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Effect of Organic and Inorganic Fertilizers on Growth and Yield of "Tomaloo"

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Keywords:
Compatibility; Grafting; Growth; Organic & inorganic; Potato; Tomato; Tomaloo; Yield.

Abstract
An experiment was carried out at the Agricultural Research Field of IUBAT, Dhaka, Bangladesh from October 2022 to April 2023 to investigate the Effects of organic and inorganic fertilizers on the growth and yield of "Tomaloo" in continuation of previous research. "Tomaloo" is a wonder plant created by grafting between a potato and a tomato plant which bears tomato in the upper parts of the plant and the potato grows underground. The experiment was set following Randomized Complete Block Design consisting of four treatments and three replications. The treatments used in the study were F0- Without fertilizer, F1-Organic fertilizer, F2-Chemical fertilizer, and F3-Organic + Chemical fertilizer. The tomato variety BARI-20 (Cherry Tomato) and Potato variety Diamant were used in this experiment. From the study, significant differences were observed in terms of growth and yield components. Most of the studied parameters such as plant height, number of leaves, number of branches, number of flower clusters per plant, number of fruits per cluster, number of fruits per plant, fruit length, fruit diameter, single fruit weight, and total fruit yield per plant of Tomato and Potato showed significant difference by the different fertilizer treatments. The maximum "Tomaloo" plant growth was found in the F1 treatment and the minimum was recorded in the F0 treatment. The highest yield of Tomato (373.58 g) and Potato (204.90 g) per plant of "Tomaloo" was recorded in the F1 treatment and the lowest yield of Tomato (171.95 g) and Potato (117.37 g) per plant was recorded in the F0 treatment. It was revealed from the present findings that maximum growth and yield of tomato and potato were obtained from "Tomaloo" plant in response to F1 (Organic fertilizer) fertilizer treatments..

1. Introduction

Growing vegetables is a significant way to improve the socioeconomic situation of marginal and small farmers because demand for vegetables is rising daily as a

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result of changing dietary preferences, the concept of a balanced diet for nutritional security, higher yields per unit area, and higher prices for vegetables per unit area. So, vegetables are more economical to grow and have a significant role in nutritional security for the human being. The two most significant solanaceous high-valued vegetables commercially farmed in Bangladesh are the tomato (*Solanum lycopersicum)* and potato (*Solanum tuberosum*), due to their utility, affordability, and nutritional value.

The potato (*Solanum tuberosum* L.), is considered as a vegetable crop and produces up to 67% of Bangladesh's total vegetable production (BBS, 2021). Tomatoes (*Solanum lycopersicum*) are also a very important vegetable crop and are eaten throughout the majority of the world, from home gardens and greenhouses to huge commercial farms due to their greater resilience to a variety of agro-climatic conditions. (Laily *et al*., 2021). The tomato a member of exist to the family Solanaceae is a popularly grown vegetable that ranks third in worldwide vegetable production (Javaria *et al*., 2012). Bangladesh produces 387653 MT of tomato from an area of about 28205 ha, (BBS, 2019).

In Bangladesh, nearly 4 million individuals including over a million women, are employed in household or commercial vegetable farming. Presently, 3.73 million tons of vegetables are produced annually from 2.57 percent of Bangladesh's total land area (Haque *et al*., 2021). The nation is now self-sufficient in the production of grain foods, but the main source of nutrition—vegetables—are still not being met the demand as per requirement. Vegetable intake for adults should be at least 200g per day. However, the Bangladeshi population only consumes 60g, leaving a requirement of 140g. The population is also growing daily, which puts pressure on the need to rise even further. Therefore, there is an urgent need to increase the nation's vegetable production since agricultural land is losing by 0.19 percent every year (BBS, 2019).

Therefore, it is now necessary to develop new technologies and apply them to boost vegetable output on little land in order to guarantee the nation’s food security. “Tomaloo” production technology might be a good proposition. This improved technology could be accomplished through a process called grafting – a method of asexual propagation where rootstock and scion are united together to create a new plant. Most plants belonging to the same species, genus, or family can be grafted to create one plant. The “Tomaloo” is a grafted plant developed by uniting a tomato (*Solanum lycopersicum*L.*)* scion, on a potato (*Solanum tuberosum* L.*)* rootstock by cleft grafting and given name as”Tomaloo” plant at the IUBAT, Bangladesh (Farooque, 2018). The success in grafting was possible due to the genetic compatibility between these two species as they belong to the same genus and same family. The “Tomaloo” plant was created to get more than one vegetable from one plant using minimum land. It was anticipated that this grafting technology may open a new avenue in Bangladesh for vegetable production.

Fertilizer and nutrient management are essential components of successful commercial potato and tomato production and are also thought to be essential for successful "Tomaloo" production. The amounts of nitrogen, phosphorus, and potassium that a crop needs (in the forms of N, P2O5, and K2O, respectively) are the optimum amounts that will result in the highest crop production. (Reiter *et al*., 2012). The application of fertilizer in the most efficient ways depends upon increased nutrient uptake in crop plants and improved growth and yields (Kumar *et al*., 2012).

