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Dragon Fruit (*Hylocereus polyrhizus*) Cultivation in Pareugreug Hill, Pajagan Village: A Community Service Case

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ABSTRACT

Red-fleshed dragon fruit (*Hylocereus polyrhizus*) has gained popularity in Indonesia due to its nutritional value and economic potential. This work was aimed to report the community service about dragon fruit cultivation in Pareugreug Hill, Pajagan Village, Sumedang. The consultation was held during January to February 2025. This study documented the sustainable agricultural practices such as implementation of vegetative propagation, organic fertilization, and natural climbing supports for dragon fruit. At 15 months after planting, 5% of the 400 plants had entered the fruiting stage. However, challenges such as pathogen attacks remain, requiring further research to improve disease management and ensure sustainable cultivation.

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1. Introduction

Dragon fruit (*Hylocereus species*) is acknowledged as a significant horticultural commodity worldwide (Ortiz-Hernandez & Carillo-Salazar, 2012), although it originally came from the dry areas of Mexico (Cruz, et al., 2015). This fruit has also gained popularity in Indonesia due to its unique appearance, subtle sweetness, and considerable health benefits (Mansyah, et al., 2019). Previous report by Arivalagan, et al., (2021) stated that the nutritional composition of dragon fruit contributes to its high

market demand, as it serves as a rich source of flavonoid (55 mg GAE), total phenolics (35 mg CE per 100 g), total sugar (7%), protein (0.85%), dietary fiber (1%), vitamin C (6 mg/100 g), vitamin E (150 µg). Consequently, consuming dragon fruit is highly recommended to enhance dietary diversity and promote well-being.

Among numerous species of dragon fruit, the red flesh dragon fruit (*Hylocereus polyrhizus*) is widely cultivated by local farmers (Siregar, *et al.*, 2021). Red flesh dragon fruit is one of the fruiting plants cultivated on Pareugreug Hill in Pajagan Village. This village, located in Cisitu District, Sumedang Regency, is predominantly an agricultural area, with 25% of its population engaged in farming (Diskominfosanditik Sumedang Regency, 2024). One of the village's tourism icons is currently transforming. Originally featuring a windmill park with the scenic Jatigede Reservoir as a backdrop, the site is being redesigned into a diverse fruit garden. This development aims to enhance local tourism and increase the income of the surrounding community. This community service activity report aims to document and analyze the growth characteristics of dragon fruit plants in Pajagan Village, Cisitu, Sumedang Regency.

2. Methods

This community service activity, focused on cultivation assistance through technical guidance and counseling, was conducted by the Community Service Team of the Faculty of Agriculture, Universitas Padjadjaran, at Pareugreug Hill, Pajagan Village, Sumedang, West Java. The dragon fruit plants observed during the study were those previously planted in September 2023. By the time of the growth observation, conducted between January and February 2025, the plants had reached 15 months of age. Technical guidance included [1] preparing dragon fruit stem cuttings treated with auxin (20 ppm), soaked under auxin solution for about 15 minutes to enhance root development; [2] observing fruiting percentage on plant population (400 plants in total). Additionally, maintenance activities were carried out, such as applying 1 kg/tree of fermented organic fertilizer. A counseling approach with consultation sessions was conducted to address observed growth disorders, including potential disease attacks. Farmers responsible for plant maintenance actively participated in discussions, fostering collaboration and knowledge exchange to support the development of the dragon fruit plantation.

3. Results and Discussion

Technological advancements from cultivation to post-harvest play a crucial role in the development of horticultural farming businesses (Poerwanto & Susila, 2014), including dragon fruit production. The cultivation technology for dragon fruit is relatively simple and can be easily implemented by partner farmers. They have successfully adopted vegetative propagation through stem cuttings and stimulated root growth using auxin-based growth regulators.

