which showed that appropriate cultivation practices can reduce disease rates in horticultural crops. Furthermore, the high incidence of diseases in crops such as chilli peppers and long beans in several villages underscores the need for a more integrated disease management approach. These findings support the initial hypothesis that farmers' attitudes and practices regarding disease

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management significantly influence the level of infestation, as outlined in the introduction. Therefore, interventions in the form of intensive training and outreach related to plant disease control are urgently needed to reduce production losses in Bangka Regency (Ministry of Agriculture, 2021).

The disease incidence of 23.33%, with a peak in cucumber crops (66%), in Bangka is consistent with findings in other regions (Arsi *et al.,* 2025). Major diseases such as Fusarium wilt and anthracnose are effectively controlled with a combination of cultivation and biological agents recommended in various studies (Himabindu & Kumar 2021). Major diseases such as Fusarium wilt and anthracnose are effectively controlled with a combination of cultivation and biological agents recommended in various studies (Himabindu & Kumar 2021). As described in the literature, the dominant monoculture pattern (75% of farmers) leads to the accumulation of soil pathogens (Fusarium, root rot), thus increasing disease incidence. The use of crop rotation can reduce the pathogen inoculum load and improve soil health (Wang & Sugiyama, 2024).

The survey results show that although most respondent farmers (56%) manage land areas of less than 1 hectare, there are also groups of farmers with land areas between 1 and 2 hectares (Table 2). This reflects the variation in the scale of farming in Bangka Regency. Most farmers tend to implement a monoculture pattern in horticultural cultivation, with vegetables and fruits being the dominant crops, while peanuts are only grown by one farmer. This monoculture pattern can potentially increase the risk of plant disease spread, considering that the continuous presence of a single plant species in one location can facilitate the survival and spread of pathogen inoculum (Ministry of Agriculture of the Republic of Indonesia, 2023).

Table 2 Characteristics of Horticultural Crop Cultivation by Respondent Farmers

Variable	Number of farmers
Vegetables	14
Fruits	10
Nuts	1
<1 ha	14
1-2 hectares	3
2 hectares	8
Monoculture	15
Polyculture	5
Yes	25
No	0
Yes	25
No	0

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The high incidence of disease can be attributed to inappropriate cultivation practices, one of which is monoculture. According to Table 2,75% of respondent farmers employ monoculture, which allows the pathogen's life cycle to continue uninterrupted due to the lack of crop rotation. This practice increases the potential for inoculum accumulation in the field and accelerates the spread of disease (Djatnika, 2012).

Furthermore, all respondent farmers used organic fertilizer as a base fertilizer in the initial phase before planting, followed by synthetic fertilizers to stimulate growth and increase crop productivity. This combination of organic and synthetic fertilizers aligns with standard agronomic practices aimed at improving soil fertility while providing essential nutrients for plants (Annisa & Helfi, 2017). However, the exclusive use of synthetic fertilizers without integrated management can affect the balance of soil microorganisms and plant health (Ministry of Agriculture of the Republic of Indonesia, 2021).

These cultivation characteristics align with the research hypothesis, which states that farmer cultivation practices, including planting patterns and fertilizer management, play a crucial role in managing horticultural plant diseases. Dominant monoculture patterns can potentially exacerbate disease outbreaks, while optimal nutrient management through organic and synthetic fertilizers can help maintain plant resilience (Ministry of Agriculture of the Republic of Indonesia, 2023; Annisa & Helfi 2017). Therefore, a more integrated cultivation management approach, such as crop rotation and balanced fertilization, is needed to minimize the risk of disease attacks while increasing production yields.

Control measures taken by farmers are generally reactive, such as uprooting infected plants, burning the soil, and applying agricultural lime and organic matter. The most commonly chosen method is synthetic pesticides, applied by 68% of respondent farmers. Most farmers consider synthetic pesticides a determining factor in successful cultivation. Thus, they tend to increase the frequency and dosage of their use to anticipate attacks by plant pests (OPT) and plant pathogens (Arsi, 2023). The finding that 68% of farmers routinely use pesticides at doses often exceeding recommendations aligns with the risk of resistance described in various sources. The introduction of IPM techniques and active rotation of pesticide active ingredients is necessary to avoid resistance (Curl *et al.*, 2020)

