

The Diversity of Several Flower Color Types of the Zinnia Plant (*Zinnia elegans* Jacq.)

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Abstract

This study aims to determine the diversity of several traits of zinnia plants derived from four flower colors (red, white, yellow, and purple). The activity was carried out from October 2020 to January 2021 in Pineleng Satu Village, Pineleng District, Minahasa Regency. For this purpose, each of the five plants was observed in a survey for plant height (cm), number of branches, number of flowers, and diameter of flowers. Data were analyzed by means and analysis of variance. The results showed that the four types of color did not show any differences in the properties measured quantitatively.

Keywords: Zinnia, diversity, flower color.

INTRODUCTION

Zinnia plants or often referred to as paper flowers are one of the plants where the flowers found can be colorful and certainly pleasing to the eye. This plant is fast growing and easy to grow everywhere. There are many types of zinnia that can be found in the field, but the most common is *Zinnia elegans*.

The genus *Zinnia* is one of the Asteraceae family. This family has members with 19 species consisting of annual and perennial plants. The *Zinnia* genus is divided into two subgenera, namely *Diplothrix* and *Zinnia*. There are six species of the subgenus *Diplothrix*. *Zinnia elegans* has a synonym, namely *Zinnia violacea*. *Zinnia elegans* is a plant that is often developed because it has economic value because various flower colors can provide coolness to the viewer. Apparently, the flower crown is unique and has a variety of colors.

The popular zinnia plant and also known as the paper flower is an annual plant that is widely distributed throughout the world. This plant is often used as an ornamental plant in the yard and can be used as a cut flower. This species is able to grow in tropical and subtropical areas with a height of up to 1800 m above sea level. This plant is easy to grow and prefers loamy soil, which is a soil with a relatively balanced composition of sand, silt and clay. Further likes full sun (Anonymous, 2021a).

With advantages such as good flower shape, upright plant posture, and being able to grow throughout the year, paper flowers are widely developed in various places. The habitus of this plant is stems that stand upright with a height of 10 to 100 cm with greenish leaves, and can become yellowish. The leaves of this plant are lanceolate, oblong and elongated with leaf bases in the shape of a romping or flat and blunt and have a pointed leaf tip. The results of the Pongoh study (2020)

obtained an average of 63.5 cm of zinnia plants. The number of flowers ranged from one to 22 flowers per plant, with an average flower diameter of 6.4 cm with a range of 4.0 to 8.1 cm. Plants that grow in nature can reach a height of 30 inches or 76 cm with a flower head measuring about 2 inches or 5 cm (Anonymous, 2021a).

Paper flowers are florets in shape with flower diameters up to 10 cm. The shape of the flower consists of a disk and petals where the disk is located in the middle with a yellow-orange or brownish purple color. Meanwhile, the petals are located on the disc, which is arranged in a spread out with the number ranging from 8 to 20 and the number can be doubled to tripled in cultivar plants. The color of the petals varies from white, yellow, red, orange, pink, purple, and reddish-purple, but in nature, it is often found in red. The shape of the paper flower itself consists of single, stacked, and pompom shapes which are based on a layer of petals on the flower disk.

Of all the Zinnia genera, it turns out that the paper flower is an ornamental plant that is often widely cultivated so that economically this plant becomes a cut flower commodity in certain countries. This is because paper flowers have a very wide variety of shapes and colors and have a sufficient flowering period. Fajar., Purwantoro and Supriyanta (2016) report that people's preferences for paper flowers show that people prefer pompom-shaped flowers, white flower colors, medium flower diameters (4.1 to 6 cm) with a small number of flowers (1 to 13 buds). and short-habitual (15 to 50 cm) plants for both cut flowers and potted plants.

METHOD

The research was carried out in Pineleng Satu Village, Pineleng District, Minahasa Regency from October 2020 to January 2021. The plant is the second generation and comes from the results of

the Pongoh research (2020). Observations were made on four flower colors, namely red, white, yellow and purple as treatment subjects. The things that were observed and measured were plant height (cm), number of branches, number of flower plants, flower diameter of five plant samples at random. The collected data were analyzed by means and analysis of variance (Pongoh, et al. 2021).

