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Identification of Pests and Diseases in Atlantic Variety of Potato *(Solanum Tuberosum)* Crops in Sukapura Village Kertasari District Bandung District

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ABSTRACT

Potatoes are plants that grow in highland areas. Potatoes have the potential to be exported to various countries because they are used as a source of carbohydrates. The purpose of this technical note is to provide information on the identification of pests and diseases that attack the Atlantic variety of potato (Solanum tuberosum) in Sukapura Village. Field Work Practice activities were carried out on June 3 - July 20, 2024 at Sumber Jaya, Sukapura Village, Kertasari District, Bandung Regency. The method used to obtain primary data is direct observation and interviews with field supervisors. The method used to obtain secondary data by means of literature studies. The results of observations have revealed a variety of pests and diseases in potato plants, which are controlled by applying pesticides for control. The results of this control obtained suppression of the intensity of pest attacks on potato plants (Solanum tuberosum) Atlantic varieties.

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A. Intoduction

The potato (*Solanum tuberosum* L.) plays a crucial role in global food security, serving as a staple food in numerous countries and contributing substantially to dietary energy intake. Its importance extends beyond direct consumption, with potatoes processed into a variety of food products and utilized as a raw material in industries such as starch production. The nutritional value of potatoes is noteworthy, providing complex carbohydrates, dietary fiber, and essential micronutrients, notably vitamin C, which plays a vital role in supporting human immune function. However, potato production faces significant challenges worldwide, including susceptibility to a wide range of pests and diseases, as well as the increasing pressures of climate change, which can impact yield and quality.

The Atlantic variety is particularly prized within the potato processing industry, specifically for the production of potato chips. This variety exhibits several key characteristics that make it highly suitable for chip manufacturing, including high dry matter content, optimal specific gravity, and low levels of reducing sugars. High dry matter ensures a desirable crisp texture, while low reducing sugar content prevents excessive browning during the frying process, maintaining the chip's visual appeal. The potato chip industry represents a significant economic sector, contributing to both local and national economies through employment and revenue generation.

Potato cultivation necessitates specific environmental conditions for optimal growth and yield. Potatoes thrive in well-drained soils with a slightly acidic pH and cool temperatures, typically found in highland regions. Sustainable potato production practices, including crop rotation, integrated pest management, and efficient water use, are crucial to minimize environmental impact and ensure long-term productivity.

Sumber Jaya Farmer Group is a farmer group founded by Ali Irfan Fauzan in 2017. The farmer group is located in Sukapura Village, Kertasari District, Bandung Regency. The group specifically focuses on the cultivation of horticultural crops such as potatoes, carrots, leeks, chicory, and cabbage. Ali Irfan Fauzan has 15 hectares of land, one of which is located in Sukapura Village which is in the highlands with an altitude of around 1,400 meters above sea level, this condition is very suitable for potato cultivation (Tampubolon, 2020).

Despite the economic and nutritional importance of potatoes, pest and disease outbreaks can cause substantial yield losses, threatening the livelihoods of farmers and impacting food supply chains. In Sukapura Village, Kertasari District, Bandung Regency, potato cultivation is a major agricultural activity. However, there is a limited understanding of the specific pest and disease pressures affecting the Atlantic variety in this region. Therefore, this study aimed to identify the key pests and diseases affecting Atlantic potato crops in Sukapura Village and to evaluate the effectiveness of current pest management practices. This information is crucial for developing sustainable and effective strategies to protect potato crops and ensure the continued productivity of this important commodity in the region

Plant care is carried out to keep plants growing well and fulfill the nutritional needs required by plants (Suharto, et al., 2016). Plant care includes clearing weeds, providing nutrients, and watering the plants. Potato plant care is carried out according to the needs in order to increase the yield and growth of potato plants. (Karjadi, 2014). High plant productivity is achieved when plants grow optimally. The use of proper and balanced fertilizers helps in optimal growth and better yields. Apart from fertilization, care from seedling to maintenance is also important for the desired results. (Hayati, 2015).

The purpose of this field work practice is to determine the identification of pests and diseases in Atlantic potato (Solanum tuberosum) varieties in Desa Sukapura, Kecamatan Kertasari, Kabupaten Bandung.