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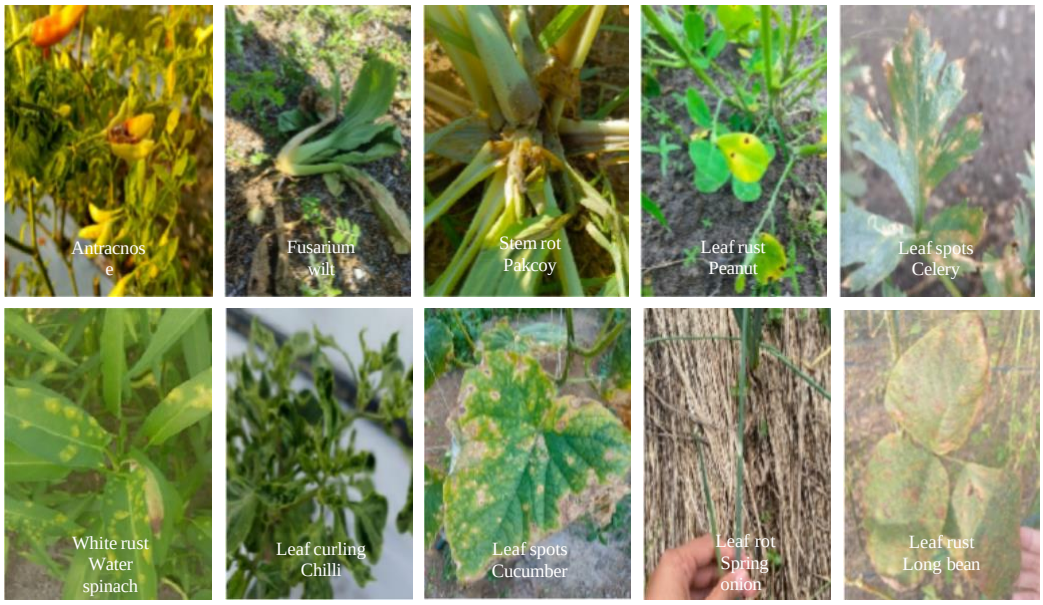

Figure 1. Symptoms of Pathogen Infection in Horticultural Plants

Based on field surveys, disease identification, and interviews with farmers in Bangka Regency, various types of dominant horticultural plant diseases were found and caused significant losses, namely anthracnose in chilies, fusarium wilt in mustard greens, stem rot in bok choy, leaf rust in peanuts, leaf spot in celery, white rust in kale, leaf curl in chilies, leaf spot in cucumbers, leaf rot in onions, and leaf rust in long beans (Table 3). The image of infection symptoms in Figure 2 shows the typical characteristics of these pathogen attacks, which helps visualize disease diagnosis. Interpretation of these results indicates that most farmers perceive disease-causing pathogens as fungal and bacterial organisms from various sources, such as fertilizers, seeds, water, and soil considered less fertile. This perception is consistent with previous findings indicating that suboptimal soil conditions increase plant susceptibility to pathogen infection (Ministry of Agriculture, Republic of Indonesia, 2023). This supports the initial hypothesis that cultivation practices and land management influence plant disease incidence.

Environmental factors such as pathogens in degraded soil are suspected to be key factors in disease spread. Furthermore, inappropriate fertilizer use and poor seed quality increase infection risk. Other studies also confirm that seed quality and field sanitation are crucial factors in controlling horticultural plant diseases (Annisa & Helfi 2017; Indonesian Ministry of Agriculture, 2021).

Thus, these data support the hypothesis that farmers' attitudes and practices regarding disease management, particularly fertilizer use, seed procurement, and soil management, significantly influence the success of disease control and horticultural crop productivity. These findings underscore the need for integrated management

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strategies based on understanding infection sources and improved cultivation practices to minimize disease losses.

Synthetic pesticides are chosen because they are practical, have a rapid effect, and can be applied to large areas. However, in practice, many irregularities are still found, such as using doses exceeding the recommended dosage and mixing several types of pesticides to increase their effectiveness (Azahra, 2021). Using pesticides that do not comply with recommended guidelines can disrupt the balance of agricultural ecosystems, reduce soil fertility, and endanger human health (Aulya *et al.,* 2024).