RESULTS AND DISCUSSION

Types and Benefits of Zinnia Plants

Zinnia is a very tenacious plant, has a beautiful color and shape and is easy to grow and is able to adapt to various environmental conditions. Thus, Zinnia is one of the easiest plants to add color to the available land or garden. Zinnia flowers can be found in various types and cultivars. Grows best in moist, fertile, well-drained soil in full sun. In general, zinnia plants prefer temperatures from 23°C to 29°C (74 to 84 degrees °F) and the soil pH should be between 5.5 and 7.5. If you add compost to the soil, the flowers will grow faster. This plant has a very thin and stiff flower crown similar to a sheet of paper. There are several types of zinnia found in Indonesia, namely:

1) Curved zinnia (*Zinnia angustifolia*). The word *angustifolia* comes from Latin which means grooved or curved, according to the shape of the curved leaves. The morphology of the curved zinnia is a bush, the stem is green, the top is hairy, has many branches and can reach 0.2 to 0.7 m in height. The leaves sit on the stem, are oval in shape, slightly lanceolate and green in color, the leaves are slightly curved, the tip is slightly stiff and thin, measuring 8x3 cm and the small one 2x0.5 cm. Flowers come out of the ends of the stem branches. Compound flowers are round, 3 to 5 cm in diameter composed of several leaves of the crown which are yellowish white, yellow or orange. Self pollination or assisted by wind and insects. Dried flower cobs

contain many seeds. *Zinnia* curvature is propagated by seed sowing. Benefits of this type of flower is as an ornamental plant, cut flowers.

2) *Zinia* grace (*Zinnia elegans*). The word *elegans* comes from Latin which means graceful because the flowers of this Mexican plant are the most graceful compared to other *zinias*. The stem morphology of this flower grows upright, has many branches, is green and has a brown line at the base, covered with fine white hairs, and is 0.3 to 1 meter high, and the diameter is the size of a pencil. The leaves are green, oval in shape with a pointed tip, the leaves are not stemmed so that the base of the leaf is attached directly to the stem, the leaves are rough, the leaves are 7.5 x 3 cm and the small ones are 4.5 x 2 cm. Flowers from *Zinnia* gracefully come out at the end of the stem, in the form of compound flowers, round in shape, with the arrangement of the crown leaves stacked in a circle. The flower crown is pink, reddish-purple orange, yellow, red, and white. Compound flowers can measure 4 to 6 cm, located in the flower cob. Each base of the corolla has an ovary, the corolla is thin, oblong and stiff like paper. Stamens are yellow, in the form of two blades or in the form of an open quadrangle blade, Pollen is yellow. The pistil is located under the anther. Pollination of plants can be assisted by wind and or insects. Dried fruit is also known as longkah fruit. Plant propagation is done by seed sowing. This graceful *zinia* is used as an ornamental plant or cut flower.

3) *Zinnia* line (*Zinnia linearis*). The word *linearis* comes from Latin which means line, according to the leaves that are in the form of a line. The morphology of the line *zinia* is a shrub, the stem is erect and thin, widely branched, and the height is 0.2 to 0.6 meters. The leaves are line-shaped, with a pointed tip measuring 6 x 0.5 cm and a small one 1 x 0.1 cm. Flowers come

out from the end of the stem or the end of the branch. Compound flowers are in the cob, androgynous. The flowers are round with an orange crown and the tips of the petals are notched. Plant propagation is done by seed sowing.

Zinnia plants are useful in addition to seeing the colorful flowers and as cut flowers. It is also useful to help with problems in the human body because it can be used as herbal ingredients (Monel, 2021). The benefits of *zinnia* flowers are: 1) overcoming menstruation, 2) overcoming vaginal discharge in women, 3) treating hepatitis. Furthermore, according to Anonymous (2021a) other benefits are: 1) treating swollen breasts, 2) ulcers (*furunculus*). 3) sore nipples, 4) whooping cough (*pertussis*), 5) dysentery due to internal heat and 6) urinary disturbances.

Zinnia Plants Diversity

Diversity or other terms are appearance or outward appearance which is an interaction between genotype and environment. In this report, a number of genotypes of *zinnia* plants were subjected to treatment on the basis of flower colors, namely red, white, yellow and purple (*Figure 1*).

