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THE EFFECT OF DAILY OF DARK HOURS AND THE NUMBER OF SHORT DAYLIGHT HOURS IN THE PRODUCTION OF FLOWERING POTTED PLANTS (*ZINNIA ELEGANS* JAC)

Lo'ayAbd-Elhameed H. Al-Rawy and HaithamMuhi M.Al- Abdaly
College of Agriculture - University of Anbar, Iraq
loaealrawi19@gmail.com

Abstract

A simple experiment was carried out according to the design of the complete random sections RCBD in the wooden canopy in the Department of Horticulture and Garden Engineering - Faculty of Agriculture in February 2017 to study the effect of combinations of darkening and the number of short day days necessary for the emergence of bud and syphilis and associated qualities, the experiment included exposing the plant to three hours of darkness hours 12, 14, 16 hours of darkness / day per day, as well as exposing the plant to three periods time. The results showed a significant increase in the plant exposure to 16 hours of darkness for 4 weeks in the vegetative and zebra growth characteristics of number of leaves, number of secondary branches, percentage of dry matter in stems, branches and duration of survival The number of flowers on the plant reached 258.7 leaves / leaves, 19.33 branches/ plants, 44.03% and 16.7 days respectively. The results showed a significant increase in the plant exposure to 12 hours of darkness for 4 weeks in the vegetative and syphilis characteristics of the date of flowering and seedling diameter. The values of these traits were 61.70 days and 26.50 cm respectively. The results showed a significant increase in the plant exposure to 16 hours of darkness for 4 weeks in the characteristics of syphilis flowering, the percentage of dry matter in flowering, the percentage of anthocyanin and the number of total blooms on the plant, with values of 13.61 days and 72 days. 20% and 58.13% 13.00 Flower / plant sequentially.

***Key words*:** Zinnia flowers, Flowering potted plants, duration of flowering on plan.

Introduction

Zinia (***Zinnia elegans* Jac)** belongs to the Compositae or Asteraceae. Its native habitat is the American continent and has been discovered in its wild state in the southwestern United States of America, Mexico and Central America and is called locally (Gite). These plants are characterized by a solid leg with stiff opara and opposite legs, which sit in a full-rimmed shape ranging from amphibian to oval and ranging from pale green to medium-green with a rough feel. The flowers are collected in a single, double or multilayered dome, which is most important as flowering flowers, multicolored in white, yellow, reddish, orange and purple, as well as many flowering potted plants. The plant is suitable for planting in ponds and flower bouquets, for the beauty of its flowers and its variety of colors. Moreover, it is an important commercial flowering flower, with a variety of features such as the beauty of its flowers, the ease of its propagation with seeds and its rapid growth, the lack of service required for its growth and flowers as well as its low need for fertilizers, The other (Stevevs, 1993; Sloan, 2003; Singh, 2003). A study (Blanchard and Runkle, 2011) indicated that the use of Darkening by black cloth on the Zinia plant led to the early flowering process. Zinia is easy to propagate and is fast growing, as it can be reduced to 70-80 days through the use of opiate treatment (Pinto, 2005; Hegazi, 2010). As the increase in the period of darkness accelerates the emergence of syphilis bud at certain limits according to the varieties that varied from (6-16) hours and the response at certain stages of the growth of the plant and the possibility of carrying those shoots from the rapid collapse of aging on the plant. This study was conducted in order to increase the duration of the presentation of flowering Zinia plants in nurseries and flower shops by controlling the photovoltaic period. Therefore, we obtain different dates according to the need of the local market for the flowering seedlings. In order to improve the plant's adaptability and increase the number of branches.

Materials and Methods

The experiment was carried out in the wooden canopy of the Department of Gardening and Garden Engineering / Faculty of Agriculture / Anbar University (alternative site) during the month of February 2017 on the plant Zinia, as seeds were planted in the dishes of cork in the glass house on 2017/2/20 and seedlings were cut to the site Experiment 2017/4/1 After arriving at the appropriate size of the seedlings and transported in plastic brackets (15 cm diameter), the mixture was filled with the foreign bitmus available in the market by 1: 1. And raised in the shadow of the seedlings one in the sacrament.

Pinching was the top of plants, and this was done after the emergence of five pairs of real leaves on the plants and after the arrival of all branches to the stage of three pairs of leaves were exposed to the processes of

the shadow of the experiment. The seedlings were sprayed with the AGRISAVE pesticide at a concentration of 1 ml-1 on 15/4/2017 to control the insect of the leaves. The control continued to be sprayed every two weeks. The irrigation of the plants was at one rate per day. Plant fertilization with NPK fertilizer (10:10:10) During the month of April and May and June and 20 days apart between the addition and the other, soil samples were taken for the purpose of some physical chemical analysis before the implementation of the experiment Table (1).

