

# Effect Of Number Of Sprays For Levels Of Organic Fertilizer Seamino In The Gardenia Plant *Gardenia Jasminoides Ellis*

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## Abstract

The experiment was conducted inside the wooden canopy in one of the private nurseries in Kirkuk governorate in the year 2024 to know the effect of the number of sprays with organic fertiliser Seamino and the interference between the two on gardenia plant. The experiment was conducted by randomized complete block design (R.C.B.D.) with three replications. The results showed that the two sprays treatment with Seamino nutrient solution was significantly superior to one spray in all studied traits as the two sprays treatment gave the highest average plant height (56.88) cm and number of branches/plant (8.12) (122.79) leaves, leaf area (25.31) cm<sup>2</sup> and dry weight of the total plant (45.79) g. The concentration of 6 ml/litre of fertiliser was significantly superior to the other concentrations in all the traits under study: plant height (67.22) cm, number of branches/plant (8.12) and number of leaves/plant (12.79). cm and number of branches/plant (10.12) (161.62) leaves, leaf area (33.65) cm<sup>2</sup> and dry weight of the total vegetative plant (53.99) g. The interference of the two sprays with 6 ml/litre of compost achieved the highest rate of plant height (181.79) cm and number of branches/plant (10.12). 79 cm, number of branches/plant (11.45), number of leaves/plant (181.79), leaf area (37.36) cm<sup>2</sup> and dry weight of the total plant (57.4) g compared to the control treatment.

**Keywords:** Number of sprays, effect of concentration, organic fertiliser, gardenia

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## INTRODUCTION

Gardenia is one of the most beautiful and popular varieties of plants in the floral world, belonging to the Rubiaceae family. Known for its unique aromatic scent and beautiful white or creamy flowers, making it a favourite choice for many plant and garden lovers, Gardenia is considered a symbol of beauty and sophistication, and is used for many occasions that require a touch of elegance. It is used for many occasions that require a touch of elegance. Native to tropical and subtropical regions of Africa and Asia (Rauch, 1996), where it was first discovered in the 18th century, Cardinia was named in honour of the American botanist Alexander Cardin, who had a prominent role in the study of plants. Since then, the flower has become a symbol of many cultures, used as an ornamental, gifted on special occasions, and used in perfumery. (Edward, 1990).

Gardenia plants are characterised by their attractive shape, usually growing as small trees or shrubs. Gardenia leaves are dark green in colour, glossy and oval in shape (Kidder et al., 1991), Gardenia blooms at different times of the year, but prefers warm and humid climates (Hasan and Abdullah, 2020), its flowers consist of five petals, usually white or cream, with a yellow or orange heart, giving it a special attraction besides its beauty, Gardenia is also known for its health benefits.

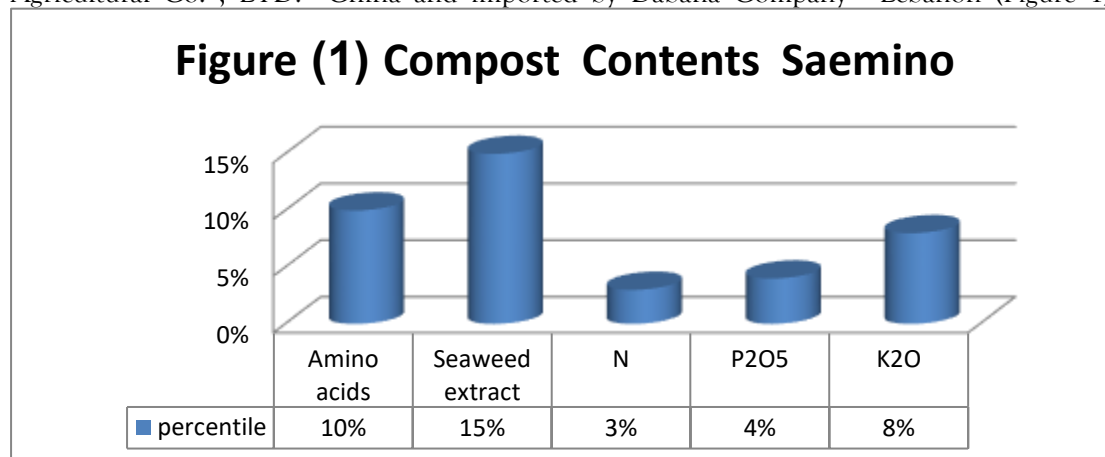
Gardenia oil is used in folk medicine to treat many ailments (Kent and Andrew, 2006), such as inflammation and respiratory issues. The aromatic scent of its flowers is also used in aromatherapy, where it is considered soothing and relaxing, Cardinia plants need special care to

ensure their healthy growth. They are best planted in soil rich in organic matter, with good drainage (Gowdy, 2002), as their roots do not tolerate excess water. They also need bright indirect light, as they can be exposed to direct sunlight for short periods of time. Humidity levels should also be monitored (Bradshaw, 2003), as cardinia prefers a humid environment, which means it is useful to spray the leaves with water every now and then (Abu-Khamra, 2009).