Organic manure can help increase soil fertility and crop yield, which is necessary for sustainable crop production. (Ferdous *et al*., 2018). In addition to varied amounts of micronutrients and physical characteristics of the soil, organic fertilizers frequently also supply some N, P, and K. A significant production barrier in Bangladesh is the low organic matter content of the soil, which results in poor soil fertility. (Laily *et al*., 2021). The most common agricultural technique for increasing crop yield is the use of chemical fertilizers. However, its overuse has had a negative effect on the environment (Ali *et al*., 2021). Chemical fertilizers are used to maintain the soil's deficiency in nitrogen, phosphorous, and potassium. The usually used chemical fertilizers in the crop field are urea, diammonium phosphate (DAP), and single superphosphate (SSP)/ triple superphosphate (TSP) (Tuncsoy, 2021).

Therefore, it is established that the effect of both organic and inorganic fertilizers has a significant effect on crop growth, yield, and the importance of soil health. However, the combined and individual effect of both organic and inorganic fertilizer application on "Tomaloo" has not yet been investigated in Bangladesh. Thus, the experiment was established to find out the individual and combined effect of organic and inorganic fertilizers on the growth and yield of "Tomaloo".

2. Materials and methods

The experiment was set up at the Agricultural Research Field in the IUBAT-International University of Business Agriculture and Technology Campus, 4 Embankment Drive Road, Sector 10, Uttara Model Town, Dhaka 1230, Bangladesh, during the period from October 2022 to April 2023 in the winter season. This site is under the Agro-Ecological Zone – Modhupur Tract (AEZ 28). Geographically the experimental field is located at 23.8883° N latitude and 90.3907° E longitude. The geographic position of the experimental site belongs to the sub-tropical zone, characterized by dry season from November to March. The soil's pH was 6, and its texture was sandy loam.

Table 1. Temperature during the experiment period:

Month	Temperature (^{0}C)	
	Maximum	Minimum
October	32	26
November	30	23

December	27	19
January	25	16
February	29	16
March	32	23
April	36	25

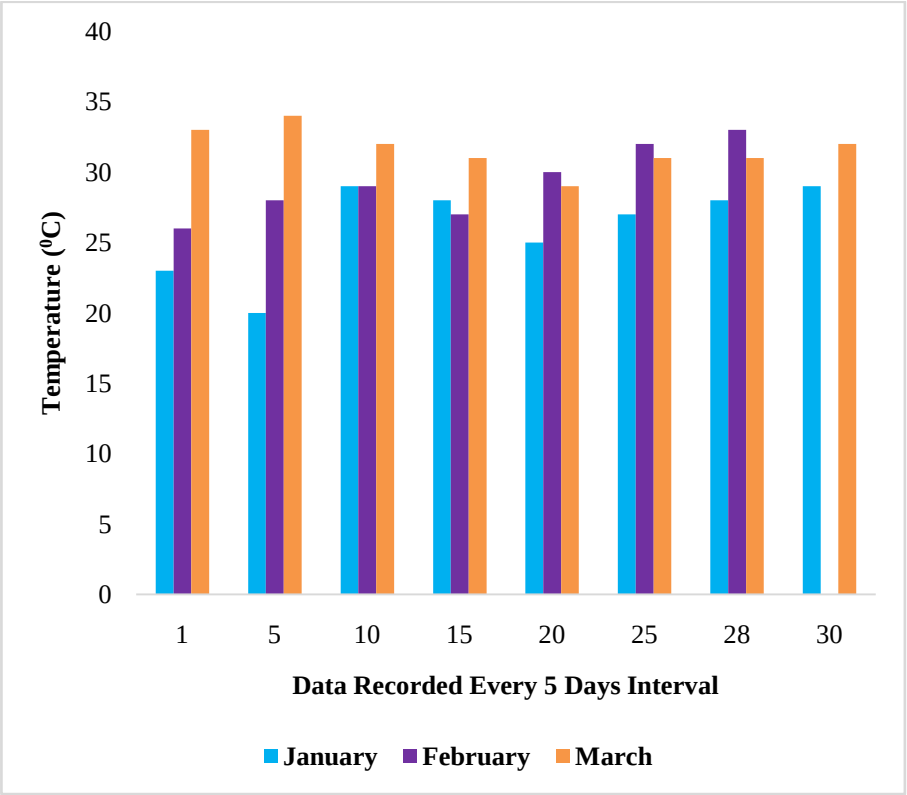

Figure 1. Temperature during the flowering period of the experimental area

The experiment had four fertilizer treatments—a mix of organic and inorganic—and three replications. It was set up using a Randomized Complete Block Design (RCBD). The treatments were F_0- Without fertilizer as control, F_1-Organic fertilizer, F_2-Chemical fertilizer, and F_3-Organic + Chemical fertilizer. The tomato variety BARI-20 (Cherry Tomato) and Potato variety Diamant were used in this experiment.