Cuttings measuring 30–40 cm are initially plugged in polybags before being transferred to the field (Figure 1A). These cuttings are inserted 5–10 cm deep into the growing medium and placed in a shaded area for the first month to promote healthy root development. Successful seedling growth is typically observed within 6–8 weeks, indicated by the emergence of new shoots. While stem rot is a potential risk during propagation, its occurrence is minimal due to effective watering management, i.e., watering once every two days when seedlings are kept in shaded conditions.



Figure 1. Growth stage of dragon fruit (*Hylocereus polyrhizus*) plants starting from vegetative-propagated seedling (A), immature fruit (B), to ready-to harvest red fruit (C) that was cultivated by farmers in Bukit Pareugreug, Pajagan Village

Farmers prepare planting holes alongside natural climbing supports such as angšana (*Pterocarpus indicus*), gamelina (*Gmelina arborea*), kelor (*Moringa oleifera*), gamal (*Gliricidia sepium*), kedondong pagar (*Spondias pinnata*), and other tree species. Once seedlings develop new shoots, they are transplanted into the production garden and tied to climbing structures using raffia or cloth strips. Although concrete poles (1.5–2 m in high, 10–15 cm in diameter) are an alternative, most farmers prefer natural supports due to cost efficiency and sustainability. Similarly, in the red-fleshed dragon fruit cultivation, most farmers use cut wooden climbing supports (Suparwata & Djibrán, 2018).

Dragon fruit care is relatively simple, involving weed control through manual weeding, pruning of climbing trees to minimize competition, and the application of fermented organic fertilizers. The dragon fruit population on Pareugreug Hill consists of approximately 400 plants. At 15 months after planting, 20 plants (5%) have reached the flowering and fruiting stage, with some fruits still enlarging (Figure 1B) while others are ready for harvest (Figure 1C). Each fruiting plant bears approximately 2–4 fruits per tree. Harvesting can also be carried out based on consumer orders or agrotourism needs, as previously reported by researchers on white dragon fruit cultivation (Kristriandiny & Susanto, 2016).

The successful growth of dragon fruit in this area is supported by sustainable and environmentally friendly practices implemented by farmers. These include regular weeding and garden sanitation (Figure 2A), the use of leaf litter as mulch to reduce evapotranspiration (Figure 2B), and the application of manure at a recommended rate of 10 kg per plant. The extension approach to technical guidance included assessing participant responses. The positive outcomes of transforming marginal and idle land into productive dragon fruit orchards provide a valuable learning experience to share with other regions. Similarly, previous study by (Sudarjat, *et al.*, 2017) in Cintaratu Village successfully highlighted the benefits of dragon fruit, encouraged its cultivation among farmers, especially farmer group leaders, and garnered high community enthusiasm due to favorable growing conditions, while also presenting opportunities for developing dragon fruit agrotourism through the village's tourism sector. However, challenges remain, particularly concerning pathogen attacks that affect a small portion of the plantation. As a follow-up to community service, further technical guidance is needed through research to identify pathogens and develop effective control measures for the long-term sustainability of dragon fruit cultivation.



Figure 2. Post-weeding conditions in dragon fruit (*Hylocereus polyrhizus*) orchard (A) and the use of litter as mulch to reduce evapotranspiration that was applied intentionally by farmers in Bukit Pareugreug, Pajagan Village.

4. Conclusions

The community service initiative at Pareugreug Hill, Pajagan Village, Sumedang, successfully demonstrated the practical application of simple yet effective cultivation techniques through technical guidance and counseling. Methods such as vegetative propagation with auxin-treated stem cuttings and natural climbing supports led to the establishment of a productive dragon fruit plantation. Sustainable and environmentally friendly practices, including manual weeding, mulching with leaf litter, and the application of organic fertilizers, have contributed significantly to the healthy growth of dragon fruit plants, with 5% of the population reaching the flowering and fruiting stage within 15 months. Despite progress in transforming marginal land into productive dragon fruit orchards, challenges from pathogen attacks persist. Continuing community service activities with technical guidance, further research, and targeted interventions is essential to enhance the resilience and sustainability of dragon fruit cultivation in the region.

5. Acknowledgment

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6. Author's Note

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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