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DISEASE INTENSITY AND INCIDENCE OF PEST AND DISEASES ON EGGPLANT (*Solanum melongena* L.) IN WEDOMARTANI, SLEMAN REGENCY, SPECIAL REGION OF YOGYAKARTA

INTENSITAS DAN INSIDENSI PENYAKIT PADA HAMA DAN PENYAKIT TANAMAN TERONG (Solanum melongena L.) DI WEDOMARTANI, KECAMATAN SLEMAN, YOGYAKARTA

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Abstract

Eggplant (*Solanum melongena* L.) is a horticultural commodity whose production continues to increase in Indonesia, but pests and diseases remain a limiting factor affecting productivity. This study aims to identify the main types of pests and diseases in eggplant plants and assess appropriate control strategies to support sustainable productivity increases. The study was conducted at Rd. Blotan Sono, Wedomartani, Sleman, Special Region of Yogyakarta using a direct observation in the field with a random sampling technique. The results showed that the ladybug was the most dominant pest, with an attack intensity of 37 - 55% and an incidence of 57 - 86%. Yellow virus disease had a stable incidence of 14% with a low intensity ranging from 11 - 14%. Powdery mildew disease was found with an incidence of 28 - 43% and an intensity that increased from 4% to 12% during the observation period. Meanwhile, the *Halyomorpha halys* pest showed a relatively low attack rate with an intensity of 1 - 10%. These variations in intensity and incidence indicate differences in the level of threat each plant pest poses to eggplant growth. Based on these findings, consistent implementation of Integrated Pest Management (IPM) is necessary to minimize damage and maintain eggplant productivity. Recommended IPM strategies include field sanitation, pruning infected plant parts, crop rotation with non-hosts, the use of resistant varieties, and the use of biological agents and mechanical application of pesticides. Integrating these approaches is crucial to maintaining production levels while minimizing the environmental impact of chemical-based control.

Keywords: eggplant, koksi beetle, powdery mildew

Introduction

Indonesia is a country rich in natural resources, one of which is agriculture. Agriculture itself is the activity of cultivating plants carried out by humans to meet their living needs. One of the most widely cultivated vegetable commodities by the community is purple eggplant (*Solanum melongena* L.). Purple eggplant is well known among various groups because it has a delicious taste, affordable price, and can be processed into various dishes in a relatively easy and simple way. According to Poto *et al*. (2024), every 100 grams of fresh eggplant contains 24 calories, 1.1 g protein, 0.2 g fat, 5.5 g carbohydrates, 15 mg calcium, 37 mg phosphorus, 0.4 mg iron, 4 mg vitamin A, 5 mg vitamin C, 0.04 mg vitamin B1, and 92.7 g water. In addition, eggplant also contains alkaloids, solanine, and solasodine that are useful as medicines. These compounds are known to have beneficial pharmacological activities, including as antioxidants, anti-inflammatory, and antimicrobial agents.

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Based on data from the Central Bureau of Statistics (BPS) in 2024, eggplant production in Indonesia has continuously increased over the last three years. In 2021, eggplant production was recorded at 676,339 tons. Then, in 2022, production increased to 691,738 tons, showing a significant increase of 15,399 tons from the previous year. Eggplant production in 2023 again experienced an increase reaching 699,096 tons. This production rise reflects the efforts made by eggplant farmers to improve their harvest yields through various cultivation techniques, selection of superior varieties, and better management. Although production continues to rise each year, market demand for eggplant has not been fully met. This is caused by the high interest of the public in consuming eggplant as a vegetable with high nutritional value and competitive prices in the market. Increasing demand from consumers makes the existing eggplant supply unable to fully meet market needs. This condition presents both challenges and opportunities for farmers to continue increasing their productivity (Quttub *et al*., 2025).

However, purple eggplant cultivation faces various obstacles, especially pest and disease attacks. The pests that often attack eggplant plants are the koksi beetles. Koksi beetles (Epilachna sparsa) attack eggplant plants by biting the underside of the leaves. In severe attacks, they can damage all leaf tissue, leaving only the veins (Nabila *et al.*, 2022). In addition, there is the brown marmorated stink bug (*Halyomorpha halys*). The Brown Marmorated Stink Bug is a pest that attacks the leaves, stems, and especially the fruits of eggplant plants by piercing and sucking their sap, causing damage such as necrotic spots and defects on the eggplant fruits, which can reduce the quality of the harvest (Weber *et al*., 2017).