Table 3. Pest and Disease Disturbances in Pepper Plantations in Bangka Regency

Variable	Amount
Anthracnose	2
Fusarium wilt	4
Colletrotrichum bekcak	1
Septoria spot	1
Leaf spots	4
Stem rot	2
Curly leaves and mosaic	4
Leaf rust	2
Stem rot	2
Leaf rot	1
Root rot	1
Fungus	6
Bacteria	4
Virus	1
Nematodes	0
Unknown	2
From seeds	2
From seed	0
From the water	4
From fertilizer	6

Based on the survey results and interviews with farmer respondents, it was found that most farmers already recognize the symptoms of diseases that commonly attack the horticultural crops they cultivate. However, their understanding of the stages of disease development is still limited. Farmers' attitudes toward plant diseases are generally positive, as indicated by their awareness of disease control. Various control techniques farmers implement include removing and replacing infected plants, reapplication of agricultural lime, using synthetic fungicides, burning soil, and applying organic matter (Table 4).

Although most farmers can visually recognize disease symptoms, their understanding of the causes and mechanisms of infection remains very limited. Interview results showed that all respondents were unaware of biological disease control methods. This lack of awareness of biological agents such as

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Trichoderma sp., *Bacillus subtilis*, and Plant Growth-Promoting Rhizobacteria (PGPR) as control alternatives is common. However, environmentally friendly pest and disease control encompasses various approaches such as using natural enemies, crop rotation, biopesticide application, and cultivation techniques that can reduce pathogen populations and limit their spread (Harahap *et al.*, 2024). This approach supports agroecosystem health and improves agricultural sustainability and productivity (Gulo & Larosa, 2025).

Table 4. Several Control Techniques for Yellowing Disease in Pepper carried out by Respondent Farmers

Variable	Amount
Left alone	1
Controlled	24
Revoked and replaced	11
Application of agricultural lime	3
Administration of synthetic pesticides	17
Land burning	3
Addition of burnt soil	2
Land clearing	0
Application of organic materials	4

Interpretation of these results indicates that farmers' disease control efforts are highly diverse and reflect their practical understanding of managing pathogen attacks. Respondents' predominant use of synthetic fungicides indicates a reliance on chemical methods for disease management. This is consistent with what Rangga *et al.*, (2024) reported fungicides are effective primarily when disease attacks have reached levels that are difficult to control. However, burning and burning soil indicate the possibility of physical land sanitation efforts, which are important for reducing pathogen inoculum in the soil, as recommended in integrated disease management (Ministry of Agriculture of the Republic of Indonesia, 2023).

The reapplication of agricultural lime also demonstrates farmers' understanding of the importance of soil pH regulation to prevent pathogen growth, in line with recommendations for the use of Mg-containing dolomite to maintain soil fertility and health (Rangga *et al.*, 2024). However, the low use of organic matter as a control measure indicates that biological or agroecological control methods are still limited.

These results support the hypothesis that farmers' attitudes and actions in plant disease management play a crucial role in suppressing the incidence and impact of yellowing disease in horticultural crops. However, the diversity of actions taken, as well as the presence of one farmer who chose to leave diseased plants untreated, demonstrates the need for increased education and technical outreach related to effective and sustainable disease control (Ministry of Agriculture of the Republic of Indonesia, 2021; Annisa & Helfi, 2017).

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Therefore, strengthening farmers' capacity to recognize disease development stages and implementing integrated control techniques, including biological agents and environmentally friendly cultivation practices, is crucial for improving the success of horticultural disease control in Bangka Regency. This approach is expected to improve productivity while reducing excessive reliance on synthetic chemicals. The results showed that synthetic pesticides were the most dominant method of controlling yellow fever among respondent farmers (Table 5). The majority of farmers (20) applied synthetic pesticides on a scheduled basis, although some did so when disease symptoms appeared (6) or depending on the disease incidence (1). The application interval was generally once a week, especially after the initial identification of pathogen infection in plants.