Furthermore, the appearance is observed and measured as an external form such as plant height, number of branches, number of flowers and the number of flowers in each color of the plant. Quantitative properties that can be measured in cm or grams which differ gradually, are continuous and can be approached by statistical analysis and are influenced by the environment because they are controlled by a number of genes (Makmur, 1988). Climatic elements (temperature, humidity, duration of irradiation, rainfall) are strongly correlated with plant vegetative and generative growth (Rogi, et al. 2021).



Figure 1. The Four Colors of Zinnia Flowers (personal documentation)

The results of research conducted by Paat, et al (2021) through secondary data from BMKG Mapanget obtained were analyzed by analysis of variance matrix unbalanced to determine the effect of environmental factors on the number of flower pods. The climatic factors that were evaluated were rainfall, duration of irradiation, and average wind speed, temperature, humidity. The results of the study concluded that environmental factors influenced the formation of the number of pods and the number of flowers. The rate of change in the length of day and night is different throughout the year will affect the reproductive system of plants. This affects

the processes of anabolism and catabolism in the series of photosynthesis and respiration. The difference between the reaction curve and the overhaul curve produces an asymmetrical curve that has a minimum, optimum and maximum temperature. Sunlight is correlated with photoperiodism. This curve applies to the processes of photosynthesis and respiration as a form of plant growth response (Paat, et al. 2021). Research conducted by Atrakchii, et al. (2010) on the inflorescence of Zinnia through a factorial experiment carried out with a Completely Randomized Block Design with three blocks and eight plants for blocks. The results of pinching

caused a significant increase in the number of shoots, the number of flowers/total plants, flower diameter and flower dry weight, in addition, flower stalk diameter, length and dry weight, on the other hand, flower longevity increased. of 48.85 days when compared to 37.17 days for the control. Nitrogen fertilization at 150 kg/ha caused a significant increase in all vegetative growth, inflorescence character and chemical content when compared to control. In general, double pinch interactions with fertilization of 75 and 150 kg/ha gave the best results for most of the inflorescence characters.

Niu, et al. (2021) recommend that zinnia cultivars should not be planted in areas with high soil salinity or where alternative high salinity water can be used for irrigation. The results of observations in the form of quantitative properties are in fact strongly influenced by environmental factors such as soil, water, air factors that are around where plants grow and will ultimately affect the growth of these plants. According to Sitompul and Guritno (1995) the growing environment is a combination of various factors that can be grouped into two parts, namely the factors that make up the environment above the soil and the environment in the soil. The factors that make up the environment often vary from place to place and also from time to time so that the environment is one of the causes of plant diversity and performance in the field.

Danish, et al. (2021) have conducted an experiment through the evaluation of hormones to increase the quality and shelf life of zinnia cut flowers. Maximum water absorption of 150.7 ml was observed at IAA @ 150 mg L⁻¹ and maximum vase life of 11.33 days at SA @ 50 mg L⁻¹. The maximum percentage of flower color and

physical appearance (67% very good) was recorded at NAA@100 mg L⁻¹, however, maximum structural integrity (67% very good) was recorded at SA@150 mg L⁻¹. This finding is a recommended result in line with other studies that will be more helpful for commercial recommendations to get zinnia cultivation with good quality and better shelf life. There are many types and varieties of zinnia plants, both in terms of plant size and flower shape and type. There are plants that grow short as high as 30 to 40 cm, but there are also plants that grow as high as 80 to 100 cm. This plant grows in nature can reach a height of 30 inches or 76 cm with a flower head size of about 2 inches or 5 cm (Anonymous, 2021a). The description of plant height, number of branches, number of flowers planted and number of flowers in four types of flower colors are presented in Table 1.

The description of the smallest and largest observed values and the average of the four types of flower colors observed can be followed in Table 2.

Visualization of plant height, number of branches, number of flowers and flower diameter can be seen in Figure 2.

If you pay attention to the average value of observations on plant height, number of branches, number of flowers and flower diameter, it turns out that the flower color varies from one flower color to another and the results of the analysis of variance are presented in Table 3.

From Table 3 above, statistically the four flower colors as treatment objects were not significantly different even though the yellow flower color had the largest plant height, the largest number of flowers and the widest flower diameter.

