



## Influences of variety and flowering time on some physio-morphological and chemical traits of dragon fruit (*Hylocereus* spp.)

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### ABSTRACT

**Purpose:** This study was conducted to evaluate the influences of variety and flowering time on physio-morphological and chemical characters of Dragon fruit. **Research Method:** Two varieties (BAU Dragon fruit 1 and BAU Dragon fruit 2) and four flowering times (May, June, July, and August) were selected for this investigation. The experiment was laid out in a randomized completely block design with five replications. **Findings:** Significant variations were observed between two varieties of Dragon fruit. It was found that BAU Dragon fruit 2 exhibited better performances on studied parameters as compared to BAU Dragon fruit 1. It was observed that at 38 days after fruit setting (DAFS), BAU Dragon fruit 2 produced the highest fruit length (10.01cm), fresh weight (307.94 g/fruit), dry weight (24.85 g/fruit), pulp weight (168.98 g/fruit), peel weight (91.32 g/fruit) and total soluble solids (TSS) (25.16% Brix) as compared to another variety. The combine effects of variety and flowering time showed that August flowering of BAU Dragon fruit 2 produced maximum fruit length (10.74 cm) and peel weight (115.65 g/fruit) while May flowering of BAU Dragon fruit 2 produced maximum fresh weight (456.50 g/fruit), pulp weight (302.12 g/fruit), moisture content (94.63%) and TSS (27.17 %Brix) as compared to other flowering time. In terms of time required to fruit maturity, August flowering BAU dragon fruit 2 matured earlier (30.6 days) than June flowering (35.04 days). **Research limitations:** Evaluation of more varieties of dragon fruit was a research limitation. **Originality/value:** These findings reveal that flowering time irrespective of variety has direct effects on fruit growth and development of Dragon fruit.

## INTRODUCTION

Dragon fruit (*Hylocereus spp.* (Haw). Britton and Rose) is a newly introduced fruit in Bangladesh belongs to the family Cactaceae from the subfamily Cactoidea (Raveh et al., 1993). It is also known as night-blooming cereus, strawberry pears, queen of the night and Honolulu Queen, Latin American names pitaya and pitahaya (Martin et al., 1987). The origin of dragon fruit is in the tropical and subtropical regions of Central South America (Mirzahi et al., 1997; Thulaja, 1999; Zee et al., 2004). The fruit is round or oval shape, often red colored fruit with prominent scales. The thin rind encloses the large mass of sweetly flavored white or red pulp and small black seeds. Some varieties are pinkish or yellow. Several studies showed that Dragon fruits are a good source of minerals, glucose, fructose, dietary fiber and vitamins (Berbeu, 1990; Wu & Chen, 1997). Due to its high fiber, with almost 1 g of fiber per 100 g of fresh fruit, the dragon fruit can serve as a natural laxative to treat constipation. The fruit is also said to help neutralize and excrete heavy metal toxins. Dragon fruit may help to maintain eye health as well (Berbeu, 1990).

Fruit plants must have gained a suitable stage before they will flower. Environmental factors like photoperiod, temperature, humidity, and rainfall etc. are directly involved in flowering and fruit setting in Cacti (Nerd & Mizrahi, 1995; Yen & Chang, 1997). Among the various factors which affect the growth, development, and quality of Dragon fruit, flowering, as well as fruit setting time, assume much more significance. It requires a tropical climate, especially when growing for commercial purposes to have successful and fruitful yield. Dragon fruit requires a warm climate thus it grows well in semi-arid regions (Feng-Ru & Chung-Ruey, 1997a, 1997b). The climatic condition of Bangladesh is favorable to grow this nutritious fruit. A couple of years back Dragon fruit has been started to cultivate in some locations of Bangladesh especially in Natore, Pabna, Mymensingh districts and some Horticulture Centers of Department of Agriculture Extension (DAE). Until now BAU-GPC has been released two varieties of Dragon fruit namely BAU Dragon fruit 1 (red flesh) and BAU Dragon fruit 2 (white flesh). From our experience, we observed that Dragon fruits plants start blooming from the month of April and continued till to September irrespective of variety. It has a photoperiodic response and it produces flowers and bears fruits during the long-day of May to September. During these times, the temperature and light intensity affects growth and development of this fruit (Mizrahi & Nerd, 1999). It also reported that moderate temperatures are suitable for better fruit growth and scorching sunlight and full shade hamper the flowering and fruit setting thus influences the growth and development of fruits.

It was observed that both the varieties bear's fruits from the month of April and continued up to September but the size and quality of fruits are not uniform in all the months. On the other hand, the time required for fruit maturity is also a vital factor for fruit quality which varies based on flowering and fruit setting time of plants. It is assumed that variety and flowering time may have influenced on fruit growth and development, fruit size, nutritional quality, time required to fruit mature etc. Until now no research on the influence of flowering and fruit setting time on fruit growth, nutritional quality and yield has yet been reported on Dragon fruit in Bangladesh. Therefore, it is very important to determine the effect of flowering and fruit setting time on growth, development, and quality of this fruit.

## MATERIALS AND METHODS

### Experimental site

The study was conducted at BAU-GPC, Department of Horticulture, Bangladesh Agriculture University, Mymensingh during April to September 2015. The soil of the experimental area was sandy loam belongs to the Old Brahmaputra Flood Plain Alluvial Tract. The experimental site was a medium high land and the pH of the soil was 6.7. It is situated in the subtropical zone, characterized by heavy rainfall during Kharif season (April to September) and scanty in Rabi season (October to March). Rabi season is characterized by plenty of sunshine. The temperature and relative humidity during the experimental period were 26.5-33.8 °C and 62-96%, respectively.

### Experimental materials

The experiment was conducted in an established Dragon fruit garden at BAU-GPC. The age of the plants was almost seven years old. There were two varieties of Dragon fruit namely BAU Dragon fruit 1 (red flesh) and BAU Dragon fruit 2 (white flesh) planted in an alternate line in a garden.

### Design of experiment and treatments

The experiment was conducted following randomized completely block design with five replications. A single plant was considered as a replication. The experiment consisted of two-factor viz., two varieties of Dragon fruit such as V<sub>1</sub>: BAU Dragon fruit 1 and V<sub>2</sub>: BAU Dragon fruit 2 and four flowering time such as May, June, July, and August. Flowering at the beginning of each month was considered as the flowering time for this study.

### Collection of data

Data on different parameters were recorded from each replication during the course of the experiment. Fruit length and diameters were measured from 5 similar aged fruits of each variety from 4 days after fruit setting (DAFS) to 38 DAFS at 1-day interval. It was measured by using slide calipers and expressed in centimeter (cm). Fruits of each variety were detached at 5-day intervals from 4 to 38 DAFS to find out the mean fresh weight, dry weight and moisture content of fruits. The weight of fruits was measured by an electrical balance and expressed in gram (g). After recording fresh weight, peel and pulp weight were also recorded to get pulp to peel ratio. Total soluble solids (TSS, %Brix) of Dragon fruit pulp was measured with the help of Abbe's Hand-Refractometer. A drop of fruit juice was squeezed from the pulp and placed on the prism of the Refractometer, thereafter, the percentage of TSS was recorded from the reading of the instrument. Temperature corrections were made as described by [Ranganna \(1994\)](#), using the temperature correction chart. Fruit TSS content was determined at 5-day intervals from 4 to 38 DAFS. Fruits were tagged at 4 DAFS for both of the varieties and flowering time. Fruits were under close observations during the experimental period and days required to fruit mature were recorded during harvesting.

### Statistical analysis

Data for each parameter were analyzed statistically to find out the variations resulting from experimental treatments using MSTAT-C statistical package program. The influences of variety and flowering time on growth, development, and quality of Dragon fruit were studied by analysis of variance by *F*-test. The significance of the difference among the treatment means was evaluated by LSD test at 1% level of probability ([Gomez & Gomez, 1984](#)).