The dominant use of synthetic pesticides aligns with conventional agricultural practices, which often rely on chemicals for rapid and effective pest and disease control (Rienzani & Suhendra, 2018). However, these findings also indicate that some farmers (10 individuals) tended to increase fungicide concentrations above the recommended dosages on the packaging, as they felt the initial concentrations were ineffective in reducing disease severity. This phenomenon of increased concentrations is a serious concern because it can cause various negative impacts, such as pathogen resistance to active ingredients, chemical residues in agricultural products, and adverse impacts on the environment and human health (Annisa & Helfi, 2017; Ministry of Agriculture, 2021). Pathogen resistance occurs when inappropriate or excessive pesticide use selects for more tolerant pathogen strains, decreasing pesticide effectiveness over time (Ministry of Agriculture 2023).

Table 5. Respondent Farmers' Attitudes Towards using Synthetic Pesticides to control Yellow Disease

Observed variables	Number of farmers
Scheduled	20
When there are symptoms	6
Depends on the level of disease incidence	1
Initial type with initial concentration	19
Early type with increased concentration	10
New pesticide	2

Farmers' behaviour of increasing pesticide concentrations reflects a lack of in-depth understanding of resistance management and the long-term impacts of chemical use. It may also indicate that pathogens in the field have developed resistance to certain fungicides. This situation strengthens the hypothesis that farmers' knowledge and practices regarding disease management significantly influence control effectiveness and disease dynamics.

Therefore, improving farmer education regarding the wise and responsible use of synthetic pesticides is

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crucial. Training on proper dosage, active ingredient rotation, and the application of Integrated Pest Management (IPM) concepts that integrate various control methods (physical, biological, cultural, and chemical) will be highly beneficial. This will reduce dependence on synthetic pesticides, minimize the risk of resistance, and ensure the sustainability of horticultural agriculture.

Table 6. The Manners And Responses of Farmer Respondents Towards Yellow Disease on Pepper

Variable	Number of farmers
Yes	22
No	3
Yes	22
No	3
Yes	22
No	3
Yes	9
No	16
Yes	0
No	0
Do not know	25

Interviews with farmer respondents found that although the horticultural crops they grow are still frequently attacked by yellow disease, most farmers remain enthusiastic about continuing cultivation activities. This is reflected in the belief of 22 farmers that infected plants can still produce well as long as fertilization and care are carried out optimally (Table 6). This finding demonstrates farmers' optimistic attitude despite facing the challenge of detrimental diseases, which aligns with previous reports on farmer resilience and adaptation to biotic pressures in horticultural cultivation (Annisa & Helfi, 2017).

Furthermore, a small proportion of farmers (9 out of 25 respondents) believed that organic materials could be used to control plant diseases. In contrast, the majority (16 farmers) doubted the effectiveness of organic materials in this regard. This indicates that farmers still have a limited understanding and experience regarding organic or biological-based disease control. This data is supported by the finding that all farmer respondents were unfamiliar or not yet familiar with the concept of biological disease control; 25 farmers answered "I do not know" to the question about biological control (Table 6).

Not a single farmer is familiar with biological agents such as Trichoderma or PGPR, even though these agents are recognized as environmentally friendly and effective methods for disease control (Villavencio-Vasquez *et al.,* 2025). Training on the use of biological agents and integrated pest management is a crucial solution. Farmers' skepticism about the effectiveness of organic materials needs to be addressed through education, as the use of organic materials and biofertilizers can improve the

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balance of soil microorganisms and increase plant resistance to pathogens (Rithesh *et al.,* 2024). Integrated management includes the use of resistant varieties, land sanitation, crop rotation, application of biological agents, and optimal nutrient management to minimize diseases such as Fusarium wilt (Himabindu & Kumar, 2021).

Table 7. Relationship Between Cropping Patterns, Farmer Knowledge, Control Techniques, and Attitudes Towards using Organic Materials And Biological Approaches with The Level of Disease Attack

Variables	Key Findings	Impact on Disease Incidence
Cropping Pattern	75% of farmers plant monoculture	High incidence of soil-borne diseases (Fusarium, root rot) due to lack of crop rotation
Disease Knowledge	Farmers do not understand the causes of the disease in detail; some say soil/fertilizer/and water are the causes.	Handling is not targeted, only reactive when the plant is sick
Control Techniques	The dominant use of synthetic pesticides (68%), some above the recommended dose	Pathogen resistance, environmental pollution, and long-term soil damage
Attitudes Towards Organic	Only 9 out of 25 farmers believe organic matter can reduce disease	Usage is still very low, even though it can improve the soil ecosystem
Biological Consciousness	No farmer knows about biological agents like Trichoderma, PGPR	The potential for environmentally friendly control is not being utilized at all.