Table 1 : Some physical and chemical properties of soil cultivation

The value	Measuring unit	Types of analysis
Sand mixtures	_____	Tissue
5.02	Desi Siemens-1	EC
7.38	_____	pH
588	Milli Mall	Ca^{+2}
310	Milli Mall	Mg^{+2}
648	Milli Mall	Na^{+}
575	Milli Mall	SO_4
631	Milli Mall	Ci
285	Milli Mall	HCO^2
30	(PAA)	Nitrogen Ready
6.5	(ppm)	Phosphorus Ready
18	(ppm)	Potassium Ready
8.0	(G / kg^{-1})	Organic matter
20.0	(Centmol/kg^{-1})	C.E.C.
275	(G /kg^{-1})	Lime
0.53	(G /kg^{-1})	Gypsum

Used 150 seedlings of Zinia plants homogenous to the extent possible, to study the effect of the combination of darkening and the number of short day days necessary for the emergence of syphilis and associated traits:

Shorten the day to three hours of dark extra (12, 14, 16) hour of darkness / day during the day on 16 May 2017 through the use of black cloth cloaks. Continue to default by exposure for a duration of (6, 4, 2) weeks. Thus, the experiment was simple according to the design of random randomized segments (RCBD) with 10 combinations distributed randomly and in three sectors, and 5 seedlings were experimental unit (Table 2).

Table 2 : The combinations carried out in the study

Synthesis	The details
T1	Exposure of the plant to 16 hours of darkness for two weeks.
T2	Exposure of the plant to 16 hours of darkness for four weeks.
T3	Exposure of the plant to 16 hours of darkness for six weeks.
T4	Exposure of plant to 14 hours of darkness for two weeks.
T5	Exposure of the plant to 14 hours of darkness for four weeks.
T6	Exposure of the plant to 14 hours of darkness for six weeks.
T7	Exposure of plant to 12 hours of darkness for two weeks.
T8	Exposure of the plant to 12 hours of darkness for four weeks.
T9	Exposure of plant to 12 hours of darkness for six weeks.
T10	Comparative treatment left without coverage under normal day conditions.

The total number of leaves per unit of experimental unit was calculated and its rate calculated when picking flowers. The number of secondary branches per plant was calculated and the average of each experimental unit was extracted at the end of flowering. Qatar Seedling was calculated at the end of the season. The seedling diameter of each plant of the selected plants was measured in each experimental unit by measuring tape between the two opposite points of the seedling diameter and extracting its rate. The ratio of the dry matter of the legs and the gums was calculated at the end of the season. The samples were taken from the stems and the leaves, weighed and then dried in an electric oven at a temperature of 70° C and with constant weight. After removing them from the oven, With a sensitive balance and dry matter is calculated according to the following equation (AL-Sahaf, 1989):

$$\text{Dry weight Ratio of dry matter to legs and branches} = \frac{\text{Dry weight}}{\text{Wet weight (gm)}}$$

The date of flowering was calculated by calculating the number of days from the date of cultivation until the emergence of the syphilis bud. As measured and measured the speed of flowering as mentioned (Mohmmed, 1985) according to the following :

Number of flowers per day (1) x% for flowering for this day + number of flowers today (2) x% for flowering for the day +

Was calculated Total number of flowers on the plant by calculating the number of flowers for each experimental unit plants and extract the rate. Calculation of anthocyanins was also calculated of the vegetable tissue by a certain volume of the alcoholic hydrochloric solution consisting of 95% ethyl alcohol and 1.5 Nl (Hl) by 85:15 and then measuring the resulting color using Spectrophotometer at different wavelengths for different types of anthocyanins:

$$\% \text{ of anthocyanins} = \frac{\text{Optical intensity at a specified wavelength x The size of the solution used in extraction x dilutions}}{\text{Weight of the sample}}$$

(100ml / 100g soft texture of flowers)

The duration of the flower was calculated on the plant by selecting five flowers from the experimental unit at the beginning of the color of the syphilis, where the period was calculated until the flower petals of the flower died on the plant.

The percentage of dry matter was calculated in flowers where samples of flowers were taken and weighed and then dried in an electric oven at a temperature of 70 m until the weight was stable. After removing them from the oven left until the laboratory temperature was obtained and then weighed again with a sensitive balance, For the following equation (AL-Sahaf,1989):

$$\text{Dry matter ratio of flowers} = \frac{\text{Dry weight}(g)}{\text{Wet weight}(gm)} \times 100$$

Results and Discussion

Characteristics of vegetative growth

Number of leaf (Leaf plants -1)

The results in Table 3 showed that all combinations were significantly higher than the T10 comparison formula, with the T2 combination giving the highest number of leaves with 258.7 leaves. 1 - Compared to the comparison combination, the lowest number of leaves was 64.0. Significant differences between all combinations except T6, T4, T8 and T3 were not significant.