## RESULTS

### Effect of variety and flowering dates on fruit length of Dragon fruit

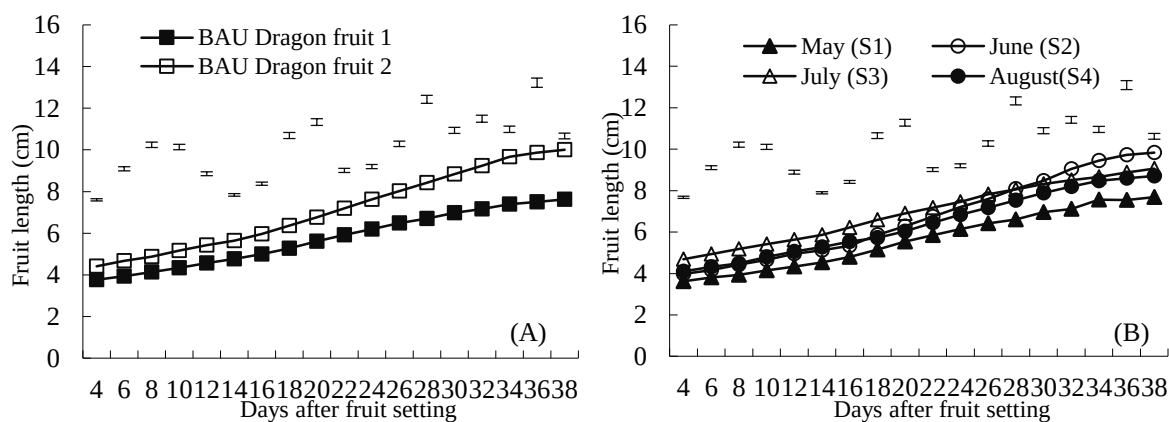
Significant variations were observed between two varieties from 4 to 38 DAFS. At 38 DAFS, higher fruit length was recorded from BAU Dragon fruit 2 (10.01 cm) while BAU Dragon fruit 1 produced lower fruit length (7.48 cm) (Fig. 1A). Length of Dragon fruit was also significantly influenced by different flowering time. At 38 DAFS, the highest fruit length (9.83 cm) was recorded in June while the lowest fruit length (7.70 cm) was found in the May (Fig. 1B). It was observed that there were significant variations in fruit length due to combining effects of variety and flowering time from 4 to 38 DAFS. At 38 DAFS, August flowering of BAU Dragon fruit 2 produced the highest fruit length (10.74 cm) while August flowering of BAU Dragon fruit 1 produced the lowest fruit length (6.66 cm) (Table 1).

### Effect of variety and flowering dates on the diameter of Dragon fruit

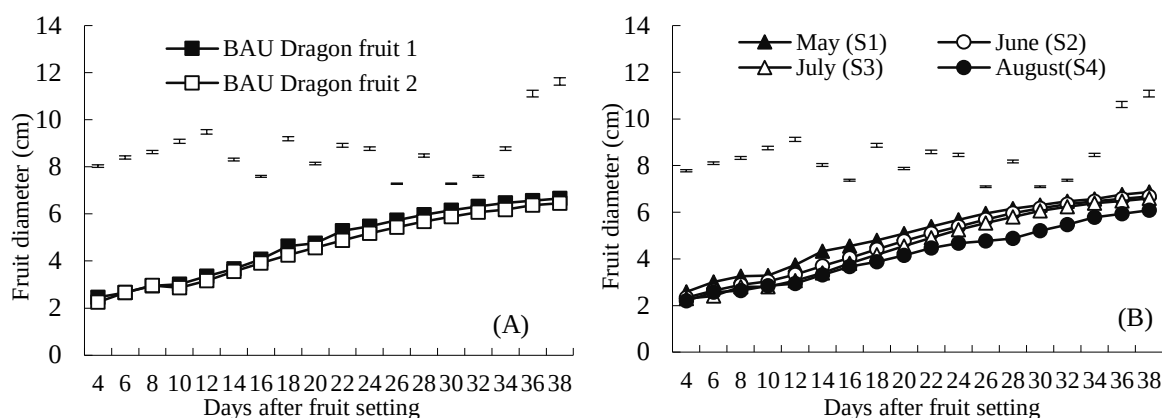
In respect of fruit diameter, insignificant variations were observed between two varieties from 4 to 38 DAFS. At 38 DAFS, higher fruit diameter was recorded from BAU Dragon fruit 2 (6.47cm) while BAU Dragon fruit 1 produced lower fruit diameter (6.46 cm) (Fig. 2A). It was observed that highest fruit diameter (6.69 cm) was obtained in the month of July while lowest fruit diameter (5.99 cm) was found in the month August at 38 DAFS (Fig. 2B). Fruit diameter was significantly varied due to combining effects of variety and flowering time from 4 to 38 DAFS. At 38 DAFS, the highest fruit diameter (7.16 cm) was found in June flowering of BAU Dragon fruit 1 while the lowest fruit diameter (5.95 cm) was recorded in August flowering of BAU Dragon fruit 2 (Table 2).

### Effect of variety and flowering dates on fresh weight of Dragon fruit

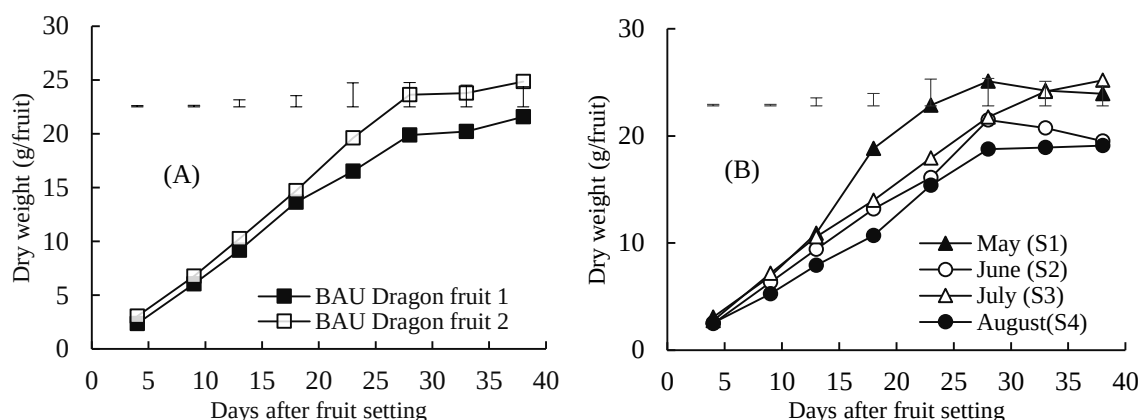
Fresh weight of fruit increased gradually from 4 to 38 DAFS in case of both the varieties. Significant variations were recorded between two varieties from 4 to 38 DAFS. At 38 DAFS, higher fruit fresh weight (307.74 g) was found from BAU Dragon fruit 2 while BAU Dragon fruit 1 gave lower fruit fresh weight (228.72 g) (Table 3). Fresh weight of Dragon fruit was significantly influenced by different flowering time. At 38 DAFS, the highest fruit fresh weight (358.97 g) was found in the month of May while the lowest fruit fresh weight (206.55 g) was found in the month June (Table 4). It was observed that there was a significant variation found in fruit fresh weight due to combined effects of variety and fruit setting time from 4 to 38 DAFS.



**Fig. 1.** Effect of variety (A) and flowering dates (B) on fruit length of Dragon fruit at different days after fruit setting (DAFS). Vertical bars indicate LSD at 1% level of probability.



**Fig. 2.** Effect of variety (A) and flowering dates (B) on the diameter of Dragon fruit at different days after fruit setting (DAFS). Vertical bars indicate LSD at 1% level of probability.



**Fig. 3.** Effect of variety (A) and flowering dates (B) on dry matter content of Dragon fruit at different days after fruit setting (DAFS). Vertical bars indicate LSD at 1% level of probability.

At 38 DAFS, maximum fresh weight (456.50 g) obtained from May flowering of BAU Dragon fruit 2 and minimum fresh weight (195.25 g) found from June flowering of BAU Dragon fruit 2 (Table 5).

### Effect of variety and flowering time on the dry weight of Dragon fruit

It was found that dry weight of Dragon fruit was increased from 4 to 38 DAFS in case of both the varieties. In respect of fruit dry weight, significant variations were obtained between two varieties. At 38 DAFS, higher dry weight was recorded from BAU Dragon fruit 2 (24.85 g) while lower dry weight (21.56 g) was found in BAU Dragon fruit 1 (Fig. 3A). It was also revealed that dry weight of Dragon fruit was significantly influenced by different flowering time. Dry weight was increased at a certain level at different DAFS and then decreased gradually. At 38 DAFS, the highest dry weight (25.20 g) was obtained in the month of July and the lowest dry weight (19.1 g) recorded in the month of August (Fig. 3B). Fruit dry weight was significantly varied due to combining effects of variety and fruit setting time from 4 to 38 DAFS. At 38 DAFS, the highest fruit dry weight (32.01 g) was found in July flowering of BAU Dragon fruit 2 and the lowest dry weight (19.82 g) was recorded in July flowering of BAU Dragon fruit 1 (Table 6).