Interestingly, despite losses due to disease, most farmers continue to farm. This reflects that horticulture remains a primary source of income for the people of Bangka Regency, and farmers are adapting by trying various control measures, even if they do not fully adhere to healthy farming principles. However, this also highlights the importance of understanding farming practices alone, which suggests that enthusiasm for farming alone is insufficient to guarantee successful production without a sound technic understanding.

This approach provides important insight into the need for education and training for farmers on environmentally friendly and sustainable biological control methods. According to the Indonesian Ministry of Agriculture, (2023), biological control effectively reduces dependence on synthetic pesticides while maintaining the balance of agricultural ecosystems. Farmers' lack of knowledge about biological control can be a barrier to implementing more sustainable farming practices and reducing the negative impacts of chemical pesticides.

Regarding synthetic pesticide use, almost all farmers (22) believed their

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fungicides could control plant diseases, although three were unsure. This belief demonstrates strong confidence in the role of synthetic pesticides in disease control, but it can also increase the risk of overuse and pathogen resistance if not accompanied by proper management (Annisa & Hefi, 2017; Ministry of Agriculture, 2021).

Overall, the results of these interviews reinforce the hypothesis that farmers' attitudes and knowledge play a significant role in determining their choice of plant disease control methods. Extension interventions focused on improving understanding of integrated control, particularly introducing biological control and organic materials, are needed to optimize effective and environmentally friendly plant disease management in Bangka Regency. Therefore, a better understanding of various control options will help farmers increase crop productivity while reducing negative impacts on the environment and human health, which aligns with this study's objectives.

CONCLUSION

Based on the research results and discussions conducted, it can be concluded that farmers' attitudes and actions in managing horticultural plant diseases in Bangka Regency play a crucial role in suppressing disease incidence and supporting increased production. Although farmers generally recognize disease symptoms and take the initiative to implement control measures, particularly through the scheduled use of synthetic pesticides, their understanding of biological disease control and the use of organic materials remains very limited. Therefore, increasing farmers' knowledge and awareness in implementing integrated and environmentally friendly disease management techniques is essential to optimize disease control, reduce production losses, and support the sustainability of horticultural cultivation in the region.

REFERENCES

Annisa, P., & Helfi, G. (2017). Response of melon plant growth and production to applying Tithonia diversifolia liquid organic fertilizer, *Proceedings of the AGRI National Seminar*, 4(2), pp.45-52.

Arsi, A., Rahmawati, T., Salsabila, A., Anugrah, F., Andani, M., Ani, F., Rahmadhona, R.S., & Arifudin, M. (2025). Pests and diseases of horticultural crops in Tanjung Seteko Village Indralaya District, Ogan Ilir Regency, South Sumatra, *JLSO*. 14(1), pp.30-37. https://doi.org/10.36706/jlso.14.1.2 025.662.

Arsi., Gunawan, B., Suparman., & Trimeiwarna. A.A. (2023). The infestation rate pests and diseases on horticultural plants in Bangka District, Bangka Belitung Islands province, *Planta Simbiosa: Jurnal Tanaman Pangan dan Hortikultura, 5*(1), pp. 75-90. https://doi.org/10.25181/jplantasim biosa.vXiX.XXXX.

Aulya, C.R., Kartini, S., Z.P. Reswariningtyas, B., Saruksuk, K.Y., Naqi, A..AA.,

ISSN : 2085-4226
e-ISSN : 2745-8946

Rahmatullah, R.D., & Desmawan, D. (2024). The use of synthetic pesticides on food security in Indonesia, *Indonesian Journal of Education and Development Research*, *3* (1), pp. 726- 729. https://doi.org/10.57235/ijedr.v3i1.4 876.

Bubici G., Kaushal M., Prigigallo M.I., Gómez-Lama Cabanás, C., & Mercado-Blanco, J. (2019). Biological control agents against Fusarium wilt of banana, *Front. Microbiol*.10, pp.616. https://doi.org/10.3389/fmicb.2019. 00616.

Central Bureau of Statistics. (2023). *Horticultural Statistics 2022*. Central Bureau of Statistics of Indonesia.