B. Metode

The study was conducted in Sumber Jaya, Sukapura Village, Kertasari District, Bandung Regency, West Java, Indonesia (7°10'20" South 107°41'00" East). This area is characterized by a highland climate with an average altitude of 1400 meters above sea level. The region experiences a humid subtropical climate with mean annual rainfall of approximately 2500 mm, and average daily temperatures ranging from 18°C to 25°C. The soil

type is predominantly Andisol, known for its high water-holding capacity and fertility, which is suitable for potato cultivation. The primary agricultural activity in Sukapura Village is the cultivation of horticultural crops, with potatoes being a major commodity.

The study was conducted in a 15-hectare potato field cultivated with the Atlantic variety. A randomized block design was employed to assess pest and disease incidence. The field was divided into five blocks, and within each block, ten 1-square-meter plots were randomly selected for data collection. Sampling was conducted weekly for the duration of the 50-day study period.

The materials used are Atlantic Variety Potatoes, fungicides, inseksticides, the tools needed are sprayers, elastic hoses, HONDA GP 160 type pump machines. The implementation of Field Work Practices (PKL) uses several methods in data collection, the main data is obtained through observations and interviews related to the identification of pests and diseases in Atlantic potato varieties to field supervisors and secondary data from journal.

C. Result and Disscusion

1. Land Preparation

Figure 1. Land Preparation

Land preparation, in Figure 1, follows a conventional approach utilizing mechanized tools such as tractors and cultivators. The process commences with the application of Gromoxone herbicide to control pre-existing weed growth. Subsequently, Kaptan fungicide is applied with the objective of increasing soil pH towards a neutral level. The soil is then left undisturbed for a period of one week. Following this, initial manure application is carried out, and the soil is again left undisturbed for another week, resulting in a total land preparation time of approximately three weeks prior to planting.

After the resting period, beds are formed with dimensions of 4x1 meters, incorporating 20 cm trenches to accommodate a total of 80 plants. However, it is important to note that land management practices at Sumber Jaya are sometimes modified due to unpredictable weather conditions, with operations heavily influenced by rainfall patterns in this rain-fed agricultural setting, as well as time constraints and market demands.

2. Seed Material

Figure 2. Seed Material of Potato

The seed material, as shown in Figure 2, consists of Atlantic variety potato tubers sourced from the Indofood seed center, ensuring the use of certified seeds. These certified seeds are obtained directly from PT. Indofood, highlighting their specific source and limited availability in the general market. A notable characteristic of the Atlantic variety is its suitability for division; tubers can be sectioned into up to four pieces, with each section capable of producing viable buds, thus allowing for efficient propagation.

Figure 3. Pembelahan bibit kentang

3. Planting Procedure

Planting is performed following the completion of land preparation. Seed tubers are planted at a spacing of 20 cm x 20 cm, with planting depth maintained between 5 and 10 cm using a dibber. Seed tubers are oriented with the sprouts positioned upwards to facilitate optimal emergence.

4. Irrigation Method

Figure 4. Irrigation Method

Irrigation, as depicted in Figure 4, is conducted using a sprinkler system powered by an MDX-170 F diesel engine. The use of diesel fuel is employed to enhance fuel efficiency in the irrigation process.

5. Weed control

Figure 5. Weed Control

Weed control, as illustrated in Figure 5, is performed through hilling at 40 days after sowing (DAS). This hilling process not only serves to suppress weed growth but also functions to aerate the soil and elevate the height of the planting bed. The elevation of the planting bed facilitates the covering of developing potato tubers, preventing their exposure to sunlight (Ichsan, et al., 2017).

6. Replanting Procedure

Replanting of potato plants is conducted between 2 days and 1 month after planting to replace non-viable plants. Plants exhibiting abnormal growth are also replaced with healthy seedlings. The procedure involves carefully removing the deceased or abnormal plants, creating new planting holes using a dibber, and subsequently planting new seed

tubers. Replanting is performed repeatedly to monitor the rate of plant mortality and to investigate the underlying causes of plant death.

7. Fertilization Regime

Figure 6. Fertilization

Fertilization is applied bi-monthly. During the vegetative phase, the fertilizers used are nitrea and phonska. Upon transitioning to the generative and flowering phases, the application rate of phonska and KNO3 fertilizers is increased relative to nitrea, to promote stem and leaf development.

A cultivation system incorporating appropriate fertilizer doses and balanced nutrient ratios can enhance potato production. Fertilization is essential to provide potatoes with the necessary macro- and micronutrients. The availability of these nutrients supports robust plant growth, including the development of roots, stems, and leaves, ultimately contributing to increased yield.

