

Effect of Organic Fertilizers on the Growth of Ornamental Plants

Abdul-Kadhm N. S. Al-Showily¹, Fatima Ali Hussein²

^{1,2}*Department of Horticulture and Landscape Design, College of Agriculture, University of Basrah, Iraq*

Abstract: Many researchers have pointed out the importance of the agricultural medium in the growth of seedlings, where the components of the medium from the soil, soil disintegrating materials and moisture preservatives play an effective role in this. The organic matter added to the soil has a significant impact on improving the physical, chemical and biological properties of the soil, so that the light sandy soil becomes more coherent and the clay soil more disintegrated, thus providing the oxygen necessary for the respiration of the roots and the activity of microorganisms. Atmospheric oxygen or dissolves in water, forming carbonic acid, and nitrogen turns into ammonium ion (NH₄), and then turns into nitrate (NO₃) and sulfur into sulfate ion. The organic media also contains several major and minor nutrients and other rare elements, where the organic matter is a source of supply for plants and microorganisms with these nutrients necessary for its growth, in addition to improving soil porosity, regulating water and air movement, the spread of gases, and increasing the water holding capacity of the soil. Increasing the cation exchange capacity of positive ions (C.E.C) and lowering the soil pH. The organic compounds work in mixing the nutrients and preventing sedimentation in the soil, thus increasing its readiness, especially the microelements. The slow decomposition of the organic matter will provide the plant with nutrients for a sufficient period of time.

Keywords: organic fertilizers, growth, ornamental plants

1. INTRODUCTION

Organic Agriculture is one of the interfaces of sustainable agriculture, where it is a comprehensive system of production that depends on the management and maintenance of the natural ecosystem rather than the flow of external agricultural inputs (manufactured materials). The potential health and environmental aspects are taken into consideration by eliminating the use of all industrial fertilizers, pesticides, and growth regulators and replacing them with what is natural and available in the agricultural environment through the recycling of available natural resources, including animal waste of various types and plant residues. In view of the countries' needs for organic products, the area cultivated organically increased in Europe and many countries began to move towards organic agriculture (Patil, 2004). Bocek and Potockova (2008) reported that American consumers pay higher prices for organic produce than conventional produce. Many researchers have been interested in studying the effects of organic fertilizers on plant growth and yield, where organic matter is one of the important and effective factors in influencing the readiness of nutrients for plants because of the properties that affect the soil's content of soil nutrients and make it available for absorption by the plant and then positively affect the growth and development Plant (Tisdale et al., 1997). Adding organic waste to the soil increases the organic matter in it and increases

the number and activity of microorganisms, as well as continuously adding nutrients to the soil, which restores the balance of nutrients in it. Thus, the added organic matter is a good source for providing the plant with nutrients, as well as reducing its loss through washing, by adsorbing it on the surfaces of its particles. What is meant by organic fertilizers are natural materials that are slow to decompose and include animal waste, dried blood powder, seaweed powder (algae), bone powder, as well as plant waste and household garbage (Al-Mohammadi, 2009). Animal fertilizers are considered the main and safe source of providing the plant and thus humans with nutrients, in addition to their great role in improving the chemical properties of the soil. One of the most widely used animal fertilizers is sheep and poultry manure, which contains large proportions of nutrients. The proportion of both nitrogen and phosphorous is high in poultry waste, while the proportion of potassium is high in cattle manure (Harawati, 2018). Compost activates soil microbial biomass and maintains the ecosystem through the recycling of excreta (Tonfack et al., 2009). Among the organic fertilizers is poultry waste, which is the blue of birds and chickens. This type of fertilizer is characterized by its high content of macronutrients. The value and quality of fertilizer vary according to the type of birds, food consumption, and the amount of feed energy (Al-Amri, 2010) and also cow manure, which contains three essential elements for human health: nitrogen, phosphorous and potassium. Nitrogen helps form proteins to build living tissues. Phosphorous helps release energy and potassium helps transport sugars (Ram, 2017). One of the aims of organic agriculture is to produce plants that are free from the toxic effects of pesticides and chemical fertilizers and to produce clean crops. The addition of organic residues to the soil plays a major role in increasing soil fertility and providing nutrients in it, as well as improving chemical and physical properties of soil such as ionic exchange capacity, water storage capacity, and release of stimuli from amino acids (Madejon and Melero (2008) and due to the increase in population numbers in the world, which led to an increase in the demand for food, the interest was greatly increased in raising production, regardless of quality, which led to an increase in the rates of use of chemical additives, especially when planting vegetable crops compared to other crops due to the short season of their growth and production and the high consumption of its fruits exacerbated and increased the harmful effects on health and the environment by increasing the proportion of nitrates and oxalates and the toxic effects of pesticides in the part in which they are assigned. As a result of these bad effects from the use of chemical additives, concerns in many countries of the world have tended to encourage organic production, whose products are characterized as clean food, free from the residual effects of pesticides and chemical fertilizers, and in which the percentage of nitrates and oxalates is low so that the percentage does not exceed the safe health limits, in addition to the high economic returns, especially In developed countries, the continuous increase in the economic value of organic products in the world may appear on the extent to which these products receive consumer interests (Hanafy et al 2002)

organic fertilizers

- Organic fertilizers are natural materials that are slow to decompose, and they include animal waste, dried blood powder, seaweed powder (algae), bone powder, as well as plant waste and house rubbish, their benefits.-
- Improving the physical properties of the soil
- Increasing soil fertility
- Increased ability to retain water
- Securing the Macro and Micro elements in a balanced manner

Providing an excellent medium for vegetables whose crop is underground, such as potatoes, radishes, and carrots