In addition to pests, diseases also pose serious problems in eggplant cultivation. One common disease is yellow leaf. This disease is caused by the gemini virus transmitted by the whitefly insect vector (*Bemisia tabaci*). B. tabaci is a leaf-sucking insect pest that plays a role in the spread and transmission of gemini virus in the field. The mechanism of yellow virus infection in eggplant plants manifests with symptoms of yellow leaves, stunted growth, and curling upward (Rahmani *et al*., 2023). Powdery mildew disease is characterized by the appearance of white powder on the leaves and stems (Hardianto *et al*., 2023).

Considering the high production potential of purple eggplant in Indonesia, pests and diseases remain unavoidable limiting factors. Pest and disease attacks can cause significant yield reductions and even total crop failure if not properly managed. This situation requires precise identification of pest and disease types through field sampling activities. Data obtained from identification results will be important in determining appropriate control strategies. The Integrated Pest Management (IPM) approach is one strategy that can be applied as it combines various effective, efficient, and environmentally friendly control methods. Implementing IPM based on field information enables farmers to reduce losses while maintaining agroecosystem sustainability. Therefore, this study was conducted to identify pests and diseases, and to review appropriate control strategies to support sustainable increases in purple eggplant productivity.

Materials and Methods

1. Research Implementation

The research was conducted from 28th October to 20th November 2025. The research was conducted at the Rd. Blotan Sono, Wedomartani, Sleman Regency, Special Region of Yogyakarta. The materials used in this research were eggplant plants. The tools used in this research were stationery and cameras. Observation is a technique used to observe symptoms of pest and disease attacks on eggplant plants, so it is necessary to conduct observations as a reference for conducting further research. Observations are carried out by observing and recording the level of disease damage to plants.

2. Research Methods

The research was conducted using a survey method or direct observation in the field. Sampling was carried out using diagonal random sampling. Simple random sampling is a method of selecting a sample from a population in which each member of the population has an equal chance of being selected. This sampling process ensures that the sample quality remains

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unaffected, as each member of the population has an equal probability of being chosen for inclusion in the sample (Nabila *et al.*, 2022). Sampling was carried out by selecting 10% eggplant plant samples from the total plant population per bedding. Each bedding has 16-20 plants, the first beeding has 20 plants, second bedding has 16 plants, and third bedding had 16 plants. 3 plant samples were taken from the first bedding, 2 plants from the second bedding, and 2 plants from the third bedding. Pest observations were carried out visually and documented with cameras. Documentation was carried out to strengthen the data obtained in the field using a cellphone camera. The results of the documentation in the form of field photographs will be attached as research data. Research was conducted from 28th October 2025 to 20th November 2025, with observations carried out once every 7 days.

3. Data Analysis

The parameters observed were pest attack symptoms and the intensity of pest and disease attacks. Pest and disease attack intensity was determined using a scale of 0–5.

Scoring	Damage Level on Plants
0	No Damage
1	1-20% Damage on Plant (Very Light)
2	20-40% Damage on Plant (Light)
3	40-60% Damage on Plant (Average)
4	60-80% Damage on Plant (Severe)
5	80-100% Damage on Plant (Very Severe)

The percentage of attack intensity can be calculated based on symptoms using the following formula (Wagiyanti *et al.*, 2024):

$$IS = \frac{(ni \times vi)}{Z \times N} \times 100\%$$

Description:
IS = Attack Intensity (%)
ni = Number of plant parts showing the i score
vi = Score of the i plant part
N = Number of plant parts observed
Z = Highest damage scale value.

The incidence and severity of the disease were obtained using the Townsend and Heuberger disease incidence calculation formula (Masnilah *et al.*, 2020):

$$I = \frac{a}{b} \times 100\%$$

Description:
I: Disease Incidence
a: Number of affected plants
b: Number of observed plants

Results and Discussion

Observation results of eggplant plant diseases and pests in Wedomartani, Sleman Regency can be seen in following images:

1. Yellow Leaf Virus Disease

The incidence of yellow leaf virus disease in eggplants found in Table 1 is scored at 14%. During the observation, 1 out of 7 samples were reported to have been infected with yellow leaf virus disease caused by Begomovirus, total population during the observation is 52. Disease incidence was calculated using the amount of infected sample plants and total sample plants. Due to the constant amount of infected during the observation, every observation had the same incidence of yellow leaf disease caused by Begomovirus, that is 14%. The disease intensity can also be found on Table 2 ranging from 11% on the first observation, 12.8% on the second

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observation, 13% on the third observation, and 14% on the fourth observation. 1 out of 7 samples were found to have been infected with this virus and showing this disease. This disease can be caused by the eggplant plants being planted beside chili plants that can indirectly infect this virus through insect vectors such as *Bemisia tabaci* (Sidik *et al.*, 2023).