**Table 1.** Combine effect of variety and flowering dates on the length of dragon fruit at different days after fruit setting (DAFS)

| Variety             | Flowering dates | Fruit length (cm) at DAFS |      |      |      |      |      |      |      |      |       |       |
|---------------------|-----------------|---------------------------|------|------|------|------|------|------|------|------|-------|-------|
|                     |                 | 4                         | 6    | 8    | 10   | 14   | 18   | 22   | 26   | 30   | 34    | 38    |
| BAU Dragon fruit 1  | May (S1)        | 3.57                      | 3.72 | 3.86 | 4.05 | 4.48 | 4.99 | 5.48 | 5.92 | 6.34 | 6.74  | 6.82  |
|                     | June (S2)       | 3.93                      | 4.12 | 4.33 | 4.51 | 4.90 | 5.55 | 6.40 | 7.19 | 8.01 | 8.82  | 9.14  |
|                     | July (S3)       | 4.25                      | 4.42 | 4.72 | 4.95 | 5.33 | 5.91 | 6.41 | 7.00 | 7.35 | 7.57  | 8.19  |
|                     | August (S4)     | 3.33                      | 3.50 | 3.65 | 3.83 | 4.33 | 4.68 | 5.37 | 5.85 | 6.24 | 6.48  | 6.66  |
| BAU Dragon fruit 2  | May (S1)        | 3.67                      | 3.89 | 4.00 | 4.23 | 4.60 | 5.30 | 6.22 | 6.90 | 7.59 | 8.38  | 8.85  |
|                     | June (S2)       | 4.00                      | 4.19 | 4.50 | 4.81 | 5.33 | 6.17 | 7.07 | 8.00 | 8.93 | 10.09 | 10.52 |
|                     | July (S3)       | 5.11                      | 5.45 | 5.63 | 5.86 | 6.38 | 7.25 | 7.96 | 8.66 | 9.28 | 9.73  | 9.94  |
|                     | August (S4)     | 4.87                      | 5.13 | 5.33 | 5.75 | 6.23 | 6.75 | 7.52 | 8.52 | 9.52 | 10.46 | 10.74 |
| LSD <sub>0.01</sub> |                 | 0.17                      | 0.32 | 0.44 | 0.43 | 0.19 | 0.48 | 0.31 | 0.44 | 0.51 | 0.51  | 0.48  |
| Level of Signi.     |                 | **                        | **   | **   | **   | **   | **   | **   | **   | **   | **    | **    |

\*\* indicates LSD at 1% level of significance.

**Table 2.** Combine effect of variety and flowering dates on the diameter of dragon fruit at different days after fruit setting (DAFS)

| Variety             | Flowering dates | Fruit diameter (cm) at DAFS |      |      |      |      |      |      |      |      |      |      |
|---------------------|-----------------|-----------------------------|------|------|------|------|------|------|------|------|------|------|
|                     |                 | 4                           | 6    | 8    | 10   | 14   | 18   | 22   | 26   | 30   | 34   | 38   |
| BAU Dragon fruit 1  | May (S1)        | 2.76                        | 3.10 | 3.35 | 3.61 | 4.14 | 4.49 | 4.95 | 5.44 | 5.74 | 6.02 | 6.12 |
|                     | June (S2)       | 2.65                        | 3.02 | 3.41 | 3.40 | 3.94 | 4.63 | 5.31 | 5.94 | 6.54 | 6.93 | 7.16 |
|                     | July (S3)       | 2.17                        | 1.94 | 2.24 | 2.64 | 3.37 | 4.24 | 5.04 | 5.65 | 6.08 | 6.34 | 6.54 |
|                     | August (S4)     | 2.24                        | 2.58 | 2.76 | 2.42 | 3.15 | 5.15 | 4.62 | 5.08 | 5.47 | 5.78 | 6.02 |
| BAU Dragon fruit 2  | May (S1)        | 2.40                        | 2.92 | 3.16 | 2.95 | 3.88 | 4.51 | 5.22 | 5.86 | 6.27 | 6.50 | 6.87 |
|                     | June (S2)       | 2.01                        | 2.27 | 2.37 | 2.68 | 3.44 | 4.18 | 4.87 | 5.42 | 5.80 | 6.02 | 6.18 |
|                     | July (S3)       | 2.42                        | 2.89 | 3.36 | 2.97 | 3.64 | 4.32 | 4.98 | 5.60 | 6.22 | 6.61 | 6.84 |
|                     | August (S4)     | 2.16                        | 2.55 | 2.93 | 2.86 | 3.28 | 3.97 | 4.46 | 4.88 | 5.26 | 5.58 | 5.95 |
| LSD <sub>0.01</sub> |                 | 0.16                        | 0.19 | 0.22 | 0.26 | 0.19 | 0.27 | 0.24 | 0.09 | 0.09 | 0.23 | 0.50 |
| Level of Signi.     |                 | **                          | **   | **   | **   | **   | **   | **   | **   | **   | **   | **   |

\*\* indicates LSD at 1% level of significance.

**Table 3.** Effect of variety on fresh weight of Dragon fruit at different days after fruit setting (DAFS)

| Variety             | Fresh weight of fruit (g) at DAFS |       |        |        |        |        |        |        |
|---------------------|-----------------------------------|-------|--------|--------|--------|--------|--------|--------|
|                     | 4                                 | 9     | 13     | 18     | 23     | 28     | 33     | 38     |
| BAU Dragon fruit 1  | 59.38                             | 78.04 | 105.33 | 145.29 | 168.92 | 199.31 | 227.66 | 228.72 |
| BAU Dragon fruit 2  | 63.8                              | 90.61 | 116.2  | 184.6  | 206.97 | 255.41 | 306.34 | 307.94 |
| LSD <sub>0.01</sub> | 2.56                              | 2.80  | 3.68   | 3.62   | 7.71   | 6.09   | 42.46  | 43.56  |
| Level of Signi.     | **                                | **    | **     | **     | **     | **     | **     | **     |

\*\* indicates LSD at 1% level of significance.

### Effect of variety and flowering time on the moisture content of Dragon fruit

The moisture content of Dragon fruit was found non-significant variations at 38 DAFS in case of both the varieties. However, higher fruit moisture content (91.28%) was obtained from BAU Dragon fruit 2 and lower moisture content (91.13%) from BAU Dragon fruit 1 (Table 7). Fruit moisture content was significantly influenced by different flowering time. At 38 DAFS, the highest fruit moisture content (93.43%) was found in the month of May and lowest (90.23%) in the month of June (Table 8). It was observed that there was a significant variation found in fruit moisture content due to combining effects of variety and flowering time of Dragon fruit from 4 to 38 DAFS. At 38 DAFS, the highest moisture content (94.63%) was recorded from May flowering of BAU Dragon fruit 2 while the lowest fruit moisture content (90.16%) observed in June flowering of BAU Dragon fruit 1 (Table 9).

**Table 4.** Effect of flowering dates on fresh weight of Dragon fruit at different days after fruit setting (DAFS)

| Flowering dates          | Fresh weight of fruit (g) at DAFS |        |        |        |        |        |        |        |
|--------------------------|-----------------------------------|--------|--------|--------|--------|--------|--------|--------|
|                          | 4                                 | 9      | 13     | 18     | 23     | 28     | 33     | 38     |
| May (S <sub>1</sub> )    | 95.65                             | 119.26 | 145.26 | 206.5  | 213.65 | 279.67 | 356.95 | 358.97 |
| June (S <sub>2</sub> )   | 51.11                             | 77.66  | 105.29 | 130.58 | 157.49 | 182.08 | 204.6  | 206.55 |
| July (S <sub>3</sub> )   | 57.1                              | 77.95  | 106.97 | 173.3  | 200.84 | 238.19 | 265.57 | 267.48 |
| August (S <sub>4</sub> ) | 42.5                              | 62.44  | 85.56  | 149.38 | 179.81 | 209.51 | 240.88 | 242.20 |
| LSD <sub>0.01</sub>      | 3.96                              | 2.87   | 5.20   | 5.12   | 10.90  | 8.62   | 60.04  | 62.14  |
| Level of Signi.          | **                                | **     | **     | **     | **     | **     | **     | **     |

\*\* indicates LSD at 1% level of significance.