The surface of the land was leveled by laddering after the area was repeatedly plowed and cross-plowed. After the first plowing, Carbotuff 5G (Carbofuran) was used for soil treatment. At the time of final land preparation, manure, and fertilizers were applied in accordance with the treatment. The experimental plots were set up following the experimental design after the final land preparation. The total land area of the experimental plot was 2.1 m x 9 m = 18.9 m^2 which were

divided into three replications. Each replication was divided into 4 rows where 4 different organic and inorganic fertilizer treatments were applied.

2.1 Application of organic and inorganic fertilizers

The recommended dose of organic and inorganic fertilizers was applied following the recommendation of the Bangladesh Agricultural Research Institute (BARI). N=196 kg/ha. P_2O_5=130 kg/ha. K_2O=195kg/ha.

Table 2. Treatment details:

SL	Treatment	Dose of fertilizer per plot (1.575m^2)
1	F_0- Control	No fertilizer
2	F_1- 100% Organic fertilizer	9kg (Decomposed Cowdung)
3	F_2- 100% Inorganic fertilizer	Urea=66g, TSP=42g, MoP=50g.
4	F_3- 50% Organic+ 50% Inorganic (fertilizer)	4.5 Kg (Cowdung) Urea=33g, TSP=21g, MoP=25g.

The total amount of cow dung, TSP, MoP, and one-fourth of urea were applied as basal application to the crop field. After 20 days of seed sowing another one-fourth dose of urea was applied before grafting. The remaining 50% of urea was applied after the grafting.

The Potato tubers were planted in rows of raised beds. Row to Row and plant-to-plant spacing were maintained at 75 cm and 40 cm respectively. Then the seeds were covered with the fine soil by hand. The tubers were soaked with fungicide before planting for seed treatment.

2.2 Grafting of potato and tomato (Tomaloo)

Tomato seedlings were cleft-grafted on the rootstock of potato *in situ*. The top of the rootstock was severed just below a node about 8-12 cm from the base with the help of a sharp blade. A sharp blade was then placed at the center of the cut surface carefully pressed down to 3-5cm deep to make the cleft. Similarly, scion was collected from raised tomato seedlings. A ‘V-shaped slanting cut of 3-5cm was given at the base on both sides of the scion. The prepared scion was then inserted into the prepared cleft of the rootstock so that the cambium layer of rootstock and scion on both sides come in close contact. Then the union part was tied with a polythene strip. Rootstocks and scions with compatible stem diameters were selected to improve the success of grafting. The grafted area, of the scion, and rootstock were covered with an appropriate size polythene bag. New shoots came out from the scion part after 10-12 days of grafting indicating the success of grafting. Then polythene bag was removed and the grafts were allowed to grow. Twenty-eight (28) tomato seedlings were cleft-grafted on a 21-day old potato seedling. During the time of grafting, average height of tomato plant and leaves length was 25 and 7 cm respectively, and the potato plant height and leaves length

were 18 and 10 cm respectively. The plants for grafting were selected based on the rootstock's similar diameter to scion, which was naturally strong and free from disease and pest attack. Scion and rootstock were mature and the diameter was pencil-like.

Plate 1. Insertion of scion on rootstock in grafting process in “Tomaloo”

Plate 2. Completion of the grafting process in “Tomaloo”

Plate 3. Strong union of scion and rootstock through callus tissue formation in “Tomaloo”

2.3 Intercultural Operations

For the plant's better growth and development after grafting, necessary intercultural activities like irrigation, weeding, thinning, etc. were carried out as and when necessary. During grafting, only one healthy potato plant was kept, and other shoots emerging from the base of the plant were removed for better growth of the “Tomaloo” plant. Throughout the experiment, pruning was done several times to remove undesirable branches and leaves for optimal development and productivity. Irrigation was given as and when required. The field was cleared of weeds as needed when the sprouts had fully emerged. Weeding was done at an interval of seven days.

Bordeaux mixture was sprayed on the plants to protect them from fungal disease, and some fungicides Mancer 75wp (Carbendazim 12% + Mancozeb 63%) and Indofil M-45 (Mancozeb 80% Wp) 2g/l were used at seven days interval. Garlic paste was sprinkled on the field to control insects and viral disease vectors.

2.4 Harvesting

Ripe tomatoes were first harvested on 18th March 2023 and afterward, it was done at an interval of 5 days from the “Tomaloo” plant. Final harvesting was done on 8th April along with potato.

2.5 Data Collection

Data were collected from five sample plants at an interval of seven days up to harvest on the following parameters: plant height (cm), number of leaves per plant, number of branches per plant, first date of flowering, total number of flowers per plant, number of clusters per flower, number of fruits per cluster, individual fruit weight (g), fruit length (cm), fruit diameter (cm), number of tubers per plant, individual tuber weight (g).

2.6 Statistical analysis

The collected data were statistically analyzed using STAR (Statistical Tool for Agricultural Research, http://bbi.irri.org/products) statistical package to test the significance of the experiment. The significance of the difference between the pair of means was compared by LSD at 5% level of significance.

