International Journal of Horticulture, 2026, Vol.16, No.1, 27-43
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Research Article Open Access

Growth, Yield, and Quality Performance of Swamp Cabbage (*Ipomoea aquatica*) Cultivars under NFT Hydroponic System

Afrin Fardous [1], Sifat Ullah [2] ✉, Shreef Mahmud [3]

1 Department of Horticulture, Hajee Mohammad Danesh Science and Technology University, Dinajpur, 5200, Bangladesh

2 Department of Genetics and Plant Breeding (Research Support), Hajee Mohammad Danesh Science and Technology University, Dinajpur, 5200, Bangladesh

3 Department of Horticulture, Hajee Mohammad Danesh Science and Technology University, Dinajpur, 5200, Bangladesh

✉ Corresponding author: sifat.hstu.edu@gmail.com

International Journal of Horticulture, 2026, Vol.16, No.1 doi: 10.5376/ijh.2026.16.0003

Received: 11 Oct., 2025

Accepted: 26 Dec., 2025

Published: 12 Feb., 2026

Preferred citation for this article:

Fardous A., Ullah S., and Mahmud S., 2026, Growth, yield, and quality performance of swamp cabbage (*Ipomoea aquatica*) cultivars under NFT hydroponic system, International Journal of Horticulture, 16(1): 27-43 (doi: 10.5376/ijh.2026.16.0003)

Abstract The experiment was conducted to study the growth, yield and quality of swamp cabbage (*Ipomoea aquatica*) varieties grown with Nutrient Film Technique (NFT) hydroponic system in the net house of the Department of Horticulture, Hajee Mohammad Danesh Science and Technology University' Dinajpur during the period of May-July 2023. The single-factor experiment was run with three swamp cabbage cultivars, BARI swamp cabbage-1 (V1), La procesa swamp cabbage-1 (V2), and Nice green swamp cabbage (V3) under Complete Randomized Design (CRD) with three replications. The average temperature and humidity (daytime) for the study period were 33.86 °C and 91.5%. The results showed that BARI swamp cabbage-1(V1) was better than other cultivars. BARI swamp cabbage-1 (V1) exhibited the highest plant height, leaf area, fresh weight per plant, yield and dry matter percentage, which was found to be 30.33 cm, 664.80 mm^2, 235.03 g, 34.83 ton/ha and 12.33%, respectively. The study examined the performance of two swamp cabbage flowers growing in the same hydroponic system. Nice green (V3) showed the highest number of leaf (31 leaf/plant) and good adaptation increase. It also excelled in SPAD readings and vitamin C content. Nonetheless, results from V2 (LP-1) were only moderate compared to the other two. BARI swamp cabbage-1 (V1) is resulted superior in chlorophyll-a and β-carotene concentration compared to others. So, it was the highest yield and quality performer. The study's findings show the NFT hydroponic system is a suitable system to grow swamp cabbage sustainably especially in the area with limited water and land. The NFT growing aytem that is V1 (BARI swamp cabbage-1) demonstrated best performance for high yield and quality among the tested cultivars.

Keywords Swamp cabbage (*Ipomoea aquatica*); NFT; Hydroponic; Growth and yield performance

1 Introduction

In addition to being a source of food, the swamp cabbage (*Ipomoea aquatica*) was traditionally used for medicinal purposes. Swamp cabbage or Kangkong, a member of the Convolvulaceae family, generally grows in wet soils and is an aquatic plant. In particular, the evidence suggests that the extracts of leaves and stem showed antidiabetic, anti-inflammatory and antioxidant activities. Swamp cabbage (*Ipomoea aquatica*), known as Water Spinach or Kang Kong, is a rapidly growing semi-aquatic vegetable in Asia and tropical climates. Swamp cabbage is used as food due to the various nutritional properties it has, including the presence of iron, food fibers, vitamins A, B and C. helps to maintain intestinal health, as well as preventing anemia and increasing immunity (Shah et al., 2023). Swamp cabbage helps to protect ecosystems of wetlands by absorbing excess nutrients from water, which improves its quality. Therefore, the cabbage of the swamp is a potential functional food (Ahmed et al., 2022). Due to climate change and population growth, the swamp cabbage has been taken as a solution for sustainable agricultural growth.

The nutrient circulation of the system's system minimizes water waste and environmental influences and supports sustainable goals of food production (Jensen, 1997; Resh, 2020). Global challenges such as food shortages, land deterioration and water shortages have accelerated the introduction of sustainable cultivation methods such as hydroponics, which enables plants without a soil with optimized nutrient levy (Sousa et al., 2024). Under the hydroponic techniques, nutrient film technology (NFT) for its efficient nutrient and water consumption, a higher