Table 1. Disease Incidence of Yellow Leaf Virus Disease on Eggplant Plants

	Disease Incidence
1	14%
2	14%
3	14%
4	14%

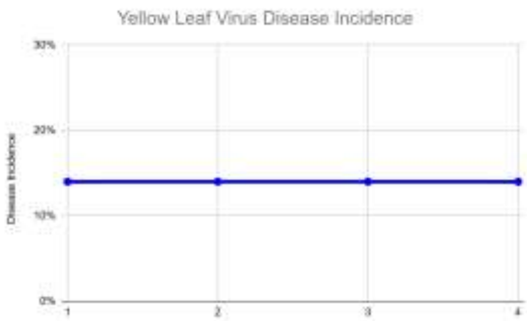
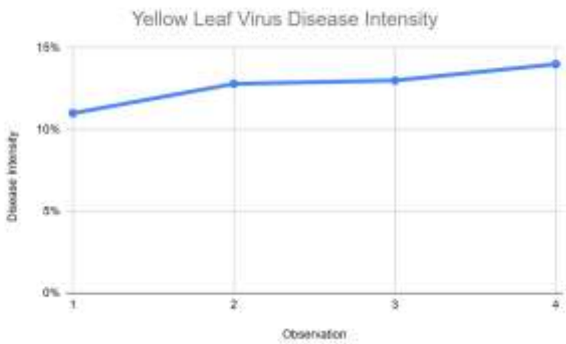


Table 2. Disease Intensity of Yellow Leaf Virus Disease on Eggplant Plants

Observation	Disease Intensity	Category
1	11%	Light Attack Intensity
2	12.8%	
3	13%	
4	14%	



Plants infected with Begomovirus exhibit characteristic symptoms such as yellow mosaic, mottled, curled, green mosaic, upward and/or downward curling of leaves, and stunted growth (Aulia *et al.*, 2022). During the observation, some symptomps of Begomovirus such as yellow, green mosaic leaves and stunted growth were identified. Even though not many plants are affected by this disease, the incidence of yellow virus disease in eggplants is because of the vector insects for this disease, that is expected to be *Bemisia tabaci*. It is suspected that the whitefly vectors might have come from the chili plants that are planted beside the eggplant plants. During this observation however, no whiteflies were spotted or identified on or near any sample plants. This could be caused by predators that are weaver ants. Research by Salsabilla and Riyanto (2021) reported that weaver ants can become potential predators for whiteflies. Weaver ants will create

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small colonies to attack whiteflies that live in groups, so they will attack in one place together and close together. Due to the severe virus attack from the first observation, it is suspected the whitefly population was eliminated beforehand by weaver ants.


Image 1. Weaver Ants on Eggplant Plant; **Image 2.** Yellow Leaf Virus Disease in Eggplant Plant

Based on the disease intensity percentage in Table 2, Begomovirus in eggplants intensity is marked into the light category (< 25%) of disease attacks. From these results, we can take efforts to help control and eliminate any risk of further spreading diseases through IPM (Integrated Pest Management). An approach that could be taken with a light category is replacing the infected or abnormal plant with a new and healthy plant. Other efforts such as planting resistant variants of eggplant plants, doing planting rotation with non-host plants, and field sanitation could also be done (Vinisafitri *et al.*, 2022). Although, replacing infected plants could be the most helpful strategy in this observation because only 1 out of 7 sample plants were infected, and results were constant over 4 observations. Therefore, replacing plants could benefit more than other strategies.

2. Powdery Mildew Disease

The incidence rate of powdery mildew disease in Table 3 shows that in the first observation, the incidence rate was 28.57%, then increased in the second to fourth observations to 43%. There were 7 eggplant samples observed, with 2 plants infected with powdery mildew in the first observation. In the second to fourth observations, there were 3 plants infected with powdery mildew out of the seven samples. The powdery mildew disease intensity data in Table 4 shows an increase over time. In the first observation, the disease intensity was recorded at 4.28%, then increased to 7.14% in the second observation, 9% in the third observation, and reached 12.85% in the fourth observation.