Foliar fertilisation is an advanced agricultural technique used to improve plant health and increase plant productivity (Kent and Andrew, 2006), and it is one of the effective methods of feeding gardenia plants, which is considered a beautiful aromatic plant. Gardenia belongs to the 'cheesy' family and is famous for its fragrant white flowers (Al Batal, 1994), which makes it one of the most popular plants in gardens and homes (Abu Khamra, 2009), the success of growing gardenia requires special care, including providing proper nutrition (Hasan and Abdullah, 2021), 2021), where foliar fertilisation plays a vital role in achieving this (Al-Nabawi and Wali, 1972). Seaweeds have recently gained importance as foliar nutrients because their extracts contain micronutrients and growth-promoting hormones such as auxins, cytokinins, gibberellins, vitamins, amino acids and high levels of organic matter (Tawajin, 1987), There was a significant increase in the studied traits of Dawoodi plant, namely plant height, number of branches, leaves and leaf area when sprayed at a concentration of 3 mg/litre of foliar nutrient Master (Al-Tahafi and Hassan, (2009), and a significant increase was obtained for *Amaranthus* spp.) in stem length and diameter, roots, number of leaves, inflorescences and their dry weights when sprayed with seaweed extract (*Ascophyllum nodosum*) at a concentration of 2.5 ml/litre on plants (Nahed et al., 2011). The research aims to study the effect of the number of times Seamino organic fertiliser is sprayed on gardenia plants. *Gardenia Jasminoides* Ellis.

#### MATERIALS AND METHODS

The experiment was conducted inside a wooden canopy in a community nursery in Kirkuk Governorate in 2024 to determine the effect of the number of sprays (1 and 2) and several concentrations of Seamino compost (6 - 4 - 2 - 0) ml/litre for gardenia plants, Gardenia plants were obtained on 10/2/2024 from a private nursery in Kirkuk Governorate with 24 plants and were planted in 20 cm diameter pots at the age of 2 years, then transferred and planted in large plastic pots with a diameter of 40 cm. Seamino organic fertiliser was a nutrient solution containing marine algae extract, amino acids and macronutrients N,P,K produced by Beijing Leili Agricultural Co. , LTD. China and imported by Dabana Company - Lebanon (Figure 1).



The randomised complete block design (R.C.C.B.D.) Randomised Complete Block Design was implemented as the experiment contained 8 treatments with three replicates and 1 pot for the experimental unit as follows:

The first factor: The number of times of spraying with Seamino organic fertiliser is (one spray, two sprays).

Second factor: Four concentrations of this fertiliser are (0 - 2 - 4 - 6) ml/litre.

The plants were sprayed with a 5-litre hand-held sprayer in the early morning, the first spray was on 2024/3/5 and the second 25 days after the first spray after adding the spreader at a concentration of (0.01%), while the control plants were sprayed with distilled water only, the results were analysed and the means were compared according to the least significant difference test under 5% probability level (Al-Rawi and Khalafallah, 2000). The following traits were taken and studied on 10/6/2024: plant height (cm), number of branches and leaves, leaf surface area (cm<sup>2</sup>) and dry weight of the vegetative population (Al-Sahaf, 1989).

## Results and discussion

### Effect of the number of sprays with SEAMINO nutrient solution on gardenia plant:

The results of table (1) indicate that two sprays of SEAMINO nutrient solution were significantly superior to one spray in all studied traits, where the two sprays gave the highest average plant height (56.88 cm) and number of branches/plant (8.12). cm and number of branches/plant (8.12) branch, number of leaves/plant (122.79), leaf area (25.31) cm<sup>2</sup> and dry weight of the total plant (45.79) g, while the lowest rate in the single spray treatment was in plant height (47.54) cm and number of branches/plant (8.12) cm and the number of branches/plant 6.62) The number of leaves/plant was 102.79 leaves, leaf area (21.74 cm<sup>2</sup>) and dry weight of the plant (39.23 g), respectively while the lowest rate of the single spray treatment was 47.54 cm, and the dry weight of the plant (45.79 g).