**Table 5.** Combine effects of variety and flowering dates on fresh weight of dragon fruit at different days after fruit setting (DAFS)

| Variety             | Flowering dates          | Fresh weight of dragon fruit (g) at DAFS |        |        |        |        |        |        |        |
|---------------------|--------------------------|------------------------------------------|--------|--------|--------|--------|--------|--------|--------|
|                     |                          | 4                                        | 9      | 13     | 18     | 23     | 28     | 33     | 38     |
| BAU Dragon fruit 1  | May (S <sub>1</sub> )    | 95.32                                    | 113.64 | 140.34 | 227.64 | 237.24 | 248.76 | 260.42 | 262.32 |
|                     | June (S <sub>2</sub> )   | 68.18                                    | 93.12  | 120.51 | 142.42 | 161.19 | 191.45 | 215.63 | 217.52 |
|                     | July (S <sub>3</sub> )   | 45.23                                    | 64.73  | 98.82  | 120.68 | 153.70 | 197.80 | 239.08 | 242.19 |
|                     | August (S <sub>4</sub> ) | 28.78                                    | 40.68  | 61.65  | 90.40  | 123.56 | 159.24 | 195.50 | 198.48 |
| BAU Dragon fruit 2  | May (S <sub>1</sub> )    | 95.98                                    | 124.88 | 160.17 | 235.37 | 286.06 | 365.58 | 418.48 | 456.50 |
|                     | June (S <sub>2</sub> )   | 34.03                                    | 62.19  | 90.07  | 118.74 | 153.78 | 172.71 | 193.56 | 195.25 |
|                     | July (S <sub>3</sub> )   | 68.96                                    | 91.16  | 115.11 | 225.92 | 247.98 | 278.57 | 292.07 | 294.09 |
|                     | August (S <sub>4</sub> ) | 56.22                                    | 84.19  | 109.46 | 208.35 | 236.05 | 259.77 | 286.25 | 289.14 |
| LSD <sub>0.01</sub> |                          | 5.13                                     | 5.59   | 7.35   | 7.24   | 15.41  | 12.19  | 84.91  | 89.34  |
| Level of Signi.     |                          | **                                       | **     | **     | **     | **     | **     | **     | **     |

\*\* indicates LSD at 1% level of significance.

**Table 6.** Combine effects of variety and flowering dates on the dry weight of dragon fruit at different days after fruit setting (DAFS)

| Variety             | Flowering dates          | Dry weight (g/fruit) of dragon fruit at DAFS |      |       |       |       |       |       |       |
|---------------------|--------------------------|----------------------------------------------|------|-------|-------|-------|-------|-------|-------|
|                     |                          | 4                                            | 9    | 13    | 18    | 23    | 28    | 33    | 38    |
| BAU Dragon fruit 1  | May (S <sub>1</sub> )    | 2.66                                         | 7.08 | 11.16 | 21.02 | 21.63 | 21.94 | 22.01 | 23.08 |
|                     | June (S <sub>2</sub> )   | 2.36                                         | 6.78 | 10.12 | 13.96 | 16.83 | 24.15 | 24.98 | 25.92 |
|                     | July (S <sub>3</sub> )   | 2.36                                         | 6.92 | 9.86  | 11.50 | 14.72 | 17.12 | 18.10 | 19.82 |
|                     | August (S <sub>4</sub> ) | 2.12                                         | 3.37 | 5.56  | 8.03  | 12.88 | 16.35 | 18.74 | 20.02 |
| BAU Dragon fruit 2  | May (S <sub>1</sub> )    | 3.45                                         | 6.71 | 10.66 | 16.63 | 24.12 | 28.24 | 29.44 | 31.03 |
|                     | June (S <sub>2</sub> )   | 2.66                                         | 5.86 | 8.68  | 12.34 | 15.37 | 18.78 | 19.45 | 20.97 |
|                     | July (S <sub>3</sub> )   | 3.12                                         | 7.37 | 11.29 | 16.45 | 21.15 | 26.37 | 30.16 | 32.01 |
|                     | August (S <sub>4</sub> ) | 2.96                                         | 7.15 | 10.32 | 13.36 | 17.86 | 21.18 | 23.07 | 24.25 |
| LSD <sub>0.01</sub> |                          | 0.16                                         | 0.18 | 0.87  | 1.39  | 2.96  | 3.01  | 2.71  | 1.54  |
| Level of Signi.     |                          | **                                           | **   | **    | **    | **    | **    | **    | **    |

\*\* indicates LSD at 1% level of significance.

**Table 7.** Effect of variety on the moisture content of Dragon fruit at different days after fruit setting (DAFS)

| Variety             | Moisture content (%) of fruit at DAFS |       |       |       |       |       |       |       |
|---------------------|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|
|                     | 4                                     | 9     | 13    | 18    | 23    | 28    | 33    | 38    |
| BAU Dragon fruit 1  | 94.29                                 | 91.87 | 91.17 | 90.64 | 90.11 | 89.91 | 91.02 | 91.13 |
| BAU Dragon fruit 2  | 94.71                                 | 92.16 | 91.10 | 91.74 | 90.30 | 90.60 | 91.15 | 91.28 |
| LSD <sub>0.01</sub> | 0.50                                  | 0.55  | 0.40  | 0.64  | 0.66  | 0.54  | 0.26  | 0.27  |
| Level of Signi.     | *                                     | NS    | NS    | **    | **    | **    | NS    | NS    |

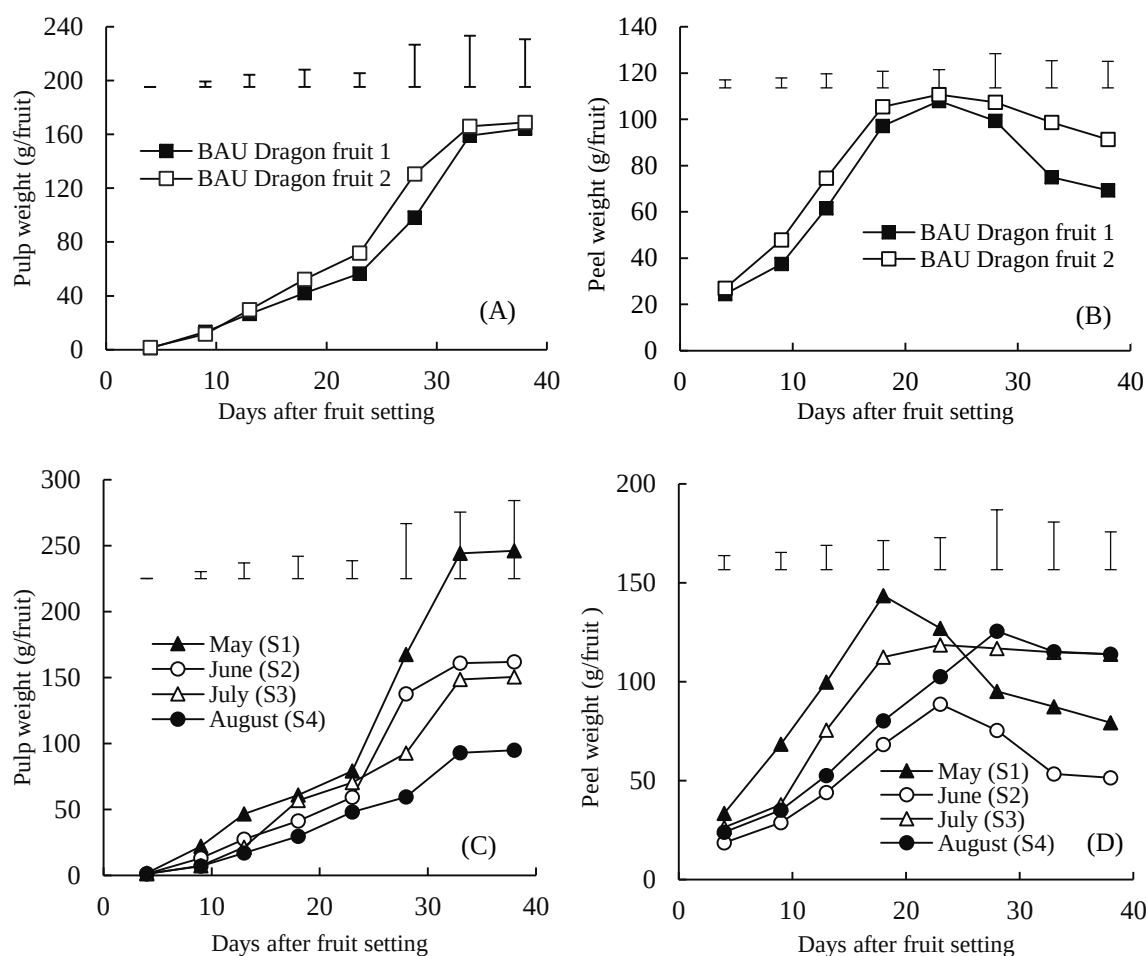
\* & \*\* indicates LSD at 5% and 1% level of significance, NS indicates non-significance.