Table 3. Disease Incidence of Powdery Mildew Disease on Eggplant Plants

Observations	Disease Incidence
1	28.57%
2	42.85%
3	42.85%
4	42.85%

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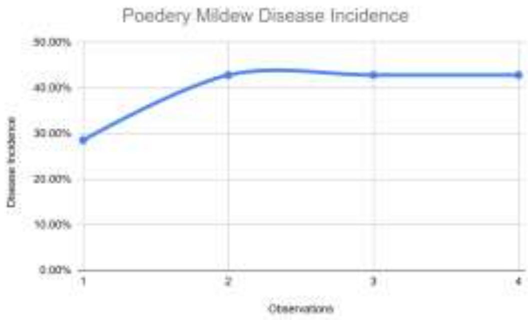
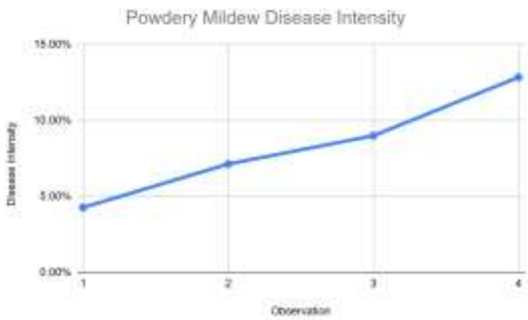


Graphic 3. Powdery Mildew Disease Incidence

Table 4. Disease Intensity of Powdery Mildew s Disease on Eggplant Plants

Observation	Disease Intensity	Category
1	4.28%	Light Attack Intensity
2	7.14%	
3	9%	
4	12.85%	



Graphics 4. Powdery Mildew Disease Intensity

This powdery mildew disease is characterised by the appearance of white spots resembling flour on the surface of the leaves, as shown in Image 2. Powdery mildew is caused by fungi of the order Erysiphales (phylum Ascomycota). These symptoms are consistent with the research by Siadari *et al*. (2023). Powdery mildew usually attacks young leaves, characterized by the presence of white powdery particles which are a collection of mycelium, conidiophores, and conidia of the fungus that causes powdery mildew. The symptoms of the disease are a mass of conidia formed on the conidiophores, which are white in colour and are a characteristic feature of this disease. Mature spores will detach and cover the surface of the tissue and be spread by the wind, causing infection (Sastrahidayat, 2016). If left unchecked, the fungus will continue to absorb nutrients from the plant tissue, while the dust-like white layer covering the leaves can inhibit the photosynthesis process. As a result, the growth of eggplant plants is inhibited (Siadari *et al.,* 2023)**.**

The control of powdery mildew disease includes mechanical control, which involves picking all leaves infected by the fungus that causes powdery mildew, planting resistant varieties, implementing cultural techniques such as environmental sanitation, crop rotation with non-host plants, and fertilization with sulfur and zinc nutrients. In addition, powdery mildew can also be controlled biologically, using botanical fungicides (neem seed extract and compost tea) and biological fungicides (the fungus *Ampelomyces quisqualis*). The last alternative is spraying with chemical fungicides if the previous methods are unable to control powdery mildew (Sumatini and Rahayu, 2017).

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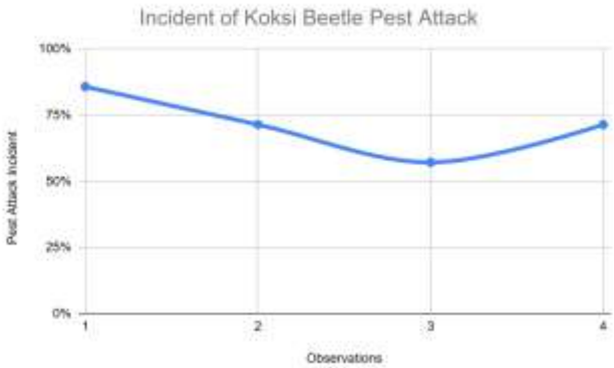
Image 2. Powdery Mildew Disease in Eggplant Plant

3. Koksi Beetle

The incidence rate of koksi beetle pest attacks in Table 5 shows that in the first observation, the incidence rate was 85.71%, then decreased in the second and third observations to 57.14% and the fourth observation increased to 71.42%. There were 7 eggplant samples observed, 6 plants were attacked by ladybug pests in the first observation. In the second observation, 5 beetles were infested, in the third observation, 4 beetles, and in the fourth observation, 5 beetles were infested from seven samples. The powdery mildew disease intensity data in Table 6 shows an increase over time. In the first observation, the disease intensity was recorded at 13.14%, then increased to 45.71% in the second observation, 52% in the third observation, and reached 55.14% in the fourth observation.