3. Results and Discussion

3.1 Plant height of "Tomaloo" plant affected by different fertilizers treatment

The plant height was measured at 7, 14, 21, 28, 35, 42, 49, 56, 63, 70, 77, and 84 days after grafting (DAG). Different fertilizer treatments showed to considerably affect the plant height. Plant height significantly increased day by day (Figure 2). A linear increase in plant height took place with advancing dates in all treatments. However, the highest plant (229.9 cm) height was recorded from the treatment F_1 at 84 DAG. In contrast, the F_0 treatment had the lowest plant height (188.37 cm).

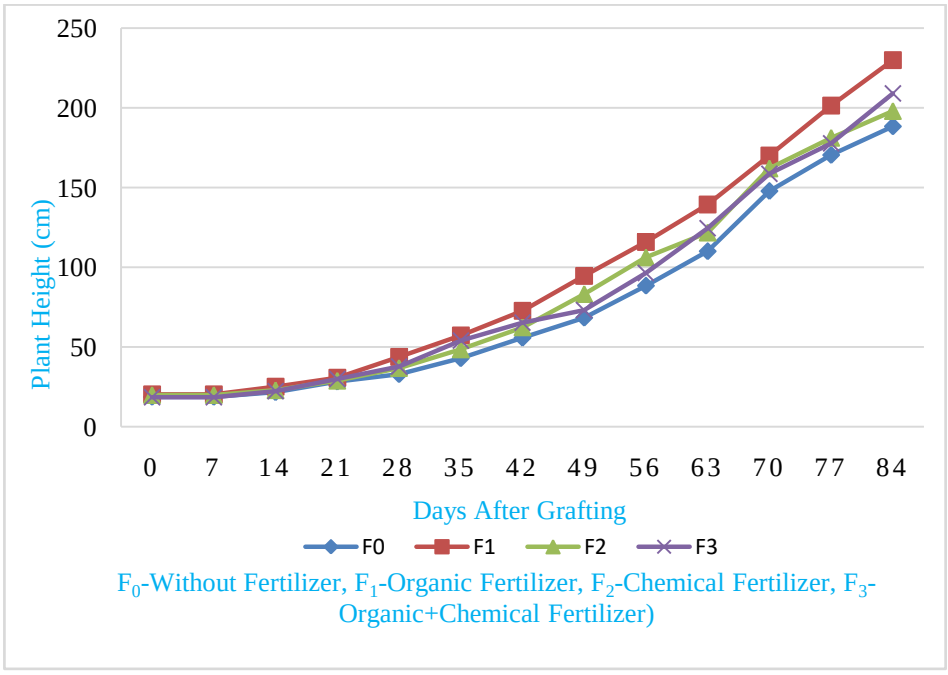

Figure 2. 'Tomaloo' plant height at different days after grafting

3.2 Number of leaves per plant of "Tomaloo" affected by different fertilizer treatments

Different organic and inorganic fertilizer treatments resulted in a substantial variance in the number of leaves per plant. The leaf number per plant was recorded on different days after grafting according to Figure 3. There was a linear increase in leaf numbers with the advancement of days irrespective of all the treatments. The maximum leaf number was found in F_1 (114) treatment while the treatment F_0 (67) gave the minimum number of leaves per plant.

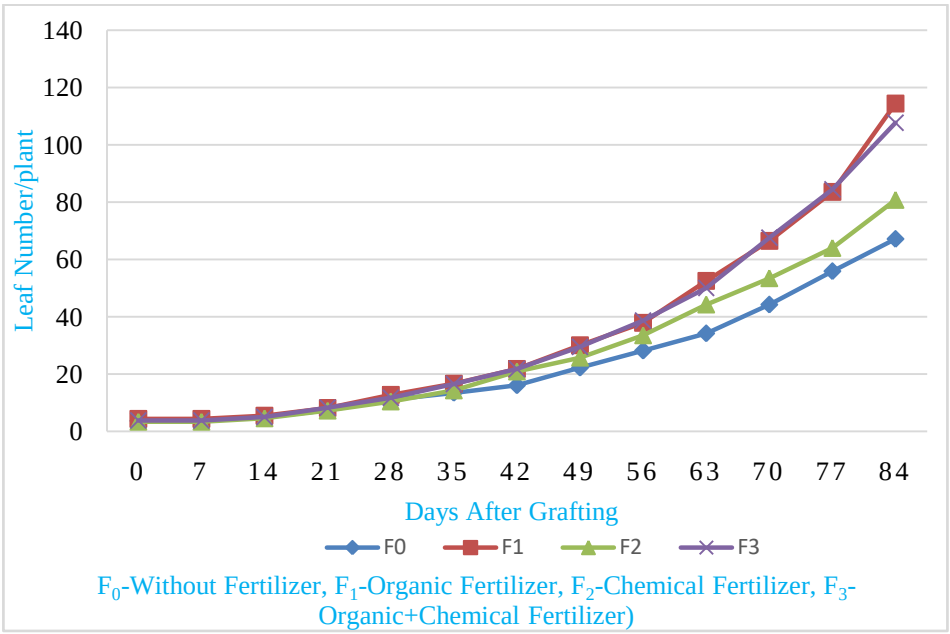

Figure 3. Number of leaves per 'Tomaloo' plant at different days after grafting

3.3 Number of branches per plant of "Tomaloo" affected by different fertilizer treatments

After grafting, the number of branches per plant was counted on various days. Different fertilizer treatments significantly affected the number of branches per plant (Figure 4). The number of branches per plant gradually increased as advancement of days. The maximum branch number (7) per plant was recorded from treatment F_1. Whereas the minimum plant branch number (4) per plant was from in F_0 treatment.