Curl, C.L., Spivak, M., Phinney, R., & Montrose, L. (2020). Synthetic pesticides and health in vulnerable populations: agricultural workers, *Current Environmental Health Reports*, 7(1), pp.13-29. https://doi.org/10.1007/s40572-020-00266-5.

Gulo, B.T., & Larosa, Y.M. (2025). Environmentally friendly pest and disease control strategies in kepok banana (*Musa Paradisiaca* L.) cultivation. *Hydroponics: Journal of Agricultural Science and Technology in Plant Science*, *2*(1), pp.202–212. https://doi.org/10.62951/hidroponik.v2i1.264.

Himabindu, P., & Kumar, V. (2021). Methods for management of fusarium wilt in tomato. *Int.J.Curr.Microbiol.App.Sci*. 10(1), pp. 363-371. https://doi.org/10.20546/ijcmas.202 1.1001.045.

Indonesian Horticultural Journal. (2025). Determination of water requirements for red chilli (*Capsicum annuum* L.) and chilli plants, *Indonesian Horticultural Journal*, 16(1).

Maheswari, S.K., Singh, P.P., & Jatav, M.K. (2021). Dryland Horticulture 1st Edition : Integrated Disease Management in Arid Horticulture Crops. CRC Press:eBook ISBN 9781003245902 Ministry of Agriculture of the Republic of Indonesia. *Ministry of Agriculture Strategic Plan 2020–2024 (Revised 2021)*. Ministry of Agriculture of the Republic of Indonesia.

Ministry of Agriculture of the Republic of Indonesia. (2023). *Chilli Outlook 2023*. Centre for Agricultural Data and Information Systems.

Nepal, S., Dhakal K.H., Bolakhe, K., Kharel, N., & Sharma, M. (2022). Farmers' knowledge, perceptions, and management of major diseases of potato atKavrepalanchok, Nepal, *Extension Journal*, 6(1), pp.23-27. https://doi.org/10.33545/26180723.

Ojiambo, P.S. (2025). Insect pest and plant diseasemanagement in horticulturalcrop production: recent insights provide opportunities forimproved control. *Front. Hortic*. 4:1605035. https://doi.org/10.3389/fhort.2025.1 605035.

ISSN : 2085-4226
e-ISSN : 2745-8946

Pandey, K. .K., Nagendran, K., Tripathi, A.N., Manjunath, M., Rai, A.B., & Singh, B. (2019). Integrated disease management in vegetable crops. *Indian Horticulture*, 61(1). https://epubs.icar.org.in/index.php/IndHort/article/view/88442.

Pandit, M.A., Kumar, J., Gulati, S., Bhandari, N., Mehta, P., Katyal, R., Rawat, C.D, Mishra, V., & Kaur J. (2022(. Major biological control strategies for plant pathogens, *Pathogens*, 11(2). https://doi.org/10.3390/pathogens11 020273.

Rangga, K.K., Listiana, I., & Safitri, A. (2024). Dukungan kelompok tani terhadap tingkat perilaku petani padi organik dalam budidaya yang ramah lingkungan, Jurnal Penelitian Pertanian Terapan, 24(2), pp. 161-170. https://dx.doi.org/10.25181/jppt.v24 i2.3075.

Rithesh, L., & Radhakrishnan, N.V. (2024). Effective organic strategies for plant disease management. *Greenaria.in*. 2(2), pp.44-49.

Susanna, S. (2020). Environmental factors and cultivation techniques on the epidemic of deciduous disease in nutmeg trees in South Aceh, *Indonesian Journal of Phytopathology*, 15(6), pp.213-220. https://doi.org/10.14692/jfi.15.6.21 3-220.

Villavicencio-Vasquez, M., Espinoza-Lozano, F., Espinoza-Lozano, L., & Coronel-Leon, J. (2025). Biological control agents: mechanism of action, selection, formulation and challenges in agriculture, *Front. Agron,*7:1578915. https://doi.org/10.3389/fagro.2025.1 578915.

Wang, B., & Sugiyama, S. (2024). Microbial basis for suppression of soil-borne disease in crop rotation. *Microorganisms*, 12, pp.2290. https://doi.org/10.3390/microorgani sms12112290