Table (2) Effect of the number of times of spraying with SEAMINO nutrient solution on gardenia plant

Number of Sprinklers	Leaf area	Number of leaves	Number of branches	Plant height	Dry weight of total vegetative matter
1	21.74	102.79	6.62	47.54	39.23
2	25.31	122.79	8.12	56.88	45.79
L.S.D.	3.98	8.5	1.61	3.92	4.01

### Effect of Seamino organic fertiliser concentrations on gardenia plant:

The results in Table (3) indicated that the concentrations of Seamino compost had a significant effect on the characteristics of the gardenia plant, as the concentration of 6 ml/litre of compost was significantly superior to the rest of the concentration in all the characteristics under study, namely plant height 67.22) cm and number of branches/plant 10.12) (161.62) leaves, leaf area (33.65) cm<sup>2</sup> and dry weight of the total plant (53.99) g, while the control treatment recorded the lowest average for these traits, plant height (38.8) cm and number of branches/plant (4.12). cm and number of branches/plant (4.79) Plant height (38.8 cm), number of leaves (53.12), leaf area (16.04) cm<sup>2</sup> and dry weight (30.26) g, respectively. Nitrogen helps to promote vegetative growth through the formation of dense and healthy leaves, which contributes to increasing the surface area of the leaves to absorb light and stimulate biological production. Nitrogen is essential for the formation of chlorophyll, which plays a vital role in photosynthesis (Mengel and Kirkby, 1987 and Al-Sahaf, 1989), As for phosphorus, it is an important element that plays a key role in the

energy processes in the plant, and one of its benefits is that it works to encourage the roots, which helps the cardinia to absorb water and nutrients better and works to improve flowering in enhancing the flowering process, which leads to the production of beautiful and dense flowers, and phosphorus is important in breaking down carbohydrates needed for the vital processes of the plant and it enters with nitrogen to build cell membranes (Abu Dahi and Al-Younis, 1988 and Hassan et al., 1990), while potassium is a vital element in promoting plant health in general (Kok et al., 2010). Its effect on gardenia includes improving disease resistance Potassium helps enhance the plant's ability to resist diseases and pests, water regulation, and plays a role in regulating water absorption and fluid balance within the plant (Wallen, 1955), which contributes to improving leaf health, Potassium also has a significant effect on maintaining and regulating the osmotic pressure of cells, activating protein synthesis enzymes and increasing the rate of photosynthesis in leaves, which increases the synthesised carbohydrates and their transport to other growth areas (Abu Dahi et al., 1988 and Al-Nuaimi, 2000) These results are consistent with Al-Tahafi and Hassan (2009) and Nahed et al. (2011).

**Table (3) Effect of Seamino organic fertiliser concentrations on gardenia plant**

Spray concentrations	Leaf area	Number of leaves	Number of branches	Plant height	Dry weight of total vegetative matter
0	16.04	53.12	4.79	38.8	30.26
2	19.17	90.62	6.29	47.11	38.58
4	25.23	145.79	8.29	55.72	47.21
6	33.65	161.62	10.12	67.22	53.99
L.S.D.	5.2	11.56	1.81	6.84	5.21

**Effect of interference between the number of sprinklers and Seamino organic fertiliser concentration on gardenia plant:**

The interference between the number of sprays and Seamino compost concentration had a significant effect (Table 4), as the interference of two sprays with 6 ml/l of compost achieved the highest rate of plant height (181.79 cm), number of branches/plant (11.45), number of leaves/plant (181.79), leaf area (37.36 cm<sup>2</sup>), and dry weight. 45) branches, number of leaves/plant (181.79), leaf area (37.36) cm<sup>2</sup> and dry weight of the total plant (57.4) g, while the treatment without spraying with compost with the number of sprays (1) gave the lowest rate of these traits for plant height (38. (28) cm, number of branches/plant (4.45) branches, number of leaves/plant (52.79), leaf area (15.78) cm<sup>2</sup> and dry weight of total plant (29.54) g. The reason for the superiority of the high concentration may be due to the process of photosynthesis, respiration and protoplasmic structure, as nitrogen is an essential element in the synthesis of proteins and enzymes, and is necessary for the growth of green tissues. In the case of gardenia (Hasan et al., 2022).

**Table (4) Effect of the interaction between the number of sprays and Seamino organic fertiliser concentration on gardenia plant**

								Spray frequency
2				1				Foliar nutrient concentration ml/litre
6	4	2	0	6	4	2	0	Plant height
78.94	59.55	49.73	39.31	44.48	51.89	55.5	38.28	Number of branches
11.45	9.12	6.79	5.12	5.79	7.45	8.79	4.45	Number of leaves
181.79	157.45	98.45	53.45	82.79	134.12	141.45	52.79	

37.36	27.77	19.79	16.3	18.54	22.69	29.93	15.78	Leaf area
57.4	51.49	43.31	30.97	33.85	42.93	50.58	29.54	Dry weight of total vegetative matter

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