### Effect of variety and flowering time on pulp and peel weight of Dragon fruit

Pulp weight of Dragon fruit was found to increase from 4 to 38 DAFS in case of both the varieties. Significant variations were found between two varieties from 4 to 38 DAFS. At 38 DAFS, higher fruit pulp weight was obtained from BAU Dragon fruit 2 (168.98 g) while BAU Dragon fruit 1 gave lower fruit pulp weight (164.24 g) (Fig. 4A). Peel weight of Dragon

fruit showed significant variations from 4 to 38 DAFS in case of both the varieties. Peel weight of both the varieties was increased rapidly up to 23 DAFS then decreased gradually. At 23 DAFS, the highest peel weight (110.61 g) was obtained from the BAU Dragon fruit 2 and the lowest peel weight (107.97 g) was found from BAU Dragon fruit 1 (Fig. 4B).

Pulp weight was significantly influenced by different fruit setting time. At 38 DAFS, the highest fruit pulp weight (246.16 g) was obtained in the month of May while the lowest fruit pulp weight (94.91 g) was found in the month August (Fig. 4C). Fruit peel weight of Dragon fruit was also significantly influenced by different fruit setting time. Peel weight was increased rapidly at a certain level at different DAFS and then decreased gradually. At 18 DAFS, highest fruit peel weight (143.54 g) was obtained in the month of May (Fig. 4D).



**Fig. 4.** Effect of variety (A, B) and flowering dates (C, D) on pulp and peel weight of Dragon fruit at different days after fruit setting (DAFS). Vertical bars indicate LSD at 1% level of probability.

**Table 8.** Effect of flowering dates on fresh weight of Dragon fruit at different days after fruit setting (DAFS)

| Flowering dates          | Moisture content of fruit (%) at DAFS |       |       |       |       |       |       |       |
|--------------------------|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|
|                          | 4                                     | 9     | 13    | 18    | 23    | 28    | 33    | 38    |
| May (S <sub>1</sub> )    | 94.63                                 | 94.17 | 92.47 | 90.90 | 89.10 | 91.04 | 92.72 | 93.43 |
| June (S <sub>2</sub> )   | 94.45                                 | 91.65 | 91.18 | 89.90 | 89.78 | 88.26 | 89.80 | 90.23 |
| July (S <sub>3</sub> )   | 95.19                                 | 90.63 | 90.11 | 91.60 | 90.95 | 90.94 | 91.02 | 92.00 |
| August (S <sub>4</sub> ) | 93.72                                 | 91.63 | 90.78 | 92.36 | 91.01 | 90.80 | 90.89 | 91.16 |
| LSD <sub>0.01</sub>      | 0.71                                  | 0.78  | 0.57  | 0.66  | 0.94  | 0.77  | 0.37  | 0.39  |
| Level of Signi.          | **                                    | **    | **    | **    | **    | **    | **    | **    |

\*\* indicates LSD at 1% level of significance.

**Table 9.** Combine effects of variety and flowering dates on the moisture content of dragon fruit at different days after fruit setting (DAFS)

| Variety             | Flowering dates | Moisture content (%) of dragon fruit at DAFS |       |       |       |       |       |       |       |
|---------------------|-----------------|----------------------------------------------|-------|-------|-------|-------|-------|-------|-------|
|                     |                 | 4                                            | 9     | 13    | 18    | 23    | 28    | 33    | 38    |
| BAU Dragon fruit 1  | May (S1)        | 92.86                                        | 93.70 | 92.04 | 90.76 | 90.88 | 91.18 | 91.93 | 92.17 |
|                     | June (S2)       | 96.71                                        | 92.71 | 91.61 | 90.19 | 89.56 | 87.39 | 89.34 | 90.16 |
|                     | July (S3)       | 94.89                                        | 89.33 | 90.03 | 90.47 | 90.42 | 91.34 | 92.37 | 93.20 |
|                     | August (S4)     | 92.69                                        | 91.75 | 90.99 | 91.12 | 89.58 | 89.74 | 90.42 | 91.67 |
| BAU Dragon fruit 2  | May (S1)        | 96.40                                        | 94.63 | 92.90 | 91.03 | 87.31 | 90.90 | 93.51 | 94.63 |
|                     | June (S2)       | 92.19                                        | 90.58 | 90.74 | 89.60 | 90.00 | 89.13 | 90.26 | 91.34 |
|                     | July (S3)       | 95.49                                        | 91.92 | 90.19 | 92.72 | 91.47 | 90.53 | 89.67 | 90.23 |
|                     | August (S4)     | 94.74                                        | 91.51 | 90.57 | 93.59 | 92.43 | 91.85 | 91.17 | 92.02 |
| LSD <sub>0.01</sub> |                 | 1.01                                         | 1.12  | 0.81  | 1.29  | 1.33  | 1.09  | 0.52  | 0.54  |
| Level of Signi.     |                 | **                                           | **    | **    | **    | **    | **    | **    | **    |

\*\* indicates LSD at 1% level of significance.

**Table 10.** Combine effects of variety and flowering dates on pulp weight (g) of dragon fruit at different days after fruit setting (DAFS)

| Variety             | Flowering dates | Pulp weight (g) of dragon fruit at DAFS |       |       |       |       |        |        |        |
|---------------------|-----------------|-----------------------------------------|-------|-------|-------|-------|--------|--------|--------|
|                     |                 | 4                                       | 9     | 13    | 18    | 23    | 28     | 33     | 38     |
| BAU Dragon fruit 1  | May (S1)        | 1.33                                    | 22.88 | 41.53 | 68.41 | 95.68 | 116.97 | 187.88 | 189.47 |
|                     | June (S2)       | 1.21                                    | 15.36 | 29.86 | 40.18 | 51.89 | 185.47 | 214.12 | 217.02 |
|                     | July (S3)       | 1.15                                    | 8.49  | 20.42 | 36.20 | 43.27 | 50.13  | 141.54 | 143.09 |
|                     | August (S4)     | 1.15                                    | 6.25  | 14.72 | 23.08 | 35.39 | 40.65  | 105.71 | 106.91 |
| BAU Dragon fruit 2  | May (S1)        | 1.83                                    | 21.12 | 51.69 | 53.37 | 62.49 | 218.25 | 300.49 | 302.12 |
|                     | June (S2)       | 1.34                                    | 10.72 | 24.84 | 42.52 | 66.67 | 89.76  | 107.75 | 108.25 |
|                     | July (S3)       | 1.38                                    | 6.07  | 22.51 | 77.31 | 97.40 | 135.52 | 155.37 | 156.78 |
|                     | August (S4)     | 1.28                                    | 8.04  | 19.45 | 35.99 | 60.92 | 78.46  | 80.09  | 82.02  |
| LSD <sub>0.01</sub> |                 | 0.07                                    | 1.28  | 2.82  | 2.92  | 3.21  | 9.84   | 11.92  | 12.21  |
| Level of Signi.     |                 | **                                      | **    | **    | **    | **    | **     | **     | **     |

\*\* indicates LSD at 1% level of significance.