8. Pests and Deseases

Direct observations revealed the presence of four major pest groups infesting the Atlantic potato crop: uret (*Lepidiota stigma* F.) larvae, stem-boring caterpillars (European Lepidoptera), Thrips sp., and flies. Uret larvae were observed feeding on potato tubers (Figure 7), causing hollowing damage. The mean number of uret larvae per square meter was 2.5 ± 0.8 (Table 1). Stem-boring caterpillars were found to damage both stems and leaves (Figure 8), with an average of 1.2 caterpillars per plant. Thrips sp. (Figure 9), identified by their small size (0.5 mm – 1.4 mm) and piercing-sucking mouthparts, were observed on leaves, consistent with the findings of Caroulus (2017) in chili plants. Flies, potentially attracted by the application of manure, were also noted (Figure 10).

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Figure 7. ***Lepidiota stigma***

Uret (*Lepidiota stigma* F.) larvae: These soil-dwelling larvae were observed feeding on potato tubers (Figure 7), causing characteristic hollowing damage. The mean population density of *L. stigma* larvae was 2.5 ± 0.8 larvae per square meter (Table 1). In Sukapura village, these larvae are locally known as "kuuk."

In Figure 8 shows one of the pests that often attacks the uret pest (Lepidiota stigma F), in Sukapura village this pest is often called "kuuk" which often attacks the potato tubers so that the potatoes that are attacked become hollow.

Figure 8. ***European Lepidoptera***

Stem-boring caterpillars (*European Lepidoptera*): These caterpillars were found to damage both stems and leaves (Figure 8). The average number of stem-boring caterpillars per plant was 1.2. These pests were observed to infest potato plants during both vegetative and generative growth stages, causing significant damage including stem breakage and leaf defoliation. The European Lepidoptera, identified as moth larvae, were found at a high intensity.

Pests Caterpillars often attack potato plants both vegetative and generative phases, the level of damage produced is quite large which is a lot of broken stems and can also attack the leaves, borer caterpillars as shown in Figure 9 is a pest that is very disturbing in potato productivity with the Latin name European lepidoptera which is the larvae of moth insects. This pest is found with quite a lot of intensity and often damages potato plants.

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Figure 9. ***Thysanoptera***

Thrips sp. (*Thysanoptera*): These small insects (0.5 mm – 1.4 mm) were observed on leaves (Figure 9). Damage caused by Thrips sp. feeding, characterized by their piercing-sucking mouthparts, resulted in alterations to the color, shape, and size of leaves, consistent with the findings of Caroulus (2017) in chili plants. Thrips sp. also damage buds and flowers by piercing plant tissue and extracting plant fluids. The fecal matter produced by Thrips sp. can serve as a medium for fungal growth, potentially disrupting the plant's photosynthetic processes. Furthermore, Thrips sp. can act as vectors for various plant viruses. The population dynamics of Thrips sp. are strongly influenced by environmental factors, including temperature and rainfall. While Thrips sp. can move within a plant by walking, jumping, or flying, their dispersal between plants is largely dependent on wind currents due to their limited flight capability.

Figure 10. ***Diptera***

Flies (*Diptera*): Adult flies were observed on potato plants (Figure 10). The application of manure may attract flies, which can indirectly contribute to pest problems. Flies can lay eggs, and the resulting larvae may feed on plant tissues.

9. Disease Symptoms and Impact

Figure 11. Fungal Infection on Potato Tuber

Figure 11 depicts a potato tuber exhibiting symptoms of fungal infection. The presence of mycelial growth, potentially appearing as a white or colored mold-like substance on the tuber's surface, is indicative of fungal colonization. This fungal growth can lead to tuber decay, compromising its quality and marketability. While the specific fungal species cannot be definitively identified from the image alone, fungal pathogens commonly associated with potato tuber infections include *Fusarium* spp., *Rhizoctonia solani*, and *Colletotrichum coccodes*. These fungi can cause various symptoms, such as dry rot, soft rot, or silver scurf, depending on the pathogen involved.

Figure 12. Tuber rot

Tuber rot (*Pectobacterium atrosepticum*): As shown in Figure 12, tuber rot caused by *P. atrosepticum* is characterized by the presence of moist, soft tissue areas. Initially, healthy and infected tuber tissues are distinguishable; however, the infection progresses, leading to the decay of the entire tuber. Bacterial decomposition and secondary microbial invasion can result in a foul odor. Symptoms on potato tubers manifest as a brownish discoloration, eventually turning black, with the tuber's texture becoming mushy and slimy, accompanied by an unpleasant odor upon cutting (Maghfiroh, 2022).