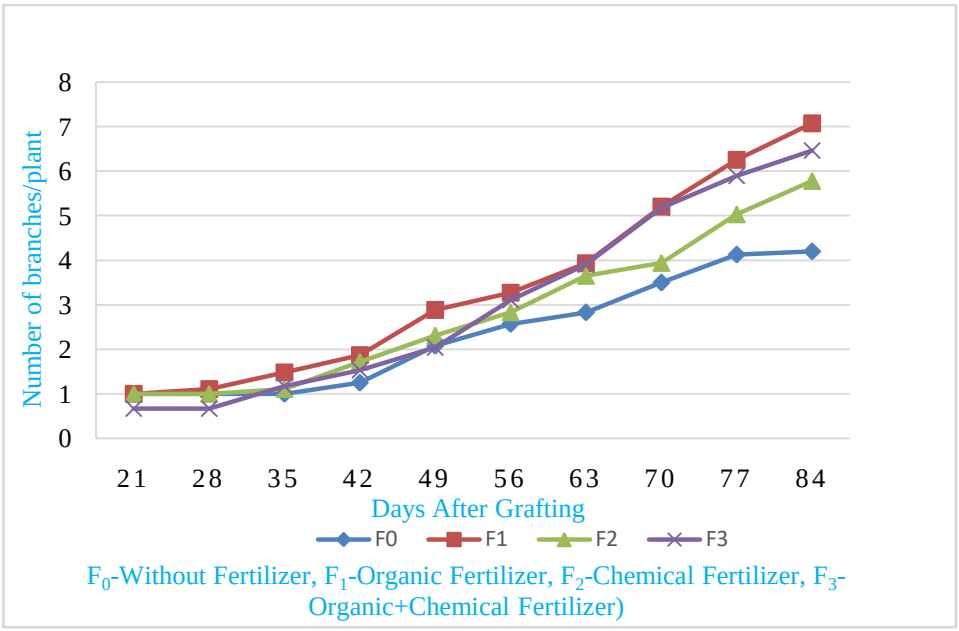

Figure 4. Number of branches per 'Tomaloo' plant at different days after grafting

3.4 Number of flowers per plant of "Tomaloo" affected by different fertilizer treatments

The first flower was observed at 42 DAG in F_3 (Organic +Chemical, Fertilizer) treatment. However, flowers started observed from 49 DAG in the remaining treatment (F_0, F_1, and F_2). The number of flowers per plant started gradually increasing in different treatments up to 63 DAG. At 63 DAG plant bears the maximum number of flowers irrespective of all treatments. At 70 DAG the number of flowers suddenly decreased. Again, the number of flowers gradually increased at 77 DAG and then gradually decreased (Figure 5).

Overall, F3 had the highest average number of flowers per plant, while F2 had the lowest average number of flowers per plant.