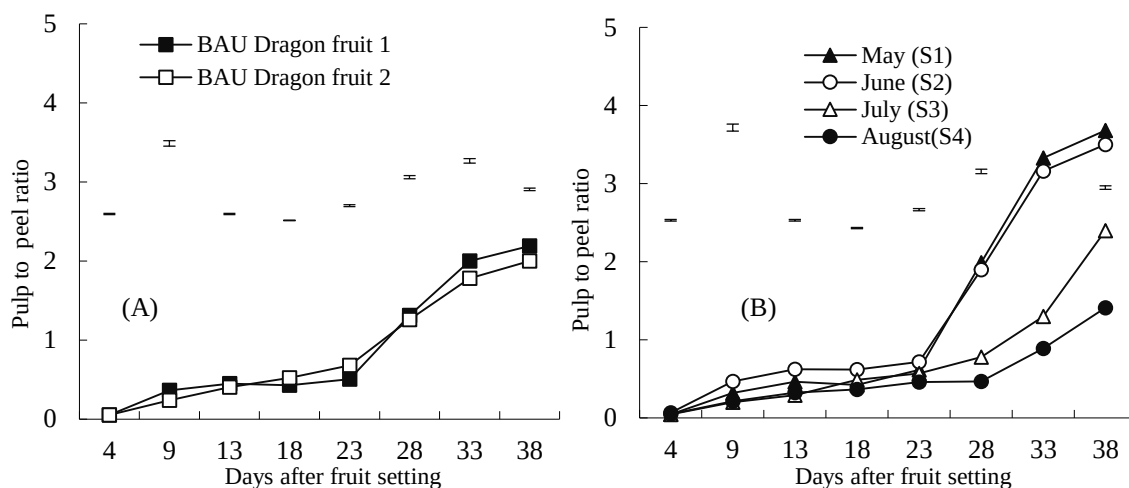
**Table 11.** Combine effects of variety and flowering dates on peel weight (g) of dragon fruit at different days after fruit setting (DAFS)

| Variety             | Flowering dates | Peel weight (g) of dragon fruit at DAFS |       |        |        |        |        |        |        |
|---------------------|-----------------|-----------------------------------------|-------|--------|--------|--------|--------|--------|--------|
|                     |                 | 4                                       | 9     | 13     | 18     | 23     | 28     | 33     | 38     |
| BAU Dragon fruit 1  | May (S1)        | 33.26                                   | 66.45 | 101.21 | 161.72 | 136.53 | 103.89 | 64.71  | 53.15  |
|                     | June (S2)       | 18.68                                   | 25.14 | 42.71  | 78.53  | 107.09 | 68.34  | 32.18  | 20.82  |
|                     | July (S3)       | 26.56                                   | 34.09 | 60.08  | 82.30  | 100.67 | 109.34 | 100.51 | 96.28  |
|                     | August (S4)     | 18.98                                   | 24.10 | 42.24  | 65.62  | 87.58  | 115.53 | 86.67  | 79.24  |
| BAU Dragon fruit 2  | May (S1)        | 33.88                                   | 70.68 | 98.48  | 125.36 | 117.71 | 86.57  | 80.36  | 74.29  |
|                     | June (S2)       | 18.52                                   | 32.56 | 45.34  | 58.28  | 70.27  | 82.61  | 74.83  | 67.12  |
|                     | July (S3)       | 26.19                                   | 41.78 | 91.26  | 142.66 | 136.74 | 124.48 | 113.51 | 106.92 |
|                     | August (S4)     | 29.12                                   | 46.32 | 63.17  | 95.14  | 117.71 | 135.69 | 123.97 | 115.65 |
| LSD <sub>0.01</sub> |                 | 3.04                                    | 3.71  | 5.26   | 6.26   | 6.86   | 12.88  | 10.26  | 9.15   |
| Level of Signi.     |                 | **                                      | **    | **     | **     | **     | **     | **     | **     |

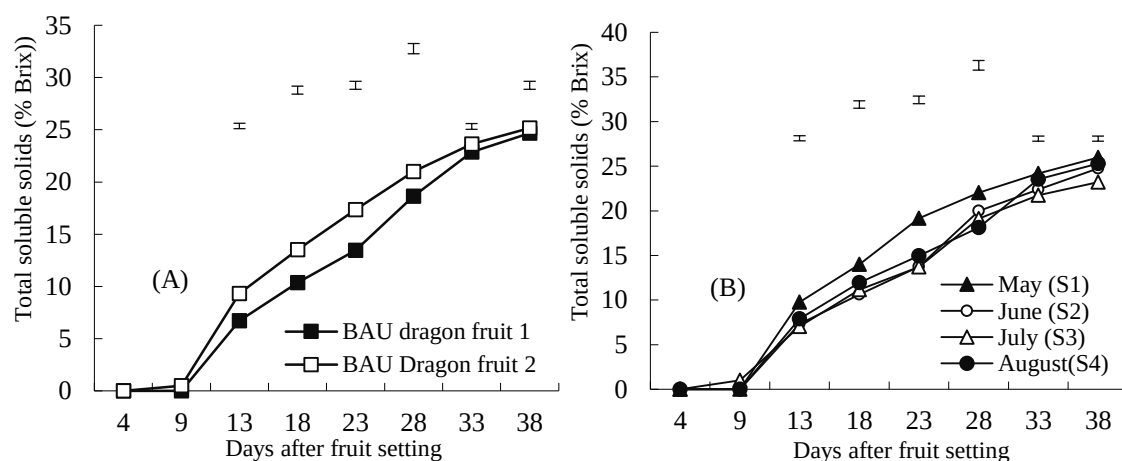
\*\* indicates LSD at 1% level of significance.

There were significant variations found in fruit pulp weight due to combining effects of variety and fruit setting time. At 38 DAFS, BAU Dragon fruit 2 produced maximum pulp weight (302.12 g) when flowering in May and the lowest pulp weight (82.02 g) found in August flowering (Table 10).

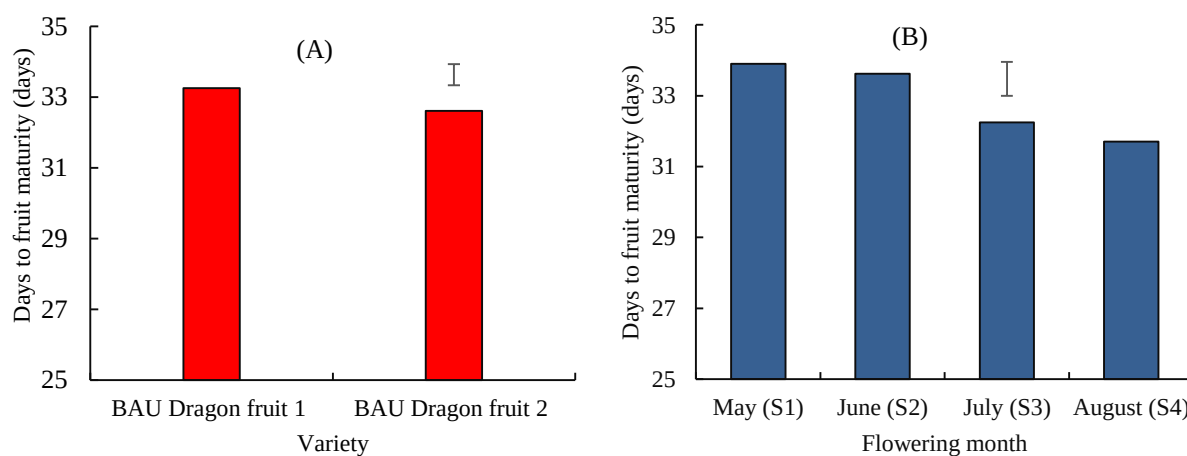
Fruit peel weight was significantly varied due to combining effects of variety and fruit setting time from 4 to 38 DAFS. Peel weight was increased at a certain level at different DAFS and then decreased gradually. At 18 DAFS, the highest fruit peel weight (161.72 g) was found from BAU Dragon fruit 1 when flowering in May while BAU Dragon Fruit-2 reached the highest fruit peel weight (142.66 g) of when flowering in the month of July (Table 11).