Table 5. Incident of Koksi Beetle Pest Attack on Eggplant Plants

Observation	Disease Incidence
1	85.71%
2	71.42%
3	57.14%
4	71.42%



Graphics 5. Incident of Koksi Beetle Pest Attack

Table 6. Intensity of Koksi Beetle Pest Attack on Eggplant Plants

Observation	Disease Intensity	Category
1	37.14%	
2	45.71%	Severe Attack Intensity
3	52%	
4	55.14%	

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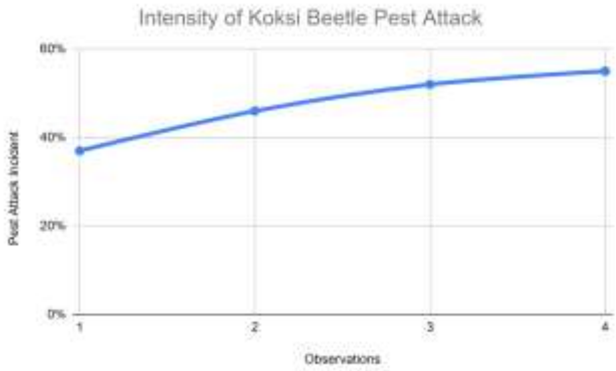

Graphics 6. Intensity of Koksi Beetle Pest Attack

Koksi beetle (*Coccinellidae*) are considered to have an impact on the cultivation of Solanaceae plants because many species act as biological control agents for plant pests and as phytophagous insects. There are 15 species of predatory ladybugs that prey on aphids found in Asia. Phytophagous ladybugs are plant eating insects. These beetles are herbivorous and have specific host plants, namely members of the Solanaceae family (Sutarma et al., 2023). Symptoms of ladybug infestation can be found on eggplant leaves. Eggplant leaves contain nitrogen and secondary metabolites such as alkaloids, making them highly palatable to these insect pests. Ladybugs feed on the leaf lamina, leaving the veins and midribs uneaten. This i s because the leaf lamina is softer and easier to ingest (Arsi et al., 2023).

Pest control in eggplant plants can be achieved through planting patterns, one of which is plant spacing. Planting too close together makes it easier for pests to move from one plant to another, resulting in more infested plants (Arsi et al., 2022). Delayed control during the generative phase of a plant can result in yield loss. Common control methods used by farmers include the use of synthetic pesticides, such as organophosphates, carbamates, and pyrethroids. The negative impacts of synthetic pesticide use on the environment include pollution, killing natural enemies, developing pest resistance, accumulating pesticide residues in produce, and poisoning of farmers who use them (Nabila et al., 2023).


Image 4. *Coccinellidae* Pest in Mature Stage; **Image 5.** *Coccinellidae* Pest in Larva Stage

4. Brown Marmorated Stink Bug

The brown marmorated stink bug pest attack rate in Table 7 shows that in the first observation, the incidence rate was 14%, then increased in the second to fourth observations to 29%. There were 7 eggplant samples observed, with 1 plant attacked by the brown marmorated stink bug in the first observation. In the second to fourth observations, there were 2 plants attacked by the brown marmorated stink bug out of seven samples. Data on the intensity of the brown marmorated stink bug pest attack in Table 8 shows an increase over time. In the first observation, the disease intensity was recorded at 1.42%, then increased to 5.14% in the second observation, 8% in the third observation, and reached 10% in the fourth observation.