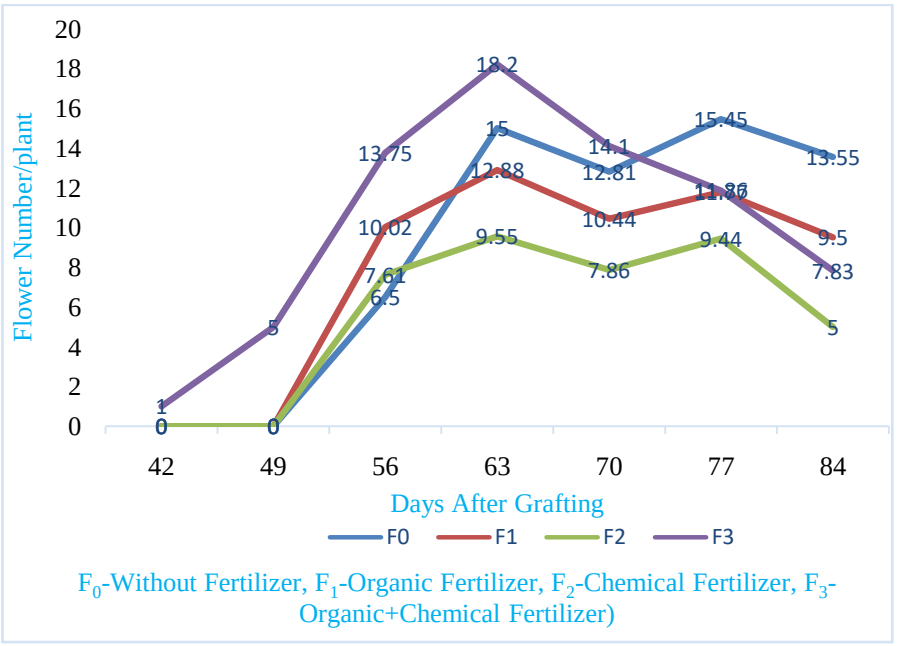

Figure 5. Number of flowers per 'Tomaloo' plant on different days after grafting

3.5 Number of fruits per plant of "Tomaloo" affected by different fertilizer treatments

The first fruit was observed at 56 DAG in F_3 (Organic +Chemical Fertilizer) whereas 63 DAG was required to obtain fruits in the remaining treatment (F_0, F_1, and F_2). The number of fruits per plant was recorded at the different days i.e., 56, 63, 70, 77, 84, and 95 days after grafting (DAG). The number of fruits per plant was observed to be significantly influenced due to different fertilizer treatments (Figure 6). The maximum number (20) of fruits per plant was recorded in F_1, and the minimum fruits number (11) per plant was recorded in F_0. The fruits number gradually increased with every treatment but F_2 at 70 DAG and F_3 at 77 DAG increasing rate decreases. It was possible that the deceased may be accounted for the environmental fluctuations during that period.

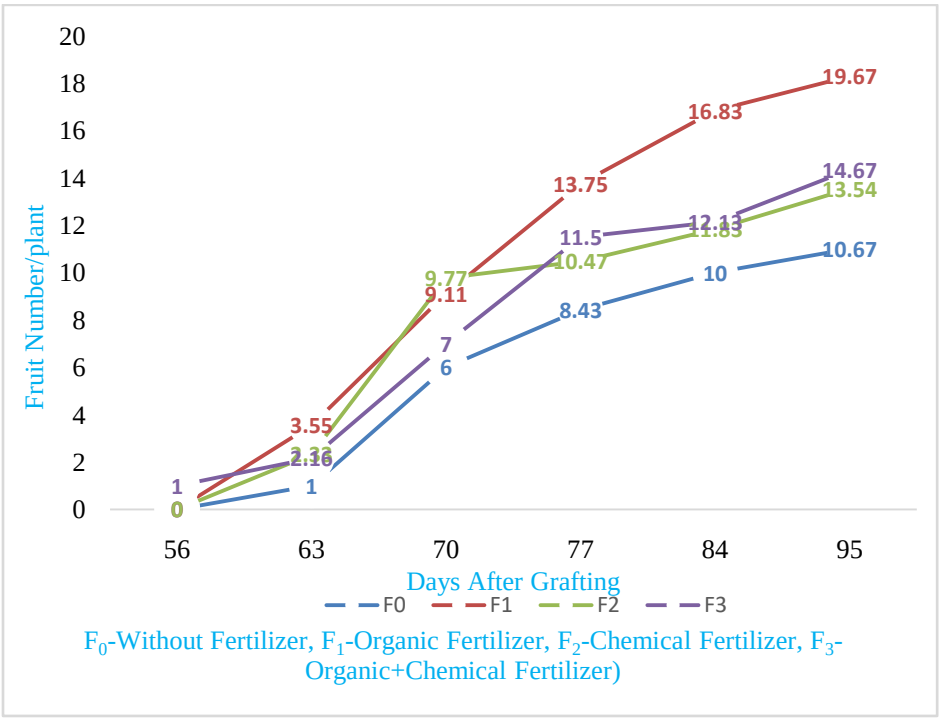

Figure 6. Fruit number per 'Tomaloo' plant at different days after grafting

3.6 Yield and yield attributing characters of "Tomaloo" Plant

There was a significant impact of different organic and fertilizer treatments on tomato fruit yield and yield contributing characteristics of the "Tomaloo" plant (Table 3). Among the various treatments and treatment combinations, the F_1 treatment showed a significantly higher number of clusters per plant, fruits per cluster, fruits per plant, fruit diameter, weight of a single fruit, tomato yield per plant and per plot, and total fruit yield per plant (373.58 g).

Table 3. Effect of different fertilizer treatments on yield and yield contributing characteristics of tomato fruit of "Tomaloo" plants

Treatment	Number of clusters per plant	Number of fruit per cluster	Number of fruit per plant	Fruit length (cm)	Fruit diameter (cm)	Single fruit weight (gm)	Tomato yield per plant (gm)	Tomato yield per plot (1.575m^2) (gm)	Tomato yield (t ha^{-1})
F_0	3.23c	3.3b	10.67c	3.51b	3.01b	16.13b	171.95d	859.76d	5.54d
F_1	4.87a	4.04a	19.67a	3.73a	3.21a	19.02a	373.58a	1867.9a	12.04a
F_2	3.75c	3.61b	13.54b	3.73a	3.05ab	16.73b	226.2c	1131c	7.29c
F_3	4.17b	3.56b	14.67b	3.45b	2.9b	18.81a	275.62b	1378.11b	8.88b
LSD $_{(0.05)}$	0.6497	0.4066	1.202	0.1739	0.1896	1.7052	12.7685	63.8427	0.4148
CV (%)	8.12	5.61	4.11	2.42	3.12	4.83	2.44	2.44	2.46

3.7 Potato yield of "Tomaloo" plants

The "Tomaloo" plant's potato tuber yield was significantly impacted by several treatments (Table 4). The treatments considerably differed in terms of the number of tubers/plants, weight of a single tuber, and tuber yield/plant. Comparing F_1 to other treatments, a significantly higher number of tubers/plants, single tuber weight, and tuber yield/plant were observed.