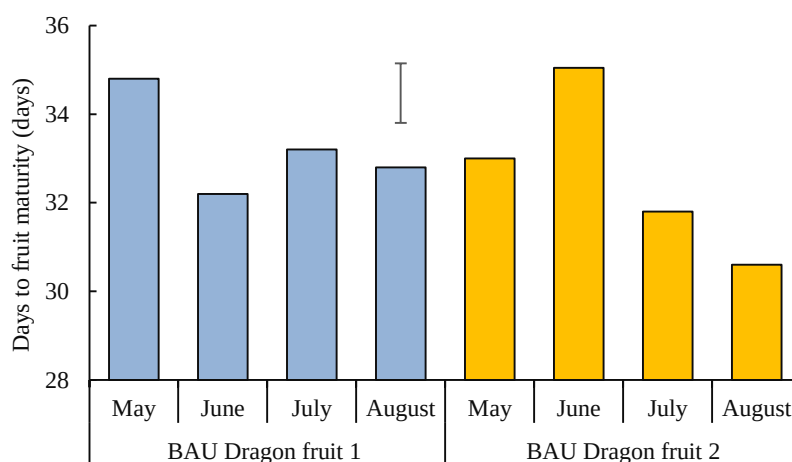
**Fig. 5.** Effect of variety (A) and flowering dates (B) on pulp to peel ratio of Dragon fruit at different days after fruit setting (DAFS). Vertical bars indicate LSD at 1% level of probability.



**Fig. 6.** Effect of variety (A) and flowering dates (B) on total soluble solids contents of Dragon fruit at different days after fruit setting (DAFS). Vertical bars indicate LSD at 1% level of probability.



**Fig. 7.** Effect of variety (A) and flowering dates (B) on days to fruit maturity of Dragon fruit at different days after fruit setting (DAFS). Vertical bars indicate LSD at 1% level of probability.



**Fig. 8.** Combine effect of variety and flowering dates on days to fruit maturity of Dragon fruit at different days after fruit setting (DAFS). Vertical bars indicate LSD at 1% level of probability.

### Effect of variety and flowering time on pulp to peel ration of Dragon fruit

Pulp to peel ratio of Dragon fruit was found to increase from 4 to 38 DAFS for both the varieties. Significant variations were recorded between two varieties from 9 to 38 DAFS. At 38 DAFS, higher pulp to peel ratio of fruits (2.19) was obtained from BAU Dragon fruit 1 while BAU Dragon fruit 2 gave the lower fruit pulp to peel ratio (2.00) (Fig. 5A). Pulp to peel ratio was significantly influenced by different fruit setting time. At 38 DAFS, the highest fruit pulp to peel ratio (3.68) was found in the month of May while the lowest fruit pulp to peel ratio (1.41) was found in the month of August (Fig. 5B). Significant variations were also found in fruit pulp to peel ratio due to combining effects of variety and fruit setting time of Dragon fruit from 9 to 38 DAFS. At 38 DAFS, June flowering of BAU Dragon fruit 1 produced the highest pulp to peel ratio (7.02) while August flowering of BAU Dragon fruit 2 gave the lowest pulp to peel ratio (1.75) (Table 12).

### Effect of variety and flowering time on total soluble solids contents of Dragon fruit

Total soluble solids (TSS, %Brix) contents of Dragon fruit varieties were increased rapidly from 4 to 38 DAFS. Significant variations were found between two varieties from 13 to 38 DAFS. At 38 DAFS, the highest TSS (25.16 %Brix) was found from BAU Dragon fruit 2 while BAU Dragon fruit 1 gave the lowest TSS (24.67 %Brix) (Fig. 6A). Percent TSS contents of Dragon fruit was significantly influenced by different fruit setting time. Percent TSS was zero at 4 DAFS in case of all fruit setting time. But it was increased speedily from 9 to 33 DAFS and then increased slowly up to fruit mature. At 38 DAFS, the highest total soluble solids (25.3 %Brix) was obtained in the month of May while the lowest TSS (23.21 %Brix) was observed in the month of July (Fig. 6B). There was a significant variations found in TSS contents of fruits due to combine effects of variety and fruit setting time from 9 to 38 DAFS. At 38 DAFS, the May flowering of BAU Dragon fruit 2 reached maximum TSS (27.17 %Brix) and in June flowering produced the minimum TSS (21.98 %Brix) (Table 13).

**Table 12.** Combine effects of variety and flowering dates on pulp to peel ratio of dragon fruit at different days after fruit setting (DAFS)

| Variety             | Flowering dates | Pulp to peel ratio of dragon fruit at DAFS |      |      |      |      |      |      |      |
|---------------------|-----------------|--------------------------------------------|------|------|------|------|------|------|------|
|                     |                 | 4                                          | 9    | 13   | 18   | 23   | 28   | 33   | 38   |
| BAU Dragon fruit 1  | May (S1)        | 0.04                                       | 0.34 | 0.41 | 0.42 | 0.70 | 1.72 | 2.90 | 3.34 |
|                     | June (S2)       | 0.06                                       | 0.61 | 0.70 | 0.51 | 0.49 | 2.71 | 6.65 | 7.02 |
|                     | July (S3)       | 0.04                                       | 0.25 | 0.34 | 0.44 | 0.43 | 0.46 | 1.22 | 2.06 |
|                     | August (S4)     | 0.06                                       | 0.26 | 0.35 | 0.35 | 0.40 | 0.35 | 1.22 | 2.01 |
| BAU Dragon fruit 2  | May (S1)        | 0.05                                       | 0.30 | 0.52 | 0.43 | 0.53 | 2.26 | 3.76 | 4.25 |
|                     | June (S2)       | 0.07                                       | 0.33 | 0.55 | 0.73 | 0.95 | 1.09 | 1.44 | 2.15 |
|                     | July (S3)       | 0.05                                       | 0.15 | 0.24 | 0.54 | 0.71 | 1.09 | 1.37 | 2.09 |
|                     | August (S4)     | 0.04                                       | 0.17 | 0.30 | 0.38 | 0.52 | 0.58 | 0.56 | 1.75 |
| LSD <sub>0.01</sub> |                 | 0.10                                       | 0.47 | 0.10 | 0.07 | 0.15 | 0.30 | 0.94 | 1.33 |
| Level of Signi.     |                 | **                                         | **   | **   | **   | **   | **   | **   | **   |

\*\* indicates LSD at 1% level of significance.

**Table 13.** Combine effects of variety and flowering dates on total soluble solids (%Brix) contents of dragon fruit at different days after fruit setting (DAFS)

| Variety             | Flowering dates | Total soluble solids (% Brix) contents of fruit at |      |       |       |       |       |       |       |
|---------------------|-----------------|----------------------------------------------------|------|-------|-------|-------|-------|-------|-------|
|                     |                 | 4                                                  | 9    | 13    | 18    | 23    | 28    | 33    | 38    |
| BAU Dragon fruit 1  | May (S1)        | 0.00                                               | 0.00 | 8.67  | 12.83 | 19.33 | 20.17 | 23.33 | 24.65 |
|                     | June (S2)       | 0.00                                               | 0.00 | 7.48  | 10.72 | 12.33 | 21.33 | 24.45 | 26.28 |
|                     | July (S3)       | 0.00                                               | 0.00 | 5.42  | 8.90  | 10.82 | 18.40 | 21.00 | 23.12 |
|                     | August (S4)     | 0.00                                               | 0.00 | 5.24  | 9.00  | 11.32 | 14.67 | 22.70 | 24.27 |
| BAU Dragon fruit 2  | May (S1)        | 0.00                                               | 0.00 | 10.89 | 15.18 | 19.00 | 23.87 | 25.00 | 27.17 |
|                     | June (S2)       | 0.00                                               | 0.00 | 7.14  | 10.54 | 15.17 | 18.65 | 20.34 | 21.98 |
|                     | July (S3)       | 0.00                                               | 0.00 | 8.67  | 13.45 | 16.57 | 19.85 | 22.50 | 24.10 |
|                     | August (S4)     | 0.00                                               | 0.00 | 10.54 | 14.90 | 18.64 | 21.57 | 24.33 | 26.46 |
| LSD <sub>0.01</sub> |                 | -                                                  | -    | 0.77  | 1.07  | 1.47  | 1.53  | 1.06  | 0.76  |
| Level of Signi.     |                 | -                                                  | -    | **    | **    | **    | **    | **    | **    |

\*\* indicates LSD at 1% level of significance.

