

measures the foliar surface (MM²). Leaf length (length of the leaf between the apex and the base of the leaf-stalk) of each plant was recorded at 14-day time intervals starting at 14 days after transplanting (DAT) with a Leaf Area Index Meter, until 42 DAT.

Using the same Leaf area Index Meter, the leaf length to breadth ratio was measured from each plant at 7-day intervals beginning 14 days after transplanting (DAT) and continuing until 42 DAT. At the last stage of harvest, the swamp cabbage plants were carefully uprooted in order to measure the length of their roots. A measuring scale was used to determine the distance between the root collar and the tip of the longest root. Next, the sampled plants' average root length was determined.

2.8.2 Yield and yield contributing parameter

At each harvest, the plant yield per plant was expressed in grams. The final yield per plant was calculated by adding these figures from each harvest. The final yield per plant was multiplied by the planting density to obtain the total marketable plant yield per hectare. The leaves were then sun-dried for three weeks, followed by another drying in an electric oven at 70 °C for three days. The percentage of the dry mass was calculated using the following formula:

$$\text{Dry Weight} = \frac{\text{Dry weight of plant}}{\text{Fresh weight of plant}} \times 100$$

In order to determine the percentage of the dry matter, the fresh weight of the swamp cabbage system was first recorded. As soon as a constant weight was reached, the dry weight was measured using an electronic balance (G G T100, Germany).

2.8.3 Quality parameters

The space was recorded at 14 that 28 and 42. A spad-502 plus (Horiba, Japan) model of a renowned manufacturer was used to measure the chlorophyll content in plant leaves. In the method, clean leaves were picked, the spad-502 plus calibrated, the sensor (2 × 3 mm) were placed on the leaves and spades.

The mix was made by the filter paper from Whatman no. Chlorophyll "A" in leaves was determined using the method of Nagata and Yamashita (1992). 1 filtered and the absorption at 445 Nm and 663 Nm measured. Chlorophyll "A" stop was calculated using the formula. A gram macerated sheet was mixed with 10 mL acetone hexan mixture (4: 6) and swirled for 5 minutes:

$$\text{Chlorophyll-a (mg/100 g fw)} = 0.999A_{663} - 0.0989A_{645}$$

Where, A₆₆₃ and A₆₄₅ are the absorbances at 663 nm and 645 nm, respectively.

The same procedure used to measure chlorophyll "a" was used to measure chlorophyll "b" in leaves. The following formula was used to determine the amount of chlorophyll "b":

$$\text{Chlorophyll-b (mg/100 g fw)} = -0.328A_{663} + 1.77A_{645}$$

The amount of beta-carotene in leaves was measured using the technique outlined by Tsiakaras et al. (2014). Ten milliliters of an acetone-hexane (4:6) combination were combined with one gram of macerated leaf, and the mixture was vortexed for five minutes. After passing the combination through Whatman No. 1 filter paper, absorbance measurements were made at 445, 663, 505, and 453 nm. The following formula was used to determine the beta-carotene content:

$$\beta\text{-carotene (mg/100 g fw)} = 0.216A_{663} - 1.22A_{645} - 0.304A_{505} + 0.452A_{453}$$

Five grams of leaf tissue were homogenized in 100 mL of oxalic-eda acid solution. The homogenate was centrifuged at 1,500 rpm for 15 minutes and the Sirnaant was filtered through Whatman n. 1. The ecorbic acid content was determined using the spectrophotometric procedure described by Farajzadeh and Nagizadeh (2003). Absorbance was measured at 760 nm and the concentration of ascorbic acid was quantified using a standard curve