Table 4. Effect of different fertilizer treatments on yield and yield Contributing character of Potato tuber yield of "Tomaloo" Plants

Treatment	Number of tuber per plant	Individual tuber weight(g)	Tuber yield per plant(g)	Tuber yield per ($1.575m^2$) (gm)	Tuber yield (t ha^{-1})
F_0	5.63d	20.83c	117.37c	586.87c	3.78c
F_1	7.20a	28.44a	204.90a	1024.48a	6.60a
F_2	6.23c	25.70b	160.20b	801.02b	5.16b
F_3	6.47b	26.20b	169.51b	847.57b	5.46b
$LSD_{(0.05)}$	0.1597	1.2741	11.2535	56.2675	0.3654
CV (%)	1.25	2.52	3.46	3.46	3.48

Plate 4. "Tomaloo" plant-bearing Tomato and Potato

3.8 Discussion

From the current study, it was found that different organic and inorganic fertilizers treatment and their combination showed significant influence on the growth and yield attributing characteristics of the "Tomaloo" plant. The F_1 treatment outperformed the other treatments in terms of plant height and the number of leaves per plant. Comparing the F_1 treatment to the other treatments, the most branches per plant were also recorded. The number of flowers per plant suddenly decreased on 70 DAG while it again increased. This might be due to a sudden increase in temperature at that time (temperature data available on materials and methods in Table 1). The optimal temperature for tomato cultivation throughout the day is between 21 and 27 °C (70 and 82 °F). Additionally, for pollination, this temperature range is ideal. These temperatures are regarded as ideal during the daytime. However, in our case, we observed a higher temperature than 27^0C in the month of March 2023. Tomato crops may benefit from lower temperatures at night, reaching 16–18°C (62–64°F) for blooming and fruit setting. Blossom drop is a usual issue connected to temperature fluctuations during tomato reproduction (Ozores-Hampton *et al.,* 2012). According to Singh *et al.,* (2013),one of the environmental issues that harms agriculture the most is excessive temperatures. The effects of rising temperatures on plant growth and reproduction result in severe productivity losses.

Among the different treatments, a significant increase in number of clusters per plant, number of fruits per cluster, number of fruits per plant, fruit length, fruit diameter, single fruit weight, and total fruit yield of tomato per plant (373.58 g) as well as plot yield (1867.90g) were obtained by the F_1 treatment. Similarly, a significant increase of potato tubers/plants, single tuber weight (28.44g), and tuber yield/plant (204.90 g) was also observed in the F_1 treatment compared to other treatments. In general, among different fertilizer treatments, higher plant growth and maximum production were found in the F_1 (Organic) treatment, and minimum growth and production were found in the F_0 treatment (No fertilizer). It was noted that the soil of the experimental field was sandy type which might be responsible for overall lower performance in F_2 treatment, it may be accounted for the characteristics of sandy soil for their less moisture-holding capacity, and less effective for nutrient and moisture supply. Noble *et al.,* (2008) reported that tropical sandy soils are frequently infertile due to their high sand content, low water-holding ability, low cation exchange capacity, low pH (varying from 4.5 to 5.5), low total organic carbon (TOC), and low nutrient that are available to the plants. Moreover, in tomato plants number of clusters per plant, number of fruits per plant, single fruit weight, and tomato yield per plant and plot were observed to be higher in the F_3 treatment compared to the F_2 treatment. A similar trend was also observed in case of potato where the number of tubers per plant, individual tuber weight, and finally tuber yield was also higher in the F_3 treatment than the F_2 treatment. These findings interestingly indicated that, added organic matter improves soil physical and other necessary soil properties which finally positively influence different studied parameters and consequently increase yield in both

tomato and potato. Thus "Tomaloo" plants absorb available nutrients and moisture efficiently to give better performance under this experimental condition and this is also supported by Hou *et al.*, (2013). They also stated the impact of organic fertilizer is most significant on sand-based soil. Therefore, only inorganic fertilizer (F_2) did not bring a positive impact on the "Tomaloo" plant. When 50% of organic fertilizer added in the F_3 treatment along with inorganic fertilizer (F_2), the studied parameters and yield are started positive changes in the case of both tomato and potato. These results clearly indicate solid evidence that soil physical properties were an important condition for successful crop growth, development, and yield.

4. Conclusion

The two most significant solanaceous high-value vegetables grown commercially in Bangladesh are the tomato (*Solanum lycopersicum*) and potato (*Solanum tuberosum*), both of which are valued for their practicality, as well as their economic and nutritional value. Considering the facts, it may be concluded that grafting between tomato and potato plants may be successful by creating a wonder plant named "Tomaloo". This plant produced tomato fruits on the aerial part and potato tubers underground. Based on the present investigation, it could also be stated that the Tomaloo plant responds well to the application of organic fertilizer to maximize the yield of tomato and potato in "Tomaloo" plant. For further validation of this result, the experiment can be conducted in different locations, in different soil conditions, and even with different combinations of both organic and inorganic fertilizers.