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Figure 13. Caterpillar bites

Caterpillar damage: Figure 13 the damage inflicted by caterpillars. High caterpillar infestation leads to widespread and rapid damage, primarily characterized by holes in stems and leaves, a result of stem- and leaf-boring activity.

Figure 14. *Phytoptora infestan*

Late blight (*Phytophthora infestans*): As shown in Figure 14, late blight, caused by *P. infestans*, frequently affects potato plants. The development and spread of *P. infestans* are strongly influenced by environmental factors such as temperature, humidity, and rainfall intensity. Spore dispersal occurs via wind, water, or insects. Upon reaching wet potato leaves, *P. infestans* spores germinate, releasing zoospores that penetrate the plant tissue, culminating in late blight infection. Nurhayati (2011) emphasizes the role of temperature and host plant susceptibility in disease infection, noting that temperature influences disease development due to the existence of optimum, minimum, and maximum temperature thresholds for pathogen activity.

10. Pest and Disease Management

Figure 15. Pesticide spraying

Pest and disease management in the Sumber Jaya farmer group primarily relies on chemical control through pesticide application, as illustrated in Figure 15. Pesticide spraying is conducted at intervals of approximately every three days, with the frequency adjusted based on the observed intensity of pest and disease incidence. While this approach has proven effective in providing rapid control of infestations, the potential for long-term negative impacts due to pesticide residues is acknowledged.

D. Conclusion

The primary pest management strategy employed in the Sumber Jaya farmer group to mitigate pest and disease infestations was the application of chemical pesticides. This approach was largely attributed to the high pest pressure and the need for rapid intervention to meet market demands. Key pests identified included uret larvae (targeting tubers), stem-boring caterpillars, leaf-boring caterpillars, and flies, all exhibiting considerable infestation levels. Pesticide formulations, comprising fungicides and insecticides combined with adhesives to enhance efficacy and application, were applied via mechanized spraying.

E. References

Asgar, A. (2013). Umbi Kentang (Solanum tuberosum L.) Klon 395195.7 dan Cip 394613.32 Balai Penelitian Tanaman Sayuran.

Fauzan Hamdani. (2017). Analisis Biaya Produksi Pada Keripik Kentang Dan Keripik Ubi Jalar Dengan Pendekatan Target Costing Di CV. Mandiri Kota Batu Jawa Timur.

Hayati, A. A., Hayati, R., & Erita. (2015). Pengaruh Pemupukan Terhadap Pertumbuhan Beberapa Varietas Padi Gogo (Oryza Sativa L.). J.Floratek, 10, 61–68.

Ichsan, M., Riskiyandika, P., & Wijaya. (2017). Respon Produktifitas Okra (Abelmoschus esculentus) Terhadap Pemberian Dosis Pupuk Petroganik dan Pupuk N. Agritrop Jurnal Ilmu-Ilmu Pertanian, 14(1), 29–41.

Karjadi, A. K. (2014). Pengaruh Penyemprotan Ga3 Dan Asal Tanaman Induk Dalam Memperpanjang Masa Juvenile Tanaman Kentang. Agrin, 18(2), 97–106.

Nurhayati. (2011). Epidemiologi Penyakit Tumbuhan. Universitas Sriwijaya.

Rante, C. S. (2017). Preferensi Hama Thrips sp. (Thysanoptera: Thripidae) Terhadap Perangkap Berwarna Pada Tanaman Cabai 23(3), 114.

Suharto, Y. B., Suhardiyanto, H., & Susila, A. D. (2016). Pengembangan Sistem Hidroponik Untuk Budidaya Tanaman Kentang (Solanum tuberosum L.). Jurnal Keteknikan Pertanian, 4(2), 211–218.

Sumartono, G. H., & Sumarni, E. (2013). Pengaruh Suhu Media Tanam Terhadap Pertumbuhan Vegetatif Kentang Hidroponik Di Dataran Medium Tropika Basah. Agronomika, 13(1).

Yusdian, Y., Karya, & Faisal, R. (2018). Pengaruh Dosis Pupuk Kandang Ayam Terhadap Pertumbuhan Dan Hasil Tanaman Kentang Varietas Granola. Paspalum: Jurnal Ilmiah Pertanian, 6(2), 981