Table 1. Diversity of Plant Height, Number of Branches, Number of Flowers and Flower Diameter

Color flower	Plants	Plant Height (cm)	Number of branches	Amount of flower	Flower Diameter (cm)
1 (red)	1	84,1	5	3	7,1
1 (red)	2	93,0	4	4	6,9
1 (red)	3	95,0	5	14	7,2
1 (red)	4	78,0	3	9	6,5
1 (red)	5	69,2	3	2	6,5
2 (white)	1	74,3	5	8	7,0
2 (white)	2	100,2	4	7	7,2
2 (white)	3	118,0	6	13	8,0
2 (white)	4	86,0	5	9	7,0
2 (white)	5	90,0	5	17	6,8
3 (yellow)	1	96,9	4	5	7,1
3 (yellow)	2	91,2	4	7	7,0
3 (yellow)	3	108,0	6	15	8,0
3 (yellow)	4	110,2	9	20	7,0
3 (yellow)	5	95,2	3	5	7,2
4 (purple)	1	76,3	2	7	6,7
4 (purple)	2	78,4	6	8	6,3
4 (purple)	3	94,0	3	7	5,5
4 (purple)	4	100,0	5	5	7,0
4 (purple)	5	107,0	5	8	7,3

Figure 1. The Four Colors of Zinnia Flowers (personal documentation)

Table 2. The Smallest and Largest Observation Values and the Average of Four Types of Flower Colors

Color flower	Score	Plant Height (cm)	Number of branches	Amount of flower	Flower Diameter (cm)
Red	Smallest	69,2	3,0	2,0	6,5
	Biggest	95,0	5,0	14,0	7,1
	Average	83,7	4,0	6,4	6,8
White	Smallest	74,3	4,0	7,0	6,8
	Biggest	118,0	6,0	17,0	8,0
	Average	93,7	5,0	10,8	7,2
Yellow	Terkecil	91,2	3,0	5,0	7,0
	Terbesar	110,2	9,0	20,0	8,0
	Rata-rata	100,3	5,2	10,4	7,3
Purple	Smallest	76,3	2,0	5,0	5,5
	Biggest	107,0	6,0	8,0	7,3
	Average	91,1	4,2	7,0	6,6

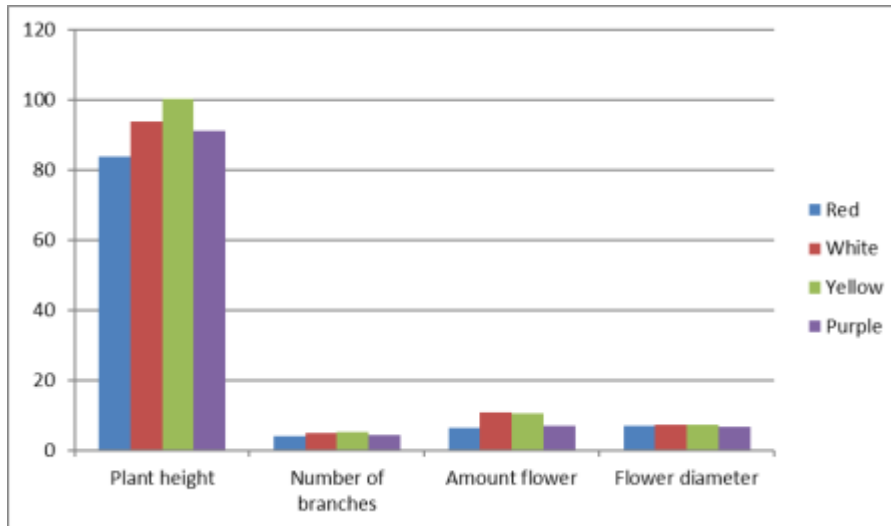


Figure 2. Diversity of plant height, number of branches, number of flowers and flower diameter of four kinds of flower color.

Table 3. Average Plant Height, Number of Branches, Number of Flowers and Flower Diameter and Analysis of Variance Results of Four kinds of flower colors

Observations	Zinnia plant flower color				Result of analysis of variance
	Red	White	Yellow	Purple	
Plant Height (cm)	83,9	93,7	100,3	91,1	1,46 (not significant)
Number of branches	4,0	5,0	5,2	4,2	0,70 (not significant)
Amount of flower	6,4	10,8	10,4	7,0	1,15 (not significant)
Flower Diameter (cm)	6,8	7,2	7,3	6,6	2,16 (not significant)

CONCLUSIONS

The four types of zinnia flower colors, namely red, white, yellow and purple, did not show any differences in the nature of plant height, number of branches and flower diameters measured.

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