Author contributions

The study conceptualization, methodology, writing, review, and editing were performed by A. M.Farooque, Numerical analysis, writing, review, and editing by M. R. Karim. M. M. Hoque conducted the experimentation, writing the initial draftand M. Hasan provided technical support during the experimentation.

Conflict of interest

The authors and the publication of this article have no stated conflicts of interest. Additionally, the authors have fully confirmed that no unethical practices such as plagiarism, informed consent, misconduct, data fabrication or falsification, duplicate publication or submission, or redundancy have taken place.

References

Ali, S. S., Darwesh, O. M., Kornaros, M., Al-Tohamy, R., Manni, A., El-Shanshoury, A. E., Sun, J. (2021). Nano-biofertilizers: Synthesis, advantages, and applications. *Biofertilizers*, 359-370. doi:10.1016/b978-0-12-821667-5.00007-5.

BBS-Statistical Yearbook Bangladesh 2021. (2022, June). Retrieved April 10, 2023, from https://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/b2db

8758_8497_412c_a9ec_6bb299f8b3ab/2022-06-15-10-49-3cf641425dd693f9e954de5ae9470775.pdf

BBS -Agriculture Census -2019, (2019) *Bangladesh Bureau of Statistics, People's Republic. of Bangladesh.* Available at: https://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/a1d32f13_8553_44f1_92e6_8ff80a4ff82e/2020-05-15-09-25-dccb5193f34eb8e9ed1780511e55c2cf.pdf (Accessed: April 14, 2023).

Ferdous, Z., Ullah, H., Datta, A., Anwar, M., & Ali, A. (2018). Yield and profitability of tomato as influenced by integrated application of synthetic fertilizer and biogas slurry. *International Journal of Vegetable Science*,*24*(5), 445-455. doi:10.1080/19315260.2018.1434585

Farooque,A.M.(2018).Availableat: https://doi.org/https://www.youtube.com/watch?v=ZMmonEQhz9w.

Laily, U., Rahman, M., Haque, Z., Barman, K., & Talukder, M. (2021). Effects of organic fertilizer on growth and yield of tomato. *Progressive Agriculture*,*32*(1), 10-16.

Haque, M., & Hoque, M. (2021). Vegetable Production and Marketing Channels in Bangladesh: Present Scenario, Problems, and Prospects. *A Seminar Paper*.

Hou, Y., Hu, X., Yan, W., Zhang, S., & Niu, L. (2013). Effect of organic fertilizers used in sandy soil on the growth of tomatoes. *Agricultural Sciences*, *04*(05), 31–34. doi:10.4236/as.2013.45b006.

Javaria, S., Khan, M., Rahman, H., & Bakhsh, I. (2012). ResponseofTomatoyieldandpost-harvestlifetopotash levels. *Sarhad J. Agric*.,*28*(2).

Kumar, M., Baishaya, L., Ghosh, D., Gupta, V., Dubey, S., Das, A., & Patel, D. (2012). Productivity and soil health of potato (*solanum tuberosum* L.) field as influenced by organic manures, inorganic fertilizers and biofertilizers under high altitudes of Eastern Himalayas. *Journal of Agricultural Science*,*4*(5). doi:10.5539/jas.v4n5p223.

Noble, A. D., Suzuki, S., Soda, W., Ruaysoongnern, S., & Berthelsen, S. (2008). Soil acidification and carbon storage in fertilized pastures of Northeast Thailand. *Geoderma*, *144*(1–2), 248–255. doi: 10.1016/j.geoderma.2007.11.019

Ozores-Hampton, M., Kiran, F. and McAvoy, G. (2012) 'Blossom Drop, reduced fruit set, and post-pollination disorders in tomato', *EDIS*, 2012(7). doi:10.32473/edis-hs1195-2012.

Reiter, M.S., Rideout, S.L. and Freeman, J.H. (2012) "Nitrogen fertilizer and growth regulator impacts on tuber deformity, rot, and yield for russet potatoes," *International Journal of Agronomy*, 2012, pp. 1–7. Available at: https://doi.org/10.1155/2012/348754.

Singh, R.P., Prasad, P.V. and Reddy, K.R. (2013) 'Impacts of changing climate and climate variability on seed production and seed industry', *Advances in Agronomy*, pp. 49–110. doi:10.1016/b978-0-12-405942-9.00002-5.

Tuncsoy, B. (2021). Nematicidal activity of silver nanomaterials against plant-parasitic nematodes. *Silver Nanomaterials for Agri-Food Applications,* 527-548. doi:10.1016/b978-0-12-823528-7.00020-2.

Highlights

- "Tomaloo" is a wonder plant created by grafting between a potato and a tomato plant which bears tomato on the upper part of the plant and the potato grows underground.
- Through the help of this innovative technology, it will be possible to produce more vegetables on less land, ensuring the nation's food security.
- The current study demonstrated how fertilizers, both organic and inorganic, affected the growth and yield of "Tomaloo".
- The present findings indicated that maximum growth and yield of tomato and potato were obtained from "Tomaloo" plant in response to F_1 (Organic fertilizer) fertilizer treatments.