Table 7. Incident of Brown Marmorated Stink Bug Pest Attack on Eggplant Plants

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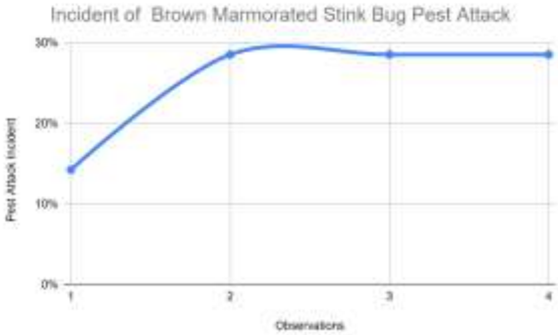
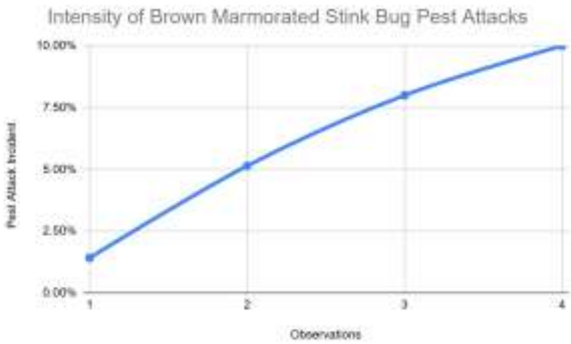
Observation	Disease Incidence
1	14%
2	29%
3	29%
4	29%



Graphics 7. Incident of Brown Marmorated Stink Bug Pest Attack

Table 8. Intensity of Brown Marmorated Stink Bug Pest Attacks on Eggplant Plants

Observation	Disease Intensity	Category
1	1.42%	Light Attack Intensity
2	5.14%	
3	8%	
4	10%	



Graphics 7. Intensity of Brown Marmorated Stink Bug Pest Attack

Brown Marmorated Stink Bug (*Halyomorpha halys)* is an invasive insect pest in the Pentatomidae family that attacks more than 100 cultivated plants, including vegetables such as eggplant. This insect measures 12–17 mm, is shield-shaped, and marmorated brown in color. Symptoms in eggplant plants caused by H. halys typically affect leaves, young stems, and especially the fruit. When the insect pierces the eggplant, it sucks out cellular fluids, causing brown spots, hardening, silvery discoloration, and scarring of the fruit's skin. Puncture marks can also serve as entry points for secondary pathogens, causing rot or reduced fruit quality at harvest (Leskey and Nielsen, 2018).

Control of *Halyomorpha halys* in eggplant is carried out in an integrated manner through monitoring, cultural, biological, and chemical approaches. Monitoring using yellow sticky traps or direct observation helps detect early pest emergence. Culturally, land sanitation, weed removal, and planting timing can suppress populations by reducing hiding places for adults. Biological control utilizes egg parasitoids such as *Trissolcus japonicus*, which effectively reduces hatching rates. At high populations, insecticides such as pyrethroids and neonicotinoids can be used selectively, but applications must be timely, especially during fruit formation, as this phase is

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most vulnerable to the pest. This integrated approach is essential to maintain control of *H. halys* populations without disrupting natural enemies and preventing resistance (Leskey and Nielsen, 2018).


Image 6. *Halyomorpha halys* Pests on eggplant plants; **Image 7.** *Halyomorpha halys* Pest Attack on Eggplant Fruit

Conclusion

Plant pest attacks on eggplants in Wedomartani consist of yellow leaf virus disease, powdery mildew, koksi beetle, and brown marmorated stink bugs, with koksi beetle being the most dominant pest with the severe intensity of attack, while yellow leaf virus disease, powdery mildew, and brown marmorated stink bugs show low intensity. In general, these conditions indicate the need for proper pest management through the implementation of Integrated Pest Management (IPM), including land sanitation, pruning of infected parts, crop rotation, use of resistant varieties, and selective biological and chemical control to maintain the productivity of eggplants.

References

Arsi, A., Gustiar, F., Pratama, R., SHK, S., Hamidson, H., Umayah, A. and Muhari, M. (2023) 'Pengaruh mulsa terhadap serangan hama pada tanaman terung (Solanum melongena L.) di Desa Timbangan Kecamatan Indralaya Utara Kabupaten Ogan Ilir', *Seminar Nasional Lahan Suboptimal*, 10(1), pp. 1023–1032.

Arsi, A., Lailaturrahmi, Hamidson, Y., Pujiastuti, B., Gunawan, R., Pratama, R. and Umayah, A. (2022) 'Inventarisasi spesies dan intensitas serangan hama tanaman terung (Solanum melongena L.) pada dua sistem kultur teknis di daerah Kabupaten Agam, Sumatera Barat', *Agrikultura*, 33(2), pp. 126–137.

Aulia, E., Sutrawati, M. and Pamekas, T. (2022) 'Deteksi molekuler dan analisis genetik Begomovirus pada tanaman cabai di Desa Pematang Donok', *Jurnal Ilmu Pertanian Indonesia*, 24(2), pp. 69–74.