### Effect of variety and flowering time on days require to fruit maturity of Dragon fruit

In respect to days required for fruit maturity, significant variations were found between two varieties. It was observed that BAU Dragon fruit 1 took higher days (33.25 days) to fruit mature while lower days (32.61 days) required for fruit maturity of BAU Dragon fruit 2 (Fig. 7A). It was revealed that days required for fruit maturity of Dragon fruit was significantly influenced by different fruit setting time. The maximum days (33.90 days) required to fruit maturity was recorded in the month of May and the lowest days (31.70 days) required to fruit maturity was observed in the month of August (Fig. 7B). Days required to fruit maturity was significantly influenced due to combining effects of variety and fruit setting time. The highest days (35.04 days) required to fruit maturity of BAU Dragon fruit 2 was obtained in the month of June while the lowest days (30.60 days) required to fruit maturity was found in the month of August (Fig. 8).

## DISCUSSION

Flowering, fruit setting, fruit growth, development and maturity of dragon fruit are regulated by environmental factors. In this study, it is reported that Dragon fruit length, diameter and some other morphological characters of fruits were influenced by variety and setting times. At the end of fruit growth, the highest length and diameter of fruit was obtained from the BAU Dragon fruit 2 while June to July flowering produced longest fruit length and maximum fruit diameter. The possible reason might be the presence of an optimum climatic condition which assisted better cell expansion thus improved growth and development of fruit. Growth and

development of any fruit largely depend on cell division followed by cell expansion (Bohner & Bangerth, 1988; Hossain & Nonami, 2011; Mapelli et al., 1978). Usually, after cell division, cell expansion become the major factor to improve fruit size (Bertin, 2005). Final fruit size is strongly related to the number of cells produced just immediately after pollination (Zhang et al., 2006). Fruit cell expansion is necessarily important to the final yield and quality of fruit crops.

The highest fruit fresh weight (456.50 g/fruit) was obtained from BAU Dragon fruit 2 when flowering in the month of May while the lowest fresh weight (195.25 g/fruit) of similar variety was obtained in the month of June. In this study, we found that early fruiting (May month) enhanced fruit growth and eventually higher fruit fresh weight. Fruit fresh weight could be 350 g to 850 g noticed by Pushpakumara et al. (2005). In the month of June, plants bear huge fruits which might cause smaller in fruit size thus fresh weight of fruit was minimum. However, fruit pulp weight increased with the time advanced and reached maximum at 38 DAFS while peel weight increased at the half way of fruit growth thereafter decreased as time progressed to mature. The results of our investigation are consistent with the findings of previous studies (Castillo-Martinez et al., 2003; Centurion et al., 2008; Chuachoochat & Babpraserth, 2005; Marquez-Guzman et al., 2005; Osuna et al., 2007). They reported that pulp mass of Dragon fruit increased as the fruit matured and peel mass decreased vice versa.

Flowering and fruit setting time have significant influenced on quality of fruits, especially on total soluble solids contents. Nomura and Yonemoto (2005) noticed that mature dragon fruits had higher TSS content and this value changed as the changes in glucose and fructose in fruits and the TSS value was high in autumn fruits than in summer fruits. But in our study, we found that flowering in May produced maximum TSS (27.17 %Brix) of mature Dragon fruit. Chuachoochat and Babpraserth (2005) reported that TSS of fruit pulp increased when fruit matured.

Days required to fruit maturity may be regulated by fruit setting time. In this study, we observed that flowering in the month of May took longest time (33.9 days) followed by the month of June (33.62 days), July (32.25 days) and shortest time required to fruit mature when flowering in August (31.7 days). Fruit maturity of Dragon fruit depends on the temperatures rises beyond with optimal point reported by different studies (Feng-Ru & Chung-Ruey, 1997a; Luders & McMahon, 2006; Yan & Wallace, 1995). From the temperature data of the experimental field, we noticed that the highest temperature was prevailing in the month of July-August which might be one of the reasons to initiate earliness of fruit maturity. To et al. (2002) noticed that Dragon fruit take 28-30 days to fruit mature after flowering. Regarding the combined effect of variety and flowering time on days required to the maturation of fruit, we found that BAU Dragon fruit 2 flowering in the month of August took the shortest time (30.60 days) and June flowering of BAU Dragon fruit 2 took the longest time to fruit mature (35.04 days). Roushanara (2013) reported that the flowering to fruit mature time for BAU Dragon fruit 1 was 47.86 days. The fruit maturation period of Dragon fruit was also reported by many other researchers. Centurion et al. (2008) found fruit maturity at 29 to 31 days after anthesis. Martínez (2011) noticed fruit maturation at 25 to 31 days after anthesis. All of these findings are in strong agreement with the findings of this study.

## CONCLUSION

Dragon fruit is a new crop in Bangladesh and has great potentiality in future due to its nutritional status and market demand. This study revealed that variety and flowering time

have great influenced on physio-morphological traits of Dragon fruit. As Dragon fruit plants flowers consecutively from the month of May to August, It is followed by fruit setting which might affect by various environmental factors such as photoperiod, temperature, rainfall, light intensity, relative humidity etc. As a result these factors influenced on fruit length, diameter, fresh weight, dry weight, pulp weight, peel weight, pulp to peel ratio, moisture content, TSS, days require to fruit maturity to great extends. From the results of this study, it is found that BAU Dragon fruit 2 exhibited superior performances on some physio-morphological and chemical characters than BAU Dragon fruit 1.

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## تأثیر وارسته و زمان گلدهی بر برخی صفات فیزیولوژیکی، مورفولوژیکی و شیمیایی میوه دراگون (*Hylocereus* spp.)

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چکیده:

این تحقیق به منظور بررسی تأثیر وارسته و زمان گلدهی بر ویژگی‌های فیزیولوژی و شیمیایی میوه‌های دراگون انجام شد. در این تحقیق دو وارسته BAU Dragon fruit 1 و BAU Dragon fruit 2 و چهار زمان گلدهی (اردیبهشت، خرداد، تیر و مرداد) انتخاب شدند. آزمایش در قالب طرح بلوک‌های کامل تصادفی با ۵ تکرار انجام شد. تغییرات معنی‌داری بین دو وارسته میوه دراگون مشاهده شد. آشکار شد که میوه BAU Dragon fruit 2 بر روی پارامترهای مورد مطالعه نسبت به میوه دراگون BAU 1 بهتر عمل می‌کند. در ۳۸ روز پس از تشکیل میوه، میوه BAU Dragon fruit 2 بالاترین طول میوه (۱۰/۰۱ سانتی متر)، وزن تازه (۳۰۷/۹۴) گرم در میوه، وزن گوشت (۲۴/۸۵) گرم در میوه، وزن پالپ (۱۶۸/۹۸) گرم در میوه، وزن پوست (۹۱/۳۲) گرم در میوه و مواد جامد محلول (۲۵/۱۶) درصد بریکس) در مقایسه با وارسته دیگر داشت. اثرات ترکیبی از وارسته و زمان‌های گلدهی نشان داد که گلدهی میوه BAU Dragon fruit 2 در مرداد ماه دارای حداکثر طول میوه (۱۰/۷۴ سانتی‌متر) و وزن پوست (۱۱۵/۶۵) گرم در میوه بود و گلدهی میوه BAU Dragon fruit 2 حداکثر وزن تازه (۴۵/۶۵۰) گرم میوه، وزن خشک (۳۰۲/۱۲) گرم در میوه، رطوبت (۹۴/۶۳) درصد و مواد جامد محلول (۱۷/۱۷) درصد بریکس) در مقایسه با زمان گلدهی دیگر بود. با توجه به زمان مورد نیاز برای بلوغ میوه، میوه BAU Dragon fruit 2 در گلدهی مرداد ماه (۳۰/۶ روز) نسبت به گلدهی خرداد (۳۵/۰۴ روز) زودتر بالغ شد. ارزیابی وارسته‌های بیشتر از میوه دراگون محدودیت تحقیق بود. این یافته‌ها نشان می‌دهد که زمان گلدهی صرف نظر از وارسته تأثیر مستقیمی بر رشد و نمو میوه دراگون دارد.

کلمات کلیدی: میوه دراگون، توده خشک و تر، شاخص برداشت، نسبت گوشت به پوست، مواد جامد محلول