Diameter of Seedling (cm)

The data shown in Table 3 showed that all combinations were significantly higher than the T10 comparison. T8 recorded the highest rate of seed diameter of 26.50 cm compared to the T10 comparison of 11.40 cm. Mixing effect T8 significantly exceeded all combinations except the T4 and T2 combinations did not reach the moral level.

Number of secondary branches (branch)

The results in Table 3 show that all combinations have a significant effect on the T10 combination, while T2 has the highest number of secondary branches with 19.33 branches. In comparison with the T10 comparison, 1.33 branches were found. There were also significant differences between the combinations except the two combinations T3, T1 combinations T6, T5, T4 did not reach the moral level.

Proportion of dry matter in the stem and secondary branches

The T2 combination showed the highest ratio of dry matter in the stems and leaves with 44.03% relative to the T10 comparison formula, which recorded the lowest percentage of dry matter for the stems and leaves. 19.20% As for the effect of combinations, there are significant differences between the combinations except T9, T8, T7, T5 and T4 combinations, no significant differences were recorded.

Table 3 : The effect of the hours of daily darkness and the duration of exposure in the diameter of the seedling, number of leaves, number of secondary branches, and percentage of dry matter in the legs and secondary branches.

Adjective				The combinations
Proportion of dry matter in the stem and secondary branches	Number of secondary branches	Number of leaf (Leaf plants -1)	Diameter Seedling (cm)	
28.97	11.67	186.0	24.40	T1
44.03	19.33	258.7	25.73	T2
23.10	13.67	231.3	24.20	T3
32.53	7.67	124.7	23.23	T4
36.87	9.00	166.0	25.73	T5
42.30	7.33	136.7	24.17	T6
33.43	14.67	172.7	20.27	T7
34.37	18.00	221.3	26.50	T8
33.03	6.33	124.0	19.53	T9
19.20	1.33	64.0	11.40	T10
4.39	2.80	13.74	1.50	LSD 0.05

The results of the study note that the shortening of the day had a positive role in all the attributes of vegetative growth and this is not consistent with the memory (Al-Fadel, 2015). The reason may be due to the different environmental conditions of the temperature and humidity and the intensity of light between the experiments, except for its positive role in increasing the proportion of dry matter. The increase in the accumulation of photosynthesis process results in the prolongation of the day compared to the shortness. The reason for the increase of dry matter in the vegetative mass may be due to the increase in the number of leaves of the developing plants under the treatment of darkening. In turn increases the efficiency of the surface area Photolithography and a better stock of photosynthesis, leading to greater accumulation of photosynthesis in different plant parts, which is consistent with what is stated (Rahman, 2008; Puskar and Singh, 2012). It was also observed that the shortening of the day led to increasing the diameter of the seedlings when using the treatment of darkening to shorten the day may be due to increase the diameter of the seedlings to the lack of plants to get the amount of light necessary for the process of photosynthesis where the efficiency and production of dioxins and found that Ban these Oksinat active in the case of low light (Lam and Leopold, 1966), leading to elongation of the cells. This may be due to the decrease in the water effort in the tissues of plants growing in the dark and thus elongation of the cells and thus increase the diameter of the seedling (Patricia and Widung, 1982; Gobb, 1973). The low water voltage inside the cell protoplasm The outside leads to the entry of the water These results are consistent with those found in (Tabakli, 1987; Durbo and Hetrogh, 1977; Biran, 1973). It was also observed

that the increase in the number of leaves of plants growing under the parameters of the darkening of the shortening of the day compared to the plants left without shade, and can be due to the rise in temperature during the period of growth of plants, where it was found that high temperatures cause the degradation of proteins (Denaturation) and enzymes related to installation And therefore less photosynthesis, so that degraded and yellow papers cannot perform photosynthesis to destroy chlorophyll and the ineffectiveness of plastids, and that enzymes are less effective and thus die leaves (Al-Abdali, 2002). Which is supported by what he found (Durbo and Hetrogh, 1977) that the temperature of 28 m at 17 m at night is the degree of thermal above optimal growth of plants Aldalia and stated that the temperature of 25 m day and 16 m at night is the best degree of thermal growth of plants Aldalia good quality and height appropriate, (Cokshull and Hughes, 1971) that the low level of light between the day 8-14 from the start of the treatment of the short day caused an increase in the number of leaves of the plant Daoudi.