The difference between organic and chemical fertilizers

• Chemical Fertilization:-

- An imbalance occurs in the biological balance, causing some excess compounds to accumulate in the soil and plants
- Fast effect and absorption and the excess amount remains accumulated in the soil and in the plant
- It kills the organisms that live in the soil and work on the decomposition and dismantling of organic matter
- Weakening the soil over time
- Prices of chemical fertilizers are very expensive compared to organic fertilizers

The most important ornamental plants covered by the study

An experiment conducted by Al-Sahhaf and Al-Zurfi (2015) to study the effect of foliar spraying with potassium humate fertilizer at a concentration of 3 ml L⁻¹ on the growth and flowering of the freesia plant, where the experiment showed that the growth indicators had increased significantly at this concentration. As the plant height and the number of leaves increased, the content of the leaves of total chlorophyll and total soluble carbohydrates increased significantly. The length of the flower stalk, the number of inflorescences, the number of flowers in the inflorescence, flower diameter and flowering period in comparison with the control treatment. Khalaf and Abdel-Latif (2013) found in an experiment conducted by planting pots in the lath house during the autumn season 2011 to study the effect of organic fertilizer at a concentration of 6% by weight of the soil on the growth traits of cloves. The addition of organic fertilizer led to an increase in the vegetative, flowering, and root growth average compared to the control treatment and for the two seasons of the experiment in the traits of plant height, leaf area, leaf content of total chlorophyll, flower diameter, vase life. The percentage of dry matter in the flowers, which recorded 68.17 cm, 978.43 cm², 280.8 mg per 100 g fresh weight, 54.75 mm, 10.33 days, 24.59%, respectively. Al-Shuwaili (2013) observed that spraying aromatic pea plants *Lathyrus odoratus* L. with seaweed extract (gatun) at a concentration of (4,2,0) ml L⁻¹. Plants sprayed with seaweed extract at a concentration of 4 ml L⁻¹ were significantly excelled in plant height and number of main branches of the plant, as they gave the highest average of 100.83 cm compared to the control plants that gave the lowest average of 82.11 cm. The results of the study conducted by Asghari (2014) on *Antirrhinum majus* L. showed that adding 20% organic fertilizer to the potting soil positively affected the dry weight of the leaves of the plant compared to the control plants. Hao et al (2008) indicated that adding organic residues to the soil increases the organic matter in it and increases the number and activity of microorganisms, as well as adding nutrients to the soil continuously, which restores the balance of nutrients in it. Animal fertilizers are a good, integrated, and safe diet because of their role in improving the physical, chemical, and biological properties of the soil, as well as being a good source of essential nutrients such as nitrogen, phosphorous and potassium, and containing micronutrients (Al-Hasnawi et al, 2018). Al-Janabi (2015) indicated that *Pimpinella anisum* L, spraying with organic fertilizer Vit.org at a concentration of (2.0) ml L⁻¹. The concentration of 2 ml L⁻¹ was significantly excelled in plant height and number of branches in a plant, where the highest value was recorded, which reached 74.9 cm, 14.7 plant branches⁻¹, compared to the control plants, which amounted to 71.1 cm and 13.2 branches. As Al-Sahhaf et al. (2018) showed

when spraying Petunia hybrid plants with organic fertilizer extract at concentrations (6,4,2,0) ml l, the treatment that sprayed with a concentration of 4 ml l-1 significantly excelled in plant height, number of branches, leaf area and dry weight of the shoot Which were 13.00 cm, 6.56 plant branches, 785.3 cm² and 4.07 g, respectively. Amin (2018) found that when the gardenia plant was sprayed with an organic fertilizer at three concentrations (0, 3, 3.5) ml L⁻¹, the plants sprayed at the concentration 3 ml L⁻¹ significantly excelled the plant, which reached 74.89 cm. While the plants sprayed with concentrations of 3.5 and 3 ml L⁻¹ had excelled in the number of branches compared to the control plants. and Bostan et al. (2014) found in their experiment on the amaryllis belladonna plant when they used three organic media (mushroom farm waste, decomposed plant waste and garden soil) added to sandy soil at a ratio of 1:1, the results showed the excelled of the medium consisting of sandy soil + decomposed plant waste in the trait of number of leaves (8), leaf area (243.65) cm², number of flowers (5.42) flower. Plant⁻¹, length of flower stalk (44 cm) and flower diameter (11.58 cm) compared to the control treatment. Urooj-ul-Nissa et al. (2015) found that when using four organic media (sheep manure, sand 1:1, poultry waste, sand 1:1, perlite, sand 1:1, vermiculite and sand 1:1) in the pots planted with dahlia, the medium The component of sheep waste and sand outperformed in some characteristics of vegetative flowering growth, including number of leaves, stem diameter, vase life, flowering period, flower diameter, intensity of chlorophyll pigment. Ikram et al. (2012) reached in their experiment on the plant Polianthus tuberosa when using organic media (poultry manure, vegetable residues and coconut residues) with sand in a ratio of 1:1, as for the control treatment, only 100% sand was used. The results showed the excelled of the middle of the plant residues in the traits of the length of the flower (cm), the weight of the (gm), the diameter of the (cm), the number of flowers in the flower, the vase life (day), while the control treatment recorded the lowest values. A study was conducted by Sonmez et al. (2013) to find out the effect of using different organic fertilizers on the content of macro and micro elements for *Gladiolus grandiflorus* L., as three types of fertilizers were used (cow manure, sheep manure and decomposing waste manure). Through the results, it was found that sheep manure gave the highest percentage of nitrogen, iron and manganese, and the decomposing wastes recorded the highest percentage of potassium content. Calcium and magnesium, as the researcher concluded that organic fertilizers increase the content of elements, major and minor, in the leaves and corms of the Gladiolus plant.

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