Hardianto, M.R. and Sukmana, R.N. (2023) 'Sistem pendukung keputusan diagnosa penyakit pada tumbuhan terong ungu menggunakan metode Teorema Bayes', *Digital Transformation Technology*, 3(2), pp. 505–514.

Leskey, T.C. and Nielsen, A.L. (2018) 'Impact of the invasive Brown Marmorated Stink Bug in North America and Europe: History, biology, ecology, and management', *Annual Review of Entomology*, 6(3), pp. 599–618.

Masnilah, R., Wahyuni, W.S., Majid, A., Addy, H.S. and Wafa, A. (2020) 'Insidensi dan keparahan penyakit penting tanaman padi di Kabupaten Jember', *Agritrop: Jurnal Ilmu-Ilmu Pertanian*, 18(1), pp. 1–12.

Nabila, F., Ferisya, M.Z., Ameilia, M., Riyanti, T.F., Aprilya, T., Umayah, A. and Arsi, A. (2023) 'Intensitas serangan serangga hama pada terung (Solanum melongena L.) di Kabupaten Ogan Ilir, Sumatera Selatan', *Seminar Nasional Lahan Suboptimal*, 10(1), pp. 504–512.

ISSN No. 2988-1803
https://e-journal.unmas.ac.id/index.php/agrofarm
Doi: https://doi.org/10.36733/agrofarm.v4i2.13108

Poto, A. and Rato, Y. (2022) 'Strategi pengembangan usahatani terung (Solanum melongena L.) di Kebun Pratek Pertanian Universitas Nusa Nipa Indonesia', *Jurnal Ilmiah Wahana Pendidikan*, 8(1), pp. 436–449.

Rahmani, A.S., Anggriani, N. and Supriatna, A.K. (2023) 'Kontrol optimal menggunakan A. aleyrodhis penyebaran penyakit virus kuning pada tanaman terong', *Jurnal Matematika Integratif*, 19(1), pp. 77–87.

Sastrahidayat, I.R. (2016) *Penyakit Tumbuhan oleh Parasit Obligat*. Malang: UB Press.

Siadari, L.H., Pamekas, T. and Nadrawati, N. (2023) 'Respon pertumbuhan tanaman melon (Cucumis melo L.) terinfeksi penyakit embun tepung terhadap aplikasi cendawan endofit', *National Multidisciplinary Sciences*, 2(3), pp. 179–184.

Sidik, E.A., Hartono, H. and Sulandari, S. (2023) 'Infeksi ganda spesies Begomovirus pada tanaman terung dan cabai di Sleman, Yogyakarta', *Prosiding Seminar Nasional Biologi*, 11, pp. 144–150.

Sumartini, S. and Rahayu, M. (2017) 'Penyakit embun tepung dan cara pengendaliannya pada tanaman kedelai dan kacang hijau', *Jurnal Penelitian dan Pengembangan Pertanian*, 36(2), pp. 59–66.

Sutarma, F.A., Rhomadon, A.G., Asrul, M.R., Fitriyani, D., Rahma, F.D., Anggraini, H.L. and Arsi, A. (2023) 'Inventarisasi dan identifikasi kumbang koksi (Coleoptera: Coccinellidae) pada tanaman Solanaceae di Kabupaten Ogan Ilir, Sumatera Selatan', *Seminar Nasional Lahan Suboptimal*, 10(1), pp. 450–457.

Vinisafitri, I., Alni, M., Fuadi, M.T., Nasir, C.M.P., Al Farabi, A., Rosydana, A. and Sutarman, S. (2022) 'Pengendalian hama dan penyakit pada tanaman terong (Solanum melongena L.) terpadu di Desa Permisan Kecamatan Jabon, Sidoarjo', *Pengelolaan Hama & Penyakit Tanaman Hortikultur*, 2(1), pp. 7–30.

Wagiyanti, W., Hamidson, H. and Suwandi, S. (2024) 'Intensity and incidence of pest disease attacks on rice plants in Enggal Rejo Village, Air Salek Subdistrict', *Journal of Global Sustainable Agriculture*, 4(2), pp. 144–150.

Weber, D.C., Morrison III, W.R., Khrimian, K., Rice, K.B., Leskey, T.C., Rodriguez-Saona, C. and Blaauw, B.R. (2017) 'Chemical ecology of Halyomorpha halys: Discoveries and applications', *Journal of Pest Science*, 90(4), pp. 989–1008.