Effect of different dark combinations on the characteristics of syphilis growth

The date of flowering (day)

The results in Table 4 show that all combinations significantly exceeded the T10 comparison combination, with the T8 combination giving a significant increase of 61.70 days. T8, T8, T6, T1, T5, T4, T2 and T1 were not significantly different. The T10 combination recorded the longest flowering time of 91.67 while the T8 combination significantly outperformed the T3 combination and was 64.88 and 61.70 sequentially.

The number of open flowers on the plant

The results obtained from Table 4 show that all combinations are significantly higher. The T2 combination showed the highest increase in the number of open flowers at 13.00 flower compared to the comparison combination which gave the lowest flowering rate of 2.33 flower. No significant differences were observed between the other combinations.

The percentage of anthocyanins

The results of Table 4 showed that all combinations were significantly higher than the combination. T2 gave the highest ratio of anthocyanins to 58.13 compared with the T10 comparison, which recorded the lowest percentage of anthocyanins of 50.46, and significant differences were observed between all combinations.

Proportion of dry matter in flowers

The results of Table 4 showed that all combinations significantly exceeded the composition of the comparison. The T2 combination gave the highest percentage of dry matter in flowering at 72.20% while the T10 combination gave the lowest percentage of dry matter in flowering was 28.93%. As for the effect of combinations, T2 was significantly higher than the rest of the combinations, recording 72.20%. On the other hand, the results showed a significant effect between the combinations. The T5 combination recorded a significant gain of 55.80 on the T8, T6 and T4 combinations and reached 49.73, 44.93 and 41.60 respectively.

Flowering speed (day)

The results in Table 4 show that all combinations are significantly higher than the T10 comparison, with T2 having the highest flowering rate of 13.61 days, while the T10 combination recorded the lowest flowering rate of 2.66 days. T2 is significantly higher than T7, T7, T1 and the rest of the combinations recorded differences did not reach the moral level.

Duration of flowering on plants (day)

The results of Table 4 showed that all the combinations were significantly higher than the T10. The T2 combination was significantly higher than the 16.7 days. The combination of T2, T7, T4 and T9, T7 and T6 were significantly higher than those of T4. The other combinations showed differences that did not reach the moral level.

Table 4 : The effect of the daily hours of darkness and the duration of exposure in the percentage of dry matter in flowering, flowering speed, the percentage of anthocyanins, the date of flowering, the duration of flowering on the plant and the total number of flowers on the plant.

Adjective						The combinations
The number of open flowers on the plant	Duration of flowering on plants (day)	The date of (flowering day)	The percentage of anthocyanins	Flowering speed (day)	Proportion of dry matter in flowers	
10.00	14.9	63.77	53.43	10.02	50.80	T1
13.00	16.7	62.33	58.13	13.61	72.20	T2
10.33	15.0	64.88	50.80	12.63	54.87	T3
10.67	12.8	62.37	52.80	11.13	41.60	T4
11.67	15.4	62.25	55.63	11.37	55.80	T5
10.67	14.7	63.05	51.20	10.83	44.93	T6
10.00	14.0	63.48	53.23	10.12	49.73	T7
12.00	15.1	61.70	54.50	11.38	54.53	T8
10.00	14.3	62.86	52.30	10.23	50.70	T9
2.33	8.7	91.67	50.46	2.66	28.93	T10
5.75	2.87	2.58	0.30	2.91	5.76	LSD 0.05

The results showed the effect of the treatment of the treatment at the time of flowering. The growing plants showed under the treatment of dimming to shorten the day the minimum number of days required for the emergence of flower buds, which led to the early flowering process (Yeh and Atherton, 1999). He confirmed that the plants that grow under the treatment

of darkening were more capable of turning their tops from vegetable to vase down to the level of daily light. He also agreed with what he indicated (Adams, 1998a) that T It is also noticed that the number of flowers increased under the treatment of dimming. The increase in the number of flowers under deworming may be due to the increase in the process of flowering buds, Number of flowers. It was also observed that the speed of flowering was increased under the treatment of dimming. The reason may be attributed to the short daylight conditions, which resulted in the rapid formation of floral buds in the peripheral capillaries (Cokshull, 1976). This was also consistent with what was found (Cathey, 1969) Short day conditions resulted in increased flowering speed. The results showed an increase in the percentage of anthocyanins in plants exposed to salivation. This may be due to the improvement of natural hormones as well as the construction of all nutrients, organic and plant pigments. It was also observed that the process of darkening of the day had led to an increase in the duration of flowering on the plant. This may be attributed to the increase of the percentage of dry matter in flowering in plants under cultivation This may be due to the increase in food processed by the process of photosynthesis due to the increase in the number of leaves, which causes an increase in the accumulation of photosynthesis process, which move to the parts of flowers as a stock of the plant (sink) and thus cause an increase in dry weight and this is consistent with what he mentioned, This is due to the different distribution of auxins.

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